Highland Renewable Energy Strategy and Planning Guidelines

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Planning & Development Service

The Highland Council
Comhairle na Gaidhealtachd
SERVING The Highland Community

Contents

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Acronyms and Abbreviations

Units of measurements	
t	tonne *(metric)*
yr	year
km	kilometre
m/s	metres per second
kW / kWh	kilowatt / kilowatt-hours*
MW / MWh	megawatt / megawatt-hours*
GWh	gigawatt-hours*
TWh	terawatt-hours*
* *NB: Quoted Power output figures (TWh, GWh etc) represent **annual** power output*	
Heritage designations	
SAC / cSAC / mSAC	Special Area of Conservation / candidate / marine
SPA	Special Protection Area
RAMSAR	(International site designated under the Ramsar Convention)
SSSI	Site of Special Scientific Interest
NNR	National Nature Reserve
LNR	Local Nature Reserve
LCA	Local Conservation Area
MCA	Marine Conservation Area
WHS	World Heritage Site
General	
CHP	Combined heat and power
CO_2	Carbon dioxide
DC	Direct current
DTI	Department of Trade and Industry
EIA	Environmental Impact Assessment
ES	Environmental Statement
FC	Forestry Commission
FREDS	Forum for Renewable Energy Development (Sco)
GDP	Gross Domestic Product
GIS	Geographic Information System
HIE	Highlands and Islands Enterprise
HiREG	Highland Renewable Energy Group
HVAC	High volume air conditioning *(ventilation systems)*
LEC	Local Enterprise Company
MCGA	Maritime and Coastguard Agency
MOD	Ministry of Defence
N/A	Not applicable
NGC	National Grid Company
NPPG	National Planning Policy Guideline
NTS	National Trust for Scotland
PAN	Planning Advice Note
PDET	Planning Development Europe and Tourism Cmtte
R&D	Research and Development
RERA	Renewable Energy Resource Assessment
ROC	Renewables Obligation Certificate
RSPB	The Royal Society for the Protection of Birds
S&SE	Scottish & Southern Energy
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SHETL	Scottish Hydro Electric Transmission Ltd
SNH	Scottish Natural Heritage
SPP	Scottish Planning Policy
SWT	Scottish Wildlife Trust
THC	The Highland Council
UHI	University of the Highlands and Islands
ZVI	Zone of Visual Influence

Summary

The Highlands have extensive renewables resources through hydro, wind, wave, tide and bio-fuel/energy. Developing ways to harness these are now being explored. This is particularly important at a time when electricity generation from traditional sources is increasingly dependent upon imported materials and the UK Government remains undecided on the future of nuclear generation.

The drive for using energy from renewable sources comes from the recognition that global warming is related to greenhouse gas emissions such as carbon dioxide (CO_2), which arise largely from energy production. The growing awareness of the finite nature of oil and gas reserves is also significant, prompting the exploration of alternative energy sources. In Scotland and the UK, targets have already been set for increasing the contribution that renewable energy makes to energy supplies. Within The Highland Council Structure Plan, there is a clear commitment to support renewable energy developments where they are shown to be appropriate.

Renewable energy developments can provide significant local benefits through investment returns, contracting opportunities, infrastructure improvements and gifted monetary support. Although there is a number of ways in which renewable energy schemes may disturb communities, habitats and species, there are significant reductions in impacts and risks compared with alternative means of generating energy. One of the key aims of this renewable energy strategy is to ensure that its advantages are realised with minimal effects.

This strategy supplements the existing policies of The Highland Council. It aims to provide guidance and direction for Council decisions and developers' plans. The strategy is underpinned by a strategic environmental assessment (SEA) which has considered the implications of alternative options and indicated those that are best aligned with the Council's policy. The strategy has also been informed by the results of a Renewable Energy Resource Assessment (RERA), completed recently for the Highland area. Guidance notes have been written to provide further information in support of the strategy.

Many of the actions arising from the strategy will be carried out through the planning and associated Environmental Impact Assessment (EIA) processes. The provisions outlined are aligned with the requirements of existing planning regulations and national guidance provided through National Planning Policy Guideline (NPPG) 6, and Planning Advice Note (PAN) 45.

Key Background Facts

There is a range of opinion about the value and acceptability of renewable energy, and during the formulation of this strategy strongly held views were expressed. Any discussion of these issues must begin from a factual base.

Although Scotland is currently self-sufficient in energy production and a net exporter of its surplus, this situation is unlikely to be maintained. It is vital that energy savings are taken wherever possible. Nevertheless, despite recent consideration of some stop-gap extensions of life for several power stations, the inevitable decommissioning of existing generating stations is likely to lead to a significant energy gap and cessation of power exports over the next 5-10 years. Renewable energy can help to fill this gap, not only by providing the needed energy, but by providing it with minimal CO_2 output, taking into account the whole lifecycle of the technology (the total costs and environmental effects of producing the cleaner energy, from manufacture to decommissioning). Although sometimes misquoted it is a fact that renewable energy systems have a greater energy payback and less associated CO_2 emissions than other conventional forms of energy production from gas, coal and oil. Renewables, such as wind, are also equal to, or better than, nuclear power production in terms of emissions and efficiency.

As experience increases in the use of renewable energy as an important part of a balanced overall energy provision, issues such as intermittency in supply and other possible practical difficulties have been shown to be less significant than envisaged. A similar pattern has been seen in public opinion, where people with direct experience of renewable energy developments tend to be more supportive than those who have no experience, or live near to proposed, but undeveloped, sites.

There are, nevertheless, important impacts and issues that can arise from renewables developments. Some of these poorly understood at present, but they are of key concern to sections of the community. A precautionary approach can provide some assurance to those concerned about such impacts, but there is an important balance to be struck between suitable precaution and the pressing need to deliver the clean energy that is required to support our way of life.

A Vision for Renewable Developments in the Highlands

The Highland area already has significant energy related activity. This will evolve over the coming years as existing oil and gas reserves become depleted and pressures to move to a low carbon economy increase. It is clear from the Highland Structure Plan[1] that the region aspires to remain a key player in the energy sector, and, in particular, that it hopes to be a centre for renewable energy production and to share in the benefits that could arise. It is also recognised, however, that there are differing views about the suitability of renewables, particularly onshore wind developments, in the Highland landscape.

Within this balanced context, there is a clear desire for the Highland area to be part of a wider regional sustainable development strategy. The following key aspects underpin the vision for renewable energy in the Highland area:

- Recognition of the need for cleaner forms of energy with minimal CO_2 emissions;
- The need for energy savings and efficiency, based on cleaner energy;
- Balance between social, economic and environmental interests;
- The importance of local involvement in any renewables industry and the retention of associated wealth;
- Retention of the regional diversity, scenic qualities and local distinctiveness of landscapes;
- The importance of protecting biodiversity, including rare and endangered habitats and species;
- The aim of maximising employment and income;
- The aspiration for viable energy self sufficiency, with a reliable supply;
- The need to integrate renewables within the existing energy framework;
- Recognition of energy poverty and the aim of eradicating it;
- Utilisation of the valuable, high calibre energy resources available in Highland.

The following statement arising from the Council's Renewable Energy Working Group (2005) captures the essence of the key points described above:

The aim is to harness both the energy and economic potential presented by renewable technologies in the Highland area to provide benefit for both the global environment and local communities. In doing so, the elements of the natural and landscape heritage that define the Highland area for locals and visitors will be protected. However, it is recognised that change is an integral part of cultural heritage and that the Highland area needs new developments in order for communities and businesses to flourish. Renewable energy projects will, therefore, be developed in ways that protect the integrity of particularly valued sites, maximise local and regional benefits and minimise or avoid negative consequences.

The Renewable Energy Resource Assessment

This (RERA) study was undertaken during 2004 to provide an objective estimate of the renewable energy potential available in the Highland area. Details of energy resources were collated, along with technical and planning constraints, and cost factors for each renewable technology for 40,000 grid squares covering the Highlands and adjacent coastal waters. The results provide estimates of the installed capacity and power output envisaged under a number of possible development scenarios. These are defined in terms of the degree of planning constraint applied. The summary results are presented below:

Levels of energy production (GWh) and installed capacity under different nominal levels of planning constraint based upon the results of the Renewable Energy Resource Assessment for Highland

Resource type	*Type of planning regime*								
	Highly constraining			Moderately constraining			Lightly constraining		
	Power (GWh)	Capacity (MW)	No. of units	Power (GWh)	Capacity (MW)	No. of units	Power (GWh)	Capacity (MW)	No. of units
New onshore wind (@2MW)	170	68	34	1,280	518	259	26,310	9772	4886
Offshore wind	80	12	3	6,020	1,064	266	31,690	5,680	*1,420*
Tidal stream	0	0	0	190	*N/A*	36	8,580	*N/A*	*3,230*
Biomass (wood fuel)	1027	140	*N/A*	2054	280	*N/A*	3081	420	*N/A*
Biomass (crops)	50	11	*N/A*	879	*N/A*	*N/A*	1746	*N/A*	*N/A*
New hydro	37	*N/A*	*N/A*	64	*N/A*	*N/A*	224	*N/A*	*N/A*
Other technologies	550	*N/A*	*N/A*	1087	*N/A*	*N/A*	2162	*N/A*	*N/A*
Overall total	**1914**	**>250**	**>40**	**11,574**	**>1,800**	**>600**	**73,793**	**>20,000**	**>8,000**

Resource type	Power (GWh)	Capacity (MW)	Number of units
Existing wind (incl. approved)	713	200	150
Existing hydro (incl. approved)*	1800	600	50
Existing total	**2513**	**800**	**200**

* Not all hydro schemes are classified as renewable energy sources

Strategic Policy Areas

Within the strategic framework for renewable energy, it is recognised that specific policies are required for different phases of the the development. It is also acknowledged that although The Highland Council has overall authority in certain areas, there were others where responsibility was shared, or where the Council could only influence other parties. The principal policy areas covered within the Strategy are listed below:

[1] Highland Structure Plan, Highland Council, March 2001

Targets for development • Installed capacity targets • CO_2 emissions reduction • Project efficiency and productivity **Areas and types of development** • Technology types and mix • Development zoning **Capacity building** • Skills and competence • Development of R&D capabilities • Education and training • Public engagement **Planning Process** • Improved EIA process	**Possible positive aspects** • Local benefit • Community and local ownership/involvement • Combating fuel poverty • Local content of works • Pace and phasing of investment; • Interface with neighbouring regions. **Possible negative aspects** • Natural energy flows • Conservation of natural heritage • Neighbour interactions • Landscape • Visibility • Wild land • Amenity interests • Other commercial users • Public attitudes to renewables	**Infrastructure & other issues** • Grid maintenance and expansion • Infrastructure requirements • Diversifying energy markets • Energy systems • Use of energy & energy efficiency

The key points emerging from these policy areas are as follows:

- Projects can be classified into four categories related to the size and power capacity of the technology. The thresholds defined are: minor (<10 kW), local (10 kW-5 MW), major (5-100 MW), national (>100 MW);

- Targets have been set for the developed capacity in each renewable technology area. The cumulative capacity and power outputs anticipated at various future dates are as follows:
    - 2005: 506 MW installed capacity, 1.3 TWh power output (existing installed base);
    - 2010: 1280 MW installed capacity, 3.5 TWh power output;
    - 2020: 4000 MW installed capacity, 12.8 TWh power output.

  An indication of longer term development potential suggests that more than 13,000 MW of installed capacity could be feasible by 2050, based upon a wide range of onshore and marine technologies. This would create significant reductions in CO_2 emissions, and opportunities for local economic benefit;

- Where renewable energy projects are permitted it makes sense to ensure that optimum energy production is achieved. This will, to some extent, prioritise the siting of developments in high energy yield areas, and determine the scaling of technologies to ensure optimum productivity, although the need to safeguard key community and environmental interests will be an essential part of the decision-making process;

- Across the Highland area, a variety of renewable technologies can be applied, but each technology will be suited to particular locations and areas. Only micro-scale developments will be applicable to all areas in Highland. This selective approach will help to ensure that the more sensitive areas of Highland are protected from development.
    - Specific development zones for hydro schemes are not established. Future developments are unlikely to reach the scale of existing schemes except in a few circumstances.
    - Bio-energy resources will arise primarily from diversification of existing cultivated land and forested areas. These are well established and significant expansion beyond the current areas is not envisaged.
    - Onshore wind projects have been broken down into three categories. For national and major schemes a zoning system has been established. Three preferred development areas have been identified where it is anticipated that clusters of larger projects will be located. These 'preferred areas' have an optimum balance between planning constraints and energy productivity. Smaller 'possible' export sites are also identified, but much the greater part of Highland carries a presumption against such development. Intermediate, local scale projects are expected to be located close to existing settlements and infrastructure (i.e. within 2 km). These schemes, limited to 5 MW in size, would comprise individual turbines or small clusters. Minor scale projects based upon micro wind technology are anticipated to be closely associated with existing dwellings and commercial properties. These projects will be encouraged, as long as they comply with certain basic siting requirements.
    - The prospects for offshore wind appear to be more limited geographically than onshore wind, but significant power outputs could still be achieved. The preferred development area for offshore wind projects is considered to be the outer Moray Firth. Possible additional development areas include sites closer to the Sutherland coast within the Moray Firth, and along the north Caithness shoreline off Dounreay.
    - Site options for offshore wave technologies are somewhat limited and initial indications suggest that there may not be sufficient resources for major development within Highland compared with adjoining Island Authority areas.
    - Technically possible sites for deploying tidal energy technologies are thought to be limited to around 10 marine channels, although the more energy rich locations are likely to be those most constrained by other interests. Prime development areas are North Stroma, North Skye, Duncansby Head and Kyle Rhea.

- One of the keys to maximising the benefits of renewable energy developments, is to ensure that there is sufficient capacity within the Highland area to exploit the opportunities. Areas of future development will include skills and competence, research and development (R&D), education and training along with maintaining public engagement and support;

- The environmental impact assessment (EIA) process lies at the heart of successful planning. It is proposed that the EIA requirements be expanded during the early stages of project definition, to include a 'pre-scoping' phase that will give an timely indication of a project's potential. Other requirements arise after planning approval has been granted, to ensure that the project proceeds as proposed (compliance), that any changes are appropriately notified and assessed, and that all stakeholders are kept informed of the project's performance during its lifetime;

- There is a wide range of possible impacts from renewable energy developments. Some of these will be positive, often related to economic benefits. Others may be negative, for example possible landscape changes and wildlife interactions. Many positive impacts can be enhanced through good management practices. Likewise, some negative impacts may be avoidable through appropriate mitigation. The strategy details some of the measures and principles that will achieve these objectives. They are considered in more detail within the planning guidance which is set out at the back of the Strategy;

- Adoption of this renewable energy strategy will have secondary implications. These may be associated with grid upgrades and expansion, new infrastructure needs, development of the energy market or changes in the way that energy is delivered and used. Although some of these areas are not the direct responsibility of The Highland Council, the influence that this strategy could be profound and needs to be carefully considered. The particular impacts arising from the presence, maintenance and upgrade of overland grid links can be considerable and are a cause for concern in a number of communities.

Implementation and Evaluation

The main responsibility for implementing the policy areas within this Strategy rests with The Highland Council, but where joint actions or recommendations have been identified, responsibility will be shared with specific partners or is held by other organisations. It is important, however, that progress in all areas, whether or not they are the direct responsibility of the Council, is understood and reported. Milestones and targets have been established for each policy area to facilitate monitoring.

Overall Development Scenario

The successful implementation of this Strategy will have other implications for the Highland area. It contains snapshot visions of the future at 2010, 2020 and 2050 timescales. These illustrate anticipated developments in each part of Highland, how the various technologies are likely to be deployed and the consequences, in terms of benefits and impacts, which may arise.

1. Introduction

1.1 Energy and the Highland area

Energy lies at the heart of our society. It affects every aspect of our lives: our survival, our comfort, our sustenance, our work and surroundings. Highland is more dependent on energy than most due to the large geographical area, the harsh weather conditions and the importance of energy-related activities to the local economy.

The Highland area has been associated with energy production for many years. Historically, peat and timber have been major energy sources, and, throughout the last century, Highland's hydro power has been harnessed via a series of schemes. Nuclear power generation was explored through the Dounreay facility during the latter half of the 20th century and, since the 1970s, oil reserves lying under the Moray Firth at the Beatrice oil field have been exploited. More recently, the oil handling facilities at Nigg have been used for the transfer of oil from shuttle tankers. Wind power has also been harnessed in Highland for the last 8 years, since the establishment of the Novar wind farm above Alness overlooking the Cromarty Firth. Energy therefore lies at the centre of Highland life and its economy.

Looking to the future the energy scene seems set to change. The increasingly clear coupling of global warming to carbon dioxide emissions is forcing both global and local communities to re-examine their sources and use of energy. Highland has particularly abundant renewable resources and a large geographical area over which they could be exploited. This potential is well recognised and the area is now attracting considerable development interest. There is currently around 200 MW of wind and 300 MW of hydro-electric generation capacity already installed or approved (*total hydro is nearer 600 MW, but some is not currently classified as renewable energy*), and further project proposals totalling up to 2,500 MW capacity are actively being considered.

1.2 Local Pros and Cons

As with all development pressures, whether they are from industry, housing, tourism or infrastructure, renewable energy schemes will impact upon many different aspects of local communities and the environment. While some of these effects may be negative, others may be positive. This balancing is represented below

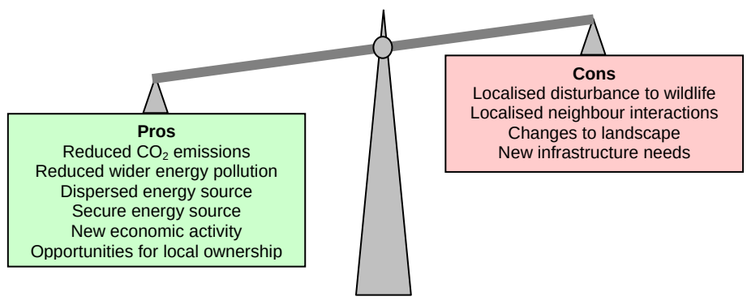

Figure 1.2.1 : Typical pros and cons associated with renewable energy

Given the large area and diverse character of Highland, a key aspect of this strategy is to recognise that different areas within the region will require quite different strategic approaches. The renewable energy resource assessment (RERA) study for Highland is particularly helpful in understanding the geographical distribution of development potential, constraints and synergies (see Section 11 for sub-regional strategy assessments).

1.3 Existing Policy Commitments

The Highland Council supports the principles of sustainability under Local Agenda 21[2] and is presently involved in a range of actions to reduce carbon emissions. These include encouraging a reduction in energy demand[3], and more efficient energy use[4]. It has an agreed policy of supporting renewable energy developments in principle. The Structure Plan as approved by Scottish Ministers in 2001 states:

> *"**Policy E1 - Distributed renewable energy developments.** The Council supports the utilisation of the region's distributed renewable energy resource, including hydro, wind, wave and tidal stream power. Proposals will be assessed against the provisions of the General Strategic Policies. Approvals for renewable energy developments will normally be for a temporary period only (tied to the lifetime of a project), with provision where appropriate for the removal and reinstatement of affected areas. Earlier action for removal and reinstatement will be required in the event of premature permanent cessation of energy production.*
>
> ***Policy E2 - Wind energy developments.** Wind energy proposals will be supported provided that impacts are not shown to be significantly detrimental. In addition to the General Strategic Policies, wind energy proposals will be assessed in respect of the following:*

• *Visual impact;* • *Noise;* • *Electro-magnetic interference;*	• *Roads, bridges and traffic;* • *Aircraft flight paths/MOD operations;* • *Cumulative effects.*

> ***Policy E3 - Wind farm safeguarding**. The Council will seek to safeguard the operational efficiency of approved and constructed wind farms in the consideration of adjacent proposed developments or other land use changes.*
>
> ***Policy E4 Hydro energy developments**. The Council will support hydro energy developments which accord with Strategic Policies G2 and G4, provided also that there is satisfactory provision for the discharge and monitoring of a compensation flow.*
>
> ***Recommendation E5 Abstraction controls**. The Council recommends to the Government that water abstraction controls through the Scottish Environment Protection Agency should be improved.*
>
> ***Recommendation E6 Offshore energy developments**. The Council recommends to the Government the extension of planning controls to incorporate offshore wind, wave and tidal stream devices, in view of the potential impacts on navigation, fishing and the natural marine heritage.*
>
> ***Policy E7 Centralised renewable energy developments**. The Council will support the development of centralised renewable energy facilities, including energy-from-waste, landfill gas, anaerobic digestion, biomass and agricultural and forestry wastes combustion provided that proposals conform with Strategic Policy G2 and that:*
> • *Schemes are compatible with existing land uses;*
> • *Traffic movements can be satisfactorily accommodated;*
> • *Methods of disposal of any by-products are acceptable;*
> • *Satisfactory connections to the grid or other utilities are provided.*
>
> ***Policy E8 Small community renewable energy projects**. The Council will support efforts to make more provision for small community renewable energy projects."*

The aim of the present strategy is to underpin this policy and to ensure that as far as possible the advantages of renewables development are maximised without undue detrimental effects.

1.4 Status of the Strategy documentation

This strategy is a non-statutory document that provides supplementary spatial and other guidance to the Structure Plan policy. It clarifies the approach that The Highland Council takes to renewable energy, and should help to give direction and reduce uncertainty regarding issues associated with renewable energy developments in Highland. The strategy is underpinned by a regional renewable energy resource assessment (RERA)[5] and a strategic environmental assessment (SEA)[6] that have evaluated the implications of a wide range of potential strategy options and provided the justification for selecting the strategy outlined here. It is recommended that the findings within these accompanying assessments are examined in parallel with any detailed interpretation of this document. This strategy is also supported by detailed planning guidance[7] that gives further details on the types of development that are considered acceptable, and the recommended approaches to planning, implementing and operating them.

1.5 The Planning Process

The Highland area is one of the most prolific in Europe for renewable energy and there has been considerable interest from developers in setting up renewables projects in the area. Biomass schemes, using forest products to generate heat and power, are being developed for a number of locations. Onshore wind schemes have also been a key focus for activity, with over 40 schemes currently notified to the Council[8]. There is also keen interest in the marine energy resources of the Highland area. A feasibility/research project is already underway for deep-water offshore wind technology in the Moray Firth and there is rapidly growing interest in the energy potential of tides flowing through the Pentland Firth. All these prospective schemes affect, and will be affected by, regional development plans.

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[2] Designing for Sustainability in the Highlands, Draft, Highland Council, December 2004
[3] Highland Council Energy Management Working Group, Highland Council, April 2005
[4] Highland Energy Efficiency Advice Centre, website, www.highland.gov.uk/property/energy-advice
[5] Highland Renewable Energy Resource Assessment Aquatera, September 2005
[6] Strategic Environmental Assessment of the Highland Council renewable energy strategy, Aquatera, (in press)
[7] Highland Council Renewable Energy Planning Guidelines, 2006
[8] The Highland Council website, www.highland.gov.uk

The Highland Council and other stakeholders need a 'road map' so that the possible scale, type and pace of development can be discussed and the consequences, both negative and positive, can be addressed and resolved.

The Scottish Executive's National Planning Policy Guideline *"Renewable Energy Developments"* (NPPG 6)[9], revised in 2000, asks planning authorities to provide positively for all forms of renewable energy development, but to do so in a way that is compatible with statutory obligations to protect natural and man-made heritage. This document is presently under review and will be reissued as SPP6[10]. The Executive's Planning Advice Note *"Renewable Energy Technologies"* (PAN 45)[11], revised in 2002, provides supplementary advice on issues to be taken into consideration, such as visual intrusion, noise, local ecology and traffic impacts. Both advise that specific issues are addressed on a case-by-case basis : but in all cases project developers are expected to demonstrate how they will mitigate any negative impacts.

1.6 Approach to the Strategy

In order to prepare this strategy a Working Group was created by the Highland Council. This comprised senior councillors, Council officials and representatives from SNH, VisitScotland, HiREG, Scottish Renewables Forum and Highlands and Islands Enterprise, covering a wide spectrum of professional interests and disciplines. The work programme for the group involved a structured series of meetings during which key issues were discussed for the purpose of bringing information back to the Planning, Development, Europe & Tourism (PDET) Committee. The deliberations of the Working Group were informed through a series of invited presentations covering, for example, public concerns, grid and infrastructure issues.

1.7 The Energy Market

The recent growth in renewable energy project proposals was stimulated by the establishment of a support mechanism, the Renewables Obligation[12,13], which provided a more attractive market for producing renewable electricity. The Obligation requires electricity companies to source an increasing proportion of their supply from renewable energy technologies. Renewable Obligation Certificates (ROCs) are awarded to accredited generators of eligible renewable electricity produced within the UK (e.g. solar energy, including 'photovoltaics', hydro, wave power, tidal energy, geothermal energy, bio fuels, including energy crops, and both on- and offshore wind). Since the establishment of ROCs in 2002, installed capacity and power outputs from renewables have risen significantly. The energy source with the greatest rate of growth is wind energy. The potential UK power output for wind increased from 1.93 GWh in 2004, to 2.69 GWh in 2005. With equal amounts under construction and more capacity approved, continued growth of the wind sector is assured in the short term. The medium term prospects, represented in part by projects already in the planning process, are for this trend to continue, but other technologies are expected increasingly to emerge.

1.8 Renewable Energy Targets

In parallel with the financial assistance provided by ROCs, the Scottish Executive and the UK government have set targets for the renewable energy contribution to UK's energy supply.

Table 1.8.1 : Existing Renewable Targets set by National Government

	2010	2020
UK government	10% of UK electricity production	20% of UK electricity production
Scottish Executive	18% of Scottish electricity demand	40% of Scottish electricity demand

The Highland area already contributes significantly to these targets through the hydro power schemes. A key question remains, however, over the level of new renewables capacity that it is reasonable, or even desirable, to generate in each area of the country. The DTI estimates that the overall UK target equates to a total of 39 TWh/year[14] (approximately 15GW installed capacity). A recent report by the Forum for Renewable Energy Development in Scotland (FREDS) has been approved by the Scottish Executive[15]. It provides greater clarity on the scale of energy output and installed capacity required in Scotland to meet the 2020 40% target. The findings conclude:

> **"… that Scotland is well placed to meet its renewable electricity targets, thereby contributing to tackling global warming and in so doing creating a viable new industry with particular benefits for remoter areas and communities. We suggest, however, that the Scottish Executive's targets are more helpfully expressed in terms of installed capacity, so providing greater clarity and allowing progress to be more easily monitored. The target should be based on estimated electricity demand in Scotland. On this basis, a total of around 6 GW renewable installed capacity is required. The target should not be regarded as a cap.**
>
> **It is technically feasible for the amount of renewable generation that we recommend to be contained on the electricity system without threat to security of supply.**
>
> **Onshore wind developments may provide the economic justification required to ensure that Scotland's grid infrastructure is sufficiently established such that it can also economically accommodate the emerging marine technologies. Continuing support for onshore wind is also essential if investor confidence in the renewables market generally is to be maintained. Implementation of the recommendations of the FREDS marine, biomass and hydrogen energy groups is essential if these technologies are to make a contribution and Scotland is to achieve its ambition of a mix of renewables technologies. The UK Government and the Scottish Executive should accelerate their support for marine and biomass technologies to ensure that they are capable of contributing to the target as soon as possible.**
>
> **Rationing infrastructure for use by individual technologies, or the setting of specific targets for these, is unnecessary and would be detrimental to the overall growth of the renewables industry in Scotland."[16]**

Taking into account existing installed capacity, this would mean that a minimum of 3.4 GW of additional installed capacity is required to meet the 6 GW total for Scotland by 2020.

[9] National Planning Policy Guideline, NPPG6, Revised 2000, Renewable Energy Developments, Scottish Executive, November 2000
[10] SPP6 review and consultation
[11] Planning Advice Note, PAN45, Revised 2002, Renewable Energy Technologies, Scottish Executive, January 2002
[12] Statutory Instrument 2005 No. 926, The Renewables Obligation Order 2005, April 2005
[13] Scottish Statutory Instrument 2005 No. 185, The Renewables Obligation (Scotland) Order 2005, April 2005
[14] DTI Renewables policy web page, www.dti.gov.uk/renewables/renewa_2.1.1.htm
[15] Scottish Executive web page, www.scotland.gov.uk
[16] FREDS (2005) Scotland's Renewable Energy Potential: Realising the 2020 target

2. Key Facts about Renewable Energy

There are diverse and widely-held views about renewable energy, not all of them based on a complete understanding. This section provides some key facts relating to renewable energy and the wider issue of energy sources and supply within our society.

On average an equivalent of 46 barrels of crude oil or 73,000 kWh of energy is required every year to support the activities of each member of the UK population (DTI, 2001, UK Energy Flows). A whole range of factors, such as peripherality, weather profile, dispersion and remoteness of communities and overall housing stock condition, contribute to make this figure at least a third higher in the Highland area, with energy use estimated at 60 barrels or 95,000 kWh (The Highland Council, 2005, draft renewable energy SEA).

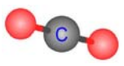
Over the last 50 years, overall energy use has shifted from burning of coal and oil to the use of gas and electricity. In parallel, fuel use for electricity generation has also largely shifted from coal powered stations to gas and nuclear generators (PIU, 2002, The energy review). However, in Scotland coal is still used to generate over a quarter of all electricity (Scottish Executive, 2005, Key Scottish Env. Statistics).

There has been a national reduction in industrial energy use in the last 25 years, but total consumption is still growing, especially in the domestic and transport sectors, with an overall annual increase of around 0.5%. Electricity use is increasing at 1-2% annually (DTI, 2005, UK energy in brief).

General energy efficiency has remained stable in the UK since 1980. This largely reflects the halving of energy use by the industrial sector due to economic decline of energy intensive industries, and has been counteracted by a 25% increase in energy consumption by road freight transport (DTI, 2005, UK energy in brief).

Nationally, energy poverty (spending more than 10% of income on fuel) has reduced from 6 million households in 1996 to less than 2 million in 2003, equivalent to 7% of households (DTI, 2005, The UK Fuel Poverty Strategy: 3rd annual progress report). However, Highland still has an estimated 21% of 'fuel poor' households (Scottish Executive, 2004, Fuel Poverty in Scotland: further analysis of the Scottish House Condition Survey).

Global atmospheric CO_2 levels have nearly doubled in the last 125 years and are predicted to double again in the next 100 years, causing a 3-6 degree rise in global temperature and a significant sea level rise caused by melting of the polar ice caps and thermal expansion (IPCC, 2002, Climate Change 2001: 3rd Assessment summary report for policymakers, Met Office, 2005, Stabilising climate to avoid dangerous climate change).



It is generally accepted that around 75% of this extra CO_2 has arisen from combustion of fossil fuels and the other 25% from human alteration to land, through changes such as deforestation (ACIA, 2005, Impacts of a warming Arctic).

Since 1751 roughly 1,065 billion tons of man-made greenhouse gases have been released globally to the atmosphere from the consumption of fossil fuels and cement production. Half of these emissions have occurred since the mid-1970s (US DOE, 2003, Database of greenhouse gas emissions).

In 2002 world fossil-fuel CO_2 emissions totalled 24.5 billion tonnes (UD DOE,2003, International Energy Annual). It is estimated that the UK produced 687 million tonnes of CO_2 equivalent greenhouse gases in 2004 (DTI, 2005, Energy trends, march 2005).

The production of electricity from renewable energy sources is growing but still only contributes 3.6% to the electricity market and 1.5 % to the overall energy market (DTI, 2005, UK energy in brief).

Renewable energy production is presently dominated by heat production from landfill gas (35%), waste (12%) and other bio-fuels (11%), and electricity generation from hydroelectric schemes (10.5%) and onshore wind turbines (4.5%) (DTI, 2005, UK energy in brief).

Large scale hydroelectric plants in Highland already play a significant role within this total, with 25% of all installed UK renewable electricity capacity being hydroelectric plant in the area. However, it is now believed that there is little potential nationally for further construction of large hydroelectric schemes (Spice briefing 03/89, Renewable energy).

One of the main drivers for increasing renewable energy production is the contribution that it can make to reducing CO_2 emissions. All renewable technologies and nuclear energy are CO_2 neutral in terms of emissions, and sustainable biomass-based energy production can actually reduce atmospheric CO_2 levels.

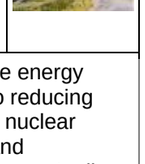
Technology	Wood	Solar	Hydro	Wind	Nuclr	Gas	Oil	Coal
Life cycle CO_2 balance (t per GWh)	-160	3-5	4-10	7	8	484	726	964

(EC, 1999, Wind energy: the facts)

For energy production to be sustainable it must produce more energy than it uses over its lifecycle (from manufacture to decommissioning). The ranges below indicate how many times more energy is typically produced, than used, throughout each technology's lifecycle.

Technology	Wood	Solar	Hydro	Wind	Nuclr	Gas	Oil	Coal
Energy payback ratio	n/a	3-12	43-205	12-80	10-60	5-6	n/a	7-34

(EC, 1999, Wind energy: the facts)

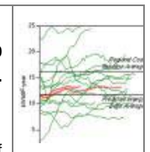


UK electricity production from wind has increased nearly 300-fold since 1990 and trebled since 2000 (DTI, 2005, Digest of UK energy statistics), with more than 25% of the 750MW of the UK's presently installed capacity constructed in Highland (Scottish Executive website).

The average UK wind farm will pay back the energy used in its manufacture within three to five months. (Millborrow, D, 1998, Dispelling the Myths of Energy Payback Time)

Renewable energy generation plants can be smaller and more dispersed than current power stations. This allows development in fragile, more remote areas and wider involvement and ownership. It may also require new infrastructure or development of 'novel' fuels (such as hydrogen) and energy storage systems such as pump storage hydro. (SSE, 2001, Impact of renewable generation on the electrical transmission network in Scotland).

Renewable energy availability tends to be variable. Although this is often viewed as a disadvantage, our energy use is also variable and is to some extent correlated with weather cycles. Our existing energy systems have incorporated extensive energy storage mechanisms; it is expected that similar provisions will be needed for renewables. (IEA, 2005, Variability of Wind Power and other Renewables: Management Options and Strategies)



The action of the world's tides provide approximately 3,000 GW of energy. It is estimated that possibly as little as 2 per cent, or 60 GW, can be recovered for electricity generation. (DTI website)

If hydro power from all the UK's rivers and streams could be tapped, it would meet just over 3% of total electricity needs (DTI website).

An average 1 MW wind turbine will produce 3.9 gigawatt-hours of energy per year in the Highlands, based upon a 40% capacity factor (i.e. actual annual output).

The level of wind resource in the Highlands is amongst the best in the world, with wind speeds averaging nearly 8.5 m/s annually for most good sites. Wind energy productivity increases as a cube of the speed increase. So, 1MW of installed capacity in Highland will produce 600% more energy than a similar machine installed in SE England (from NOABL UK wind speed database).

In the UK there are 114 wind projects approved to date, incorporating 1429 turbines, with an installed capacity of 1311 MW. This is equivalent to the electricity required for 733,000 homes and will reduce atmospheric CO_2 levels by nearly 3 million tonnes annually (BWEA website).

In Highland (as of summer 2005), there are 60 grid connected wind turbines with a combined installed capacity of 68 MW. (Highland Council website)

According to government and industry groups, the wind power industry will bring up to 8000 direct jobs to Scotland. (DTI, 2004, Renewable supply chain gap analysis)

The existing transmission grid from the north and west of Scotland places a limit on utilisation of Highland's energy resources. The current configuration can cope with 800 MW of generation capacity. Upgrades may increase this to 2600 by 2010 and 4,600 MW by 2020. (SKM, 2004, Technical evaluation of transmission network reinforcement expenditure proposals by licensees in Great Britain)

Public opinion polls have generally shown support for renewable energy and wind turbines in particular, with a large majority in favour of developments. Polls taken before and after the construction of projects in adjacent areas have indicated that most initial fears did not materialise and that there was increased support for the developments after direct experience of them. (DTI, 2003, Attitudes and Knowledge of Renewable Energy amongst the General Public, RSPB, 2001, RSPB Market Research Project 0136, Scottish Executive, 2003, Public Attitudes to Windfarms)

3. A Vision for Renewables Development in Highland

The Highland area already hosts significant energy-related activity. This sector is likely to change significantly over the coming years as existing oil and gas reserves become depleted and pressures to move to a low carbon economy increase. It is clear from the Highland Structure Plan[17] that the region aspires to remain a key player in the energy sector, in particular to be a centre for renewable energy production and to share in the benefits that could arise. It is also recognised, however, that renewables development could have significant impacts on nearby residents and the natural environment, and that there are differing views about the acceptability of renewables, particularly onshore wind developments, in the Highland landscape.

There is, nevertheless, a clear vision for the Highland area to be part of a wider regional sustainable development strategy. Based upon the factors described above, the following components of a vision for renewables are proposed in the Highland area:

The Highland area has been a key energy hub for the UK throughout the 20th Century and hydro power schemes have provided clean and flexible power over many decades. Dounreay has undertaken critical strategic research into nuclear energy and the area has benefited greatly during the North Sea oil era from oil production, platform construction and drill rig servicing, along with many other smaller scale activities. Renewable energy can help to maintain the energy focus within the Highland economy, whilst at the same time contributing positively to the reduction of greenhouse gas emissions.

Renewable energy developments are also well suited to the Highland area because of the social benefits that can arise. A key example of this is fuel poverty. People in Highland typically spend significantly more of their income on energy, yet their income levels are generally below the national average. This creates levels of fuel poverty nearly twice the Scottish, and three times the UK, average. Renewable energy technologies can help reset this imbalance by producing cheaper energy locally, creating new revenue channels and employment within local communities, which, in turn, can help to combat other social issues.

The improved awareness of energy issues should also lead to greater commitment to reducing power consumption. Underlying improvements in energy efficiency will have important economic as well as ecological effects. The clear benefits of renewable energy cannot, however, be realised at any cost and there needs to be a balance between economic, social and environmental interests or pressures. A key challenge is to manage this balance within a changing world. Other influences on technological change, economic expectations, social trends and ecosystem dynamics mean that each of these factors will change over the lifetime of a strategy. Dynamic judgements need to be made about what is appropriate and acceptable change.

This strategy recognises that change in our environment is inevitable, has helped shape it as it is today and will continue to mould it for the future. Renewable energy will add a new dimension to the landscape, the economy and the availability of energy in communities. This strategy aims to ensure that, overall, the advantages presented by renewables outweigh the disadvantages for most people and for the wider environment.

By actively engaging in the use of renewable energy technologies, the Highland area is supporting the wider aspirations of Scotland to be a world leader in the development and deployment of these technologies (and similarly wider UK and EU initiatives). Renewable energy will not solve all of our energy related problems, but it can make a significant contribution. This rationale can be summarised in the following Vision statement:

The aim is to harness both the energy and economic potential presented by renewable technologies in the Highland area to provide benefit for both the global environment and local communities. In doing so, the elements of the natural and landscape heritage that define the Highland area for locals and visitors will be protected. However, it is recognised that change is an integral part of cultural heritage and that the Highland area needs new developments in order for communities and businesses to flourish. Renewable energy projects will, therefore, be developed in ways that protect the integrity of particularly valued sites, maximise local and regional benefits and minimise or avoid negative consequences.

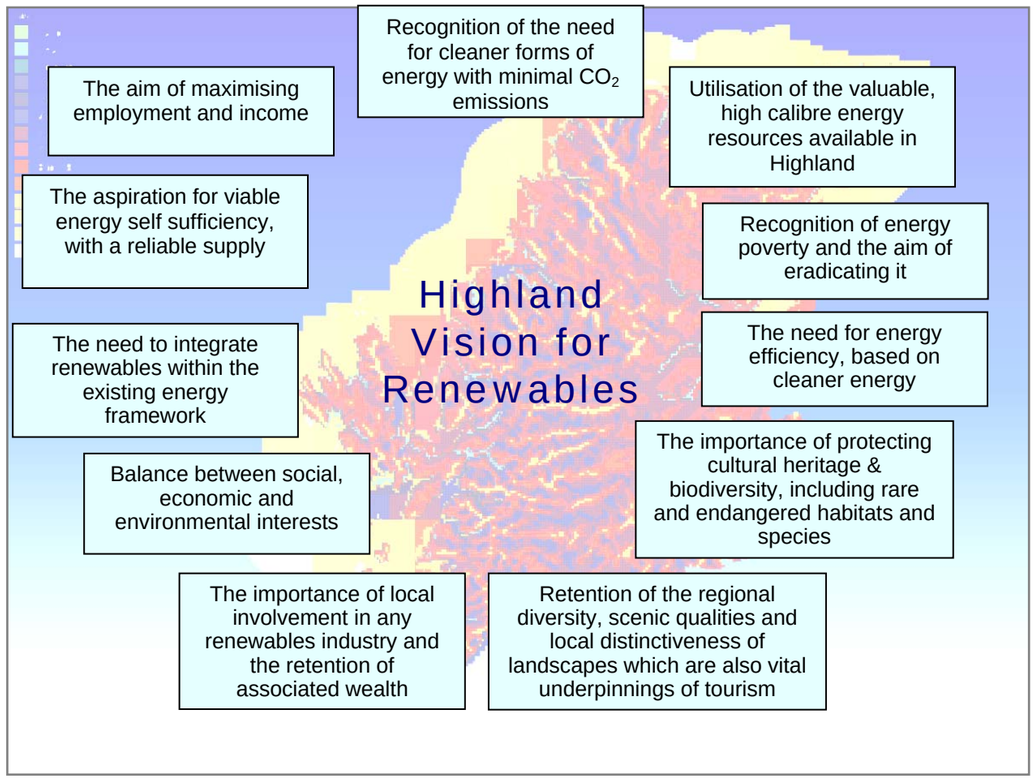


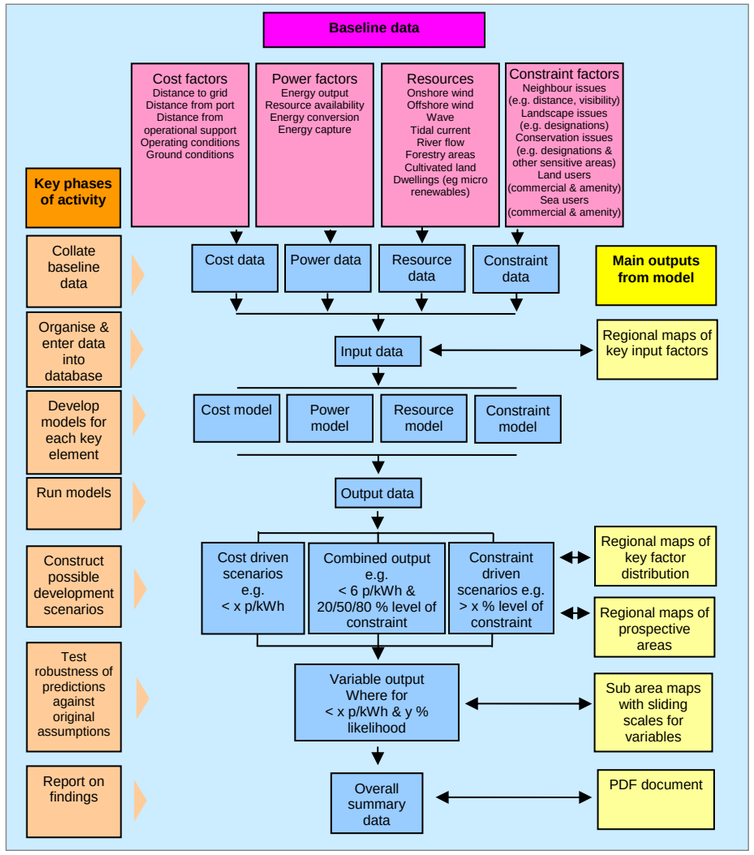
Figure 3.1.1 : Key aspects of a Renewables Vision for Highland

[17] Highland Structure Plan, Highland Council, March 2001

4. The Highland Renewable Energy Resource Database and Model

A sound strategy for renewable energy must be based on the understanding of the potential for associated developments balanced against the possible technical, cost and planning constraints. This has been achieved for Highland by undertaking a renewable energy resource assessment (RERA). Initiated in 2004, the assessment involved analysing energy potential and constraints across 40,000 1km x 1km grid squares covering the land and adjoining marine areas of Highland. The approach used within the resource assessment is illustrated below.

Figure 4.1.1 : Process followed for the assessment of renewable energy resource potential in Highland



The end result is a database containing over 4 million data records pertinent to renewable energy potential, and a predictive model that can be used to interrogate the database and produce "what if?" scenario outputs. At 1 km resolution, the information available is ideal for strategic evaluation but is not appropriate for application to site/project specific planning issues. The RERA tool provides a robust and valuable insight into the strategic development potential across Highland and into the issues that may be critical in developing renewables potential in particular areas. An outline of the factors incorporated into the resource assessment model is listed in figure 4.1.1 (above).

The outputs of the model can be crudely interpreted as the likelihood of gaining planning permission for a particular development. This creates a percentage point scale: 100% implying 'certainty' of planning approval and 0% indicating outright refusal, with a range of interim values possible. A selection of factors and typical outputs from the resource assessment model are shown in figure 4.1.2.

The resource assessment study for Highland[18] showed an overall resource potential of more than 80 TWh power output (20 GW installed capacity) across a range of technologies and under the most liberal of planning regimes. Such capacity could nevertheless be installed using less than 10% of the regional land surface and less than 15% of the adjoining sea area.

At the other end of the spectrum, under stricter planning controls, there would perhaps be capacity for perhaps 2 TWh power output (0.45 GW installed capacity) using around 2% of the region's land area and 0.1% of the adjoining sea. Further details for a range of indicative energy output scenarios are presented below.

Table 4.1.1 : Levels of energy production (GWh) and installed capacity under different nominal levels of planning constraint (from the Renewable Energy Resource Assessment)

Resource type	*Planning Regime*								
	Highly constraining			Moderately constraining			*Lightly constraining*		
	Power (GWh)	Capacity (MW)	No. of units	Power (GWh)	Capacity (MW)	No. of units	Power (GWh)	Capacity (MW)	No. of units
New onshore wind (@2MW)	170	68	34	1,280	518	259	26,310	9,772	4,886
Offshore wind (@5MW)	80	12	3	6,020	1,064	266	31,690	5,680	*1,420*
Offshore wave	0	0	0	0	0	0	0	0	*0*
Coastal wave	0	0	0	3	*N/A*	*N/A*	3	*N/A*	*N/A*
Tidal current	0	0	0	190	54	54	8,580	2,465	2,465
Tidal head	0	0	0	0	0	0	0	0	*0*
Tidal barrage	0	0	0	0	0	0	0	0	*0*
Biomass (wood fuel)	1,027	140	*N/A*	2,054	280	*N/A*	3,081	420	*N/A*
Biomass (crops)	50	11	*N/A*	879	*N/A*	*N/A*	1,746	*N/A*	*N/A*
Biomass (slurry)	8	*N/A*	*N/A*	15	*N/A*	*N/A*	38	*N/A*	*N/A*
Waste	40	*N/A*	*N/A*	60	*N/A*	*N/A*	100	*N/A*	*N/A*
New hydro	37	*N/A*	*N/A*	64	*N/A*	*N/A*	224	*N/A*	*N/A*
Civil infrastructure	3	*N/A*	*N/A*	5	*N/A*	*N/A*	13	*N/A*	*N/A*
Utility infrastructure	350	*N/A*	*N/A*	700	*N/A*	*N/A*	1,400	*N/A*	*N/A*
Micro generation	2	*N/A*	*N/A*	10	*N/A*	*N/A*	20	*N/A*	*N/A*
Energy efficiency (saving)	134	*N/A*	*N/A*	268	*N/A*	*N/A*	536	*N/A*	*N/A*
Research & development	13	*N/A*	*N/A*	26	*N/A*	*N/A*	52	*N/A*	*N/A*
Overall total	**1,914**	**>250**	**>40**	**11,574**	**>1,800**	**>600**	**73,793**	**>20,000**	**>8,000**

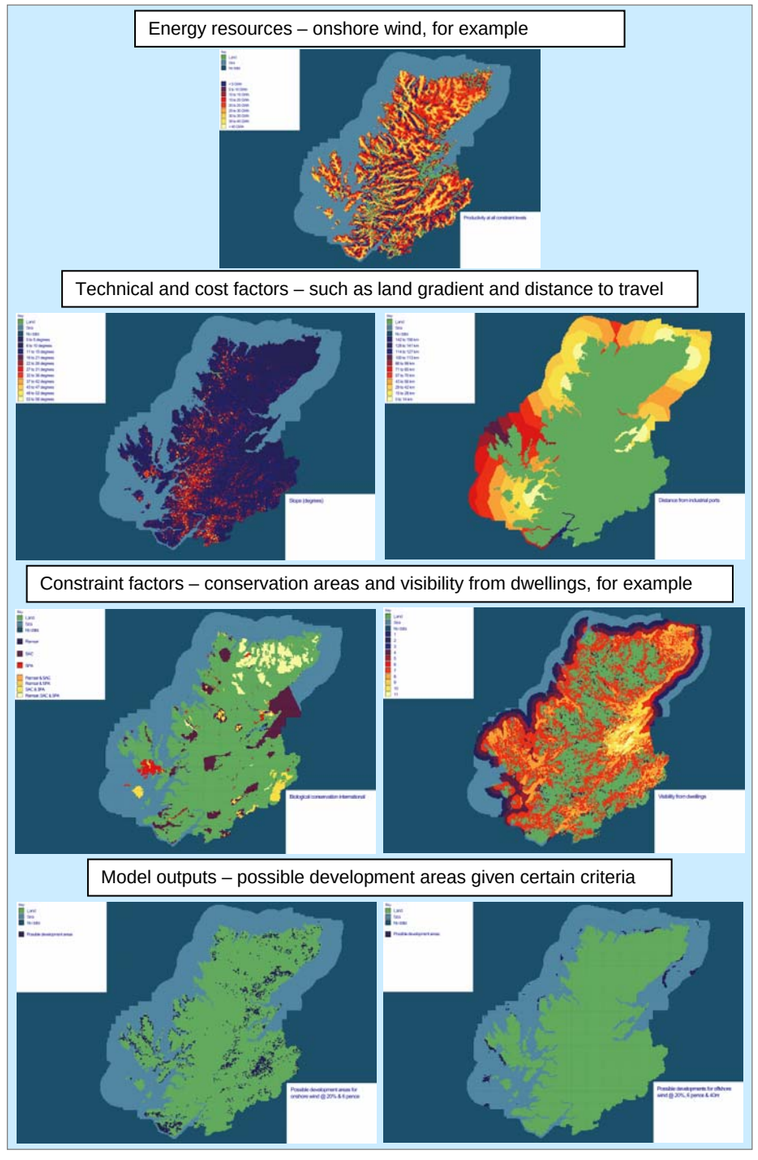
Note: N/A = not available

[18] Highland Renewable Energy Resource Assessment, Aquatera, September 2005

Resource type	Power (GWh)	Capacity (MW)	Number of units
Existing wind (incl. approved)	713	200	150
Existing hydro (incl. approved)	1800	600	50
Existing total	**2513**	**800**	**200**

* Not all hydro schemes are classified as renewable energy sources

Figure 4.1.2 : Example outputs from the Highland renewable energy resource assessment



5. Outline of Strategy and Policy Areas

5.1 Identifying Strategic Priorities for the Renewable Energy Strategy

A leet of 30 strategic topics was identified by the Renewable Energy Working Group[19],. These topics fall into 7 subcategories:

Targets for development • Installed capacity targets • CO_2 emissions reduction • Project efficiency and productivity **Areas and types of development** • Technology types and mix • Development zoning **Capacity building** • Skills and competence • Development of R&D capabilities • Education and training • Public engagement **Planning Process** • Improved EIA process	**Possible positive aspects** • Local benefit • Community and local ownership/involvement • Combating fuel poverty • Local content of works • Pace and phasing of investment • Interface with neighbouring regions **Possible negative aspects** • Natural energy flows • Conservation of natural heritage • Neighbour interactions • Landscape • Visibility • Wild land • Amenity interests • Other commercial users • Public attitudes to renewables	**Infrastructure & other issues** • Grid maintenance and expansion • Infrastructure requirements • Diversifying energy markets • Energy systems • Use of energy & energy efficiency

When considering the development and management of renewable energy projects there is also a wide variety of policy commitments[20] to consider and objectives[21] that can be set. The Highland Council has a number of other established strategies with which this Renewables Strategy should dovetail. These include:

- Highland Structure Plan[17];
- Highland Structure Plan Sustainability Appraisal[22];
- Local Transport Strategy[23];
- Highland Fuel Poverty Strategy[24];
- Highland Biodiversity Strategy[25];
- Highland Housing Strategy[26];
- Highland Forestry Plan.

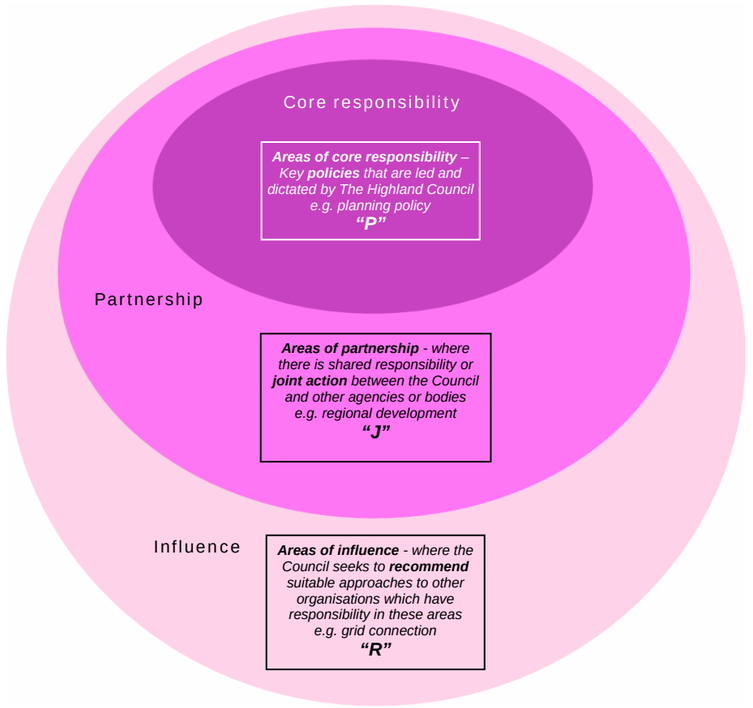
[19] Highland Council Renewable Energy Working Group website, www.highland.gov.uk/plintra/planpol/ren/ ren_wg.htm
[20] See Chapter 2 of Strategic Environment Assessment document, Aquatera, (in press)
[21] See Chapter 4 of Strategic Environment Assessment document, Aquatera, (in press)
[22] Highland Council Structure Plan Sustainability Appraisal, Highland Council, December 1999
[23] Highland local transport strategy, Highland Council, October 2000
[24] Highland Fuel Poverty Strategy, Highland Council
[25] Highland Biodiversity Project, website, www.highland/gov.uk/plintra/planpol/biodiv.htm
[26] Highland Housing Strategy, Highland Council, September 2003

Specific requirements arising from these related plans are noted, where appropriate, within this Renewable Energy Strategy document.

5.2 Level of Council influence over Strategic Priorities

A particular feature of renewable energy developments is the degree to which they are affected by external factors such as energy prices, the wider energy infrastructure, and public opinion and behaviour as regards energy use. Within this strategy the focus lies upon those areas where The Highland Council, local communities and local businesses in the region can have most influence and control. However, it is also necessary to consider wider issues where they have the potential to facilitate or obstruct renewables development. Figure 5.2.1 illustrates the 3 categories used to define the different levels of influence that the Council holds.

Figure 5.2.1 : Levels of influence held by The Highland Council



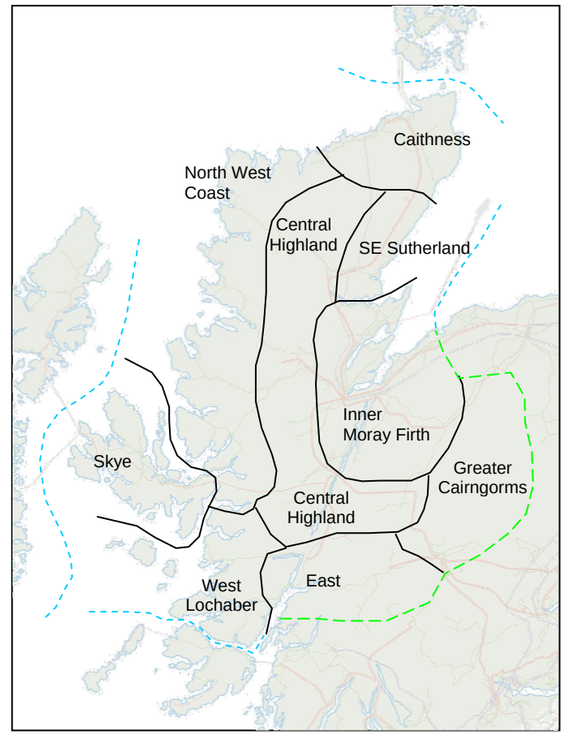
This hierarchy has been used to classify each of the policy statements included in this document. This is to clarify where they are the sole responsibility of The Highland Council, a joint action for The Council and another party, or a recommendation of the Council which seeks to influence the behaviour of others.

5.3 Definition of Geographical Areas

At 25,000 km^2, the Highland area is large and diverse. Geographical distinctions are needed to identify distinct priorities that may exist in each area. For the purposes of this strategy the boundaries defined in the Highland Structure Plan[27] have been used as a basis for identifying sub-regions, as follows.

[27] Highland Structure Plan, Highland Council, March 2001

Figure 5.3.1 : Definition of sub regional areas derived from the Highland Structure Plan



Key	Sea boundary with other authorities		Land boundary with other authorities		Internal sub area boundary	

5.4 Classification of Schemes

A variety of opportunities occur to embrace improved systems of energy production and efficiency. At a personal level it might involve installing a low energy light bulb; at the other end of the scale it may involve developing a large offshore wind farm. National regulatory requirements change according to certain size thresholds, whilst the local planning process also alters according to different scales of development. Table 5.4.1 (over) provides a list of the key thresholds for each technology.

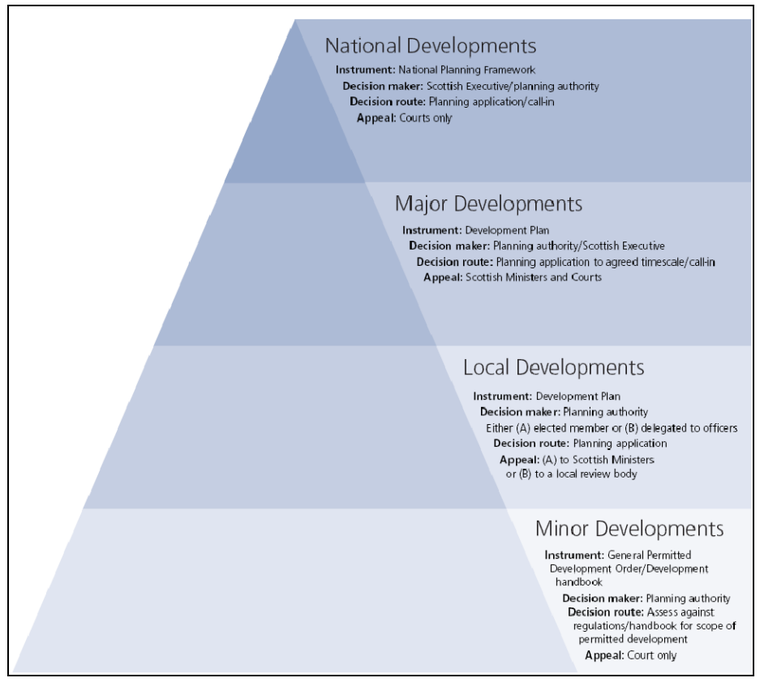
Table 5.4.1 : Size thresholds corresponding to regulatory requirements for renewable energy technologies

Threshold	Technology	Description
>1 MW	All offshore and hydro	Section 36 application must be made to Scottish Executive
>5 MW	Grid connected	Transmission as well as distribution agreements needed
<20 MW	Hydro	Maximum refurbished capacity size for ROC qualification
<50 MW	Onshore wind	Present maximum onshore generator size that will be determined by local planning authority.
>100 MW	Onshore development	Proposed new limit for local determination by The Highland Council.*

* The Council is continuing to seek legislative amendments to secure this change in thresholds.

In establishing a suitable classification scheme due note has been taken of the proposed national planning policies devised by the Scottish Executive[28] which recognise four levels of development scheme (below).

Figure 5.4.1 : New Scottish Hierarchy for Planning



The Council's proposed system for classifying renewables schemes follows along these principles.

Table 5.4.2 : Classification of projects within the proposed National Planning Framework

White Paper planning classification		Minor	Local	Major	National
Renewables category		*Domestic*	*Community*	*Intermediate*	*Large*
Permissions		Consider as permitted development if to specification	Determined by council officials with right of appeal to elected members	Determined by elected members with right of appeal to Scottish Executive	Determined by Scottish Executive, after consultation with local authority
Indicative installed capacity	Hydro	<10KW	10-100KW	100KW-1MW	>1MW
	Bio-energy	<10KW	10KW - 5MW	5 - 100MW	>100MW
	Solar				
	Thermal				
	Onshore wind				
	Waste				
	Coastal wave				
	Tidal head				
	Secondary structures				

Any renewable energy development which is exclusively offshore (below mean low water springs tide level) is, at present, outwith the jurisdiction of local authority planning, and therefore cannot be applied to the national framework. A scheme for classifying marine developments is outlined in table 5.4.3. The Council has been considering the case for changes to the present licensing and permitting systems under a framework for improved coastal zone management to ensure local control over, and perhaps benefit from, marine developments. However, if any part of the development or any associated secondary structures lie above the low water mark, this part of the development is classified by table 5.4.2 above.

Table 5.4.3 : Indicative Classification of Offshore Renewables projects

Renewables category		Domestic	Community	Large
Permissions		FEPA licence, Work Orders, MCGA approval and Crown Estate leases may be required.		Determined by Scottish Executive, after consultation with local authority
Indicative installed capacity	Offshore wind	<10KW	10KW - 1MW	>1MW
	Offshore wave			
	Offshore tide			

5.5 Strategies and Policies

As described in section 5.1, seven strategic themes were identified under which the further 30 specific policy areas can be classified. The seven themes are listed in Table 5.5.1 in relation to the key stages in a typical activity management process. This "plan–do–check–learn" cycle is common to all modern management systems and development processes.

Table 5.5.1 : Correlation of strategic themes with typical management cycle elements

Phase of management cycle	Strategic themes
Influences (plan)	Targets for development
	Areas and types of development
	Capacity building
Inputs (do)	Planning process
Outputs (check)	Possible positive aspects
	Possible negative aspects
Outcomes (learn)	Infrastructure and other issues

The policy details associated with these themes is considered in turn in the following chapters.

[28] Scottish Executive Modernising Planning: White Paper, 2005

6. Detailed Policy - Influences

6.1 Targets for Development

6.1.1 Installed Capacity Targets

Table 6.1.1 : Time related development of potential, and associated performance measures

Parameter	2005	2010	2015	2020	2050
Capacity and Power					
Technology type					
Export Hydro (MW)	*300*	*350*	*400*	*500*	*500*
Export Onshore wind (MW)	*200*	*800*	*1200*	*1400*	*2900*
Export Biomass (MW)	*-*	*50*	*100*	*200*	*1000*
Export Offshore wind (MW)	*-*	*10*	*200*	*1000*	*1975*
Export Wave (MW)	*-*	*0*	*0*	*0*	*2000*
Export Tide (MW)	*-*	*10*	*100*	*400*	*3000*
Local (MW)	*<5*	*50*	*150*	*400*	*1500*
Micro (MW)	*<1*	*10*	*30*	*100*	*400*
Total installed capacity (MW)	**506**	**1280**	**2180**	**4000**	**13275**
Total power output (TWh)	**1.3**	**3.5**	**6.4**	**12.8**	**45.6**
Life cycle carbon dioxide savings (assumes 500 t/GWh are saved)					
Local power replacement (TWh)	*0.015*	*0.15*	*0.44*	*1.46*	*4.62*
Annual CO_2 saving (million tonnes)	*0.007*	*0.07*	*0.22*	*0.73*	*2.3*
Wider power replacement (TWh)	*1.3*	*3.35*	*5.96*	*11.34*	*40.1*
Annual CO_2 saving (million tonnes)	*0.693*	*1.73*	*2.98*	*5.67*	*20.4*
Total CO_2 saving (million tonnes)	**0.7**	**1.8**	**3.2**	**6.4**	**22.7**
Economics and Revenue					
Annual local capital spend @ £700k/MW, £m	n/a	£108m	£126m	£254m	£216m
Local content*	n/a	20%	30%	40%	40%
Local revenue from services (£m)	n/a	£21m	£37m	£101m	£86m
Annual revenue (@ £0.06/kWh)(£m)	£78m	£210m	£384m	£768m	£2736m
Annual profit @ 10% (£m)	£7.8m	£21m	£38m	£77m	£274m
Local ownership (equity stake %)	10%	20%	30%	40%	50%
Local revenue from ownership (£m)	£0.78m	£4.2m	£11.4m	£30.8m	£137m
Total local revenue (content + ownership in £m)	**£0.78m**	**£25.2m**	**£48.4m**	**£132m**	**£223m**
Interactions					
Biodiversity**	=	+ve	+ve	+ve	+ve
Devt area on land (km^2)	20	105	168	225	550
Above as % total land	0.07%	0.4%	0.6%	0.9%	2.1%
Devt area at sea (km^2)	-	1	10	50	120
Visual impact (Zone of visibility over land)	5%	7%	9%	10%	13%

*excludes pass through turnover **measured as BAP indicators or wild bird measures in development areas

The resource led assessment of energy generation potential does not take account of the timing of developments. This timing may be driven by egs. the availability of technology, the introduction of government incentives, the pace of planning processes, the availability of grid connections or of suitable markets for the generated energy. In order to make the timescale clearer, development scenarios for each technology have been established as follows:

Hydro – There are extensive existing facilities. Applications for a significant increase are already in the planning system but there is limited further physical capacity. There is additional scope for pump storage linked to other renewables if required.

Biomass – Steady but moderate growth is envisaged in this sector, and there is scope for a few mega-projects (10 MW +).

Onshore wind – Some developments are already in place; many more are in queues for planning approval or grid connections. Existing grid capacity has been allocated, but new generation schemes will require upgrading of the grid.

Offshore wind – Technology should be proven by 2010 with rapid growth thereafter.

Wave – There is little potential in the short term, but new incentives and/or higher energy prices and new technologies may make developments viable in the area in the longer term.

Tide – Once concepts have been proven in the short term, rapid growth in this technology is envisaged.

On the basis of these scenarios and the capacity levels indicated in the resource assessment, quantitative targets for the various types of energy production, and their associated consequences, have been collated in Table 6.1.1. These suggested targets take account of planning constraints, cost factors and technical feasibility, but they must also correlate with energy export routes such as the grid, (see Section 9.1), and the capacities feasible in preferred development areas (see Section 6.2.2). Table 6.1.2 below compares these factors to establish the degree of alignment and validity.

Table 6.1.2 : Comparison of development targets with development capacity in preferred areas, energy export capacities and Scottish Executive renewables targets

	Time frame				
	Now	**2010**	**2015**	**2020**	**2050**
Overall Highland renewables development targets (MW)	500	1280	2180	4000	13275

Proportion of total capacity needed from preferred development areas to meet targets (%)	**Now**	**2010**	**2015**	**2020**	**2050**	**Total capacity in preferred development areas (MW)**
Hydro	*57%*	*67%*	*76%*	*96%*	*96%*	524
Onshore wind	*4%*	*32% (17%)*	*48% (26%)*	*56% (30%)*	*100% (62%)*	5182 (4654 inc. possible)
Biomass	*-*	*2.5%*	*6%*	*22%*	*26%*	3000
Offshore wind	*0%*	*0.1%*	*2%*	*10%*	*20%*	10,000
Wave	*-*	*-*	*-*	*-*	*-*	300
Tide	*0%*	*0.1%*	*1.2%*	*6%*	*40%*	7500
Local & micro	*<1%*	*3%*	*9%*	*32%*	*100%*	1900
Total						25,702

	Now	**2010**	**2015**	**2020**	**2050**
Total energy export/use capacity (MW)	**800**	**1922-2602**	**4410**	**5700**	**12600**
Land based grid capacities	*800*	*1900-2600*	*3900*	*4600*	*4600*
Marine export cables (DC links)	*-*	*-*	*500*	*1000*	*4000*
Energy conversion (hydrogen etc)	*-*	*2*	*10*	*100*	*4000*

	Now	**2010**	**2015**	**2020**	**2050**
Scottish Executive targets (MW)	**1800**	2700	n/a	6000	n/a

Considerable investment will be required to support these targets. The timeframe for decision making means that the strategic investment choices being discussed now may not be reviewed again for 20 or so years, and may influence development patterns for decades.

The Highland targets for renewable energy developments are set out below. These represent a development potential beyond that needed to meet the current Scottish Executive targets, (a minimum of 3,400 MW of new capacity by 2020). This scale of development is based upon a diverse contribution from a variety of energy sources. It also seeks to achieve the critical mass of production needed to justify any upgrade to the grid system, improvements needed to local infrastructure and for the development of a sustainable local renewables manufacturing and maintenance sector. The targets also take account of the main constraints upon development, thus providing a strategy that safeguards the most important features of local communities, wildlife and historical heritage.

P

A.1 The Highland Council considers that regional targets for renewable energy developments should be set. They are useful management tools, helping to stimulate and structure local and wider debate, and they give direction to activities undertaken by all groups involved with the renewables sector. They also provide a framework against which major investment decisions can be made. The renewable energy targets for Highland, including existing facilities, are as follows:

Date	Capacity	Power
2010	1,280 MW	3.5 TWh
2020	4,000 MW	12.8 TWh

A provisional assessment of longer term potential suggests that the following values may be appropriate:

Date	Capacity	Power
2050	13,275 MW	45.6 TWh

Policy/strategy

6.1.2 CO_2 Emissions Reduction Targets

The urgent reason for adopting renewable energy technologies, is to reduce society's carbon dioxide emissions. Despite assertions to the contrary, experience and evidence show that renewables can, have and will make an important contribution to CO_2 emissions reduction. Over the full lifecycle of the technology (taking into account energy for manufacture, construction, maintenance and decommissioning) renewables are shown to be more CO_2 efficient than fossil fuels, and similar to or better than nuclear power plant. (see below).

Table 6.1.3 : Lifecycle CO_2 Emissions for different power generation systems[29]

Technology	CO_2 emissions (tonnes per GWh)
Coal	964
Oil	726
Gas	484
Geothermal	57
Small hydro	10
Nuclear	8
Wind	7
Photovoltaics	5
Large hydro	4
Solar thermal	3
Wood burning	-160

[29] EC Wind Energy the facts, European Commission, Directorate-General for Energy, 1997

For varying amounts of renewables capacity, the levels of CO_2 emissions that could be saved are listed in Table 6.1.4, based upon the emission levels outlined above in Table 6.1.3.

Table 6.1.4 : Estimate of lifecycle CO_2 savings arising from renewables replacing different types of electrical power generation

Installed capacity (GW)	Power output (GWh)	CO_2 savings (million tonnes $CO_{2\ equiv}$)		
		Nuclear	Gas	Coal
1	3,480	=	1.6	3.3
2	6,960	=	3.2	6.6
3	10,440	=	4.8	9.9
4	13,920	=	6.4	13.2
5	17,400	=	8.0	16.5
6	21,000	=	9.6	19.8
8	28,000	=	11.2	23.1
10	35,000	=	12.8	26.4

(Note the savings include fuel extraction, transport and processing and are therefore more than just stack emissions)

A variety of factors may influence the savings outlined above, such as requirements for 'spinning reserve' (active standby) capacity. Experience demonstrates, however, that a diverse mix of renewables is little more demanding on the total power generation system than conventional power plant. In order to put these possible CO_2 savings into context, some benchmark CO_2 emission values are provided below.

Table 6.1.5 : Benchmark CO_2 Emissions

Areas	Annual CO_2 emissions[30]	Global percentage
Highland 2003	617 thousand tonnes $CO_{2\ equiv}$	0.003%
Scotland 2002	19 million tonnes $CO_{2\ equiv}$	0.09%
UK 2002	177 million tonnes $CO_{2\ equiv}$	0.8%
World wide	c.22 gigatonnes $CO_{2\ equiv}$	-

Local contributions to greenhouse gas emissions may not seem to be significant compared to the global annual emissions, but greenhouse gases accumulate in the atmosphere and every tonne produced or saved is making an incremental difference. By leading the way in using cleaner energy sources Highland will not only be making its own contribution but it will also encourage others to take a similar stand. The targets set for the world under Kyoto are a 60% reduction in CO_2 emissions by 2050.

P B.1 The Highland area will provide significant carbon dioxide (CO_2) savings if renewable energy is produced at the target levels anticipated. 2010 production levels could save around 1.8 million tonnes of CO_2 and 2020 levels could save around 6.4 million tonnes per year. Although some of these lifecycle emissions arise in other geographical areas, the total savings would be a significant proportion of total Scottish emissions, estimated at 19 million tonnes in 2002. ***Policy/strategy***

Carbon releases arising from disturbance to blanket bog and other peatlands by renewable energy schemes are a growing concern. Developers should aim to apply appropriate avoidance or mitigation arrangements in such circumstances. Conversely, sequestration of current carbon emissions into hydro-carbon strata or other environmental 'sinks' appears to be a worthwhile endeavour.

[30] SPICE briefing on climate change, Graeme Cook, The Scottish Parliament, January 2005

6.1.3 Project Efficiency and Productivity

The Highland Council wishes to encourage developments that make the most efficient use of renewable energy resources, particularly where the Highland area has a competitive advantage, but without compromising the broad acceptability of developments or their financial viability.

Factors that will maximise the efficiency and productivity of renewables developments include:

Resource optimisation – siting energy conversion technologies within the most productive energy resource regimes at macro (between sites) and micro (within sites) scales.
Economies of scale – co-location of developments in areas where infrastructure and servicing costs can be minimised and shared.
Diversity of resource fields – spreading developments within and between technologies in such a way as to optimise energy production in relation to demand.
Lifecycle efficiency – one of the key questions posed about renewable energy systems is how they compare with conventional systems regarding overall efficiency across the full energy supply cycle. Quantifying such complex systems is challenging but available information indicates that renewable energy is at least comparable with other energy systems and can be better.

It is important that renewable energy projects establish their performance in relation to these criteria, to assure people that the projects are worthwhile. It is hoped that similar scrutiny will be applied to other forms of energy to help society better understand the full implications of energy supply and the decisions associated with it.

P C.1 Projects will be scrutinized at all stages of the planning and operational processes to monitor their productivity with regard to energy supply and cost effectiveness. It is seen as universally beneficial that any energy developments should aim to maximise production whilst safeguarding neighbour, wildlife, landscape, environmental and heritage interests. ***Policy/strategy***

P C.2 The designation of preferred development zones is expected to give added advantages in terms of economies of scale for developments. Where a project is planned away from existing infrastructure, developers will be required to explain why sites close to existing projects are not feasible, and show that the advantages outweigh the disadvantages for the community and environment as well as the developer. ***Policy/strategy***

P C.3 Within the overall renewables development strategy, consideration will be given to the geographical spread of projects within a given technology category, as well as to the diversity of technologies. This approach aims to maintain an aggregate production pattern that, as far as possible, matches demand, and therefore adds value to all of the energy produced from the region. ***Policy/strategy***

6.2 Areas and Types of Development

6.2.1 Technology types and mix

Society faces many challenges as it moves towards a low carbon economy. One of these is security of supply, although using a range of power generation sources with sufficiently different production methods can smooth energy supply patterns. Diversity of supply can also be applied in a geographical context, by combining dispersed generation of domestic micro-renewables (such as the use of small wind turbines) with conventional centralised generation.

Existing energy production in the Highland Region, from hydrocarbons, hydro and wind, could then be augmented with a diversity of renewable supply technologies, creating a focus for the export of energy on centralised high output schemes, backed up locally with energy from dispersed domestic systems.

Based upon the analysis of resources completed recently in the resource assessment for the Highland area[31], supported by other information from literature and industry, the following technology roles can be envisaged.

Table 6.2.1 : Relative roles envisaged for different renewable energy sources by Highland sub-area, taking into account resources, constraints and population levels

Key	Major opportunity for energy (>100MW)		Moderate opportunity for energy (10-100MW)		Minor opportunity for energy (1-10MW)		Unlikely opportunity for energy (<1 MW)		Not applicable	-

	Caithness	North West Coast	Central Highland	SE Sutherland	Inner Moray Firth	Greater Cairngorm	East Lochaber	West Lochaber	Skye
Hydro	✗								
Bio-energy									
Solar									
Thermal									
Micro-wind									
Local onshore wind									
Major/national onshore wind		✗				✗		✗	
Offshore wind		-	-			-	-	-	
Wave			-	-	-	-	-		
Tide			-	-		-			
Waste									
Efficiency									
Energy conversion (hydrogen etc)		-	-	-		-	-	-	-

Across the whole of the Highland area there are opportunities to deploy all types of renewable energy technology, although certain areas are more suited to some technologies than others.

[31] Highland Renewable Energy Resource Assessment, Aquatera, September 2005

P	D.1 A variety of renewables projects and technologies is supported by Highland Council. Thermal, hydro, biomass and energy efficiency are all encouraged on a non site-specific basis. Technologies such as wind, wave and tide are appropriate for more selective application due to energy resource constraints (such as variable output) and planning issues. ***Policy/strategy***

J	D.2 The mix of renewable energy technologies in Highland should support existing, and potential, new areas of local industrial activity. It should also take account of the overall quality of energy supply from the Highland area. Technologies which produce energy in a different pattern to how it is used may be less desirable than those which meet demand patterns. ***Joint action with S&SE and NGC***

J	D.3 As well as having a suitable technology mix with regards to renewables, the Highland area will also benefit from a continuing association with other forms of energy production and fuel handling. Prospective areas of activity include: • Further development of offshore oil and gas resources • Transfer of oil by ship to ship transfer, or by ship to shore and shore to ship storage and transfer • Import of renewable energy from other areas • Decommissioning of nuclear facilities and oil and gas field structures • Development of novel fuel production facilities (e.g. hydrogen and biofuels) ***Joint action with HIE and industry***

6.2.2 Development Zoning for Renewable Energy Projects

Dividing areas of potential development into zones is a well established tool in the planning process. It gives structure to the pattern of development, helps to allay fears about uncontrolled development and allows prospective developers to concentrate their efforts on areas where gaining planning permission is more likely. In preparation for this strategy, the Highland Council commissioned a geographical renewable energy resource assessment. The zones described are derived from the results of modelling resources and constraints.

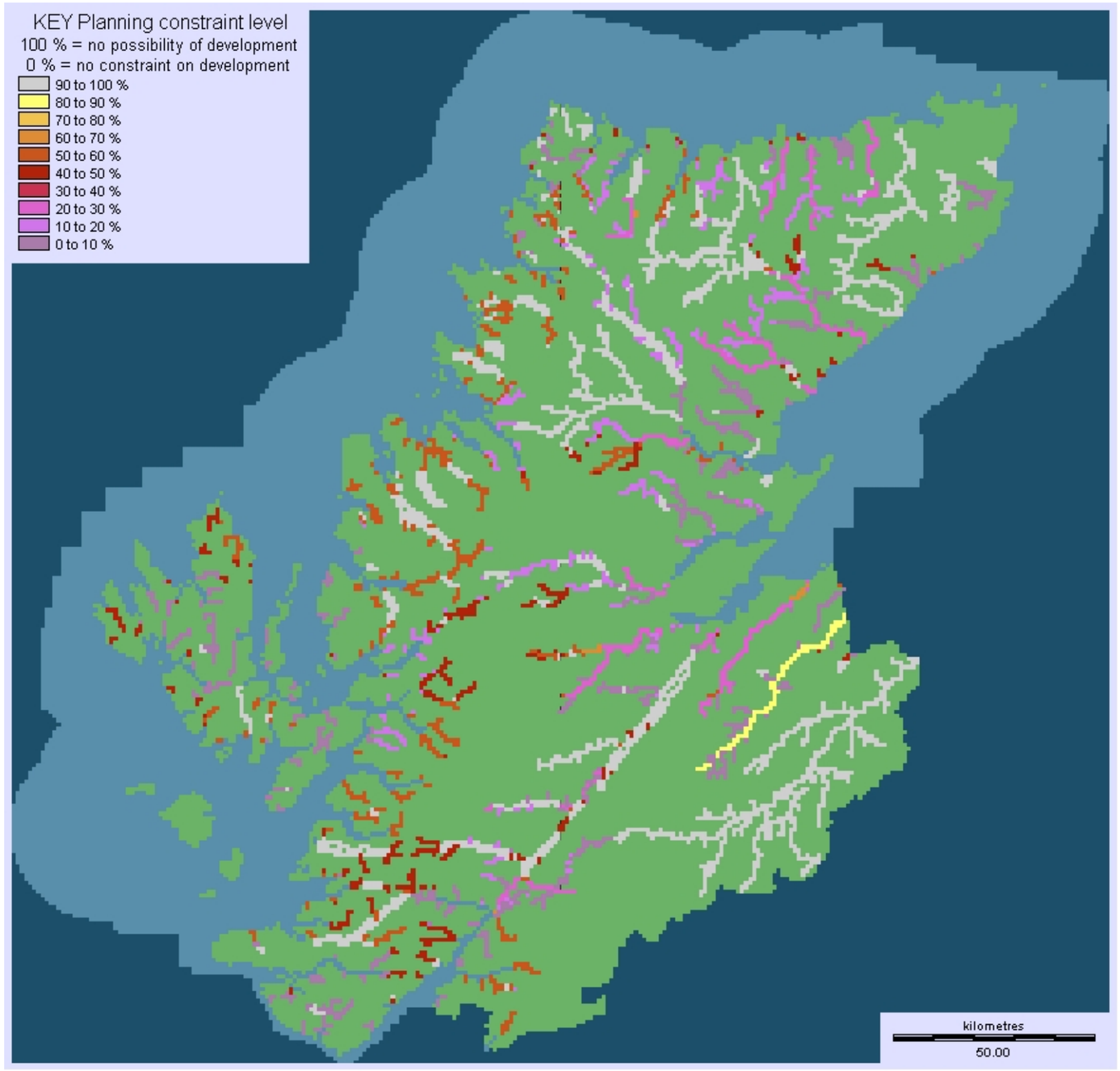
Three levels of zoning have been adopted which describe areas of more likely, less likely and least likely development potential. The establishment of such areas does not, however, obviate the need for and importance of strict planning controls; and the zones do not dictate total development potential. It may still be possible for an inappropriate project to be proposed in a preferred development area and, conversely, for an acceptable project to be approved elsewhere.

Further guidance on specific planning requirements for wind and other renewables technologies is provided in the renewable planning guidelines set out to the rear of this report.

6.2.2.1 Hydro

There are around 30 long established, larger hydro developments across Highland and around 15 more recent and smaller hydro schemes. Many are located deep in the central Highlands. Impacts associated with hydro schemes are mostly localised, including effects upon water flows, habitats, species, recreation, access roads, grid connections and sources of stone and aggregates for construction. Given the type of development involved and the topographical sensitivities, interference with wild lands and the possible threat to conservation interests are likely to be the main areas of concern. Partticular sensitivities include the freshwater pearl mussel, with otter and bird species which are dependent on specific water levels and quality. Recreational conflicts can also emerge especially with the growing interest in 'extreme' and related water sports.

Figure 6.2.1 : Range of planning constraints for prospective hydro scheme sites



Significant secondary issues could arise from traffic during the construction phase, access tracks and other associated infrastructure. Unless two schemes are located on the same river, cumulative effects should be relatively minor. Despite the widespread potential for hydro schemes a zoning policy is not needed because of the dispersed pattern and small scale of their development.

Figure 6.2.1 shows the distribution of constraint levels along the potential rivers and steams considered to have the most opportunity of hydro

development proposals. The prospective siting of schemes is derived from a study completed in 1989[32]; more recent data is not publicly available. Revision to take account of the Water Framework Directive is needed.

Table 6.2.2 : Table of hydro power outputs under light constraint levels

Region	Installed Capacity (MW)	Annual Production (MWh)
Inverness	17.7	84,000
Ross and Cromarty	9.9	46,000
Skye and Lochalsh	5.6	26,000
Sutherland	1.0	5,000

P	E.1 Hydro projects will be assessed on their individual merits, with due regard to ancillary requirements such as compensation flows, fisheries impacts, wildlife, landscape, access and recreation, grid, construction traffic and aggregate winning. Projects which link in with existing infrastructure and other renewable energy developments will be favoured. ***Policy/strategy***

Bio-energy

Renewable bio-energy describes any energy process which utilises fuels derived from recently living plant or animal matter in a sustainable manner. Generally this falls into four main categories:

- Direct combustion of wood and other organic materials (e.g. household rubbish);
- Secondary production from wood and other organic material. by gasification or pyrolysis
- Secondary production of energy from wastes, such as animal slurry or organic refuse, through digestion or natural decay processes;
- Production of bio-fuels from oil-rich crops.

SEPA advice is recommended on the requirement for advanced conversion technologies to be used for waste incineration to qualify for ROCs.

Bio-energy power production can lend itself well to collective community or district combined heat and power (CHP) schemes within a region.

Highland has a particularly high dependency on electricity for heating buildings due to the limited gas network. Heating is the single most significant factor in the area's high levels of domestic fuel poverty (see Section 3.3.9). The large land area and existing level of forestry activity magnify the potential importance of bio-energy as a renewable heat source in the region.

Commercial woodlands are widespread with biomass output presently estimated at approximately 200,000 oven dried tonnes' production per year[33] over a plantation area covering 13% of Highland[34]. Further forestry could be developed and existing areas of forest are normally replanted after harvesting. This is a significant market opportunity for the large areas of low grade commercial plantation in the North Highlands, subject to proper organisation of the wood supply chain and competitive pricing. Prospective forestry areas have been identified within the Highland Forestry Strategy[34].

[32] Small scale hydroelectric generation potential in the UK Volume 1, Salford Civil Engineering Limited, 1989

[33] Wood Fuel For Warmth p65, Sustainable Development Commission Scotland, June 2005

[34] Highland Forest and Woodland Strategy, Highland Council, December 2004

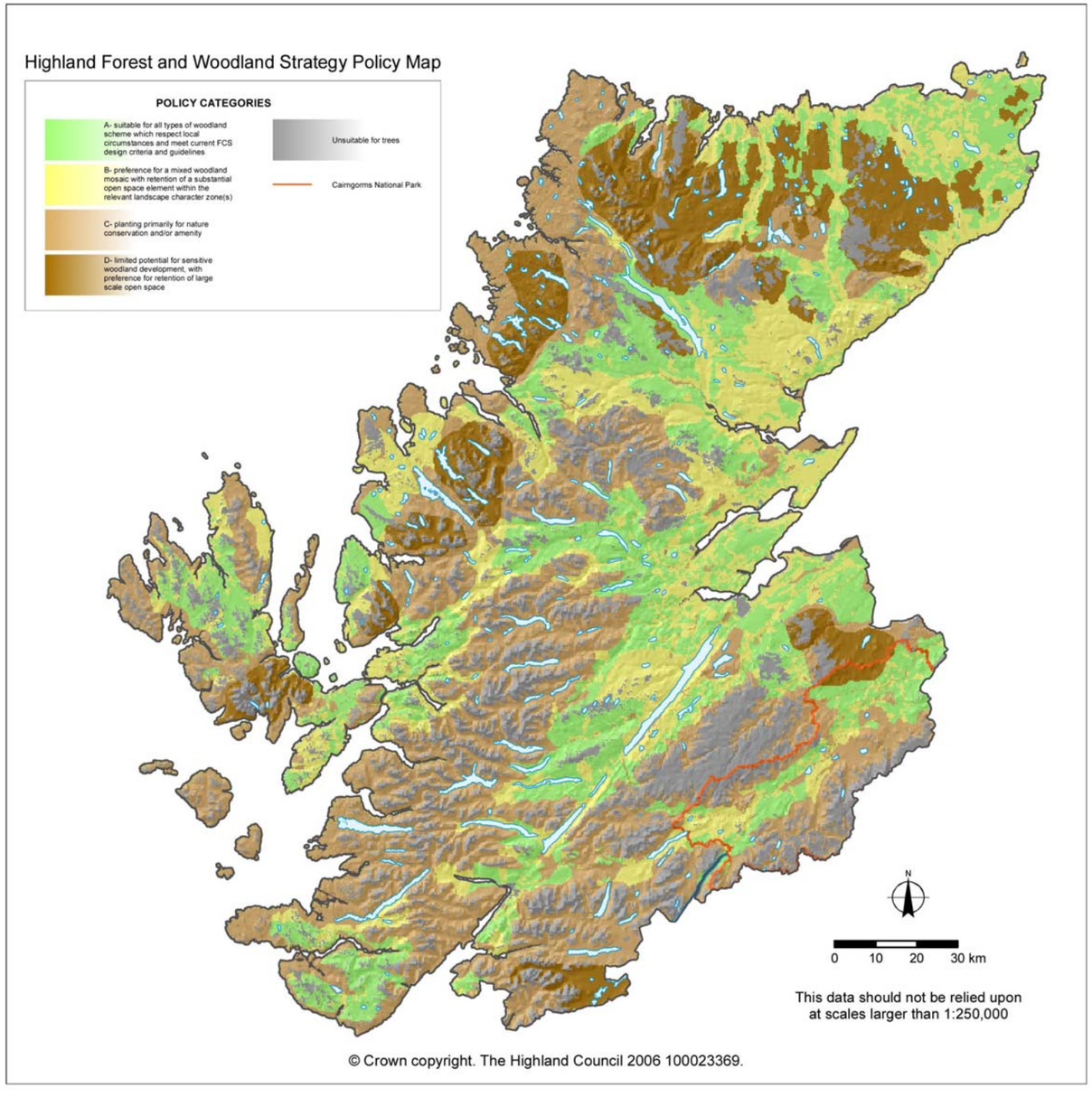
The distribution of potential forestry areas is indicated in Figure 6.2.2. Table 6.2.3 shows the projected forestry crop levels over the next decade.

Table 6.2.3 : Maximum Forestry biomass resource by area (tonnes)

Forest District	Period		
	2005-2006	*2007-2011*	*2012-2016*
Dornoch	114,000 t	134,000 t	171,000 t
Inverness	217,000 t	248,000 t	266,000 t
Fort Augustus	145,000 t	164,000 t	178,000 t
Lochaber	115,000 t	117,000 t	142,000 t

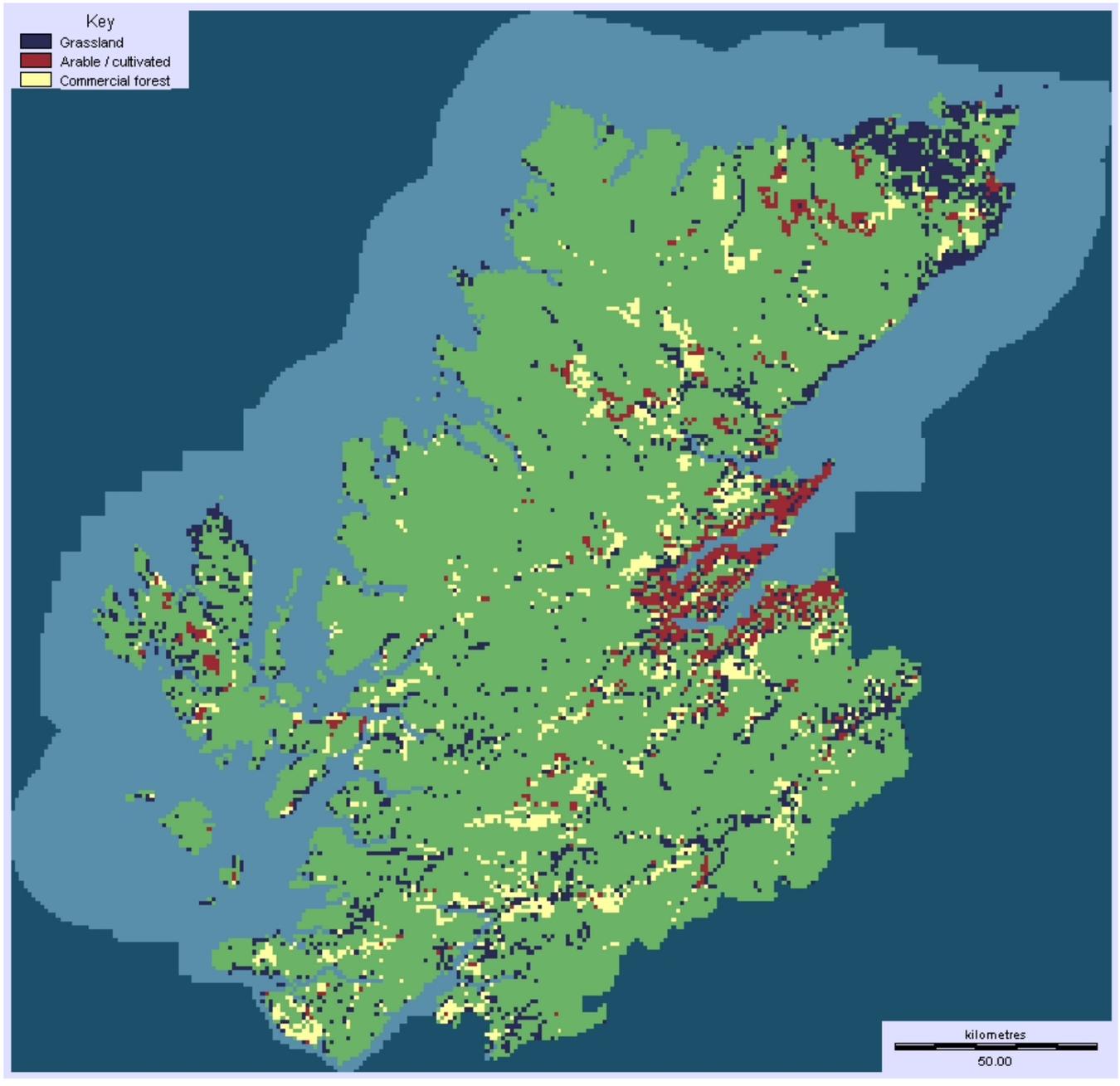
In addition to established forestry and other productive woodland there is also potential for cultivation of new energy crops, especially short rotation coppice of trees such as willow. Prospective woodland bio-crop areas are shown in Figure 6.2.3. Whether developments consist of bio-energy electricity generators or fuel production there are some common issues and impacts associated with these activities. These include increased haulage traffic, plant emissions, and disposal of by-products such as ash.

Figure 6.2.2 : Distribution of bio-crop areas based upon cultivated land



P	E.2 Wood supplies for burning to produce heat and/or power should, in the first instance, come from existing commercial forests and woodlands. Any new planting should be in harvested areas or in areas designated as having forestry potential (category A) within the Highland Forestry Strategy. ***Policy/strategy***

Figure 6.2.3 : Draft location of Potential Commercial Forestry Areas throughout Highland[34]



P	E3 Production of bio-crops for fuel should use existing cultivated land or land where growth of the fuel crops will not diminish existing conservation, landscape or amenity value of the land. ***Policy/strategy***

P	E4 Use of organic wastes for digestion or combustion is encouraged so long as local air quality can be maintained and issues such as unpleasant odours can be avoided for any nearby residents. Proposals for waste management facilities must demonstrate conformity with the National and Highland Area Waste Plans. ***Policy/strategy***

6.2.2.3 National and major scale onshore wind projects

With regard to possible renewable energy developments, the larger onshore wind farms currently present the most widespread and intense challenge to the planning system. There are a number of studies that have considered the geographical distribution of renewable energy potential. The resource assessment[35] completed for the Highland area has indicated the prospective suitability of areas in terms of a combination of energy resource, technical feasibility, energy cost and planning constraints. SNH has completed a sensitivity assessment with regard to wind turbine developments for the whole of Scotland[36] and a specific wind turbine landscape study of Moray and East and North Highland[37], whilst a number of individual developers have established GIS systems to help them find suitable sites. During the development of this strategy, these sources have been reviewed and there is a broad correlation of results among all of them. The Highland Resource Assessment provides the best indication of where development could occur, given certain assumptions. This is due to the comprehensive foundation of data upon which it is based, covering technical feasibility, economics and planning acceptability. The results show that there are certain discrete areas where the potential for development is markedly greater than in other areas. There are also wide areas that are clearly less suited to development for a variety of technical, cost and planning reasons.

Figure 6.2.4 and Table 6.2.4 show the distribution of the three types of development zone for “national” and “major” scale export-oriented wind developments:

- **Preferred development areas** combine abundant wind resources, with a relatively low planning constraint level over large adjoining areas (more than 25 km^2) and lie within 15 km of the existing 132/275 kV grid network. In these areas close grouping of schemes may be permitted;
- **Possible development areas** have similar productivity, constraint and connectivity levels but are less extensive in area and less suitable for the grouping of schemes (between 6 and 25 km^2);
- All other areas are classed as **presumption against development** for national and major scale projects. These include a number of west coast localities which have very poor grid connectivity.

The coverage of the preferred development areas in relation to overall constraint levels is shown in Figure 6.2.5 andTable 6.2.5. Figure 6.2.6 also shows the relative energy productivity of each development area.

P	E.5 Preferred development areas have been established for major and national scale onshore wind developments. There are 3 designated areas which contain optimal conditions in terms of planning constraints, energy production, technical feasibility and proximity to grid. The detailed suitability of all prospective sites still needs to be confirmed through the normal planning processes. There

[35] Highland Renewable Energy Resource Assessment Aquatera, September 2005
[36] SNH, 2002, Strategic Locational Guidance for Onshore Wind Farms in Respect of the Natural Heritage, Policy Statement No 02/02
[37] SNH Commissioned Report No. 070

will, however, be a strong presumption in favour of projects proposed for these designated areas, and developers will be encouraged to come forward with proposals there subject to appropriate community and environmental safeguards. ***Policy/strategy***

P E.6 Possible development areas have been identified in places where, although constraints are relatively light, their limited extent makes them less optimal than preferred development areas for national scale schemes. In these locations developments will be judged on their merits and will need to show that there is no scope for alternative development within preferred development areas. ***Policy/strategy***

P E.7 Elsewhere in Highland there will be a presumption against export wind development. Any proposals for national and major projects will have to overcome a precautionary approach to planning approval. Any development would also need to show that there is no scope for alternative development within other preferred and possible development areas. ***Policy/strategy***

Figure 6.2.4 : Prospective development zones for national and major onshore wind farms designed for meeting national/regional energy requirements

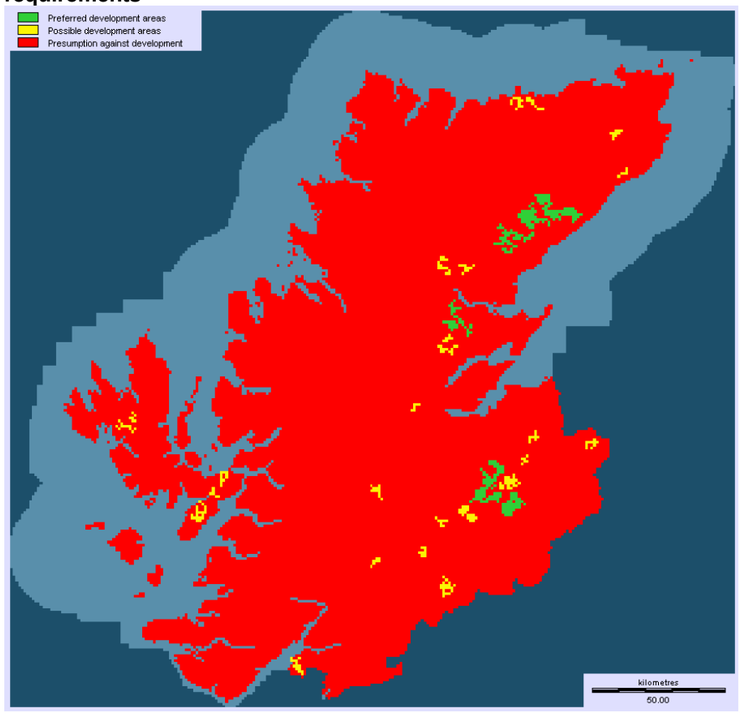
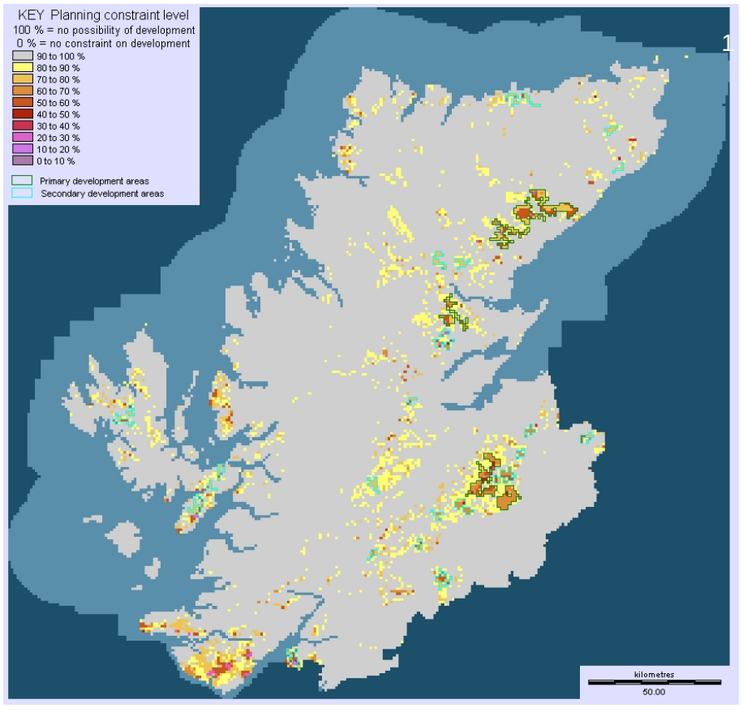


Table 6.2.4 : Summary of possible power outputs & installed capacities in the preferred development areas for national & major scale wind farms

Area	Reference number	Area available (km^2)	Possible installed capacity (MW)	Possible power output (TWh)
Helmsdale & Strath Brora	1	158	1240	3.37
Beinn Tharsuinn	2	38	298	0.86
Monadliath Mountains	3	118	940	2.6

Figure 6.2.5 : Correlation between preferred development areas and levels of anticipated constraint as defined by the resource assessment model

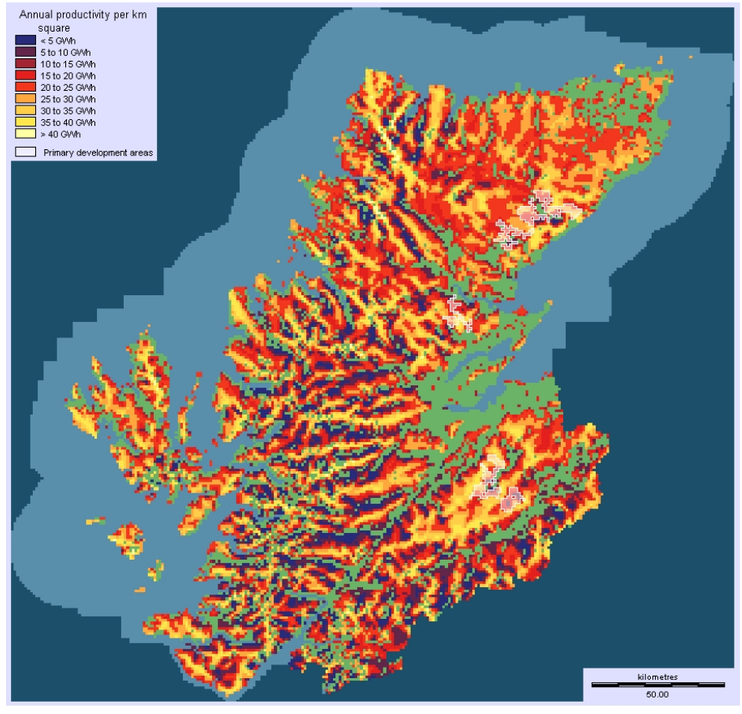


A larger scale copy of this map is enclosed in the pocket at the back of this document.

Table 6.2.5 : Summary of constraint levels per square km in the preferred development areas for national & major scale wind farms

Area	Reference number	Average constraint of selected areas (100% = total constraint)	Potential installed capacity (MW))
Helmsdale & Strath Brora	1	68%	1240
Beinn Tharsuinn	2	69%	298
Monadliath Mountains	3	66%	940

Figure 6.2.6 : Correlation between preferred development areas and annual productivity levels per km square as defined by the resource assessment model



6.2.2.4 Local scale onshore wind projects

Local scale development projects are anticipated to be closely associated with existing settlements or industrial sites where distribution grid connections are nearby. The upper threshold for total installed capacity of these types of development mean that they could include small clusters of turbines as well as single machines. No specific upper size limit has been set for individual generators within these types of development which should not exceed 5 MW installed capacity unless particular local conditions suggest otherwise. The specific circumstances of the site will determine the overall scale of development and the size of individual turbine(s) that are appropriate.

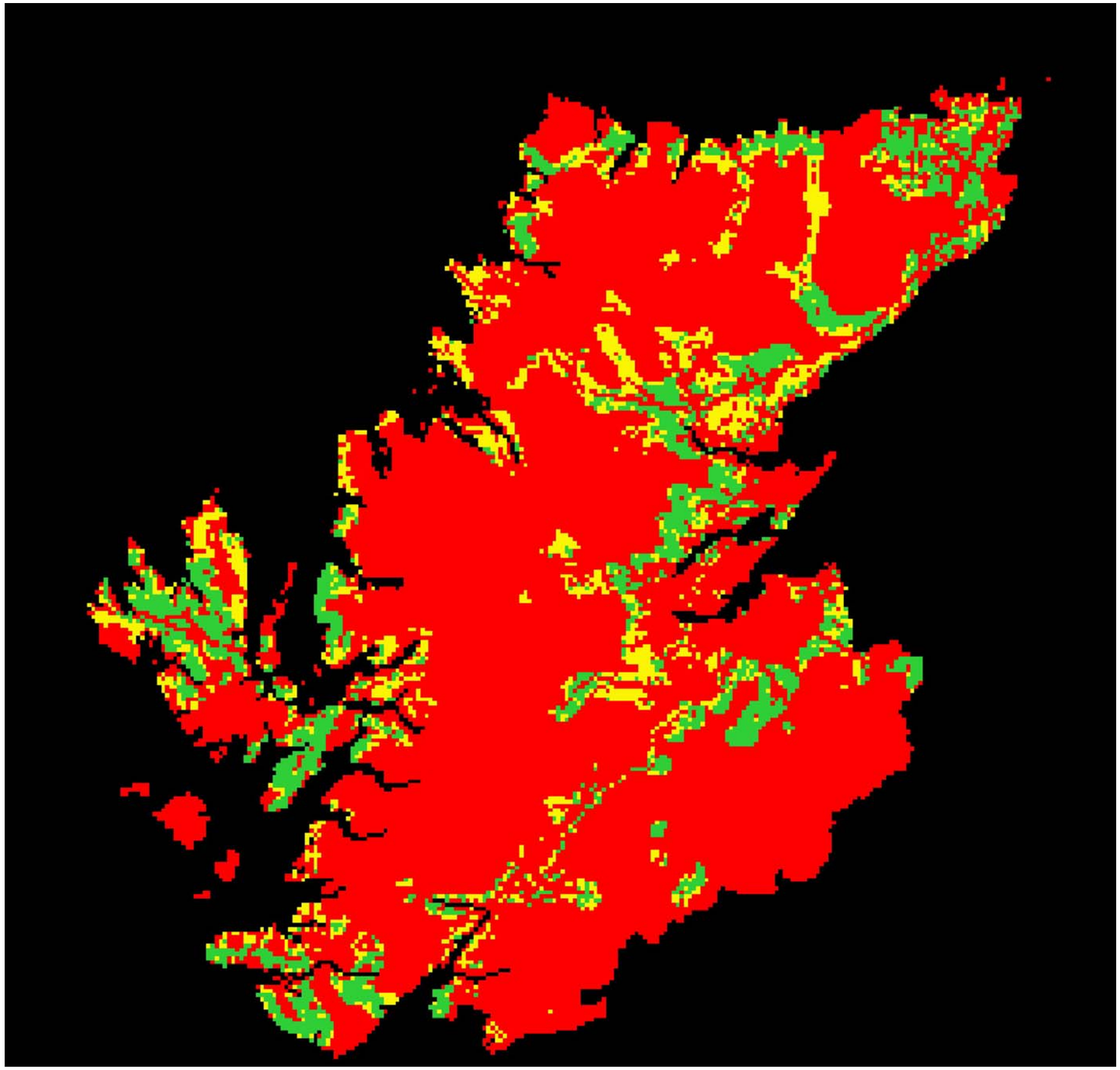
In terms of spacing it is anticipated that developments at this scale would normally be more than 5 km apart.

Since local scale developments are aimed at primarily serving local energy requirements the degree to which nearby communities will be served by any development of this scale is considered very important. Detailed consideration of such matters will be expected in support of the planning application. Substantial evidence of the project's embedded (local) supply status should be provided along with such details as the levels of community ownership, local ownership, local benefit, provisions to reduce or eliminate fuel poverty, and local work content.

Figure 6.2.7 shows the distribution of the three types of development zone for "local" scale turbine clusters or individual turbines. Preferred development areas lie within 2km of the 11 kV grid network and have relatively light planning constraint levels. Possible development areas are designated within 2km of dwellings where there is a higher level of planning constraint. In all other areas there is a presumption against this scale of development.

P	E.8 Local scale onshore wind developments will be encouraged within designated preferred development areas. These areas lie within 2 km of the existing 11 kV grid, close to settlements and infrastructure across the region. The detailed suitability of all prospective sites will need to be confirmed through the normal planning processes. ***Policy/strategy***
P	E.9 Possible development areas have a similar proximity to the 11 kV grid but have higher levels of constraint. Development proposals in these areas will be considered on their individual merits and local circumstances. ***Policy/strategy***
P	E.10 In areas with a presumption against development any proposals for local scale projects will have to overcome a precautionary approach to planning approval. Any development in such areas would also need to show that there is no scope for alternative development within designated areas. ***Policy/strategy***

Figure 6.2.7 : Prospective development zones for local scale onshore wind developments based upon individual turbines and small clusters for meeting regional/ local embedded energy demands



6.2.2.5 Minor scale onshore wind developments

Minor scale projects are defined as all onshore wind turbines of 10kW or less. This scale of turbine is most likely to be associated with a particular public building, business or private property. It is envisaged that such projects would deploy the device on land within the site or surrounding the facility in question. In most cases the consumer would draw off energy directly from the device, rather than through the grid, but a grid connection may be provided to take off any surplus energy.

The prospective distribution of such developments relates closely to the existing spread of properties across Highland. This scale of development is anticipated to be popular for more remote sites given the supply difficulties and grid costs in these locations.

The location of the turbine(s), their size and factors such as noise levels are likely to be important features in the site specific suitability of any development. Design specifications for rural, urban and industrial settings have been developed and are provided in the planning guidance for onshore wind developments[7].

P	E.11 Small wind turbines of less than 10KW installed capacity, associated with off grid domestic and very localised uses, are in general universally encouraged, subject to compliance with recommended practice and planning guidance. ***Policy/strategy***

6.2.2.6 Offshore wind

Development pressures for offshore wind are likely to remain much lower than for onshore wind, due to cost and technology issues. Nevertheless there are important spatial considerations and certain near offshore marine locations may be inappropriate from a landscape and visual perspective. There would be little point in restricting onshore development along the west coast if near offshore wind developments were then permitted. The appropriateness and likelihood of grid connections is also a key issue.

The map in Figure 6.2.9 shows the distribution of prospective development zones for offshore wind areas. The optimal areas are considered to lie in the Outer Moray Firth, with a number of possible development areas off the Sutherland coastal sections of the Moray Firth, and along the north coast of Caithness. A major scheme comprising 1 GW (200 turbines) is under consideration by a local hydrocarbons company. Details of the potential productivity of these areas are shown in Table 6.2.7.

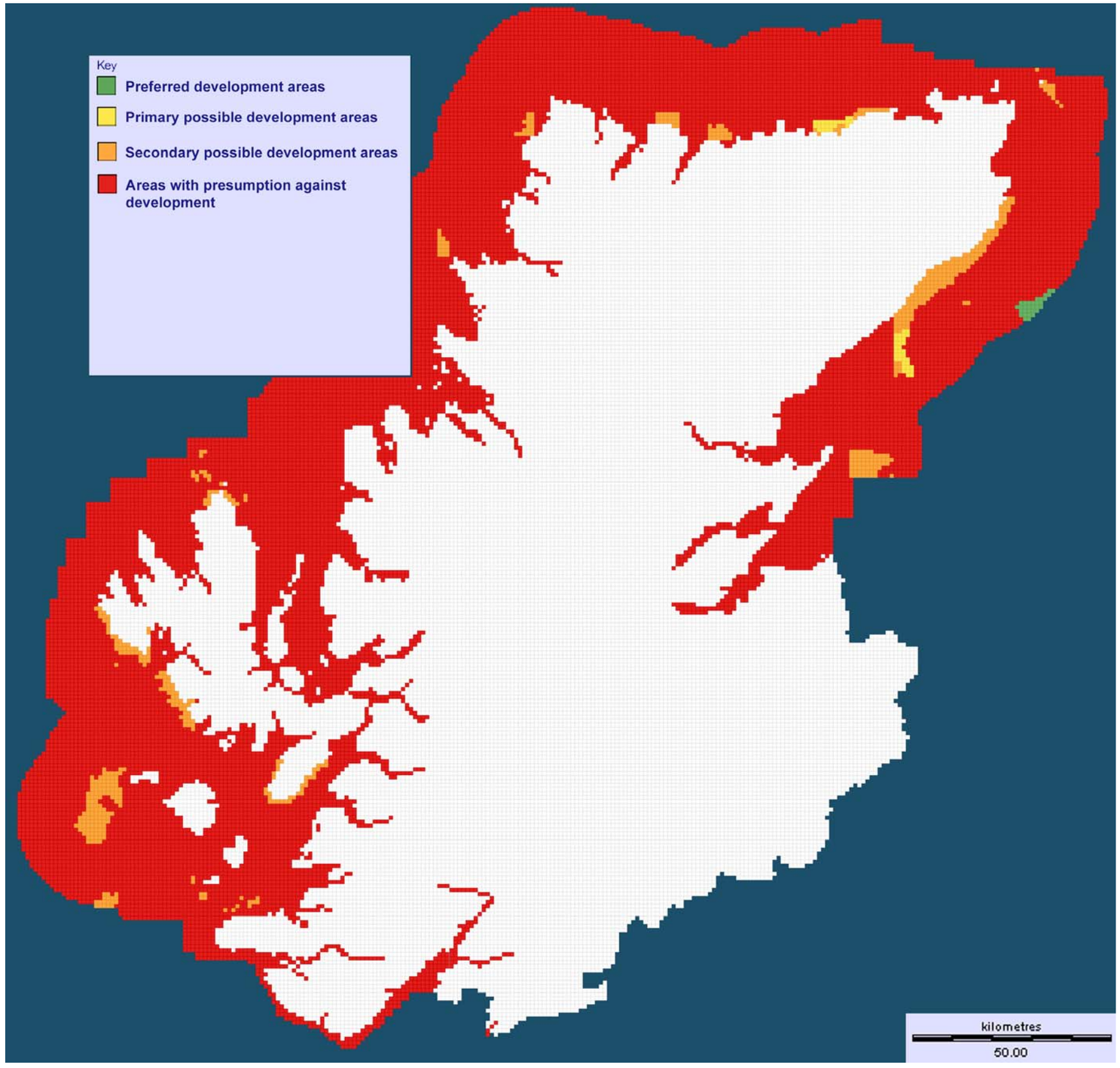
Table 6.2.7 : Summary of power outputs and installed capacities for potential offshore wind development areas under a modelled scenario

Area	Corresponding number on map	Power output under the lightly constrained scenario (GWh/yr) (figure in brackets represents installed capacity (MW))
Smith Bank	1	2700 (620)
Dunbeath Bay	2	4750 (1375)
Melvich	3	2550 (680)

There will be important navigational safety and wildlife considerations (among other maritime interests) to be investigated in taking any of these areas forward.

There are a number of other areas which are considered secondary possible zones. These are restricted by greater levels of constraint and any developer would need to show that there were no better options available in order to justify development in these locations.

Figure 6.2.8 Prospective development areas for offshore wind



J	E.12 Offshore wind is viewed as an important potential renewable energy technology for development within Highland. The preferred development area for such projects is seen as the outer Moray Firth. Possible areas for development lie nearer to the Sutherland coast in the Moray Firth and along the northern coast of Caithness off Dounreay. Development in these areas would be considered on its merits but would require stronger justification. Developments in secondary potential areas involve greater levels of constraint and are considered less suitable. Any development would need to demonstrate that there were no alternative options. Areas where there is a presumption against development are primarily defined on the basis of technical feasibility but also include areas with the highest levels of constraint. Development of offshore wind farms in these areas is unlikely to be supported. ***Joint action with Scottish Executive etc.***

6.2.2.7 Offshore and coastal wave

The wave resources around the Highland coastline are less productive than other parts of Scotland. The resource assessment model indicates that, based upon present understanding, the cost of producing offshore wave energy from Highland waters is unlikely to be economic. Contributory factors include, for example, that the more energetic areas are relatively distant from ports and existing grid connections.

If offshore wave technologies significantly improve in anticipated efficiency or new infrastructure becomes available then the position for offshore wave may alter, but at present there would seem to be few prospects for this technology in Highland waters. The potential off the NW coast is highlighted below.

Table 6.2.8 : Summary of power outputs and installed capacities for potential offshore wave development areas

Area	Power output under the lightly constrained scenario (GWh/yr) (figure in brackets represents installed capacity (MW))
NW Cape Wrath	225.8 (150)
NE Cape Wrath	190.5 (150)

There is some potential for coastal wave developments. These might be generally supported by the Council subject to natural heritage, archaeological and near neighbour interests being safeguarded.
The Inner Moray Firth has a considerable history and legacy of facilities for marine fabrication, manufacturing and servicing/support of the North Sea oil and gas sector. The existing infrastructure, skills and experience have great potential to be used to develop device manufacturing, fabrication, maintenance and shore-servicing facilities to assist the wider offshore sector. This area of activity could provide the best opportunity for economic enterprise in this sector within the region.

J	E.13 It is considered that there is restricted potential for offshore wave developments in the Highland area. Smaller scale coastal wave developments may be viable and would be considered on a case by case basis. ***Joint action with Scottish Executive etc.***

6.2.2.8 Tidal current

The pattern of possible development for tidal stream projects is far more restricted geographically than other forms of renewables technology. Such projects are only likely to be viable in the areas of the swiftest tidal currents, and are only technically practical where current speeds exceed 1 m/s. The total sea area where tidal projects may be implemented is therefore limited to a few tens of square kilometres. At present there is too little detailed information available about the nature of conditions in these tidal areas to meaningfully differentiate between sites. However the following classification is derived on the basis of the constraints and cost factors estimated in the resource assessment[38]:

Tidal stream	Classification
North Stroma	**Primary development areas**
North Skye	
Duncansby Head	
Kyle Rhea	
South Stroma	**Secondary development areas**
Ballachulish	
Annat Narrows	
Corran Narrows	
Sound of Mull (E & W)	
Cape Wrath	

Although tidal energy is often hailed as the best renewable energy resource because of its predictability and power density, there are a number of factors that may limit its exploitation. Firstly, although the energy output is predictable, it fluctuates widely and rapidly through a tidal cycle and over longer term lunar cycles. This pattern is out of step with present energy use, which follow daily behaviour patterns and weather conditions. Second, major tidal streams are also typically areas of relatively high constraint factors. Any developments particularly in larger streams such as the Pentland Firth, will need to carefully consider possible interactions with, for example, other sea users, fisheries and wildlife to devise acceptable development scenarios. The third factor to consider is that tidal streams are, by their nature, areas where the energy in coastal seas is concentrated. This energy drives a number of physical processes such as North Sea circulation and mixing, which in turn help determine ecological process such as plankton production and species' migration. It is unclear at present how much energy can be taken out of tidal streams before the knock-on effects on the ecosystem become unacceptable. This will need to be investigated before large scale tidal developments are sanctioned. Estimates of possible constrained power outputs are indicated in Table 6.2.9.

Table 6.2.9 : Summary of power outputs and installed capacities for potential tidal current development areas under a modelled scenario

Area	Lightly constrained	
Prime sites with robust capacity	**Power output (GWh/yr)**	**Installed capacity (MW)**
North Stroma	3094	(1176)
North Skye	3071	(1168)
Duncansby Head	1298	(494)
Kyle Rhea	186	(71)

J	E.14 The Council supports the full investigation and exploration of the potential for tidal energy production, but recognises that there are significant gaps in knowledge including nature conservation impacts that need to be filled before large scale exploitation of tidal energy is supported. Nevertheless, the large amounts of energy that could be available mean that finding answers should be a key priority. ***Joint action with Scottish Executive.***

[38] Highland Renewable Energy Resource Assessment Aquatera, September 2005

6.3 Capacity Building

6.3.1 Skills and Competence

Developing renewable energy projects successfully in the Highland area will require a wide range of expertise and understanding. A key factor will be making sure that designs and activities are appropriate for local conditions, considerate of local communities and appropriate for local sensitivities. It is believed that local involvement in management of projects is likely to enhance the quality of both management and decision making. Awareness of local issues, understanding local priorities, making decisions on the basis of the widest possible good, and accountability for decisions taken, are all likely to be more easily achieved with direct local input to any project. The key skills areas envisaged for the renewables job market are illustrated in Figure 6.3.1 (over).

R	F.1 Locally based management of renewables projects will help to encourage local empathy and awareness of the resources available in the area. This in turn will encourage procurement and opportunities for local businesses. It also helps to ensure that there is local accountability for projects. Incorporating this expertise into management teams and/or basing management within the area, facilitates best practice in projects from the outset. ***Recommendation***

6.3.2 Development of Research and Development (R & D) Capabilities

Research and development activity can provide a number of benefits to a region such as Highland. It creates valuable employment for skilled personnel. It can contribute to a wider image and reputation for an area as a centre for dynamic and innovative activity. It can also help to directly find solutions to local problems. Existing R & D activities in the area include nuclear decommissioning studies at Dounreay, a number of research themes in the UHI and commercial research activity undertaken by companies in the Highland area.

Given the competitive nature of research funding it is necessary to build R & D capacity around core strengths and unique factors within the region. Areas that may be particularly productive include:

Figure 6.3.1 : Key skills base needed to manage and run a renewable energy project[39]

- Dynamic management of grid networks;
- Improved technologies for transmission and distribution grids;
- Wood biomass, bioenergy & biofuel crops & conversion technologies.;
- Interactions between wind turbines and wildlife;
- Investigations into tidal energy systems;
- Potential for novel fuel utilisation;
- Potential for energy intensive industries in rural energy rich areas;
- Monitoring implementation of new technologies and energy efficiency within Council premises;
- New ways of generating, storing, distributing and using energy in line with the principles of sustainability.

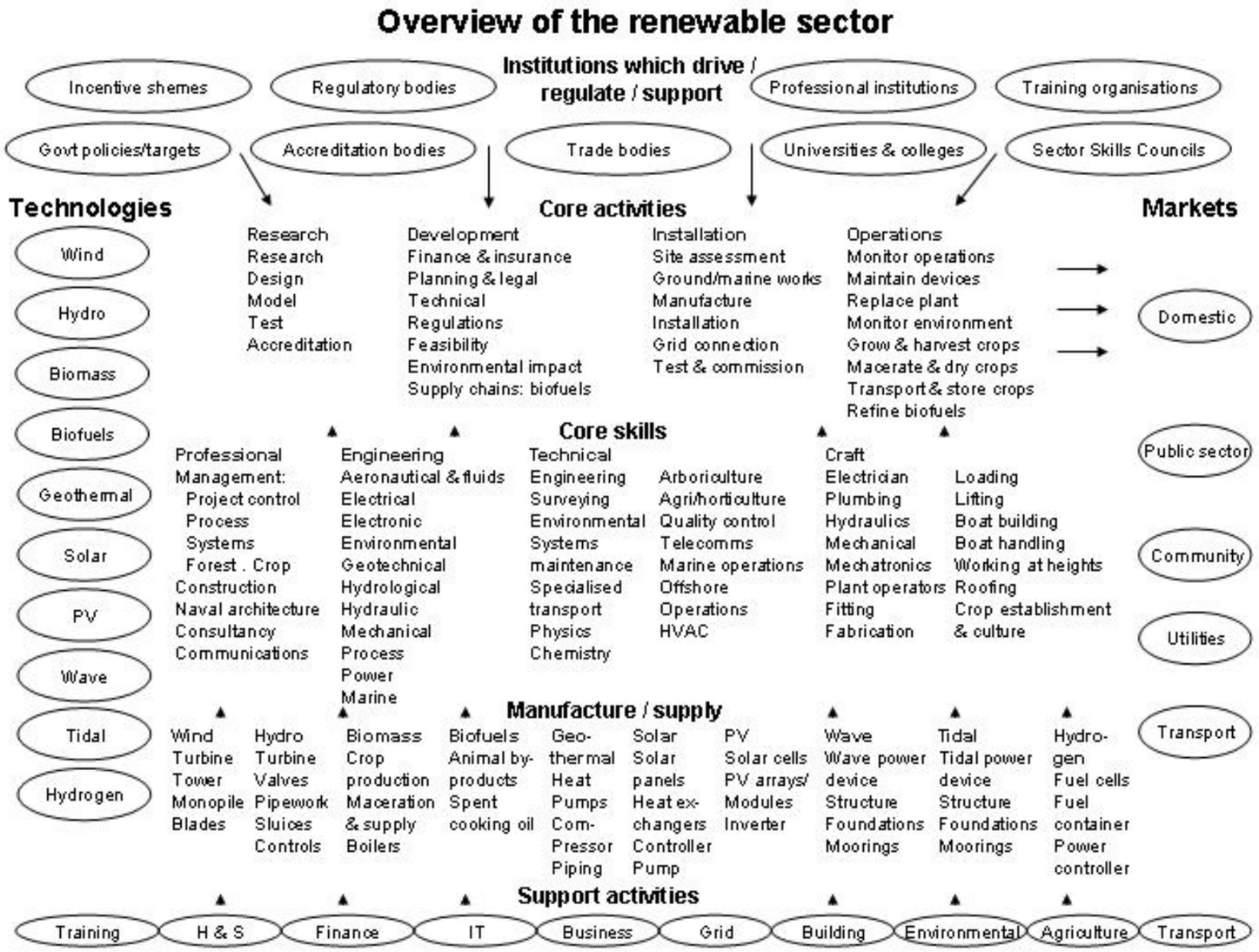
P	G.1 The Highland Council will encourage and support R & D into renewable energy within the region. This will include providing public access to case study examples, as well as seeking funds for strategic and locally important research activities. ***Policy/strategy***

[39] Skills for Renewable Energy in Scotland, Avayl Engineering, April 2005

J	G.2 The Council will support the development of UHI as a centre for academic research and learning, encouraging specialisation in renewable energy areas that are compatible with wider community interests. *Joint action with UHI*

6.3.3 Education and Training

Developing the skills and experience for tomorrow requires education and training today. Within the renewables sector this is particularly true since, as it is a relatively new sector, there are fewer people established in the field. The timeframe needed to form such a skills base ties in very well with the timeframe anticipated for development. There is a window of 5-10 years during which organic but focussed growth of vocational and academic training and education can develop.



Key topics could include:

• Energy efficiency; • Biomass for energy; • Management of onshore wind projects; • Optimising energy supply;	• Renewable energy and the householder; • Management of grid systems; • Sustainable development in rural communities; • Monitoring effects of climate change on wildlife.

In order to fill the existing knowledge gaps it will be necessary to think in new ways, not just acquire new bits of knowledge. Rural areas such as Highland are often considered by a wider society to have been left behind as development has continued apace. In a carbon constrained world, where sustainability rather than growth will be the key aim, rural areas may find themselves propelled to the forefront of new ways of thinking and living. By demonstrating solutions to wider issues from a rural perspective, communities such as Highland can become leaders and opinion formers.

Taking such a progressive and proactive stance will serve existing residents well, and will help to attract new people to Highland for study purposes, who may subsequently choose to settle in the area.

Alongside more theoretical programmes, the practical application of new energy systems in the Highland area offers considerable opportunity for professional development. The area successfully supported technological developments in hydro, nuclear engineering and in offshore fabrication. Renewable energy provides the next opportunity for skills development and establishing a centre of expertise.

P	H.1 The Council recognises that for the Highland area to fully exploit the benefits of renewables developments it needs to ensure that there are suitable educational pathways for local people to enter the sector. The Council will work with industry, UHI and other education providers in the region to deliver such pathways. In addition, Highland will collaborate with other areas in the Highlands and Islands and elsewhere to ensure educational opportunities in the sector are maximised. *Policy/strategy*

6.3.4 Public Engagement and Communication

Renewable energy can make a significant contribution to reducing carbon emissions regionally and nationally. For this potential to be realised the technology needs to retain support within wider public opinion. It will also be beneficial if concerns raised by objectors can be dealt with in a constructive way, providing greater confidence in the benefits that could arise, and less fear of negative consequences.

An effective communication programme would incorporate the following elements:

- Provide comprehensive information about renewables;
- Provide valid comparative information about alternative forms of energy;
- Provide clear information about the scale of possible impacts, risks, benefits and opportunities associated with renewables;
- Provide feedback to the public about energy levels and patterns produced from renewable sources;
- Provide feedback on the experiences of operating renewable energy technologies with regard to local communities, wildlife, cultural and archaeological heritage and business activity.

The development of informed public awareness will lead people to better understand and recognise the importance of renewable energy sources, the benefits that they provide and the residual negative impacts that may arise. This should help to maintain and increase support for renewable energy within the wider community.

P	I.1 The Highland Council will support initiatives to provide information to the public on renewable energy issues in order to maintain and broaden an informed understanding within the wider community. It will also monitor and report public opinion regarding energy issues at suitable intervals. ***Policy/strategy***

7 Detailed Policy - Inputs

7.1 Planning Process

The existing planning process provides a robust basis for scrutinising detailed project plans but the existing 'scoping' stage (see 7.1.1 below) does not provide an early enough opportunity to guide and/or change project proposals. There is also a need to improve the validation of the final ("as built") arrangements and the reporting of the performance of developments once operational.

An improved planning pathway should be applied, which places an emphasis both upon conceptual screening during a 'pre-scoping' phase and upon better follow up reporting after the grant of approval for the project. An outline of this additional pre-scoping and lifetime reporting, along with all other phases of the planning review process, is provided in the supporting Planning Guidelines[40]. An overview of the process is provided in Table 7.1.1.

7.1.1 Improved EIA Process

The environmental impact assessment (EIA) process is the cornerstone of good environmental management for new renewable energy projects. EIA is an internationally recognised tool for helping projects meet regulatory requirements and stakeholder expectations. The basic elements of the process are:

- **Scoping:** Agreeing the scope of the activities to be covered and the methods used with the key stakeholders and how best to carry out the consultation;
- **Establishing baseline conditions:** Carrying out desktop or field surveys to establish the current status of human activities and the physical & biological environment;
- **Description of the project:** This describes the justification for the development, the size and scale of the development, alternative approaches that have been considered, site information and details of the design and the proposed activities;
- **Identification of impacts:** Identifying those aspects of the development where there is the potential for an impact on the environment and the community. Trivial impacts are screened out at this stage;
- **Assessment of impacts:** A risk assessment is carried out to determine the likelihood and consequence of each of the environmental and socio-economic impacts and clear justification of the significance of impact ratings. The significance of the risk is then determined, normally using a 'tolerability matrix';
- **Mitigation measures:** This section provides any recommendations as to how the significant impacts identified can be reduced to a level that is acceptable to the developer and stakeholders;
- **Environmental management plan:** This provides a framework for carrying out the mitigation measures and monitoring their effectiveness and any changes to the environment and the community;
- **Communication and consultation plan:** This ensures that stakeholders are informed of progress in the EIA process and that their views are considered within the decision making process.

The scope of the EIA depends upon the size and complexity of the project. The results of the process are summarised in an Environmental Statement that is then offered for public consultation. Some key aspects of the EIA process that are often overlooked or poorly executed include:

- Adequate consideration of alternatives early enough in the process for real options to be considered;
- Full consideration of secondary activities related solely to the development but which perhaps occur offsite or outwith the period of main project activity;
- Consideration of cumulative effects with other similar developments and other wider development pressures;
- Provision of suitable baseline information so that informed decisions can be made as regards possible sensitivities and impacts;
- Clarity and transparency in the criteria used to assess the intensity and significance of impacts, opportunities and risk;
- Suitable investigation of socio-economic aspects related to a development;
- Assessment of the positive benefits that could arise from the development.

In order to resolve these issues the Council would expect that a full EIA process would include:

- Consideration and explanation of the appropriateness of technologies and alternatives such as scale, siting and ownership, at an early stage in project development;
- Following appropriate investigation of alternatives, and consultation, selection of the best overall option with the most benefits and least harmful consequences.

P	J.1 All national, major and local scale renewables projects[41] should undertake a pre-scoping phase of evaluation before locations, timing, and development type are specified. The aim of this evaluation is to ensure that the developer is fully aware of the opportunities and constraints relating to renewables development in the Highland area and that The Council has an opportunity to comment upon the appropriateness of development ideas early in their formulation. ***Policy/strategy***

P	J.2 At a national and major level, consideration of alternatives should establish that there is advantage in locating the development in the Highland area and/or that the development will specifically support policy objectives set for the Highland area. ***Policy/strategy***

P	J.3 At a local level, consideration of alternatives should take account of the optimal locations as regards energy conversion efficiency, planning constraints, cost efficiency and supporting infrastructure requirements, including grid, and should clearly state how and why key decisions have been made. ***Policy/strategy***

[40] Planning Guidelines for renewable energy projects in Highland, May 2006

[41] See Section 0 on Project Classification for details

Table 7.1.1 : The sequence of planning related activities within the lifecycle of a successful project

Key: - Phase title & product - Process/description - Phase output

D - Developer activity PD - Planning department activity S - Statutory consultees activity P - Public activity

Inputs	Process & documentation	Outputs
	Pre-scoping	
D - Preliminary development concept	Concept evaluation before specific site commitments are made	Indication of requirements for broad acceptability – D
PD - Advice as regards compatibility with strategy		Early notification, chance to comment on suitability – PD
S - Advice as regards compatibility with designations		Early notification, chance to comment on suitability – S
P - Project may remain confidential at this stage		None at this time - P
	Pre-scoping opinion (without prejudice to future process)	Early exchange of views on the suitability of a concept
	EIA screening	
D - Outline of project proposals and options	Does the project require a statutory EIA?	Clarity over future regulatory pathway – D
PD - Advice as to whether full EIA process is required		Assurance over future regulatory pathway – PD
S - Advice as to whether full EIA process is required		Assurance over future regulatory pathway – S
P - None at this time		None at this time – P
	EIA screening opinion	Clarity over EIA requirements
	Project scoping	
D - Objectives, option evaluation and project definition	Defines the boundaries and methodologies to be used in the EIA process	Validation of option definition and selection process – D
PD -Comments on options & detailed planning process		Comment upon options, sensitivities and priorities – PD
S - Comments on options & detailed planning process		Comment upon options, sensitivities and priorities – S
P - Initial notification and consultation on proposals		Contribution to option selection and identifying key issues -P
	Scoping opinion	Confirmed suitability of selected option and agreed scope for future works
	Preliminary planning	
D - Scope of work for baseline and monitoring works	Planning approval for preliminary works & endorsement of baseline studies	Permission for pre-works, scope for baseline info. – D
PD - Review of planning application		Planning permission for facilities (e.g. met masts) – PD
S - Review of baseline study plans by specialists		Confirmation baseline studies will give required data – S
P - None at this time		None at this time – P
	Baseline study report	Filling gaps & uncertainties over baseline condition
	Design and project definition	
D - Undertake environmental assessment process	EIA process (Preparation of an Environmental Statement and other consent materials)	Documentation to support planning application – D
PD - Periodic interim review of materials		Planning decision and associated conditions – PD
S - Periodic interim review of materials		Formal advice on suitability of proposals – S
P - Opinion on the scope, results and conclusions		Influence upon scope and conclusions – P
	Full planning documentation	Materials for planning application
	Planning application	
D - Submission of planning application	Submission of ES into formal planning process and determination of the planning application	Approved project – D
PD - Timely review and consideration of application		Planning permission and any conditions – PD
S - Timely review and consideration of application		Conditions and requirements for getting permission – S
P - Statutory notice of consultation over proposals		Comment on suitability of project & remaining issues – P
	Planning approval	Planning permission
	Change control process	
D - Access to project & updates on any alterations	Change control, during fabrication & commissioning, issuing of 'as built' report confirming approval assumptions and conditions	Ongoing confidence of stakeholders in performance – D
PD - Check compliance with regulations, ES commitments and consent conditions		Being kept informed of any changes and of any issues that are arising – PD
S - Check compliance with regulations, ES commitments and consent conditions		Being kept informed of any changes and of any issues that are arising – S
P - None at this time		Informed of significant changes to plans or designs – P
	As built report	Confirmation of operational licence
	Control & monitoring record	
D - Access & regular reports of performance	Operations – annual report of key performance factors	Reputation for good stewardship – D
PD - Regular monitoring and enforcement if required		Confirmation of good performance – PD
S - Regular monitoring and enforcement if required		Confirmation of good performance – S
P - Contribute to feedback forums etc		Confirmation of performance & value as stakeholder – P
	Auditing and public reporting	Quality control, ongoing licence to operate
	Decommissioning plan	
D - Commitment to restore site	Decommissioning	No residual liabilities – D
PD - Requirements for suitable restoration		Smooth social and economic transition – PD
S - Requirements for suitable restoration		Environmental reinstatement – S
P - Requirements for suitable restoration		Confidence in restored site – P
	Decommissioning report	Acceptable restoration, no hazards or liabilities

8. Detailed Policy – Outputs

8.1 Possible Positive Effects of Renewable Energy Projects

Positive effects from development can arise in a number of direct and indirect ways. These include:

- Community and local ownership/involvement;
- Local benefit and combating fuel poverty;
- Local content.

These benefits may be affected by:

- The pace and phasing of development;
- Collaboration with other local authorities.

8.1.1 Community Benefit

The Council wishes to ensure that local communities benefit directly from the use of their local resources and are compensated for the disruption and inconvenience associated with renewable energy development work. Development that has an impact on the environment and resources of the Highlands should be acceptable not only in land use planning terms, but should have clear and direct benefits for those who live and work in the area.

Community benefit is a "goodwill" contribution, voluntarily donated by a developer for the benefit of communities affected by development where this will have a long term impact on the environment. The Council considers that a developer's community benefit contribution, or its equivalent equity, should be at least £4-5000 per annum per MW of installed capacity.

To date, most renewable energy companies developing projects in the Highlands have been willing to make community benefit contributions. These include direct payments, benefits in kind, and support to develop community-owned energy schemes or acquire a community stake holding in a commercial project.

Community benefit presents an opportunity to secure long term, lasting benefits for Highland communities in a way that complements, but does not substitute for, existing public sector responsibilities. There may be merit in widening the scope of the Council's community benefit policy to develop a two-tier approach that delivers both direct benefit to the local community and strategic benefit to a wider area. A strategic fund could be used to finance, for example:

- Sub-regional improvements to infrastructure, over and above those which the public sector has a statutory duty to provide;
- Training to enable local people to enter the renewables industry;
- Development of local renewable energy technology such as community heat pumps or domestic solar water heating;
- Match-funding for community projects seeking grants from the Scottish Community and Householder Renewables Initiative.

J	K.1 The Highland Council will continue to press for developers to make a voluntary contribution for the benefit of communities affected by renewable energy development, including transmission grid upgrading and enhancement. The Council will also explore options with the renewables industry for widening the scope of the community benefit policy to enhance its potential for strategic benefit. ***Joint action with developers***

8.1.2 Community and Local Ownership/Involvement

This describes active financial or 'in kind' involvement in a project and would normally result in an appropriate level of profit sharing or share ownership. This shareholding may be total, majority or minority depending upon circumstances. Community ownership implies universal ownership of involvement across the community as compared to local ownership which may have a more restricted/select participation from within a community.

The benefits of well thought out schemes are widely recognised and Highlands and Islands Enterprise have established the Highland Energy Company to help stimulate community led ownership of projects. The Gigha project has shown what can be achieved with strong political backing. The private sector can also take the initiative. In Orkney, for instance, an 860 KW turbine has been installed with 100% locally raised finance from 25 or so local residents. At an individual level many households and businesses are installing heat pumps, micro turbines, and small hydro schemes to provide energy for their own use. Elsewhere it could involve formation of eg. local woodfuel supply chains. At the other end of the scale, Shetland Islands Council is developing a 250 MW wind energy scheme, the Viking project, in a full financial partnership with a major utility company. As well as wholesale energy production, retail energy supply to customers can also be undertaken at a local or regional level.

P	L.1 The Council supports the concept of local involvement and ownership of renewables energy projects. Participation of local communities and individuals in renewable energy developments helps to ensure that they are appropriate, that they are supported locally and that their benefits remain to a greater extent within the local community. ***Policy/strategy***

8.1.3 Combating Fuel Poverty

At present, national government policies use maintenance of low energy prices as the key mechanism for combating fuel poverty. Although it may provide a short term fix, this approach only serves to encourage energy profligacy in society and makes the introduction of energy efficient technologies less likely and more expensive. A change in strategy that allows energy prices to rise to more realistic levels, tied with stricter controls over emissions and impacts, would not only benefit the sustainability of the energy industry but stimulate new sectors of enterprise in energy efficiency and would bring down the price of energy efficiency technology. This would then enable low income households to invest more easily in energy efficiency measures. For those households where the fuel poverty trap is most severe, direct intervention based upon improved energy efficiency should be available and, if necessary, income support or energy payments made. Under existing regulatory mechanisms it is not possible to supply electricity through the grid at discounted prices on a localised basis. Micro and biomass are local energy options for reducing household fuel bills.

J	M.1 Energy efficiency is seen as a key mechanism for reducing fuel poverty by ensuring more efficient use of energy and thereby reducing costs to the consumer. Local benefit funds from renewable energy production projects can also provide resources for direct monetary intervention where needed. ***Joint action with other agencies***

8.1.4 Local Content of Works

The term 'local content' refers to the amount of work and the value of supply contracts undertaken by local businesses. Capital investment in renewables projects is likely to be around £700,000 per MW installed. With a medium term target for 3500 MW of new, installed capacity within the Highland area, there are expected to be many opportunities for local companies to win and undertake renewables related work. Total capital expenditure over the next 15 year period, to 2020, may exceed £2.8 billion, with ongoing operational costs reaching up to £56 million per year based on 2% of capital.

Within any capital expenditure programme there are easily identified packages that will be sought locally, some which need to be imported and others where the origin is less certain. It is believed that for most operations a local (Highland area) content target could be 50% of total expenditure.

Local content can be particularly influenced by the pace and phasing of activities. Steady growth or activity often enables a greater level of local development and content within rural areas than that arising from a less steady 'boom and bust' type cycle. The latter instability tends to favour provision of imported skills and services from other areas.

The European Commission has recently announced that electricity producers in Great Britain are exempt from the requirements of the Utilities and Public Procurement Directives. This opens the way towards more targeted local placement of capital and other contracts for Highland projects.

P	N.1 From the outset of any renewables project, the level of local participation that is expected and how this will be achieved will be an important factor for public notification. This will help align the project with local development policy and consequently increase the likelihood of gaining planning approval. Specifically, information on the local content of works will be required under *section 13 of Planning (Scotland) Act* and through the scoping of EIAs. ***Policy/strategy***
R	N.2 Participation by local business in the provision of services and goods should be maximised wherever possible, without compromising the overall quality or viability of the project. Factors which will help in this regard include transparent procurement processes, establishing details of local suppliers and services and working with local companies to establish improved renewable supply chains. ***Recommendation***

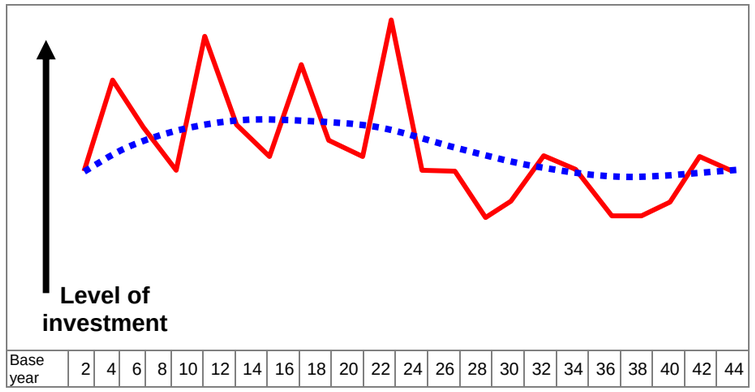
8.1.5 Pace and Phasing of Investment

Based on the optimum renewables development scenario[42], investment in renewable energy related projects and infrastructure in the Highland area over the next 15 years could amount to over £2.8 billion[43]. The pace and phasing of such an investment will have a profound effect upon local communities, business and government. Given an even spread of investment the annual spend would be in the order of £187 million. With the likely scale of imported goods and services estimated at between 50% and 70%, the actual local spend could be between £93m and £130 million. Such spending corresponds to 4-6% of the total GDP for Highland[44].

Such a large proportion of regional economic activity could be easily absorbed into the economy in a sustainable way. More difficulties may arise, however, if the investment is not even, but concentrated into short phases of activity. Such 'boom and bust' cycles undermine the potential to develop sustainable local services and facilities and the level of local content could then drop.

The ability to pace investment may be limited by the timing requirements of the renewables and infrastructure sectors themselves. If access to markets is available, through the grid for example, developers will want to be operational as soon as the grid is available; similarly the grid operators will want to fill capacity as soon as possible. It is likely therefore that the investment cycle will be linked to increasing export capacity potential (See Figure 8.1.1).

Figure 8.1.1 : Schematic investment cycle for renewables developments in Highland



One further factor to consider is what benefits can be accrued from undertaking the planning and design work for projects locally. These phases will, by their nature, fill much of the gap before major investment takes place, with project lead times of 3-5 yrs. Although the total revenue from such activities is not as much as from manufacturing, the actual retention of money in the local vicinity is proportionately better since there are no materials or equipment import costs.

Export of services, expertise and products, particularly where considerable experience has been built up locally, can provide an important additional source of income and industrial activity for the region. Such export markets may well be following different patterns of activity to that in Highland and may, therefore, serve to even out overall levels of industrial activity.

J	O.1 The Council wishes to see a spread of investment over time as far as practical. Based upon the 600 MW 'new build' targets over the next 5 years and an estimated 1.5 GW of onshore wind capacity in the planning process, an annual development target of 120 MW of installed capacity is suggested. ***Joint action with developers***

8.1.6 Interface with neighbouring regions

The Highland area is a major player with regard to renewables due to its large land and sea area and abundant energy resources. With a population of only 200,000, however, it may at times be difficult for the Highland area to influence the renewables and wider energy policy and strategy of national government and agencies. Collaboration with neighbouring island authorities and other local authorities within the Highlands and Islands area and Scotland may be helpful in increasing the effective influence of the lobby.

J	P.1 The Highland Council will work with other neighbouring authorities to develop appropriate joint renewable energy policies and strategies, recognising the strong mutual interests that exist. ***Joint action with adjacent local authorities***

[42] See Chapter 6 of Strategic Environment Assessment document (in press)
[43] Based upon assumed costs of £700,000 per MW installed
[44] Highland Trends, Highland Council, 1997

J P.2 The Highland Council will work with neighbouring authorities to integrate the results of studies into resources, capacity building and market connections. This will maximise the consideration of Highlands and Islands interests at a national level.

Joint action with adjacent local authorities

J P.3 The Highland Council will contribute to joint marketing and lobbying activities within the wider Highlands and Islands area to the mutual benefit of all areas.

Joint action with adjacent local authorities and HIE

J P.4 The numerous benefits of having a coordinated strategy with nearby local authorities include the ability to be proactive towards the industry. Strategic intra-regional collaboration will ensure that overall development pressure throughout the Highlands and Islands is spread out as far as possible, providing maximum potential for sustainable local content to be achieved.

Joint action with adjacent local authorities

8.2 Possible Negative Effects of Renewable Energy Projects

8.2.1 Natural Energy Flows

One of the merits of renewable energy is that it is apparently infinite, with the origins of the energy being the sun, the moon and the inner core of the earth. As Einstein pointed out, however, you cannot create energy, you can merely move it from one place to another and change it from one form to another. Capturing and using renewable energy does take it away from existing natural systems. Figure 8.2.1 gives some details of the types of energy flux that may be affected.

Figure 8.2.1 : List of energy fluxes associated with renewable energy streams

Energy source	Related energy fluxes	
Hydro	- Water levels in rivers	- Drainage of land
Biomass	- Nutrients in soil	- Fixing CO_2
Onshore wind	- Movement of weather - Chill factors	- Evaporation rates - Soil erosion
Offshore wind	- sea surface roughness	- Waves
Wave	- Water column mixing - Sediment re-suspension	- Coastal erosion - Storm surges
Tide	- Regional circulation - Sea levels	- Frontal systems - Transport of plankton
Solar	- Heat flux to ground or water	

So far the relatively small scale of the use of renewable energy sources, and the predominance of wind power, has meant that this issue has not been particularly important. The proportion of energy which it is proposed to extract for wave and tidal power is much greater. The aim is that energy extraction should not significantly affect natural processes which depend upon energy flows arising from waves, tidal currents, and the wind regime.

P Q.1 The Highland Council recognises that although renewable energy production can be sustainable over time there is a limit to the level of energy extraction that can be sustained by natural processes. Within the planning and monitoring of renewable energy projects it will be important to take full account of the energy dissipation resulting from any developments and the possible effects on any physical and ecological processes affected. This will be a particular issue for hydro energy and marine energy projects.

Policy/strategy

8.2.2 Conservation of Natural Heritage & Biodiversity

The Highland area has extensive areas and numerous sites which are designated as conservation areas from a wildlife, geological or landscape, point of view. Renewable energy developments can lead to effects upon habitats, protected species and features both within and outwith designated sites. Many of these features are also at risk from the effects of climate change and renewable energy developments may be part of the solution for combating this. There is therefore a paradox in that renewables may incur adverse localized impacts on conservation sites but they will contribute to widespread, longer term, protection of the whole ecosystem and society's way of life. At present, however, it is believed that there is considerable capacity for renewable energy developments that do not significantly compromise the conservation objectives of designated sites, and such impacts should therefore be avoided.

Table 8.2.1 : List of conservation designations and associated development constraints regarding renewable energy projects

Level	Designation	Description	Development Potential
International landward	World Heritage Site	None at present in Highland area but Cairngorm is a proposed site	No conflict envisaged
	Natura sites & Annex 1 species SPA SAC	NATURA Habitats and Birds Directives including a major contribution by the European Community to implementing the Biodiversity Convention agreed by more than 150 countries at the 1992 Rio Earth Summit Special Protection Areas These areas are of European importance for Wild Birds. Special Areas for Conservation These areas are of European importance for Wild Fauna and Flora. They range from sand dunes and forest to bogs and heathland.	A number of Natura species have strongholds in Highland and are widely distributed in the area. Elevated moorland areas provide a key habitat for many protected species and also provide good areas for wind farms. Foraging areas for some species may extend beyond the boundary of designated sites. Hydro schemes may also create difficulties but are less widespread. Any significant changes to forestry management or crop types may also affect some species, though there could be benefits as well.
	RAMSAR	Wetlands of International Importance (Ramsar) - These sites are internationally important wetland sites protecting wildfowl habitat.	These are less likely to be targets for development except areas for offshore wind which may be advised by SNH as seabird extensions (2km) to breeding colony SPAs
National	SSSI	Site of Special Scientific Interest (SSSI) - These are exemplary places in Scotland for nature conservation. They are special for their plants or animals or habitat, their rocks or landforms or a combination of these.	Wind farms are likely to create difficulties where wildlife and landforms are protected. Vegetation and geological interests may be more easily accommodated. Hydro schemes can affect all types of interest. Bio-energy schemes may also create difficulties if uncultivated land is used
	NNR	National Nature Reserves (NNRs) - All of these sites are important nationally for nature, they are also designated SSSIs.	As above
	National Park	National Parks - The Parks have been established to deliver better management of some of Scotland's most special areas of outstanding natural and cultural heritage	Usually have high visitor numbers as well as conservation pressures. New developments likely to be subject to tight scrutiny. Highland includes part of the Cairngorms National Park (and Authority).
International Seaward	mSAC	Special Areas for Conservation (SAC) These marine areas are of European importance for habitat, Wild Fauna and Flora. They range from mudflats, estuaries and lagoons to offshore sandbanks and cold water coral communities.	Renewable energy development tin the vicinity of marine SACs will have to take account of the conservation objectives for the area and demonstrate that the key habitats and species will not be adversely affected by the development. Some of these areas may also be subject to designation as Marine National Parks at some stage in the future.
Local areas	LNR, MCA, LCA, RSPB & SWT reserves, NTS sites	Local Nature Reserves (LNRs) - They are places with special local natural interest, set up to protect nature, and for people to enjoy and appreciate.	As local designations, there is more flexibility within the planning process to decide upon how these areas are protected. They may be valued more highly at a local level than some of the nationally designated sites.
Other areas of known sensitivity		Nature Conservation (Scotland) Act 2004 Long Distance Routes - These routes provide several days' walking on a continuous route through some of Scotland's finest landscape.	These areas are likely to be heavily used for recreational walking etc and the tourist related interests along such routes are likely to be significant.

P R.1 The Highland Council's aim is to ensure that there is no overall degradation of natural heritage conservation interests in the Highland area arising from renewable energy developments. It recognises that developing low carbon energy systems may be instrumental in protecting certain habitats and species that are threatened through global warming. It is also recognised that renewable energy developments may lead to localised impacts that are detrimental to wildlife and protected species.

In general developments in designated conservation areas and any necessary 'buffer' zones should be avoided. However, there may be circumstances where the energy dividend from a development within such an area is so significant that the overall weight of wider benefits outweighs possible site specific negative impacts. In such circumstances it will be necessary to demonstrate that no alternative development strategies are practical within the Highland area and to unambiguously estimate the pros and cons associated with the development plans.

Wherever possible, renewable energy projects should incorporate positive enhancement of habitats and species associated with development sites in line with wider conservation and biodiversity objectives.

Policy/strategy

8.2.3 Archaeology and Cultural Heritage

Certain areas in Highland are of exceptional archaeological, cultural and historic significance by virtue of the importance, number and location of features, the density of associated monuments/sites and related opportunities for interpretation. These areas span from prehistory to the 19th Century Clearances. Some 42,000 recorded sites have been registered in Highland to date. Buffer zones have been identified to help conserve the most important locations (excluding marine). For the more dense concentrations of sites these buffers aggregate into wider 'landscape' areas but further guidance is required before configuring definitive archaeological heritage areas as suggested in Structure Plan policy BC3. Renewable energy developments, including associated works and access roads, should avoid key sites and their associated landscape settings particularly in heavily visited locations. Minimum interventions are normally sought and developers also need to be able to deal with the masking effect of deep peat. In certain circumstances, appropriate mitigation or enhancement could be achieved by developers improving public access with upgraded parking/interpretation.

P R.2 Devices should be positioned to avoid direct disturbance of scheduled heritage sites and to protect the landscape in the immediate vicinity of prime visited sites. ***Policy/strategy***

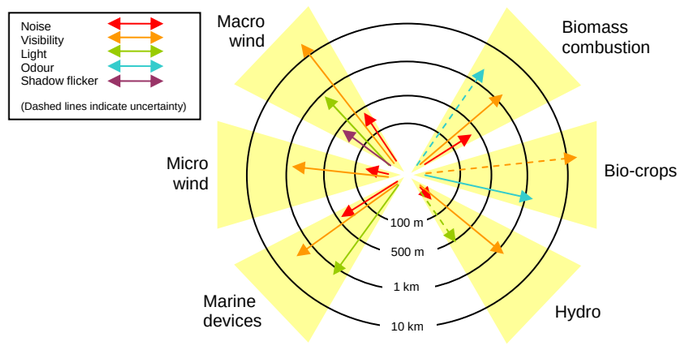
8.2.4 Neighbour Interactions

In principle, energy production should be as close as possible to energy demand. It follows that renewable energy developments should be located near to residential and industrial centres. However, renewable energy technologies can lead to impacts such as noise, odour and 'shadow flicker' that can cause a nuisance if developments are too close to neighbours or are inappropriately designed and operated. Fears of such effects and disturbances play a significant role in the reactions of local people to nearby renewables developments (particularly onshore wind farms). Renewables developments and associated infrastructure developments can also change the character of local areas and neighbourhoods. The aim is to ensure that renewables developments cause negligible nuisance or disruption to neighbours and that there is widespread support within communities for renewable energy projects. Some thresholds for various neighbour interactions are depicted in Figure 8.2.2.

P S.1 Devices should be positioned far enough away from residential areas and working places to avoid direct nuisance and disturbance. Detailed guidance on this matter is included in the Planning Guidelines. ***Policy/strategy***

P S. 2 Devices should be positioned so as to maintain at least a one km separation zone between dwellings and wind turbines.. ***Policy/strategy***

Figure 8.2.2 : Typical near neighbour interactions for different types of renewable energy projects



P S.3 The positioning of devices should also reflect the aesthetics of particular views. Developments should not take place in widely acknowledged and particularly important views, i.e. those generally valued by residents for their lack of other development influences such as wires, poles, signs, buildings, vehicles, or commercial forestry. ***Policy/strategy***

8.2.5 Landscape

Landscape is about the relationship between people and place. It results from the way that different components of our environment, both natural and cultural, interact together and are experienced or perceived by people. Landscape can therefore incorporate a number of aspects including:

Landform *– this relates to factors such as ruggedness, enclosure, orientation, lighting conditions, micro-climates, scale of features and points of interest in terms of variety, shapes, colours, patterns and views.*
Land cover *– this can include aspects such as vegetation, water, rock, soil, water which influence feelings in the observer of space, shelter, level of interest, visual diversity and richness of wildlife.*
Man-made influences *– these may add factors to those mentioned above and can include: buildings; roads, tracks; fields; crops; and "visual litter" such as fences, signs, poles, wires and vehicles.*
Cultural elements *– designations here include Areas of Great Landscape Value and historic gardens and designed landscapes.*
Climate *– this influences not only daylight quality, visibility and plant growth, but also human comfort and one's relationship with the landscape. Weather patterns also lead to change in the landscape, both seasonally and on a daily or hourly basis.*
Ambient qualities *- in addition to some of the more specific factors outlined above the sensed quality of a place can be important, for example particular noises or smells can be characteristic of a place. Feelings of* ***naturalness*** *may result where there is perceivable man made influence and intervention. The experience of* ***'wild land'*** *is an important phenomenon in a Highland context. It is a quality which arises from a response to remoteness, absence of obvious human artefacts and influences, and (often) openness as well as timelessness.*

The Highlands are renowned for their distinct and diverse range of landscapes, many of which are appreciated and held in high regard as a significant part of our natural and cultural heritage. These landscapes are an important resource that contributes to the social and economic well-being of the area. They provide the surroundings for people's daily lives, affecting their quality of life and the area's economic performance. They also provide the special places whose character and scenic quality are the main attractions for outdoor recreation and tourism.

Some landscapes merit special protection, and designation is an important tool to guide and manage change sensitively. The landscapes considered to be of national importance are designated as National Scenic Areas, National Parks or World Heritage sites. Additional designations include Areas of Great Landscape Value, Historic Gardens and Designed Landscapes.

The way that landscape is experienced by those who are dependent upon it, as well as by those who visit, may differ, and all viewpoints should be taken into account. Landscapes also change naturally, and the term 'landscape change' can encompass a spectrum from that which modifies, but which is accommodated, to that which transforms a landscape's character and creates a different landscape type.

Renewable energy projects have the potential to cause this full spectrum of change from modification to distinct transformation. Consideration of the landscape influence of renewable energy schemes is therefore very important. This may be as true, for example, for a small hydro project as for a large wind farm.

The locations of the preferred development areas for both larger (national/major) wind farms and for local scale developments avoid designated landscape areas. However, wind farms outwith, but close to, designated places can have an impact upon the landscape experience within these areas and careful assessment of any effect on a designated site is required. Close regard must also be had for cumulative impacts.

P T.1 It is the Council's aim to avoid intrusive development of windfarms that would affect designated landscape areas. It will also seek to minimise intrusion by renewable developments into historical and other particularly sensitive landscapes. Where developments do take place, the Council will seek design options which are sympathetic to existing landscape character. ***Policy/strategy***

P T.2 Any development plans should recognise the landscape interests of the proposed site, investigate the impacts that would arise from development and introduce mitigating measures where possible, to avoid unnecessary landscape degradation. Where landscape quality can be enhanced by developments, full benefit should be sought. ***Policy/strategy***

8.2.6 Visibility

Visibility refers to the range over which a particular object may be seen, how big it is in the field of view and the parts of the object that may be visible from different angles and distances. It may also include consideration of weather and lighting conditions.

Many objects in the landscape are highly visible, such as buildings, vehicles, masts, farm infrastructure and roads. The nature of renewable energy distribution - dispersed and often with best generation potential in highly visible areas - means that renewables developments will, in most cases, be seen.

The extent to which this visibility is accepted depends upon the distance of the objects from the viewer, the size and arrangement of the objects and the backdrop to the objects. Wave or tidal devices in a rough sea may be very difficult to pick out; wind turbines at, say, a 10 km range will be very small in the field of view and may have reduced visibility on many days due to

prevailing weather conditions. Structures on a horizon, however, may be easily seen.

The extent of visibility is often analysed using an assessment of the Zone of Visual Influence (ZVI). This provides a rough guide to the extent of visibility (i.e. as if from the air), but unless surface features such as woodland, trees, buildings or the angle of view possible from inside a car, for example, are taken into account, the actual visibility is likely to be more restricted.

The ZVI can, however, give an insight to the pattern of visibility. In an undulating or mountainous terrain visible corridors may be quite narrow at low levels, i.e. along glens and when crossing ridges. In flat areas visibility will be more universal with pockets of inhibited views in the shadow of any objects or relief features. Along escarpments and from isolated hills visibility may be universal over large arcs.

Other features of visibility relate to cumulative and sequential visual experience. If more than one renewable development can be seen from a certain point, it may be considered more detrimental than seeing just one. If renewable developments are continually/repeatedly seen along a route, that could be considered more intrusive than seeing more objects clustered in one place. These can be matters of subjective and variable opinion. SNH has published Guidance on Cumulative Landscape and Visual Impact Assessment for Windfarm Developments during the EIA process.

Clearly, therefore, visibility combines objective measurement and subjective judgement. Visibility can be managed, however, and visually sensitive sites or locations can be avoided or screened. The overall aim of doing this is to ensure that visibility is contained within an agreed acceptable area and that especially visually sensitive sites are avoided.

P U.1 The pattern of renewables developments proposed in the Highland area balances many different features and factors regarding visibility. In establishing patterns of development that tend to concentrate around high energy density areas, the Council has taken a view that cumulative visibility of larger scale developments in a few localised areas is preferable to developments being scattered across the area. It is, however, also recognised that smaller scale renewable developments are likely to become ubiquitous across Highland in the future and will come to be seen as a prudent response to the challenges created by global warming.
Policy/strategy

P U.2 The cumulative zone of visual influence (ZVI) within a 10 km range for large (national and major) onshore renewables projects should be less than 10% of the land area of Highland.
Policy/strategy

J U.3 The visual and landscape sensitivity of areas to renewable developments should be mapped and published within the relevant planning guidance documents. *Joint action with SNH and HS*

8.2.7 Wild Land

Wildness is a concept which is increasingly recognised as being of value and a resource which is rare and under pressure. The relevant national planning policy guidance (NPPG 14) defines wild land as: “uninhabited and often relatively inaccessible countryside where the influence of human activity on the character and quality of the environment has been minimal”. SNH’s has published a policy statement on “Wildness in Scotland’s Countryside”. The Highlands of Scotland are seen by many as an area where people can get as close to wildness as is possible in the UK and, indeed, in many parts of Europe. Any kind of development in such areas, even the construction of tracks and paths can alter the character of the place and, more materially, the number of people that reach such places and the modes of travel used.

Over the last few decades a significant number of access roads have been built in remote Highland areas, primarily to enhance access for shooting parties. In addition, the boom in forestry developments in the 1980s has led to improved access to many previously remote areas.

The development of hydro schemes throughout the 20th Century has greatly increased access to the glens of the central Highlands. Wind farm schemes, when situated on exposed ridges and hills, are likely to involve providing improved access tracks or paths to previously inaccessible areas.

Managing the expansion of vehicle access, in particular, is a key concern, but pressures, such as erosion, from walkers can also be intense on popular routes.

Views within, or from, a wild land area, contribute to the sense of wildness. Wind farms that are either within a wild land area or are clearly visible from it may impact upon that quality. There is value in having parts of the landscape that are free from modern development pressures.

P V.1 Developments of new renewables projects should safeguard the wildest areas of Highland from further direct development pressures, including any access tracks to adjacent areas.
Policy/strategy

P V.2 The indirect effects of renewables development, especially wind farms, located outwith areas with qualities of wildness, but visible from them, will be taken into account, especially if viewing distances are relatively close. *Policy/strategy*

P V.3 The preferred pattern of development is to encourage the clustering of renewable energy developments, so as to avoid the undue spread of technology influences into semi-wild areas of Highland. *Policy/strategy*

8.2.8 Amenity Interests

The Highland area is a ‘mecca’ for many types of amenity activity, from relatively passive car touring, boating, painting or photography to a whole range of physical pursuits such as walking, mountaineering, sailing and skiing. The Highland landscape and climate are key factors to many of these pursuits and renewable energy projects with their associated activities could influence a number of them.

From an assessment of the likely level of interaction between different types of activity and possible renewable energy influences it is apparent, however, that relatively few of the activities undertaken would be materially affected by renewables developments. With regard to walking, there are a number of specific attractions in the region such as the Munros, Corbetts and other popular hills, together with designated Long Distance Routes and other footpaths. Visual impact from these recognised locations needs to be taken into account. For a number of activities the wider environmental and landscape quality is important but the key areas are already recognised within existing designations and demarcations.

Many of these amenity activities bring significant economic benefits to the Highland area through fees for undertaking a particular activity, and in terms of local spend by the participants. There are therefore two groups of interest with regard to amenity activities: those who directly participate in them and those who rely upon the participants.

Another factor to consider is that some of the more active sporting activities are strongly linked to climatic conditions and may change in terms of level of interest and location as global warming trends develop. Skiing is the most obvious casualty, but long distance walking, winter mountain walking, sailing/boating and beach-based activities may be influenced positively or negatively by long term weather factors.

P W.1 Renewable energy developments should be sympathetic to the aesthetic qualities valued in the Highland landscapes and seascapes and should not restrict or inhibit leisure, recreation and visitor activities. *Policy/strategy*

8.2.9 Other Commercial Users

The Highland area currently has a thriving economy based upon a diversity of activities but fundamentally founded upon the natural resources of the region. Such sectors already include forestry, fishing, agriculture, aquaculture, hydro power supply and tourism.

Many of these activities are engaged in some way with renewable energy developments. There can be numerous synergies and ‘win:win’ situations with such industries. Farmers can benefit from a diversification of incomes; fisheries may benefit from artificial reef structures; aquaculture may benefit from offshore infrastructure; the oil and gas sector may see life extension opportunities such as carbon sequestration related to renewable energy, and onshore aquaculture could use excess energy production.

There are also areas where there could be a direct conflict of uses or where renewable energy and other activities are mutually exclusive. Some tourism and activity-based industries may see renewables as a conflict; shipping may find added navigation hazards difficult to handle and trawl fisheries may find it difficult to fish near marine renewables projects.

P X.1 Renewable energy developments should not interfere with existing commercial activities. However, where there are clear advantages and the scale of benefits from renewables developments outweighs existing levels of activity, then a suitable compromise/transition between the two commercial activities may be sought. *Policy/strategy*

J X.2 Seek out ‘win:win’ situations, where core business benefits directly or indirectly from embracing renewables technologies.
In partnership with local industry

8.2.10 Public Attitudes to Renewables

The present reputation of renewables as a sector is dominated by onshore wind. Although there is a consistent polled majority in favour of wind farms, there is also a committed and vocal minority particularly opposed to onshore wind turbine development.

The Highland Council has already committed itself to supporting the principle of renewable energy within its Structure Plan. In fulfilling this strategy it is important that the case for supporting renewables is communicated and that quality information to justify this is put into the public domain. People can then make judgements about the appropriateness of the policy in the context of a fully informed opinion.

It is important in informing public opinion that a full and balanced set of information is provided. Examples of good and bad practices need to be communicated and compared to the consequences of the energy alternatives that society has to face.

It is hoped that the future development of the sector will be seen as a model of good planning and management practices, thus bolstering the reputation of renewables development in Scotland, the UK and further afield.
A key element of maintaining a positive public attitude to any activity is to communicate the level of performance that is being achieved transparently and clearly. Regular reports of the progress of the renewables strategy should be made. These will include the following key factors:

- Capacity and power output targets;
- Overall capacity & power availability – shown as a power output curve;
- Applications & consents;
- Developers' compliance with planning conditions;
- Key issues arising;
- Opinion monitoring – including any complaints;
- Visitor numbers;
- Biodiversity measures;
- Cumulative landscape ZVI envelopes at 10 km.

J	Y.1 In order to ensure that stakeholders within the Highland area have the best possible information available, The Highland Council will support information initiatives that engage with and inform local opinion. The Council will also pass on understanding and experiences from within the area to other areas where appropriate. ***Joint action with developers and HIE***
P	Y.2 Public opinion is a key factor relating to renewables development. The Highland Council will continue to monitor public opinion through the views of Councillors, through the seeking of public opinion about all issues, through periodic special studies and through being aware of studies undertaken by others in the region or elsewhere. ***Policy/strategy***
R	Y.3 It is believed that many of the concerns raised by those who currently oppose renewables developments can be resolved once the standards of project design and operation inspire more public confidence. It is therefore important that projects undertaken in Highland follow good/best practice in their respective fields in order to gain the increased confidence of the general public. ***Recommendation***
P	Y.4 Public reporting - In order to provide the public with clear information about the performance and influences of renewables, The Highland Council will publish an annual status report with the key factors relating to renewable energy developments. Ongoing status reports will be maintained on The Highland Council website. ***Policy/strategy***

9 Detailed Policy - Outcomes

9.1 Infrastructure and Other Issues

9.1.1 Grid Maintenance and Expansion

Although The Highland Council has no direct responsibilities for maintaining or developing the grid, it is involved in planning processes for grid construction and upgrade projects. The current and possible future grid configuration is a key issue of concern within local communities, and particularly for those who live near major high voltage grid routes.

The grid can influence the Highland area in a number of ways.

- In the short to medium term, the capacity of the grid determines the overall level of renewable energy developments that are viable;
- The grid's route and the location of its connection points will be a key factor in determining where renewable energy projects are feasible;
- The grid itself impacts upon the environment through which it passes and there are increasing demands for more sympathetic methods of construction to be used.

The Council believes that the grid should be seen as a means of facilitating approved or desired development, but should not determine development potential and distribution in itself.

As well as considering grid issues with the Highland area it is recognised that many of the grid based energy export options for the Northern and Western Isles may involve using grid capacity within Highland. Two key issues arise here: that the island requirements may lead to pressure for new high voltage grid routes to be established; that electricity from the islands may displace capacity that could be developed within Highland itself.

The possible grid connections to the Western Isles have, in particular, led to detailed discussion by The Highland Council due to the potential impacts of some of the route options. The position of the Council was set out at the November 2004 PDET Committee meeting[45] as follows:

1 That Scottish Hydro Electric Transmission Ltd be advised generally to explore sub-sea, underground and hydrogen fuel cell alternative options to overhead proposals currently being consulted upon and these options should include a spinal link to the Western Isles thence a sub-sea crossing to the mainland;
2 That any spare capacity in the existing transmission line from the Western Isles should be harnessed before considering the need for an expanded link;
3 That any future link for the Northern Isles should be considered at the same time as this Western Isles work;
4 That the options from Hallin across Skye to Fort Augustus, from Ullapool (Ardmair or Loch Broom) to Beauly and Scourie/Kylestrome to Beauly should all be considered as unacceptable;
5 That SHETL should carry out further work on the Melvich-Beauly option, but on the basis of one eventual tower line only, an alternative landfall potentially at Dounreay where there are already existing industrial uses, possible undergrounding of sensitive sections and a combined analysis with any Northern Isles link;
6 That decisions on any high voltage transmission links through the Highland Council area must be taken concurrently with decisions on major generation proposals in the Western Isles and not consecutively.

Proposed grid alterations will place a significant burden on the Highland area for little economic gain in pursuit of national energy targets. Expectation is mounting that communities affected by transmission grid enhancement and upgrading should also receive a "goodwill" contribution that mirrors the community benefit donation offered by many renewable energy developers. The Council has obtained in-principle support from other local authorities for a campaign to secure community benefit from grid alterations.

The question of 'local content' in works associated with grid enhancement is also a matter of considerable interest to the Highland area. Certain works can clearly be provided locally from existing capacity. There may, however, be additional benefits in developing capacity in areas such as galvanising, for example.

As well as these policy issues associated with the grid, there are practical aspects associated with grid routing, capacity and upgrade potential. At present the grid network is saturated with existing demand and issued grid connections. In anticipation of future requirements for greater grid capacity, consideration is being given to upgrading the grid network. The first stage in this development is likely to be the upgrade to the Beauly to Denny grid connection, an initiative that is being actively planned. Further upgrade work may include adding lines to partially filled pylon routes or increasing the carrying capacity of existing pylon routes. These developments are likely to take place over the next 10 years and will determine to a large extent the level of energy export and, therefore, the level of generation capacity that will be installed.

Figure 9.1.1 provides an illustration of the core grid network and indicates the 'stepped' development of capacity that will arise as any upgrades are undertaken. The 2010 upgrade assumes the following measures are in place:

- A rebuild of the 132kV Beauly-Denny line to increase its capacity to 400kV;
- The currently vacant, second side of the Beauly-Dounreay line is strung with 275kV lines;
- New conductors are substituted onto the Beauly-Blackhillock 275kV line, increasing its capacity.

The 2015 scenario assumes that the following additional measures have been introduced:

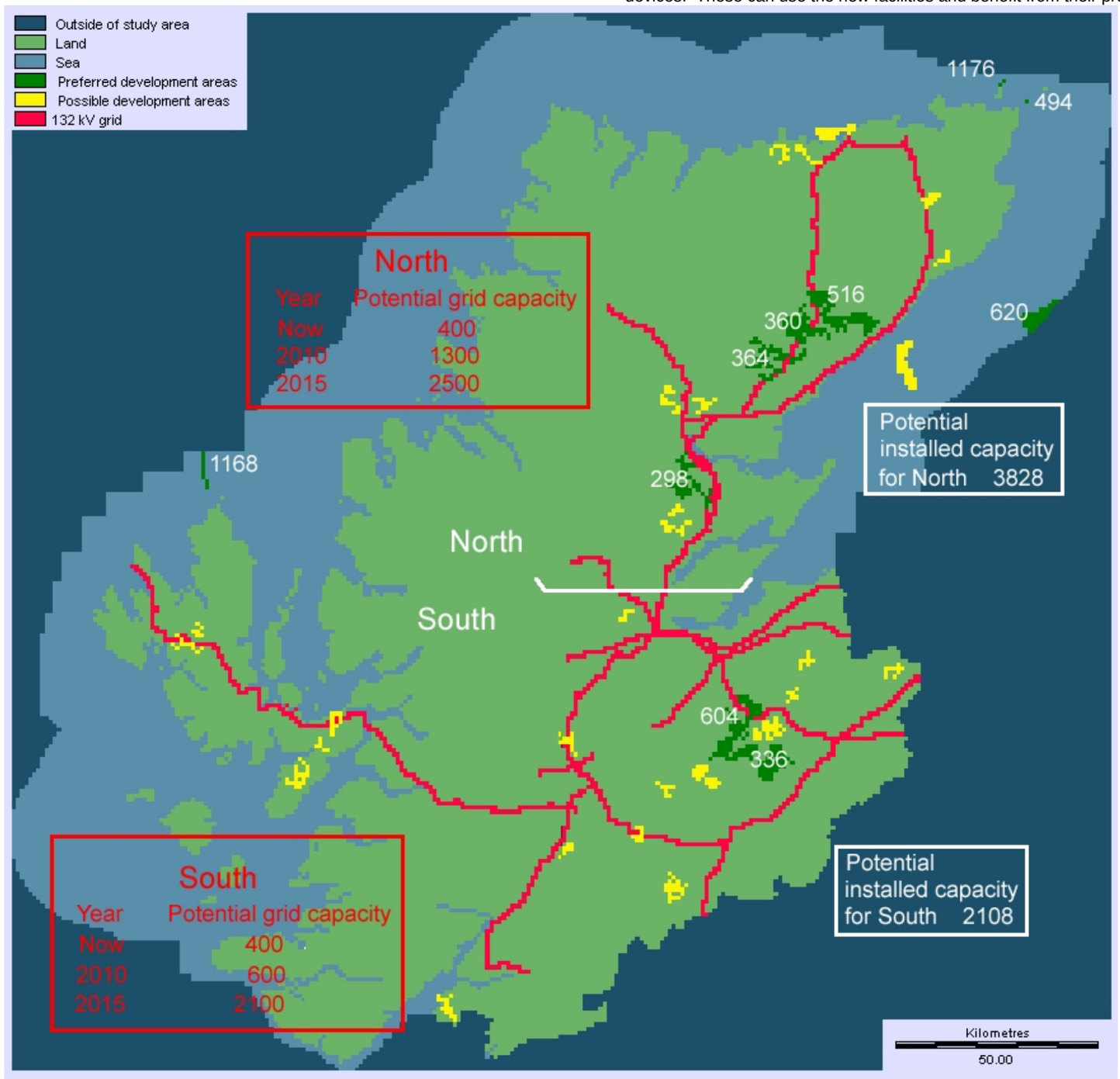
- Rebuild of the existing 132kV coastal line between Beauly-Dounreay to 275kV capacity;
- Rebuild of one of the existing 132kV lines between Beauly-Keith to 400kV;
- Upgrade of the existing East Coast 275kV circuit to 400kV.

It is suggested that this existing network provides the most likely basis for any future enhancement works, the preferred method being to increase the capacity of existing routes, rather than develop new routes.

R	Z.1 The Council supports **upgrades to the existing grid corridors** rather than creating new grid corridors wherever practical. Where upgrades are undertaken, full consideration should be given to incorporating improvements in routing and methods of construction so as to reduce the risk of potentially negative impacts. ***Recommendation***
R	Z.2 Transmission of electricity from adjacent islands – where spare capacity can be provided without expansion of the grid infrastructure, transmission of island energy through the existing grid system and associated upgrades is acceptable. Where large capacities are required for island energy, requiring new or expanded routes or limiting the development potential within the Highland area, alternative export routes such as subsea cables are preferred. ***Recommendation***

[45] The Highland Council, PDET Committee minutes, 17th Nov 2004

Figure 9.1.1 : Distribution of prospective renewables development areas in relation to the potential capacity of an enhanced transmission grid network



9.1.2 Infrastructure Requirements

Infrastructure investments are continually needed to maintain existing facilities and to develop new ones. Some of these may be directly related to facilitating renewable energy developments, such as new roads, stronger bridges and expanded dock areas. Other infrastructure investments may provide opportunities to incorporate deployment of renewable energy devices. These can use the new facilities and benefit from their presence, and also provide an energy and revenue stream. Examples of this latter option include wave converters in breakwaters, tidal energy converters under bridges or in tunnels/causeways and wind turbines built into or alongside new structures. It is believed that this will ensure the development of infrastructure that best suits the future needs for the region and wider community.

P	AA.1 The Council will examine opportunities for incorporating renewable energy generation projects in all major infrastructure projects**.** Where clear or important benefits can be demonstrated the Council will incorporate these ideas into projects under its control. ***Policy/strategy***

J	AA.2 The Council will promote the incorporation of renewables technologies into infrastructure projects for which other organisations are responsible. ***Joint action with other developers***

9.1.3 Diversifying Energy Markets

The current grid configuration in the UK was designed for centralised power production, mostly near to centres of population and energy demand. Re-configuring the grid for a more dispersed form of energy production in different areas of the country will mean significant upgrades to the transmission and distribution grid systems.

The preferred mode of energy export for the Highland area at present is through the electricity grid. It is recognised, however, that there are no guarantees that the necessary grid upgrades will be made quickly. In addition, energy conversion to 'novel' fuels such as hydrogen and methanol may provide medium and longer term opportunities for exporting energy from an energy-rich area such as Highland.

Attracting energy intensive industries to an area of abundant and cheap energy production such as Highland, provides another alternative market for local energy. Although grid supplied electricity is unlikely to be competitive, an off grid supply from a renewable source could be of interest, particularly if suitable back-up/storage can be found to meet demand requirements or, conversely, if demand levels can be varied according to supply conditions. Energy intensive industries[46] include:

• Steel • Chemicals • Paper	• Glass • Ceramics • Gypsum	• China Clay • Aluminium

In order to safeguard the full development potential for the Highland area, alternatives to grid based delivery of energy to the market place need to be investigated, evaluated and pursued where viable.

P	AB.1 The Highland Council will actively investigate the potential alternatives to grid based export of electricity for renewable energy. The aim is to ensure a suitable route to market for the energy that can be produced in Highland, whilst taking account of community, environmental and aesthetic needs. ***Policy/strategy***

9.1.4 Energy systems

It is clear that various factors define the efficiency and suitability of energy supply. 'Lifecycle' assessments provide a valuable insight into these factors, often focusing upon issues such as energy inputs and outputs, carbon balances, and cost per unit of energy. What these comparisons often fail to acknowledge is the investment over time that has been put into existing

[46] Energy Intensive Industries Group

energy systems centrally, at a local and an individual level. Oil platforms, super tankers, coal mines, forests, refineries, power stations, the electrical grid network, gas distribution network, fuel road tankers, petrol stations, heating oil tanks, vehicles, coal bunkers and storage heaters are all investments that have been made in our energy distribution systems.

In considering future energy provision there is a need to look forward to new and improved ways of providing and using energy, rather than being constrained by systems established for energy sources in the past. Energy supply systems that are dispersed and low in resource requirements are likely to be preferable in meeting tomorrow's energy challenges.

R	AC.1 Proposals for any new energy projects, and continuing use of existing energy systems, should be reviewed to confirm their suitability for the development of more sustainable communities and a low carbon economy. *Recommendation*

R	AC.2 In developing local energy systems, care should be taken not to put undue burden on other energy systems that may be interconnected through back-up supply or as markets for excess production. *Recommendation*

9.1.5 Use of Energy and Energy Markets

Society is using energy at a level that is unprecedented and unsustainable. In the UK our electrical energy consumption is increasing by about 2% per year[47]. Renewables represent a source of low carbon energy that can provide a proportion of our energy needs. It is essential, however, that new renewables production does not merely service the presently growing demand for energy, but that it replaces existing conventional energy production. Existing renewables targets are expressed in terms of electricity supply. It is believed that targets should also be developed that cover energy uses and markets. The strategies established by The Highland Council should support the transition to low carbon energy across the whole spectrum of energy use. It is believed that by helping to create a commercial market for low and no carbon technologies the Council will also help to stimulate a market for private companies and individuals to invest in such technology.

P	AD.1 The Councils aim is for Highland to have a reducing regional energy demand ratio* by 2010 and to continue to improve performance year on year until a 50% reduction in energy use compared to 2005 is achieved. (*energy demand ratio is expressed as kWh/£GDP or kWh/head). *Policy/strategy*

P	AD.2 The Council will promote the use of low or no carbon technology in new housing and public buildings where reasonable payback periods can be shown. Evaluation of cost/benefit will also be made when installing clean technologies during maintenance and refurbishment of properties owned by the Council. *Policy/strategy*

J	AD.3 An energy audit for Highland should be completed and mechanisms established to ensure that the quantification of energy supply and demand can be updated easily on an annual basis. *Joint action with HIE and local industry*

[47] UK energy statistics

10 Implementation and Evaluation

10.1 Introduction

The sections above have outlined the key strategic areas and the objectives that have been set in each of these areas. This section examines how these objectives will be achieved in practice, and the targets and measures that will be used to judge performance. This is achieved by firstly introducing the key stakeholders in the strategy, then considering the roles and responsibilities they can fulfil and, finally, considering an action plan for implementation.

10.2 Key Stakeholders

The Highland Council

This renewable energy strategy has been prepared by The Highland Council. The Council has clear policy guidance in this area from their Structure Plan document. The strategy considers in detail how the Structure Plan objectives will be fulfilled. Many of the areas of activity identified within the renewables strategy are under direct Council control, including factors such as planning for smaller developments, energy efficiency in housing and how the Council itself acts. Others are areas of shared responsibilities with other agencies such as planning for larger developments, economic and industry sector developments. There is a further area where the Council's role is more of influential in nature, for example, in facilitating local participation in, and local content of, projects.

The Public

The public have a critical role to play in the successful implementation of this renewables strategy. Many of the issues raised will require a shift in attitudes and ways of living to overcome engrained behaviours. This goes far beyond whether or not individuals like the look of wind turbines. It is about the use of resources, demand for growth and natural tendency to desire ever-higher standards of living. All the evidence suggests that if society is to be sustainable for even the short term, energy demand must be reduced, the ways in which energy is used and attitudes to its production must change. In addition, the public at large have a key role to play as scrutineers of actions taken to implement the strategy, to ensure that they are broadly acceptable in the first place, and implemented responsibly.

Highlands and Islands Enterprise

As the overarching economic development agency for Highland and adjacent areas, Highlands and Islands Enterprise **(**HIE) has a critical role to play in co-ordinating activities across its wide area of jurisdiction, and, at a Local Enterprise Company (LEC) level, to facilitate development and economic activity within individual communities. In addition, HIE is consulted on many of the larger political decisions and its voice is important in terms of the outcomes from such processes. HIE also has a specific role as a funding body which can help shape future opportunities through the prudent investment of money today.

The Scottish Executive

The Scottish Executive is the main national legislative body for planning and development, producing national policies, frameworks and guidance and advice notes. It also provides funding to enterprise agencies and local authorities for implementation of regional development and is directly responsible for the permissions process for all national scale developments and planning appeals. Bioenergy development also comes under its remit, along with supervision of a large number of regulatory agencies.

Scottish Natural Heritage

As the Scottish Executive's advisory body on natural heritage and conservation issues, Scottish Natural Heritage (SNH) has a crucial role to play in the development of the renewables industry. It is the body responsible for the maintenance and enhancement of the notified features of designated natural heritage sites, though many of these responsibilities are shared with other public bodies, including The Highland Council. It also has a significant advisory role, including assistance to landowners and other stakeholders for management of designated land in the Highlands. A further key part of SNH's remit is consideration of the balance between the wider future needs of the ecosystem and the short term, more localised pressures arising from specific project developments.

Fisheries Committee

The Fisheries Committee is an advisory public body constituted under the Electricity Act 1989. Its statutory remit is to advise and assist Ministers and persons engaging in the generation of hydro-electric power on any questions affecting fisheries or stocks of fish. Hydro schemes of less than 1 MW are subject to the 1994 Regulations on fish passes and screens and consultation by developers with the Committee are voluntary. Bigger schemes are subject to S36 of the Electricity Act 1989 and consultation by developers is mandatory. The Committee also advises on fishery effects of cooling water systems used by thermal generating stations. The Scottish Executive has determined that wave and tidal schemes being 'generating stations wholly or mainly driven by water' also fall within the Committee's statutory remit.

VisitScotland and Other Industry Groups

All sectors of industry have a role to play in delivering a successful renewable energy strategy for Highland. The existing primary industries of the area, such as tourism, need to give sound guidance as to the pressures and opportunities that this sector faces in relation to renewables development. Often, change is considered to be threatening, and yet any commercial or industrial activity is reliant upon a degree of change for its competitiveness and well being. The challenge of change is to make sure it provides maximum benefit for least disadvantage. Renewable energy provides an excellent opportunity for promotion and development across many economic sectors, including tourism.

Cairngorms National Park

The Cairngorms National Park was the second such area to be designated in Scotland. The Park is the planning authority for planning applications which it 'calls in' for determination. Consultations are also underway on the first Draft Park Plan which once approved will set out a layer of policies for consideration by prospective developers and other interested parties. The Park Authority may also be consulted on proposals in neighbouring localities.

Renewables Industry

The renewables sector itself has a key and pivotal role in delivering this strategy. The strategy has been formulated, in part, in response to some inadequacies in the way the sector has developed so far. Absence of national or regional development strategies, and inconsistencies and poor quality in planning processes, can lead to a lack of public confidence which will affect the whole industry, including those who are striving to provide good and acceptable developments. The industry needs to adopt codes of conduct that ensure better performance is the norm. The issues raised by this strategy for the Highlands go beyond those considered to date by the industry – it is important, therefore, that the renewables sector fully embraces all aspects of sustainable development in today's society and gives balanced consideration to the ecological, social and economic aspects of its communities. By seeking better alignment between the industry and

stakeholders, many of the issues that have beset the industry over recent years can be managed effectively for everyone's long term benefit.

10.3 Roles and Responsibilities

There are a number of functions that can be fulfilled by the various contributors to the strategy implementation process:

Leaders – have a core responsibility for delivery and will need to ensure resources are available to manage and monitor the requisite processes;
Facilitators – will provide monetary or other resources to help ensure that required activities are undertaken;
Implementers – will undertake specific tasks and roles within the strategic framework;
Auditors – will check that the actions have been fulfilled in line with performance targets set.

The relationships that exist between these different roles and their place in the overall development cycle are shown in Figure 10.4.1.

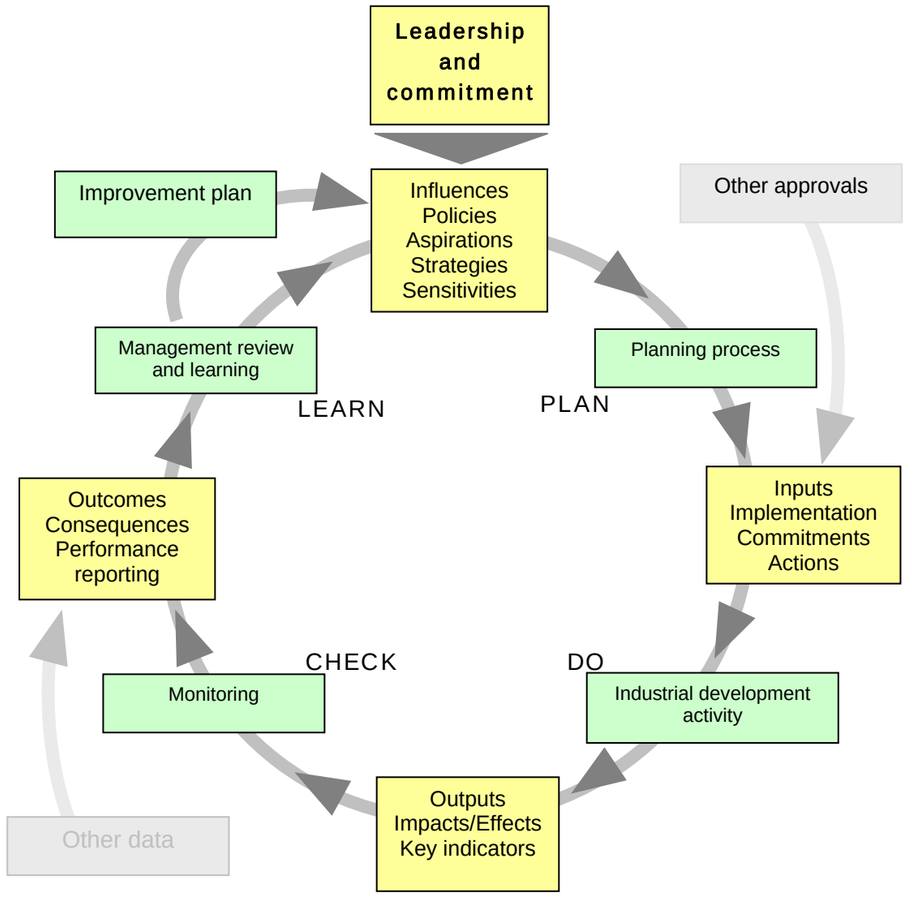
10.4 Priority and Timescales

The strategic actions that have been described, and the outcomes that may arise from this renewable energy strategy, will take place over the next 20 - 30 years. With such a large time range it is important that the key milestones are specifically set, since some may need to be completed before another can begin. In the context of this strategy 3 timescales have been defined as outlined below:

Short term – up to 2010
Medium term – up to 2020
Long term/end point – up to 2050

It should be noted that the strategy will be reviewed on a 5-yearly cycle upon its completion. This will allow updating of predictions and strategies as time passes.

Figure 10.4.1 : The plan/do/check/learn stages to apply to strategy implementation

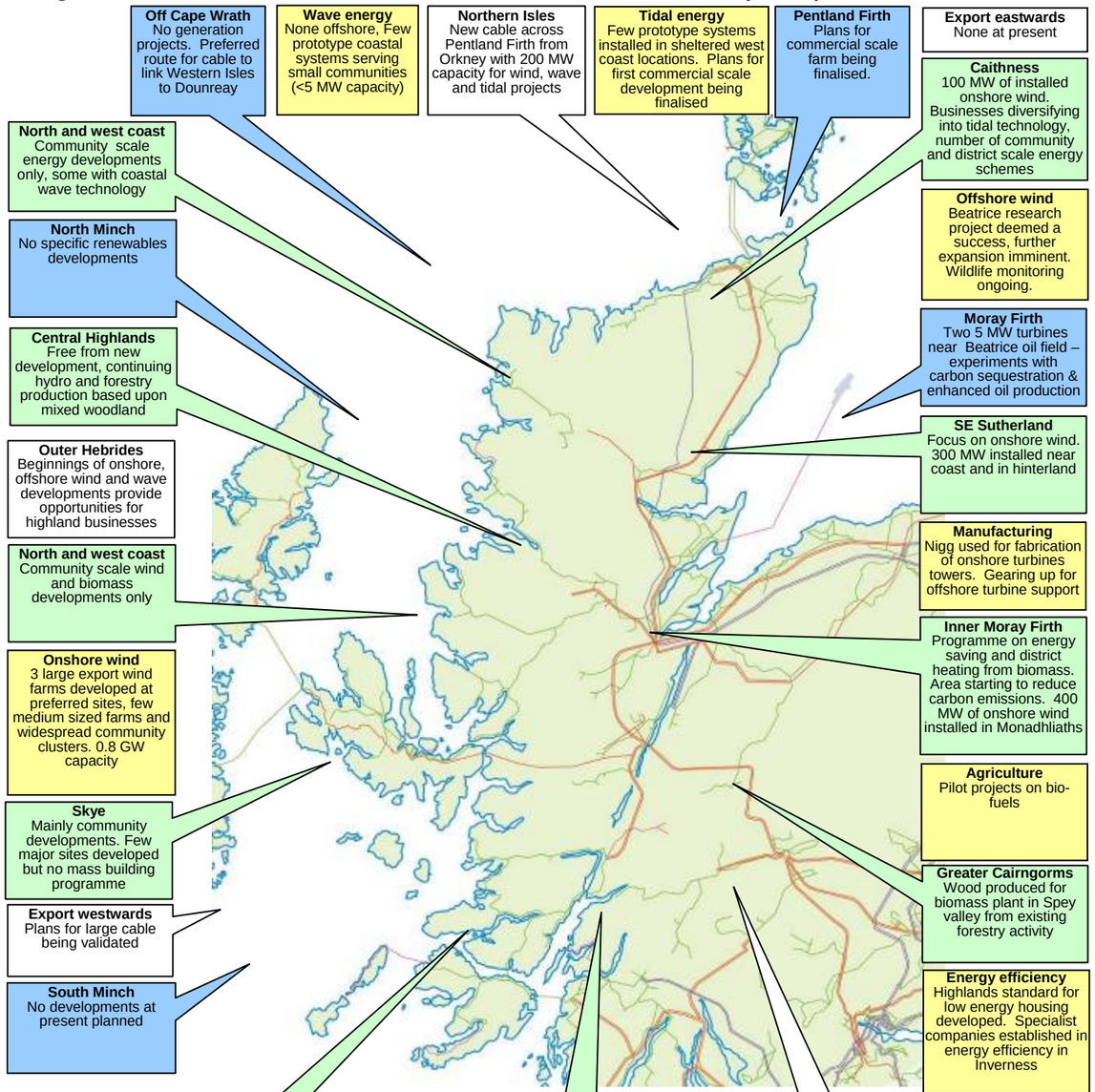


11 Overall and Sub-Regional Development Scenarios

The previous sections have reviewed in detail the foundation strategies for the renewables sector in Highland. This section takes an integrated view over what these strategies could deliver as a possible development scenario. Three future snapshots have been developed for 2010, 2020 and 2050.

Within each scenario the likely geographical pattern of development has been outlined, along with the contribution expected from each technology. Details of the infrastructure developments envisaged have also been provided. Finally, the consequences of the development scenario, in terms of various industry sectors and environmental status, have also been indicated.

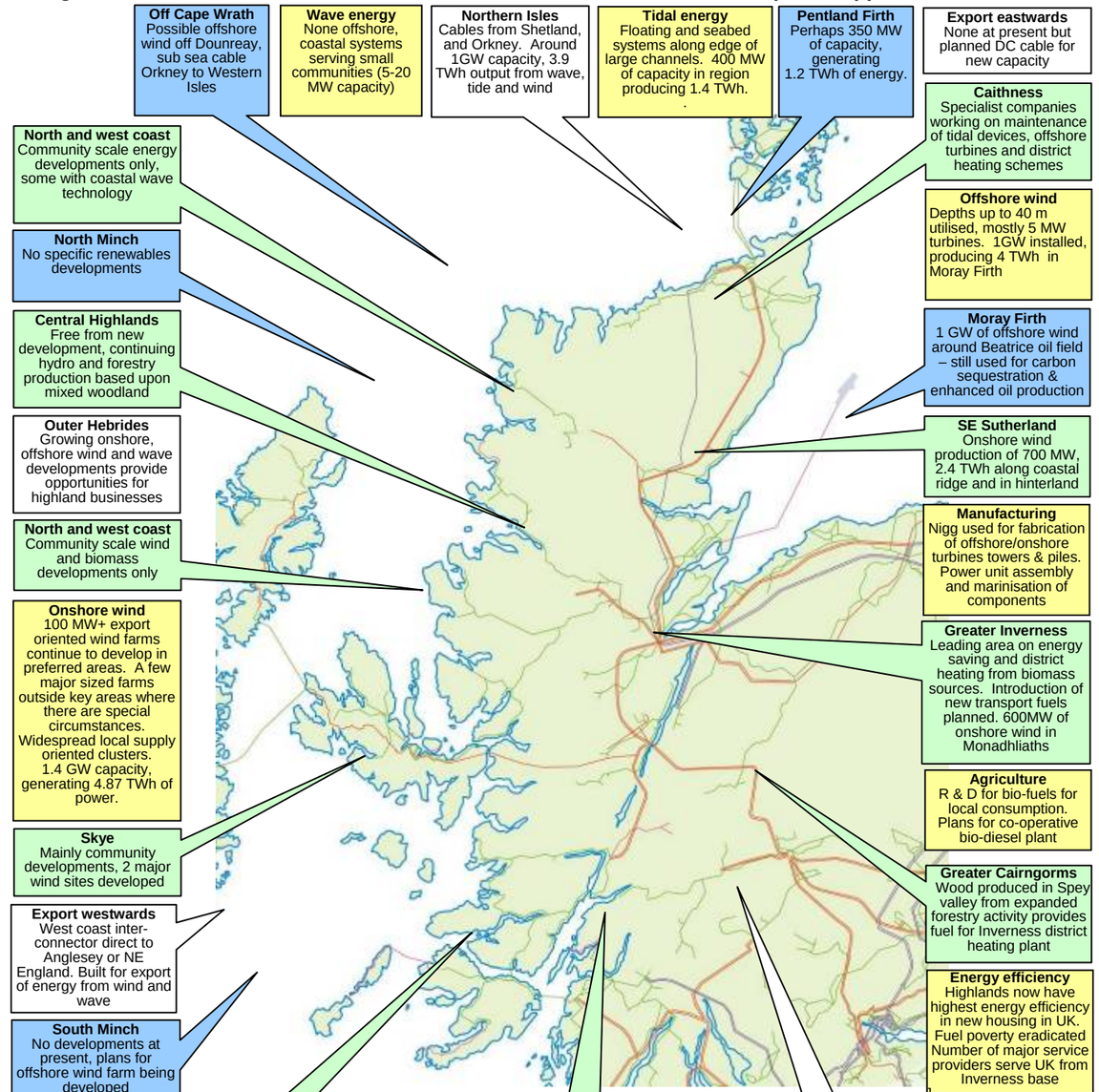
Figure 11.1.1 : Potential Renewables Vision for 2010 – Short term development potential



Key statistics for Highland: Renewables capacity (inc. Hydro) – 1.28GW; renewables power output – 3.5TWh

Landward | **Sea areas** | **Infrastructure** | **Resource types** | **Industry sectors** | **Sustainability**

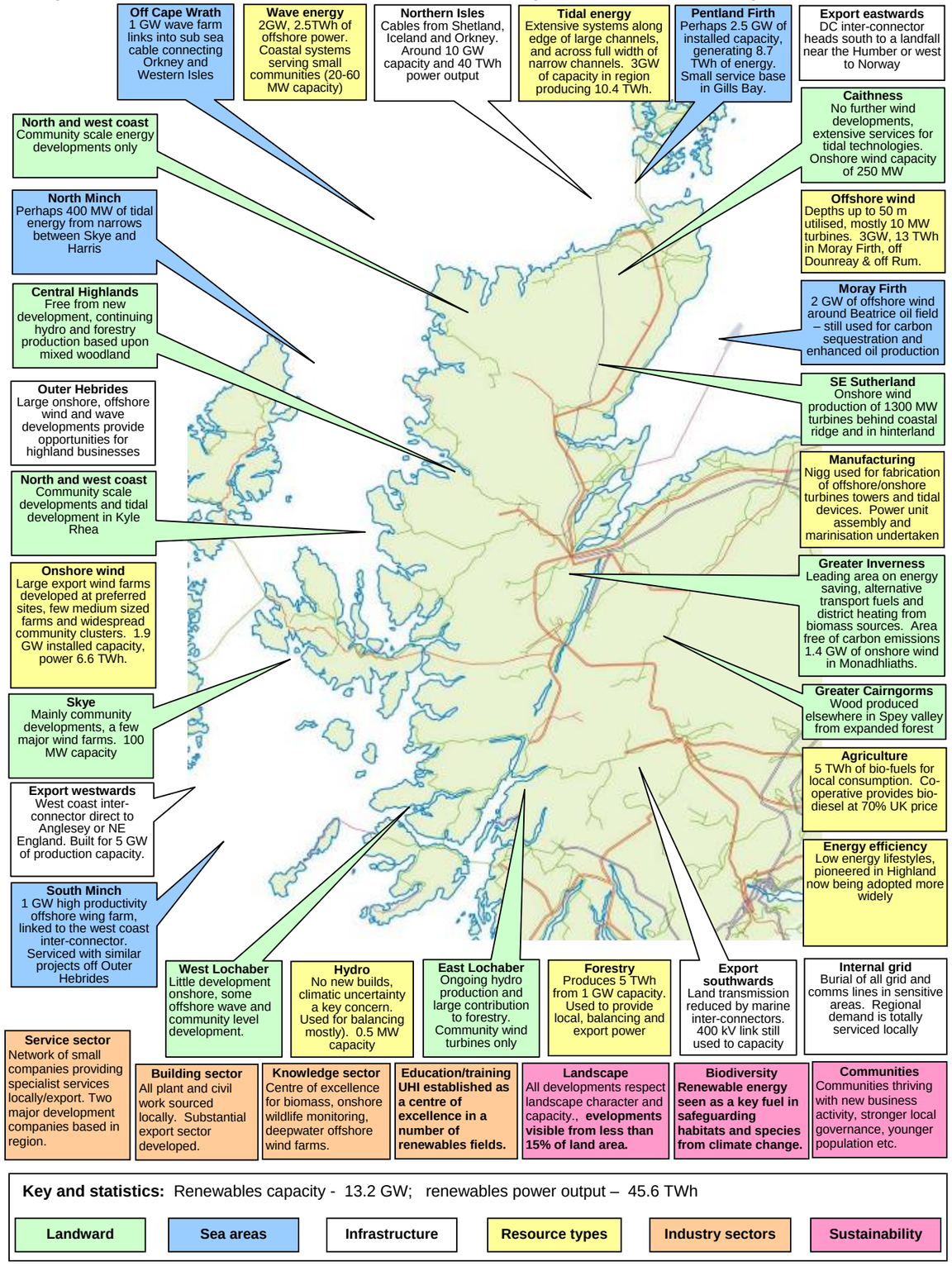
Figure 11.1.1 : Potential Renewables Vision for 2020 – Medium term development opportunities



Key and statistics: Renewables capacity - 4.0 GW; renewables power output – 12.8 TWh

Landward | **Sea areas** | **Infrastructure** | **Resource types** | **Industry sectors** | **Sustainability**

Figure 11.1.3 : Potential Renewables Vision for 2050 – Long term foreseeable developments



12 Action Plan

Key to jurisdiction, policy, and colour tabs

Jurisdiction	Statement	Tab
Areas of core responsibility	Policy	*P*
Areas of partnership	Joint Action	*J*
Areas of influence	Recommendation	*R*

Strategic topic	What are we going to do	Short term milestone (2010)	Medium term aims (2020)	Long term, end point (2050)	Status
INFLUENCES					
TARGETS FOR DEVELOPMENT					
Installed capacity targets					
A1 Capacity and power output targets	Set targets for installed capacity and power output	Installed capacity 800 MW Power output 3.5 TWh	Installed capacity 4,000 MW Power o/put 12.8 TWh	Installed capacity 13,275 MW Power o/put 45.6 TWh	*P*
CO_2 emissions reduction					
B1 Reducing greenhouse gases	Contribute to reducing CO_2 through clean energy production	1.8 million tonnes	6.4 million tonnes	22.7 million tonnes	*P*
Project efficiency and productivity					
C1 Promote productive and cost effective developments	Encourage developments with good energy productivity and reasonable energy generation costs	Efficiency factors exceeding 40%	Efficiency factors exceeding 40%	Efficiency factors exceeding 40%	*P*
C2 Economies of scale	Encourage projects to maximise economies of scale in terms of impacts and infrastructure needs	Developments focussed on high energy low constraint areas	Developments clustered around high energy low constraint areas	Developments clustered around high energy low constraint areas	*P*
C3 Geographical spread of production	Encourage a spread of developments across different energy production time zones	Energy availability of 80%	Energy availability of 90%	Energy availability approaching 100%	*P*
AREAS AND TYPES OF DEVELOPMENT					
Technology types and mix					
D1 Diversity of energy supply	Encourage energy production across all practical technologies	Main target areas are for Hydro Onshore wind Biomass Local generation	Main target areas are Tide Offshore wind Onshore wind Biomass Local generation	Main target areas are Tide Offshore wind Onshore wind Wave Local generation	*P*
D2 Optimising energy production profile	Encourage a mix of technologies and locations that smoothes the energy production profile as far as practical	Base load of 10% installed capacity	Base load of 30% installed capacity	Base load of 50% installed capacity	*J*
D3 Existing non-renewable energy activities	Maintain links with existing energy activities and maximise opportunities in these sectors,	Flourishing oil and nuclear energy sectors with synergies to renewables	Flourishing oil and nuclear energy sectors with synergies to renewables	Flourishing oil and nuclear energy sectors with synergies to renewables	*J*
Development zoning					
E1 Hydro	No particular zoning scheme projects assessed on their merits	350 MW of capacity	500 MW of capacity	500 MW of capacity	*P*
E2 Bio –energy for heat	This form of energy is encouraged with wood fuels coming from existing and designated forest areas	Significant use of wood fuels planned, some plants operating (50 MW capacity)	Numerous schemes running using wood fuel (200 MW capacity)	Optimal use of wood as fuel established (1000 MW capacity)	*P*
E3 Production of bio-fuels	This form of energy is encouraged, with crops for being grown on existing cultivated land	Bio-fuel crops being experimented with and bio-diesel available locally	Bio-fuel crops being widely grown and bio-fuels widely available	Bio-fuel crops being widely grown and bio-fuels available everywhere	*P*
E4 Energy from bio-wastes	This form of energy is encouraged as long as local nuisances are avoided	Plans being made for CHP plant(s)	CHP plants operating where appropriate (40 MW)	CHP plants operating where appropriate (100 MW)	*P*
E5 Preferred areas	Designated areas have been established in high productivity,	All new planning applications target	~50% of capacity available in preferred	~75% of capacity available in preferred	*P*

Strategic topic	What are we going to do	Short term milestone (2010)	Medium term aims (2020)	Long term, end point (2050)	Status
for large wind farms	lower constraint areas	preferred development areas	areas used	areas used	
E6 Possible areas for large wind farms	Areas outside preferred sites but with some devt. potential have been identified but development there would only take place if preferred area options were not possible	No large wind farm development	Development only where exceptional circumstances exist adjacent to preferred areas	A few developments in particularly productive areas adjacent to preferred areas	P
E7 Presumption against development of large wind farms	In areas not designated preferred or possible there will be a presumption against large wind farm developments	No large wind farm development	No large wind farm development	No large wind farm development	P
E8 Preferred areas for local wind farms	Preferred areas for local scale wind developments lie within 2 km of existing 11 kV grid network where there are relatively low constraint levels	All new applications for local scale developments are in preferred areas (50 MW capacity)	All developments lie in preferred areas (400 MW capacity)	All developments lie in preferred areas (1500 MW capacity)	P
E9 Possible areas for local wind farms	Possible areas for local scale wind developments lie within 2 km of existing grid but with higher constraint levels	No local wind developments in these areas	Continued avoidance of local scale developments in these areas	Limited development where all other options have been exhausted	P
E10 Presumption against development of local wind farms	In areas more than 2 km from existing grid there is a presumption against local scale developments	No local scale wind developments in these areas	No local scale wind developments in these areas	No local scale wind developments in these areas	P
E11 Micro wind developments	Developments within fence lines of existing dwellings and industrial sites	Widespread adoption of micro wind technology (10 MW capacity)	Extensive adoption of micro wind technology (100 MW capacity)	Universal adoption of micro wind technology (400 MW capacity)	P
E12 Offshore wind developments	Prioritise few development areas that have energy and grid potential	Experimental developments in Moray Firth (10 MW capacity)	Commercial development in Moray Firth in preferred area (1000 MW capacity)	Wide exploitation of sites within preferred and possible areas (1975 MW capacity)	J
E13 Offshore and coastal Wave	Limited potential seen for offshore technology, coastal developments more likely and will be encouraged	Only coastal/coastline development pursued at present	Only coastal/coastline development pursued at present	Some commercial scale offshore development as technology matures (2000 MW capacity)	J
E14 Tide developments	Promote prototype deployments and follow on projects as technology develops	Deployment of prototype devices in Highland area (10 MW capacity)	Commercial scale developments at a number of locations (400 MW capacity)	Extensive development in prime areas for energy, taking account of any constraints (3000 MW capacity)	J
CAPACITY BUILDING					
Skills and competence					
F1 Using and creating indigenous skills	Encourage incorporation of local expertise into projects and/or basing management locally with the area	Local involvement in the management of more than 50% development projects	Local involvement in the management of more than 75% of development projects	Highland expertise acknowledged internationally for managing renewables projects	R
Development of R&D capabilities					
G1 Encourage R & D	Encourage and support R & D in kind and through commissioning appropriate work	Specific renewables R & D plan established for the Highland area	Highland recognised as a leading centre for key areas of renewables R & D	Highland maintains its position as a leading centre for renewables R & D in key topic areas	P
G2 Support UHI	Support initiatives that strengthen UHI across the Highland area and further afield	UHI has an established renewables research programme	UHI seen as a leading institution in specialist areas of renewable research expertise	UHI has maintained its position as a leading institution in specialist areas of renewable research	J
Education & training					
H1 Education in renewables	Establish educational pathways for renewables at all levels in system	Tertiary level course in renewables at UHI. Renewables activities incorporated into the secondary and primary curricula	Tertiary level courses in renewables at UHI. Renewables activities incorporated into the secondary and primary curricula	Tertiary level course in renewables at UHI. Renewables activities incorporated into the secondary and primary curricula	P
Public engagement and communication					
I1 Information	The Council will support initiatives to improve awareness	Widespread awareness and	Extensive awareness and engagement	Total awareness and engagement	P

Strategic topic	What are we going to do	Short term milestone (2010)	Medium term aims (2020)	Long term, end point (2050)	Status
initiatives	and understanding on energy issues	engagement			
INPUTS					
PLANNING PROCESS					
Improved EIA process					
J1 Pre-scoping phase	Establish a project pre-scoping phase at an early conceptual phase of a project, to help establish likely acceptability before significant commitments have been made	Review existing applications against pre-scoping criteria. Ensure all scoping opinion projects revisit pre-scoping stage	Ensure all projects have passed through a pre-scoping stage	End up with well thought out projects, appropriately located and configured	P
J2 Regional advantage	Ensure projects developed in Highland build on areas of advantage	Establish level of advantage for existing projects within the system	Work to strengthen advantages and reduce weaknesses in the regions renewable potential	Highland seen as an international leader in a number of renewables related fields	P
J3 Local optimisation	Transparent process for considering local alternatives	Validate suitability of present proposals	All projects optimised before coming to scoping stage	Sites chosen for projects seen generally as the best available	P
OUTPUTS					
POSSIBLE POSITIVE ASPECTS					
Local benefit					
K1 Regional benefit fund	The Highland Council will continue to press for developers to make a voluntary contribution for the benefit of communities affected by renewable energy development, including transmission grid upgrading and enhancement. The Council will also explore options with the renewables industry for widening the scope of community benefit policy to enhance its potential for strategic benefit.				J
Community and local ownership/ involvement					
L1 Local ownership	The Council will actively encourage initiatives that spread ownership of renewable energy assets locally	20% local ownership of developments	40% local ownership of developments	50% local ownership of developments	P
Combating fuel poverty					
M1 Reducing fuel poverty	The Council will encourage initiatives to combat fuel poverty linking them where appropriate to renewable energy projects	Improvement in fuel poverty level <20%	fuel poverty levels <1%	Fuel poverty eradicated	J
Local content of works					
N1 Local contracting	Encourage maximum use of local businesses	20% of project value	40% of project value	>40% of project value	P
N2 Contracting strategies	The Council will request a contracting plan as part of the socio-economic assessment within the EIA process	All projects develop a local content plan	All projects develop a local content plan	All projects develop a local content plan	J
Pace and phasing of investment					
O1 Installation rates	The Council will encourage developers to phase new projects so as to spread development activity evenly over longer timescales	Installation of 200 MW onshore wind capacity per year	Ongoing steady growth in local renewables market	Ongoing steady growth in local renewables market	J
Interface with neighbouring regions					
P1 Joint policy positions	Seek areas of convergence where groups of authorities agree on issues	Established joint policies where appropriate	Ongoing work on policies, at international level across Northern periphery area	Ongoing work on policies	J
P2 Integrated resource planning	Take account of developments in adjacent areas when planning developments in Highland and vice versa	Integrated forecasts of capacity developments over time	Ongoing work to predict integrated energy capacities for the Northern periphery area	Integrated energy systems for the Northern periphery area	J
P3 Joint marketing and lobbying	Collective actions with other adjacent authorities to put across a connected message to the outside world	Established Highlands & Islands brand for energy issues	Ongoing marketing of the wider region	Ongoing marketing of the wider region	J
P4 Links to adjacent authorities	Coordination of development activities where appropriate with neighbouring authorities	Coordinated development plans for each authority and	Ongoing coordinated development plans for each authority and	Ongoing coordinated development plans for each authority and	J

Strategic topic	What are we going to do	Short term milestone (2010)	Medium term aims (2020)	Long term, end point (2050)	Status
		overall HIE area	overall HIE area	overall HIE area	
POSSIBLE NEGATIVE ASPECTS					
Natural energy flows					
Q1 Scale of energy extracted	Avoid taking out excessive energy levels	Increase understanding of importance of marine energy flows	Establish safe limits for energy extraction	Monitor effects of development to validate assumptions	*P*
Conservation of natural heritage					
R1 Avoid degradation to designated areas	Avoid developments in designated areas unless there are no viable alternatives and the development has significant widespread benefit	No development in internationally or nationally designated areas	No development in internationally or nationally designated areas unless shown not to affect key conservation objectives	No development in internationally or nationally designated areas unless shown not to affect key conservation objectives	*P*
Archaeology and cultural heritage					
R2 Avoid damage to heritage areas	Layout onshore developments so as to avoid direct disturbance of scheduled sites, protect the landscape in the immediate vicinity of prime visited sites	No development within 1 km of prime visited sites	No development within 1 km of prime visited sites	No development within 1 km of prime visited sites	*P*
Neighbour interactions					
S1 Avoid direct nuisance and disturbance	Restrict developments so as to avoid nuisance based upon established criteria and demonstrable effects from case monitoring	No long term nuisance or disturbance to local residents and communities	No long term nuisance or disturbance to local residents and communities	No long term nuisance or disturbance to local residents and communities	*P*
S2 Dwelling separation	Maintain min. 1 km separation zone between dwellings and wind turbines	No wind farm development within 1 km of general public dwellings	No wind farm development within 1 km of general public dwellings	No wind farm development within 1 km of general public dwellings	*P*
S3 Valued views	Avoid developments in valued local views that are free of other visual intrusions unless there are no viable alternatives and the development has significant widespread benefit	No loss of valued undeveloped views	Minimal loss of valued undeveloped views	Minimal loss of valued undeveloped views	*P*
Landscape					
T1 Avoiding intrusive development	Avoid developments in designated landscape and historical landscape, sympathetic developments in changed/disturbed landscapes unless there are no viable alternatives and the development has significant widespread benefit	Designated and special undeveloped landscapes protected from developments			*P*
T2 Landscape assessment	Require landscape assessments to determine necessary mitigation and enhancement measures	Optimal design of developments within the landscape			*P*
Visibility					
U1 Cumulative visual influence	The Council strategy is to group larger renewable developments and specifically wind farms in a few areas, where inter-visibility would be expected. This will protect most of Highland from visual intrusion. Widespread adoption of smaller local renewable schemes is expected over future years	Intensive large scale developments restricted to few areas, local developments adjacent to existing settlements and industrial sites			*P*
U2 Zone of visual influence	By siting developments adjacent to each other limit the spread of visibility across Highland	Restrict near visual envelope of turbines to <10% of Highland landscape			*P*
U3 Determine visually sensitive sites	Prepare a list of visually sensitive sites	Maintain the list of sites, avoid development affecting them			*J*
Wild land					
V1 Safeguard wildest areas	Avoid development in identified wild areas	No developments in wild areas			*P*
V2 Sense of isolation	Avoid developments within range of other development influences	No degradation of wild areas by renewable energy developments			*P*
V3 Semi wild areas	Cluster export developments and locate local developments near existing developments	Limit development in boundary areas unless designated as a preferred development area			*P*
Amenity interests					
W1 Sympathetic developments	Ensure developments take account of the aesthetics of existing amenity uses	No loss of overall amenity value in Highland			*P*
Other commercial users					
X1 Interference with other activities	Allow development that does not inhibit or significantly interfere with existing business activities	Overall improvements in the economic health and vitality of Highland			*P*
X2 Mutual benefit	Promote awareness of renewables and how they can provide win-win situations for existing business activities	Renewables increasingly seen as beneficial by other businesses			*J*
Public attitudes to renewables					
Y1 Monitoring opinion	Specifically monitor attitudes to renewable energy initiatives	Widespread support for renewables maintained			*J*
Y2 Allaying concerns	Be clear in reasoning, transparent in decision making, robust in beliefs and communicative over results	Reduced concerns about development pressures			*P*
Y3 Public reporting	Deliver regular reports on sector activity	Annual reports on renewables activities included within existing or new reporting mechanisms			*R*
OUTCOMES					
Grid maintenance and expansion					
Z1 Upgrades to existing grid	Encourage upgrades to focus on existing grid routes unless significant impact improvements or energy benefits can be seen through change	Ensure upgrades are implemented to deliver 2600 MW total export capacity, incorporating international best practice regards impact mitigation	Ensure upgrades are implemented to deliver 4600 MW total export capacity, incorporating international best practice regards impact mitigation	Consider alternatives to overland grid for further capacity expansion	*R*
Z2 Through transmission	Support through transmission along existing routes	Take account of adjacent regional needs	Take account of adjacent regional needs	Take account of adjacent regional needs	*R*
Infrastructure requirements					
AA1 Mutual benefits	Look for benefit in electricity and other infrastructure upgrades within Council control	All plans consider whether renewable energy can be accommodated cost effectively			*P*
AA2 Incorporating renewables	Plan renewables into all new developments	All plans consider whether renewable energy can be accommodated cost effectively			*J*
Diversifying energy markets					
AB1 Alternatives to the grid	Actively consider alternatives to the grid	Small scale energy using industries established	Larger scale energy industries developed where appropriate & energy conversion systems (hydrogen) established	New capacity uses novel routes to market rather than the land grid	*P*
Energy systems					
AC1 Compatibility with sustainability	Review energy proposals in terms of overall sustainability	Ensure future energy decisions are founded upon sustainability			*R*
AC2 Share energy burden across sectors	Ensure local energy solutions do not overburden wider energy systems	Take account of energy system capacity in decision making			*R*
Use of energy and energy efficiency					
AD1 Regional energy demand	Set targets for regional energy demand	Year on year improvement in the rate of energy efficiency	Year on year improvement in the rate of energy efficiency	50% reduction in the rate of energy use compared to 2005	*P*

Strategic topic	What are we going to do	Short term milestone (2010)	Medium term aims (2020)	Long term, end point (2050)	Status
AD2 Overall energy efficiency	Promote energy efficiency in new builds	Improving energy use ratios for buildings as new stock comes on stream			*P*
AD3 Patterns of energy use	Develop systems for monitoring energy demand	Monitor and report energy demand and rate of use	Monitor and report energy demand and rate of use	Monitor and report energy demand and rate of use	*P*

RENEWABLE ENERGY PLANNING GUIDELINES

1 The Planning Context

This document provides supplementary planning guidance for renewable energy projects for the Highlands. It has regard for existing statutory and non-statutory national and local policy documentation and guidance.

1.1 National Planning

From a general planning perspective, the Town and Country Planning (Scotland) Act 1997, and its amendments, effectively devolves most statutory planning control to Local Authorities through the instrument of Structure and Local Plans (below). The primary responsibility of the Scottish Executive is usually for strategic funding and the passing of legislation to support implementation of local authority development plans. It must approve Structure Plans on their completion and also influences their formulation through; national planning policies[48], circulars[49], planning advice notes[50], the national planning framework[51], and other more general policy[52].

However there are certain key areas, especially relevant renewable energy, where aspects of consenting and permissions still rest centrally. A clear example of this is the Electricity Act (1989). This, among other things, governs decisions about major onshore electricity installations (>1MW for hydroelectric and >50MW for other technologies). The Act applies to the whole of Great Britain as energy policy is not devolved. Under the provisions of Section 36 of the Act, Scottish Ministers are required to take decisions about the location and design of electricity generating stations, while Section 37 governs consent for overhead lines. Consent under section 36 of the Electricity Act 1989 usually carries with it deemed planning permission from the Scottish Ministers under section 57 of the Town and Country Planning (Scotland) Regulations 1997. Similarly, local Planning Authorities usually have no jurisdiction below low water mark on the sea coast, and all significant offshore developments (>1 MW) are consented centrally using the Electricity Act 1989 and other legislation (see section 3.3).

The primary planning legislation is under review. This guidance anticipates certain of the proposed changes as these might affect future renewable energy planning.

1.2 Planning for Renewables

Some national planning guidance and policy is specific to renewable developments. The National Planning Framework for Scotland[51] makes specific reference to renewable development in sections 75 & 138-140, with actions to:

- *"set a target of deriving 40% of the electricity generated in Scotland from renewable sources by 2020. The development of renewable energy technologies is being encouraged as a means of tackling climate change and promoting the Scottish economy. The aim is to realise Scotland's very large renewable energy potential while safeguarding the environment. The Executive is encouraging a mix of renewable energy technologies, with growing contributions from offshore wind, wave, tidal and solar facilities, and greater use of fuel from wood and other energy crops. The potential of some of these technologies has a strong spatial dimension. For, example, the North and West Coasts offer opportunities for harnessing the energy of tidal streams at locations which are well sheltered from ocean swells and prevailing winds."*
- *"Establish a Forum for Renewable Energy Development in Scotland (FREDS) to promote electricity generation from renewable sources; to develop technology, jobs and exports; to produce action plans for marine energy and biomass technology, and to build synergies between Scotland's existing offshore expertise and the commercialisation of offshore wind, wave and tidal technologies."*
- *[Consider] "The key improvements to the electricity transmission system to facilitate the development of Scotland's renewable energy resources are the rebuilding of the grid spine between Denny and Beauly; the upgrading of the interconnector South; and a new link to the Western Isles. Argyll and Bute, the Northern Highlands, Dumfries and Galloway and the Borders are areas where the transmission system needs to be strengthened. Consideration is being given to reinforcement or replacement of the link between Orkney and the mainland and a new subsea link to Shetland. While grid reinforcement will in general take place along existing routes, some new connections and route modifications will be necessary. The routing of new strategic connections will need to take account of opportunities for unlocking the potential of additional renewable energy resources."*
- *"legislate to establish a Renewable Energy Zone to provide a regulatory framework for projects beyond territorial waters. It will also strengthen the regulatory regime which applies within territorial waters. It may be possible to adapt coastal facilities created to support the oil and gas industry to new uses related to the development of renewable energy. There may also be opportunities to site new renewable energy facilities where they can take advantage of the transmission capacity released by the closure of existing power stations. Small-scale, community-based renewable energy projects can make a valuable contribution to rural development, and help to support the sustainable development of island communities in particular. Together, they can make a significant cumulative contribution to meeting Scotland's energy needs."*

Specific guidance for renewables planning policy has been published in the two documents: National Planning Policy Guideline (NPPG) 6: Renewable Energy Development and Planning Advice Note 45. The Council's guidelines have been formulated within the context of this policy and advice, and should be read in conjunction with these documents. NPPG6 is presently under review and will be reissued as SPP6[53]; however, both publications already cover many planning aspects of renewable development in depth. The following box summarises aspects of the policy that are most relevant to local and regional development plans:

Table G1.1.1 : Summary of the relevance of NPP6 to regional development plan formulation

NPPG 6 confirms that Development Plan policies should:

- support the Scottish Ministers' commitment to renewable energy and provide positively for its development
- define broad areas of search suitable for wind and other renewable energy developments or, where appropriate, specific sites in local plans
- safeguard, where appropriate, areas with potential for renewable energy projects
- indicate whether there are areas or sites which, after appropriate assessment and wide consultation, it is judged that for overriding environmental reasons, proposals for renewable energy development would only be considered in exceptional circumstances
- guide developers on the broad criteria they would be required to consider in any development proposal, including those falling outside preferred areas
- provide a clear development control framework

Most other NPPGs will have some bearing on renewable energy development in different circumstances, either through specific citation, e.g.

NPPG 10 (Planning and Waste Management):

- *Landfill gas - local plans should identify compatible uses on adjacent land and provide for possible renewable energy projects associated with landfill gas.*

….indirect reference to impacts and characteristics of developments, e.g.

SPP7 (Planning and flooding)
Drainage and Culverts - Intense rainfall can overload drainage systems, including sewers and culverts, leading to local flooding. If natural drainage patterns are disturbed by development, flooding may also be caused. Drainage is a material planning consideration. Drainage measures proposed as part of a planning application should have a neutral or better effect on the risk of flooding both on and off the site.

….or more generally when interacting with particular aspects of the surrounding environment, e.g.

NPPG 14 (Natural Heritage):

- *sets out national planning policy considerations in relation to Scotland's natural heritage;*
- *summarises the main statutory obligations in relation to the conservation of natural heritage;*
- *explains, as part of a wider framework for conservation and development, how natural heritage objectives should be reflected in development plans;*
- *describes the role of the planning system in safeguarding sites of national and international importance;*
- *provides guidance on the approach to be adopted in relation to local and non-statutory designations; and*
- *draws attention to the importance of safeguarding and enhancing natural heritage beyond the confines of designated areas.*

[48] Scottish Planning Policy
[49] Scottish Executive Planning Circulars
[50] Scottish Executive Planning Advice Notes
[51] National Planning Framework for Scotland
[52] Scottish Executive Strategic Topics

[53] SPP6 review and consultation

1.3 The Structure Plan

The Structure Plan and the various Local Plans, (together with the forthcoming Cairngorms National Park Plan) make up the statutory Development Plan for the Highlands. Preparation of these Plans is a statutory requirement under the Part II of the Town and Country Planning (Scotland) Act 1997. These set out the Council's planning policies and proposals spanning the next 5 - 20 years. The Structure Plan paints the broad picture on the future pattern of housing, jobs, transport, services and the environment. Local Plans are much more specific. They tackle the problems and opportunities associated with individual communities and show exactly where the Council's policies apply.

Planning legislation and National Planning Policy Guidelines have strengthened the role of Development Plans in recent years. Decisions on planning applications should be made in accordance with the provisions of the Development Plan, as outlined in structure and local plans, unless material considerations indicate otherwise. This is intended to give greater certainty to residents, community groups, developers, business investors and infrastructure providers. The current Highland Structure Plan was approved in 2001. The figures below summarise its key points:

Figure G1.3.1 : Strategic Issues identified in the 2001 Highland Council Structure Plan

A growing population	**Access to services**	**Other infrastructure services**	**Agriculture**
Rural depopulation	**Economic structure**	**New technology**	**Forestry**
An ageing population	**Peripherality**	**Culture and language**	**Other primary resources**
Housing needs	**Transport pressures**	**Built heritage**	**Community decision-making**
Inequalities	**Integrated transport**	**Natural heritage**	

From these issues it identifies seven strategic themes and an overall vision for the Plan:

Figure G1.3.2 : The strategic themes of the Structure Plan 2001

1. Conserving and promoting the Highland identity
2. Adopting a proactive approach to the wise use of the natural environment
3. Taking an integrated approach to improving accessibility to goods, services and markets
4. Consolidating the settlement hierarchy
5. Creating an improved business environment
6. Addressing the need for quality living environments
7. Working in partnership with the community and other agencies

Figure G1.3.3 : The Vision from the Structure Plan 2001:

COMMUNITY	ECONOMY	ENVIRONMENT
An emphasis on health promotion and illness prevention Access to a wide choice of services and public transport Traditions and cultures celebrated and embraced A full choice of education opportunities Community involvement and empowerment Strong sense of community and identity Interdependence and diversity fostered A secure status for the Gaelic language Integrated and balanced development Good, safe living conditions A shared sense of purpose Equality of opportunity High quality housing Energy conservation Motivated youth	High levels of efficiency Nationally aligned wage rates Best value in service provision A strong and prosperous region A skilled and motivated workforce Growing businesses, developing skills Reduced social and economic disparities Business innovation, research and development Good internal and external communication links Increased provision of Information Technology facilities Robust and diverse small and medium sized enterprises Quality and choice promoted in all sectors Choice of jobs and careers Maximised capabilities High regional profile	Recognition of European and global context Monitored use of natural resources Maintained and enhanced biodiversity Minimise land and water based pollution Increased awareness of natural processes Sustainable management of maritime areas Increased levels of environmental education Sustainable use of natural resources A desirable place to live, learn, work and relax Integrated environmental protection and enhancement A choice of opportunities for recreation and public access Community involvement in the management and stewardship of land

Figure G1.3.4 : Individual policies of the Structure Plan 2001

GENERAL STRATEGIC POLICIES

Policy G1 Conformity with strategy
Policy G2 Design for sustainability
Policy G3 Impact assessments
Policy G4 Community benefit and commitment
Policy G5 Integration of environmental and community interests
Policy G6 Conservation and promotion of the Highland heritage
Policy G7 Partnerships and community planning
Policy G8 Precautionary principle

INTEGRATED RURAL DEVELOPMENT

Policy RD1 Area sustainable development strategies
Recommendation RD2 Land Management Orders and compulsory purchase powers
Policy RD3 Cross compliance
Recommendation RD4 Management of the natural and cultural heritage
Policy RD5 National Parks
Recommendation RD6 National Parks
Policy RD7 Community land management
Policy RD8 Community land ownership

COMMUNITY

HOUSING
Policy H1 Housing allocations for Areas 1998-2017
Policy H2 New settlements
Policy H3 Housing in the countryside
Policy H4 Affordable housing
Policy H5 Affordable housing
Recommendation H6 Affordable housing in rural areas
Policy H7 Housing for varying needs
Policy H8 Access arrangements for new and existing development

RETAILING
Policy R1 Shopping hierarchy
Policy R2 Everyday shopping needs
Proposal R3 Rural Shop Support Fund
Policy R4 Major foodstores
Policy R5 Town centre shopping
Policy R6 Comparison shopping
Policy R7 Shopping facilities in the countryside

SERVICES AND FACILITIES
Policy S1 Services and facilities
Proposal S2 Education facilities
Recommendation S3 Health and social work services
Policy S4 Community safety

SPORT AND RECREATION
Proposal SR1 Provision of new sports facilities
Policy SR2 Sports facilities and open space provision
Policy SR3 Golf development
Policy SR4 Launch and mooring facilities
Policy SR5 Access
Proposal SR6 Access and paths
Proposal SR7 Countryside Around Towns
Policy SR8 Skiing developments
Policy SR9 New skiing developments

ECONOMY

BUSINESS AND INDUSTRY
Policy B1 Industrial and business sites
Policy B2 Industrial and business sites
Policy B3 Local industrial land supply
Policy B4 Oil and gas support bases
Policy B5 Oil-related development at Nigg and in Caithness
Policy B6 Diversification of Dounreay
Policy B7 Business development in rural areas
Policy B8 Adding value
Policy B9 Telematics

TOURISM
Policy T1 Highland Tourism Strategies
Policy T2 Tourism developments
Policy T3 Self catering tourist accommodation
Policy T4 Hostel accommodation
Policy T5 Strategic tourist routes
Policy T6 Scenic views

AGRICULTURE AND CROFTING
Policy A1 Safeguarding of agricultural land
Policy A2 Farm income diversification
Proposal A3 Farm income support
Recommendation A4 Agri-environmental programmes
Recommendation A5 Crofting

FISHERIES AND AQUACULTURE
Policy FA1 European fisheries
Policy FA2 Inshore fishery management
Policy FA3 Fishery Orders in capture fisheries
Policy FA4 Freshwater fisheries
Proposal FA5 Aquaculture Framework Plans
Policy FA6 Fish farming developments
Policy FA7 Fishery Orders in aquaculture
Proposal FA8 Freshwater fish farming
Policy FA9 Game fisheries
Recommendation FA10 Fishery research
Policy FA11 River management works

FORESTRY
Policy F1 Forestry developments
Recommendation F2 Financial incentives
Policy F3 Native woodlands
Policy F4 Community woodland
Policy F5 Amenity woodlands
Policy F6 Short-rotation coppicing
Recommendation F7 Consultation on forestry development proposals and the disposal of Forestry Commission land

MINERALS AND PEAT

ENVIRONMENT

NATURE CONSERVATION
Policy N1 Nature conservation
Policy N2 Interpretation and enjoyment
Recommendation N3 Review of Sites of Special Scientific Interest
Policy N4 Local Biodiversity Action Plans
Proposal N5 Local Biodiversity Action Plans

LANDSCAPE
Recommendation L1 Landscape areas of international importance
Recommendation L2 Review of National Scenic Areas
Proposal L3 Areas of Great Landscape Value
Policy L4 Landscape character

BUILT AND CULTURAL HERITAGE
Policy BC1 Preservation of archaeological sites
Policy BC2 Archaeology, tourism and education
Proposal BC3 Archaeological Heritage Areas
Policy BC4 Historic gardens and designed landscapes
Policy BC5 Listed buildings and Conservation Areas
Policy BC6 Gaelic heritage

Policy M1 Mineral resources
Policy M2 Mineral extraction
Policy M3 Protection of mineral deposits
Policy M4 Protection of mineral deposits
Policy M5 Large coastal quarries
Policy M6 Mineral wastes
Policy M7 Peat extraction

ENERGY PRODUCTION
Policy E1 Distributed renewable energy developments
Policy E2 Wind energy developments
Policy E3 Wind farm safeguarding
Policy E4 Hydro energy developments
Recommendation E5 Abstraction controls
Recommendation E6 Offshore energy developments
Policy E7 Centralised renewable energy developments
Policy E8 Small community renewable energy projects

INFRASTRUCTURE

TRANSPORT & COMMUNICATIONS
Policy TC1 Modal shift
Policy TC2 Multi-modal interchanges
Proposal TC3 Integrated Local Transport Strategy
Recommendation TC4 Trunk Roads
Recommendation TC5 Multi-modal corridors
Policy TC6 Road network improvements
Recommendation TC7 Transportation of timber
Policy TC8 Service facilities
Policy TC9 Car parking
Policy TC10 Cycling
Policy TC11 Public transport
Recommendation TC12 Passenger rail improvements
Policy TC13 Tain - Golspie rail link
Policy TC14 Air transport
Policy TC15 Ferry services
Policy TC16 Improvements to port facilities
Policy TC17 Harbour improvements
Recommendation TC18 Tanker traffic in the Minch
Recommendation TC19 Rural fuel prices
Recommendation TC20 Rural filling stations

WASTE
Policy W1 Waste management
Policy W2 Waste minimisation
Policy W3 Reuse and recycling
Policy W4 Waste disposal
Policy W5 Facilities for the waste management network.
Policy W6 Landfill/form
Policy W7 Waste combustion with energy recovery
Policy W8 Dounreay decommissioning and remediation
Recommendation W9 Development of nuclear waste management strategy
Policy W10 Import of nuclear waste material
Policy W11 Sewerage
Policy W12 Air quality

UTILITIES
Policy U1 Electricity distribution network
Policy U2 Gas pipelines
Policy U3 Water supplies
Policy U4 Telecommunications
Policy U5 Telecommunications and Council property
Recommendation U6 Telecommunications and electro-magnetic fields
Recommendation U7 Telecommunications and planning requirements

NATURAL HAZARDS
Proposal NH1 Flood consultation areas
Proposal NH2 Flood Appraisal Group
Policy NH3 Integrated Catchment Management Plans
Policy NH4 Coastal erosion
Proposal NH5 Land instability
Policy NH6 Radon gas

MONITORING AND REVIEW
Proposal MR1 Structure Plan monitoring **Proposal MR2** Structure Plan review

As part of Local Agenda 21, the structure plan was appraised for compliance with the principles of sustainability[54]. However it also has specific provisions for sustainability built into its formulation:

Figure G1.3.5 : Vision for sustainability applied to the Structure Plan 2001:

- Supporting the viability of communities;
- Developing a prosperous and vibrant local economy; and
- Safeguarding and enhancing the natural and built environment.

Figure G1.3.6 : 15 objectives for sustainability applied to the Structure Plan 2001:

- community empowerment and decision-making;
- the diversification of the regional and local economies;
- the quality and number of employment opportunities;
- accessibility to and quality of housing;
- the safety, enjoyment and diversity of towns and villages;
- standards of health for all;
- the effectiveness and efficiency of infrastructure provision;
- accessibility to community facilities and services;
- accessibility to education and training;
- the maintenance and enhancement of the cultural heritage;
- the quality of the built environment;
- biodiversity;
- the optimal use of renewable and non-renewable resources;
- the efficiency of energy use; and
- the quality of air, water and land.

Finally, the Structure Plan states it also shares some priorities with the Highland Community Plan of the time:

- Prosperous communities
- Learning communities
- Capable, confident communities
- Healthy, safe communities
- Communities rich in their heritage

1.4 Local Plans

The Council is required to maintain full up to date local plan coverage of Highland to accompany the structure plan. The purpose of a Local Plan is to:

- guide decisions made on planning applications to ensure that new developments are right for their location;
- help plan for the integrated development needs of an area such as new homes, factories, shops and schools;
- provide a consistent spatial framework within which both private and public sector investment decisions can be taken; and
- protect important natural and man-made heritage features; and, most importantly, allow local people to become involved in the planning process.

All Local Plans must consist of a *Written Statement* and a *Proposals Map*. They cover a wide range of topics including:

- population;
- housing;
- industry and employment;
- transport;
- shopping and commerce;
- community and recreation facilities;
- utilities;
- heritage; and
- environmental matters.

The Written Statement contains policies, which guide or control development, and proposals, which promote development. It also contains site allocations, environmental safeguards, the phasing of proposals and the means of implementation. The Proposals Map and Insets show where the policies and proposals apply. In addition to indicating the Council's own spending priorities and planning guidance, a Local Plan may include proposals identified by other Agencies expected to happen within the period of the Plan. The current local plan Register is available online from the Highland Council website.

The Cairngorms National Park Authority is currently consulting on its first Park Plan which will assume appropriate status within that area in due course.

[54] The Highland Structure Plan Sustainability Appraisal

1.5 Other Plans and Strategies

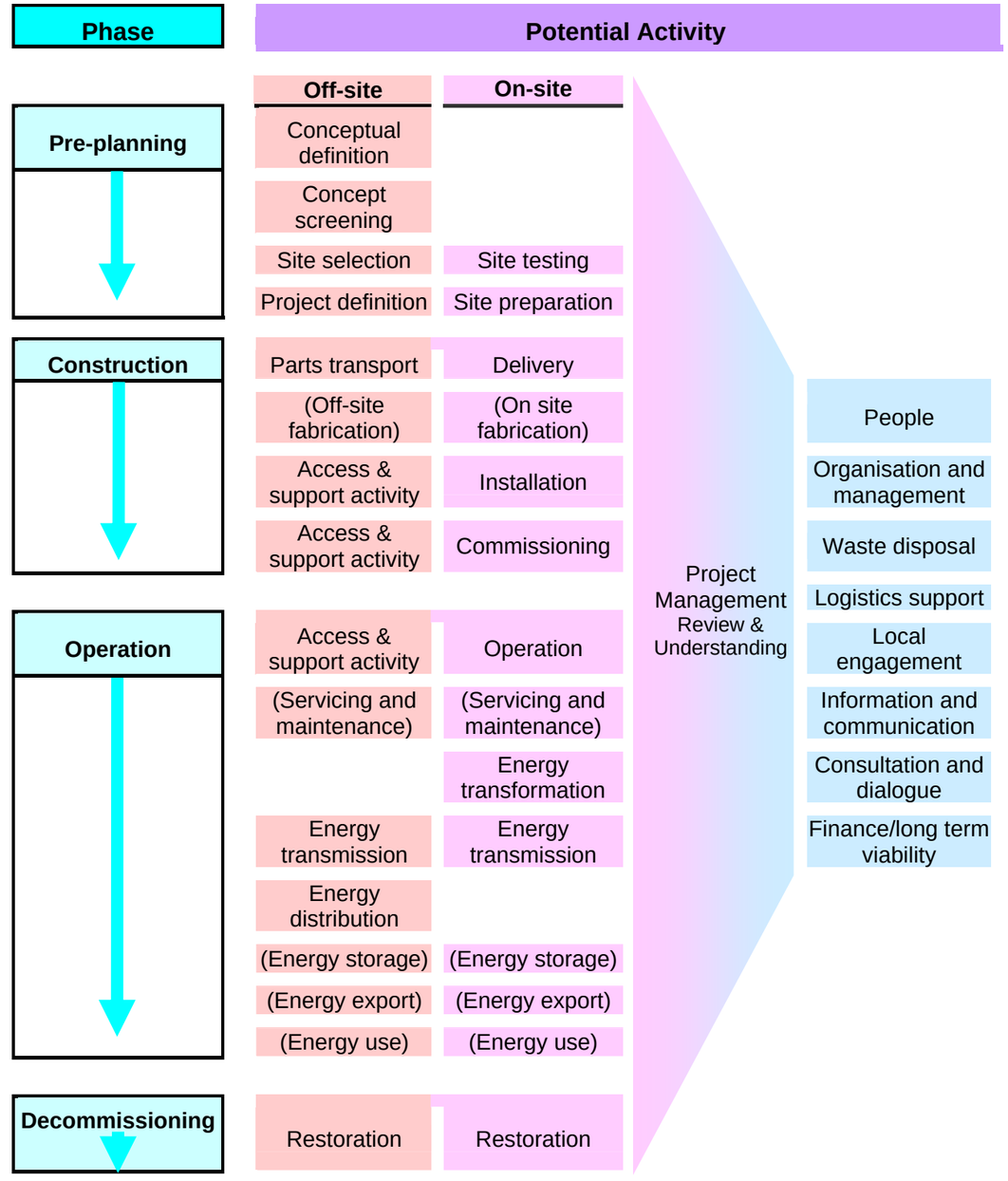
In addition to the statutory development plans, described above, the Council has prepared a number of different voluntary policy documents on specific strategies and frameworks. These cover topics that are seen to be key to or particularly significant within the region at any one time. The Highland Council website publishes strategies, research, consultation and policies for these topics as they develop. Relevant examples include e.g.

- Local Transport Strategy
- Highland Fuel Poverty Strategy
- Highland Biodiversity Strategy
- Highland Housing Strategy
- Highland Forestry Plan
- Undergrounding of Extra High Voltage Transmission Lines

The Highland Council also works with strategic partners as the Highland Wellbeing Alliance, which has produced the Community Plan for Highland 2004-7.

2 Activities During a Project Lifecycle

When designing and preparing any renewables development for application for planning permission it is important to remember that the planning authority will wish to consider the implications of all activities that may be required across the whole life-cycle of the project. Below is a summary figure indicating the range of both on and off-site activities which may occur across the different stages:



It is expected that any planning application submitted will have considered the planning and environmental implications of all relevant activities within this full range.

3 Gaining Planning Approval

Throughout the region, the most significant and controversial renewable energy proposals in the foreseeable future are likely to relate to proposals for wind and hydroelectric energy development. In addition to wind and hydro, it is likely that proposals for biomass generation will increase in number as the home market technology matures and feedstock production increases. Smaller proposals for ground-source heat, domestic solar/photovoltaic panels and domestic wind turbines are also likely to increase in number as they become more widely available and costs come down. Such micro-generation applications are expected collectively to become a significant source of future local generation.

The majority of renewable energy proposals represent development and require planning consent, unless they are classified as minor and fall under permitted development. Environmental assessment is becoming an expected part of development planning and activities relating to it run parallel with the planning process. However, different legislation and criteria apply regarding formal Environmental Impact Assessment (EIA) requirements. Details of these are described in full in section 3.2.2 below. Marine elements of renewable energy developments below the mean low water mark are not usually within the jurisdiction of the Local Authority planning process and are subject to different consenting procedures, so these are also discussed separately later, in section 3.3.

Most onshore planning applications for renewable energy developments in the region are dealt with by the Highland Council or neighbouring authorities. However, as mentioned previously, responsibility for authorising new onshore electricity generation plants over 50 megawatts and new hydro and offshore plants over 1 megawatt, under Section 36 of the Electricity Act 1989, lies with the Scottish Ministers. Decisions are reached, based on an assessment of the project against the relevant development plan and input requested by the Council or Scottish Ministers, from a variety of consultees. Appeals against refused applications are heard by the Scottish Executive Inquiry Reporters Unit. Further information can be found in Scottish Planning Policy 1 – The Planning System and National Planning Policy Guidance 6 – Renewable Energy Developments.

3.1 Integrating planning and Environmental Assessment

Though the process and legislation governing environmental assessment is strictly separate from development planning, many activities undertaken for the 2 processes are common to both and inter-related, involve similar stakeholders, and are often complementary and synergistic. As a result, the separate activities are becoming more and more integrated: with environmental impact data influencing project development plans at an early stage, and statutory or voluntary environmental statements providing the majority of supporting information for planning applications. The draft Renewable Energy Strategy wishes to both encourage and further strengthen this integration and also provide additional assistance to help developers improve the effectiveness and value of the EIA process generally. Specifically this focuses upon the sharing of information early in the process, the scope and contents of submitted Environmental Statements when they are required and providing additional information about how projects have performed in practice.

Pre-scoping and initial consultation

It is advisable for developers to contact Highland Council at an early stage in the selection and design of potential sites. Highland Council Renewable Energy Strategy policy J.1 formally creates a pre-scoping stage as part of the planning process. Such consultation can usefully inform all parties prior to site selection, more detailed project descriptions and the next stages of potential EIA screening and scoping processes. This can help the council quickly assess and advise on the potential acceptability of specific proposals, particularly their compatibility with the structure, local and other relevant development plans, and reduce wasted effort for the developer pursuing potentially fruitless areas of search.

EIA Screening and Scoping

The next stage is to establish a project description, and check the nature and scope of the project against statutory EIA guidelines to see if it is necessary to carry out a formal environmental impact assessment process and produce an environmental statement. In any event, it is good practice for commercial developers to carry out high level environmental and risk assessments of critical activities. This will helpful in identifying potential problems early in the project and will be almost certainly be required for raising external finance.

Public consultation

Generally the pre-scoping, EIA screening and scoping stages are in confidence and do not require public discussion. However, where a proposal is likely to be potentially contentious, voluntary early dialogue and consultation with the general public can be a useful way of managing the risk from objectors by identifying and addressing public concerns as soon as possible. It can also help to counter both uncertainty and misconceptions regarding the nature and impacts of particular proposals. A public consultation is also a useful means of identifying legitimate public concerns about proposals. These can then be addressed both in the detailed design of submitted proposals, and in associated, supporting information.

Project design and definition, preliminary planning, and baseline studies

After screening and scoping, normally the site and nature of the project is further defined and it is possible to gain preliminary planning permission for preparatory works, such as studying energy patterns through the erection of wind masts or water flow meters. Where an environmental impact assessment process is being undertaken baseline environmental studies will also be undertaken during this phase, and the project would be assessed and a draft environmental statement compiled for consultation.

Submission of application and supporting material

When submitting an application, applicants should provide the appropriate fee and sufficient copies of any supporting information for statutory consultees. In particular, it is important to make sure that site boundaries are correctly identified as some forms of renewable energy development can include works outside the main site, for example highway improvements necessary to allow the delivery of large turbine components. These secondary activities should all be identified. Where an Environmental Statement is required (or provided voluntarily) this will be included at this stage as part of the supporting information.

Determination

After receiving a valid planning application, the Authority has eight weeks in which to determine the proposal, unless an extension in time is agreed with the applicant. After this period, if no decision has been made or there is no agreement to an extension in the determination period, then the applicant can appeal against non-determination. Applications accompanied by an EIA must be determined within four months.

Planning conditions and legal agreements

The planning authority has the power to attach conditions to planning permission for cases where it would otherwise be necessary to refuse planning permission. However, it will only impose conditions that, in its opinion, are necessary and relevant to planning of the development being permitted, precise, enforceable and reasonable in all other respects. Such agreements can, for example, require developers to:

- address TV reception issues;
- provide decommissioning bonds;
- undertake off-site highway improvements;
- establish community funds; and
- undertake habitat enhancements.

Change control, project monitoring and decommissioning

Subject to completion of attached conditions, attainment of planning permission is sometimes seen as an endpoint to the project planning process. The Planning Authority wishes to discourage this interpretation and stress the importance of built in change control management processes within the construction phase and further performance and environmental monitoring during the operational and final decommissioning phases. All planning applications for major and national scale projects will be expected to have adequate provisions for these activities written into the application and/or supporting material, including a clear financial provision and plan for equipment decommissioning and site restoration.

3.2 Environmental Assessment Requirements and the EIA Process

As detailed in section 3.1 in addition to complying with development planning requirements, all renewables developments will be expected to have undergone some form of environmental assessment of the proposal as part of a better integrated environmental and planning process. The specific details of these requirements are laid out below below.

3.2.1 Requirement for Environmental Assessment

For generally permitted developments such as small domestic projects no formal environmental statement may be required unless there are particular concerns. This is at the discretion of the Planning Authority. All other projects may potentially be required to conduct a formal EIA process. The thresholds of requirement for formal Environmental Impact Assessment are laid out in national law and explained fully below. However it is worthwhile mentioning that

even when a project is deemed not to require a formal EIA process, an assessment of the impact on the environment, at an appropriate level of detail for the scale of development should be undertaken by the developer; to aid project planning and public communication, raise additional finance and assist the planning authority to advise any potential third parties with concerns about the nature of the proposed project. When considering environmental impact the developer is advised to consult the Scottish Executive Circular 15/1999 – The Environmental Impact Assessment (Scotland) Regulations and PAN 58 – Environmental Impact Assessment, in addition to PAN 45 and NPPG 6, for detailed information about EIA Regulations and requirements relevant to renewable energy developments.

3.2.2 Formal EIA Requirements

With regard to formal EIA, most of the larger onshore renewable energy proposals will fall within the definition of 'Schedule 1 or 2' developments under the EIA (Scotland) Regulations 1999. The classification of Schedule 1 of the EIA Regulations is broadly similar to that of the national scale developments within the proposed planning process. An EIA process is mandatory for any renewables developments which fall under Schedule 1.

Hydroelectricity proposals which include the construction of dams or other installations for the permanent holding back or permanent storage of water, where a new or additional volume of water held back or stored exceeds 10 million cubic metres, fall under Schedule 1 of the EIA Regulations, as do all generation plants associated with hazardous wastes, and larger plants associated with landfill and non-hazardous wastes of more than 100 tonnes per day. Any types of bio-energy combustion power station with a heat output of 300 megawatts are also included. However, it is not anticipated that any such installations are likely to be built in the Highlands in the near future.

Schedule 2 developments generally coincide with major and local developments. They are broadly defined by the Scottish Executive as:

- major developments which are of more than local importance;
- developments which are proposed for particularly environmentally sensitive or vulnerable locations; and
- developments with unusually complex and potentially hazardous environmental effects.

The Schedule also lists specific qualifying thresholds which are relevant to renewables developments. These are listed in 0 below:

Table G3.2.1 : EIA legislative classification and thresholds for renewable technologies

Project classification in Schedule 2	Threshold	Possible relevant renewables
1. *Agriculture and aquaculture*		
(a) Projects for the use of uncultivated land or semi-natural areas for intensive agricultural purposes;	The area of the development exceeds 0.5 hectare.	Wood biomass crop biomass bio-fuels
(b) Water management projects for agriculture, including irrigation and land drainage projects;	The area of the works exceeds 1 hectare.	Wood biomass crop biomass bio-fuels
(e) Reclamation of land from the sea.	All development.	Tidal head
2. Extractive industry		
(d) Deep drillings, in particular- (i) geothermal drilling; (iii) drilling for water supplies; with the exception of drillings for investigating the stability of the soil.	(i) In relation to any type of drilling, the area of the works exceeds 1 hectare; or (ii) in relation to geothermal drilling and drilling for the storage of nuclear waste material, the drilling is within 100 metres of any controlled waters.	Geothermal heating
3. *Energy industry*		
(a) Industrial installations for the production of electricity, steam and hot water (unless included in Schedule 1);	The area of the development exceeds 0.5 hectare.	All
(b) Industrial installations for carrying gas, steam and hot water;	The area of the works exceeds 1 hectare.	All
I Surface storage of natural gas; (d) Underground storage of combustible gases; (e) Surface storage of fossil fuels;	(i) The area of any new building, deposit or structure exceeds 500 sq. m.; or (ii) a new building, deposit or structure is to be sited within 100 m of any controlled waters.	Landfill gas waste digestion bio-fuel production
(f) Industrial briquetting of coal and lignite;	The area of new floorspace exceeds 1,000 sq. m.	wood biomass?
(h) Installations for hydroelectric energy production;	The installation is designed to produce more than 0.5 MW.	most hydroelectric (other than minor)
(i) Installations for the harnessing of wind power for energy production (wind farms).	(i) The development involves the installation of more than 2 turbines; or (ii) the hub height of any turbine or height of any other structure exceeds 15 m.	most wind (other than minor)
6. Chemical industry (unless included in Schedule 1)		
(a) Treatment of intermediate products and production of chemicals;	The area of new floorspace exceeds 1,000 square metres.	bio-fuels
(c) Storage facilities for petroleum, petrochemical and chemical products.	(i) The area of any new building or structure exceeds 0.05 hectare; or (ii) more than 200 tonnes of petroleum, petrochemical or chemical products is to be stored at any one time.	
7. Food industry		
(a) Manufacture of vegetable and animal oils and fats;	The area of new floorspace exceeds 1,000 square metres.	bio-fuels
(b) Packing and canning of animal and vegetable products;		
(d) Brewing and malting;		
10. Infrastructure projects		
(a) Industrial estate development projects. (b) Urban development projects,	The area of the development exceeds 0.5 hectare.	All
(d) Construction of railways (unless included in Schedule 1);	The area of the works exceeds 1 hectare.	wood biomass
(f) Construction of roads (unless included in Schedule 1);		All
(g) Construction of harbours and port installations, including fishing harbours (unless included in Schedule 1);		on and offshore wind other marine
(i) Dams and other installations designed to hold water or store it on a long-term basis (unless included in Schedule 1);		hydroelectric
(k) Oil and gas pipeline installations (unless included in Schedule 1); (l) Installations of long-distance aquaducts;	(i) The area of the works exceeds 1 hectare; or (ii) in the case of a gas pipeline, the installation has a design operating pressure exceeding 7 bar gauge.	bio-fuels, landfill gas waste digestion hydroelectric
(m) Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works;	All development.	tidal head coastal wave
(n) Groundwater abstraction and artificial groundwater recharge schemes not included in Schedule 1; (o) Works for the transfer of water resources between river basins not included in Sch. 1.	The area of the works exceeds 1 hectare.	hydroelectric pump storage
11. Other projects		
(b) Installations for the disposal of waste (unless included in Schedule 1);	(i) The disposal is by incineration; or (ii) the area of the development exceeds 0.5 hectare; or (iii) the installation is to be sited within 100 metres of any controlled waters.	waste biomass landfill gas waste digestion

3.2.3 EIA Screening

Where there is a possibility that an EIA may be required for a proposal, or where it is anticipated that a Schedule 2 proposal may not have sufficiently significant adverse effects to warrant an EIA, developers should formally request a screening opinion from the Planning Authority. The purpose of a screening opinion is to inform the developer as to whether or not the planning authority considers that a proposed development constitutes EIA development, based on the selection criteria in Schedule 3 of the EIA Regulations. Schedule 3 is reproduced below. It describes criteria to assess whether the development may have potentially significant impact on the environment:

Table G3.2.2 : EIA Selection Criteria for Screening Schedule 2 Development

Characteristics of development **1.** The characteristics of development must be considered having regard, in particular, to- (a) the size of the development; (b) the cumulation with other development; (c) the use of natural resources; (d) the production of waste; (e) pollution and nuisances; (f) the risk of accidents, having regard in particular to substances or technologies used.
Location of development **2.** The environmental sensitivity of geographical areas likely to be affected by development must be considered, having regard, in particular, to- (a) the existing land use; (b) the relative abundance, quality and regenerative capacity of natural resources in the area; (c) the absorption capacity of the natural environment, paying particular attention to the following areas- (i) wetlands; (ii) coastal zones; (iii) mountain and forest areas; (iv) nature reserves and parks; (v) areas classified or protected under Member States' legislation; areas designated by Member States pursuant to Council Directive 79/409/EEC on the conservation of wild birds and Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora; (vi) areas in which the environmental quality standards laid down in Community legislation have already been exceeded; (vii) densely populated areas; (viii) landscapes of historical, cultural or archaeological significance.
Characteristics of the potential impact **3.** The potential significant effects of development must be considered in relation to criteria set out under paragraphs 1 and 2 above, and having regard in particular to- (a) the extent of the impact (geographical area and size of the affected population); (b) the transfrontier nature of the impact; (c) the magnitude and complexity of the impact; (d) the probability of the impact; (e) the duration, frequency and reversibility of the impact.

Should the developer disagree with the Council's screening opinion, then a screening direction can be requested from the Scottish Ministers.

The process of requesting and issuing a screening opinion provides an excellent opportunity to identify and manage the significant risks relating to a proposal. Many developers do not pursue screening opinions where they believe that a particular development will require an EIA. Obtaining such an opinion is, however, useful as they set out the planning authority's opinions as to why an EIA is required under Schedule 3 of the EIA Regulations at an early stage. This is to be encouraged along with use of the new pre-scoping planning stage, as laid out in policy J.1 of the Highland Council Renewable Energy Strategy.

3.2.4 EIA scoping

If an EIA is required, a developer can request a 'scoping opinion' from the Planning Authority under Schedule 4 of the EIA Regulations. This request seeks the Council's opinion as to the information to be supplied within the proposed Environmental Statement (a scoping opinion). This is preferably done prior to commencing any data collection.

This request should include:

- a plan sufficiently detailed to identify the land in question;
- a brief description of the nature and purpose of the development and of its possible effects on the environment; and
- other information or representations the developer may wish to provide or make.

The Planning Authority should provide a scoping opinion within five weeks of receiving such a request, unless a longer period has been agreed in writing with the person making the request.

3.2.5 Data collection

Following agreement as to the intended scope of an Environmental Statement, developers can finalise the scope of the information required to undertake any necessary EIA. Such information is usually divided into physical, ecological, social and economic impacts, and frequently relates to an assessment of the project's potential impacts on water courses, landscape, visual, ornithology, habitats, as well as impacts on neighbours (such as noise), local transport infrastructure, (particularly during construction), and on the amenities, employment and economies of the affected areas. The collation of the raw data required to undertake an EIA is the developer's responsibility and should happen in consultation with the relevant statutory consultees. This will make sure that a competent application is submitted without any data gaps that could otherwise delay assessment and determination.

3.2.6 Production of Environmental Statements

Generally an Environmental Statement should summarise all the investigation, research and consultation carried out during the environmental impact assessment process. It should include a description of the proposal, a description and assessment of its likely significant effects (rather than all identifiable effects) and a description of any proposed mitigation.

Schedule 4 of the 1999 EIA Regulations sets out the information required for inclusion within formal Environmental Statements, below:

Table G3.2.3 : Legislative Information Requirements for Inclusion in Environmental Statements

PART I **1.** Description of the development, including in particular- (a) a description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases; (b) a description of the main characteristics of the production processes, for instance, nature and quantity of the materials used; (c) an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the development. **2.** An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects. **3.** A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors. **4.** A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from: (a) the existence of the development; (b) the use of natural resources; (c) the emission of pollutants, the creation of nuisances and the elimination of waste, and the description by the applicant or appellant of the forecasting methods used to assess the effects on the environment. **5.** A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment. **6.** A non-technical summary of the information provided under paragraphs 1 to 5 of this Part. **7.** An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant or appellant in compiling the required information.
PART II **1.** A description of the development comprising information on the site, design and size of the development. **2.** A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects. **3.** The data required to identify and assess the main effects which the development is likely to have on the environment. **4.** An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects. **5.** A non-technical summary of the information provided under paragraphs 1 to 4 of this Part.

Environmental Statements generally consist of a non-technical summary, a main report and sometimes a separate volume of plans and figures. Some Environmental Statements are also accompanied by a Planning Statement or equivalent document, setting out the relevant national and local planning context within which the proposal in question will be determined.

3.3 Offshore Renewable Energy Developments

Responsibility for the consenting of offshore renewables projects around Highland lies outside the jurisdiction of the Highland Council, whose responsibility for determining planning applications does not extend offshore below the low water mark. Where a proposed offshore development includes onshore elements such as control buildings and temporary construction compounds, consents may still be required under the Town and Country Planning (Scotland)

Act 1997, and this part of the development can be treated as the same as onshore developments as described above. For information purposes, a breakdown of the current offshore process is included below:

The relevant consents for offshore renewables developments can be granted under two pieces of legislation:

- Section 36 of the Electricity Act 1989 or
- an order under the Transport and Works Act 1992.

Applications made under the Electricity Act and the Transport and Works Act are handled by the Scottish Executive. The Electricity Act currently applies to offshore projects within territorial waters adjacent to Scotland. To bring smaller offshore wind farms and water-driven developments within the jurisdiction of the Electricity Act (and associated EIA Regulations), the Scottish Executive's powers under the Act were extended on 1 December 2001 by means of a Statutory Instrument (SI 2001/3642) to cover all offshore wind and water-driven developments of above 1 megawatt capacity. The Energy Act 2004 has extended the requirement for this consent to proposals beyond UK territorial waters.

Where applications are submitted under the Electricity Act, further consent is required under the provisions of the Coast Protection Act 1949 for construction on or under the seashore below the level of mean high water springs (MHWS). Associated licences are also required under the Food and Environmental Protection Act 1985 and additional consent may be required under the Coast Protection Act 1949.

The Transport and Works Act provides an alternative way to obtain certain statutory rights necessary for the development of offshore developments within UK territorial waters. This does not however dispense with the need for consent under S.34 of the Coast Protection Act 1949 in matters of navigation obstructions.

In addition to Electricity Act and the Transport and Works Act consents, Food and Environmental Protection Act licences are required under Section 5 of the Food and Environmental Protection Act 1985 for any activities which result in the deposition of any material in the marine environment below the MHWS. In some cases, additional consents may be required under Section 109 of the Water Resources Act 1991. It is also likely that a seabed lease will be required from the Crown Estate as owner of most of the seabed in UK territorial waters out to a distance of 12 nautical miles.

You can find a comprehensive set of guidance notes describing the consenting process as it applies to offshore wind farms from the DTI publication, Guidance Notes: Offshore wind farm consents process.

3.4 Protecting European Designated Sites and Species

In order to meet its duties under the Habitats Regulations, specifically Regulations 48 and 49 which make provision for the protection of European sites, the Highland Council will ensure that all renewables development likely to have a significant effect on areas classified/ designated or proposed for classification /designation under European directives (SACs or SPAs) or Ramsar sites should only be permitted where an appropriate assessment indicates that either:

1. The proposed development, incorporating any appropriate mitigation, will not have an adverse effect on the integrity of the site for the habitats or species for which it has been classified/designated; OR

2. There are no alternative solutions; and

3. (if so determined by the appropriate authority) There are imperative reasons of overriding public interest, including, for sites hosting non-priority habitat types or species, social or economic considerations. For sites hosting priority habitat types or species, human health or public safety are the only overriding considerations.

In respect of the animals and plants identified in Annex IV of the Habitats Directive (European Protected Species), renewables development will not be permitted unless it is demonstrated that the proposal will either not impact significantly on any European Protected Species in the area, or that all three tests as detailed in Regulation 44 of the Habitats Regulations are satisfied.

Wherever possible, renewable energy projects should also incorporate positive enhancement of habitats and species associated with renewables development sites in line with local and wider conservation objectives laid out in relevant Local Biodiversity Action Plans and the Scottish Biodiversity Strategy.

Additionally, in accordance with NPPG14 and reflecting Article 10 of the Habitats Directive, the Council, in consideration of renewables development, will seek to safeguard and enhance the wider natural heritage beyond the confines of designated sites, particularly those areas listed below where they are of major importance or contribute to the coherence of the Natura network of European sites:

- Areas of habitats listed in Annex I and the habitats of species of community interest listed in Annexes II, IV and V of the Habitats Directive
- Areas which support habitats of naturally occurring wild birds, particularly those on Annex I of the Birds Directive and migratory species.

Full consideration will also be given to species listed in Schedules 1, 5 and 8 of the Wildlife and Countryside Act, 1981 as amended."

4 Key Planning Issues and Guidance by Technology

This section provides guidance on expected planning requirements and advice for renewables developments based on type of technology employed. Where a proposal will utilise more than one technology all relevant sections should be examined.

4.1 Bio-energy

Generally bio-energy is divided into a number of sub-groups depending on the fuel source and method used to create energy. From a planning point of view, there are key issues associated with both phases. With regard to fuel source, they are usually divided into fuel derived from grown crops (dry forestry and crop biomass, and bio-fuels) and fuel produced from municipal and industrial wastes (dry organic refuse, and agricultural and industrial slurries).

Though using land for forestry and crop growing has potential to have large environmental and socio-economic impacts on an area, these decisions on land use are only under the direct control of planning authorities when they affect relevant designated conservation areas. By definition wastes are not actively produced for fuel and their arising is already covered under the relevant aspects of planning development.

The key aspects of bio-energy development planning lie in the siting, construction and operation of plant and infrastructure required to process the fuel sources. Presently these fall into 3 main categories: thermal electricity and/or heat power stations for dry fuels, biological digestors for wet fuels and waste, and fermentation and chemical manufacturing processes for the production of bio-fuels. All these technologies have issues similar to existing plants within the energy and industrial sectors, e.g. noise, pollution, and ash waste from combustion, or, odour and gas/chemical storage safety associated with bio-digestion and bio-fuels.

In addition to these specific issues, there is one issue that is common to almost all methods of bio-energy, that of transport and storage of fuels and wastes. Where appropriate, energy from waste proposals should accord with the National Waste Strategy and Area Waste Plan. Careful consideration will be required for siting of processing plant in relation to production areas, so as to minimise:

- impact and disruption to existing infrastructure;
- needs for new infrastructure;
- economics of the processes; and
- CO_2 and energy balance of the overall process.

The list below initially summarises where these possible headline issues can fall under Highland Council planning control and 0 expands specific requirements and guidance:

Bio-energy

- ☑ Increase in crop growing area linked to visibility and landscape issues
- ☑ Large areas of willow biomass or other irrigated crop may affect water tables
- ☑ New land or alternative use of established farming land
- ☑ Other land users (agriculture & existing forestry activities)
- ☑ Planting, harvesting and drying land and road traffic and infrastructure
- ☑ Transport between crop growing and generator plant locations
- ☑ Liquid run-off from storage/stockpile of wood crops
- ☑ Incinerator/generator construction impacts
- ☑ Incinerator operational noise
- ☑ Incinerator local air pollution
- ☑ Processed water requirement and remnant ash pollution from conventional incinerators
- ☑ Road, rail and sea downstream distribution of bio-fuel products
- ☑ Traffic, visibility and odour impacts from increased collection, transport and storage/stockpile and processing of fuel
- ☑ Potential public safety issues with handling explosive methane and other high energy products from bio-fuels and bio-digestion

Key	☑	Usually fall under local authority jurisdiction	?	May fall under local or national jurisdiction depending on project and permitting pathway	☒	Usually outside of local authority jurisdiction

Table G4.2.1 : Specific planning requirements and guidance for bio-energy development

Topic	Issue	Planning requirement	Guidance
Targets for development	Replacement of existing fuel sources	Developers should consider alternative/dual production.	Developments that have the ability to also grow crops for bio-fuel will be looked upon favourably. CHP projects will also be looked on favourably if they can be used for small industries/communities.
	CO_2	Developers need to consider production of greenhouse gases during construction and operation.	As with economic appraisal of the proposed development, a developer will be expected to have conducted a suitable assessment of how the project is optimised to minimise local, regional and global greenhouse gas emission and help reduce the potential effects of climate change. Most renewable energies are generally favourable with regard to these emissions but care should be taken to maximise the benefit of the proposed project.
	Project efficiency and productivity	The developer will be required to demonstrate at the scoping stage that the proposal is an efficient and productive use of the available resource.	During early screening and scoping business plans should be presented to the planning authority, which outline the justification of the development from an efficiency point of view. The later planning application should provide figures for the installed capacity per unit area, the expected capacity factor for the proposed technologies and the predicted power output per unit area.
	Need for back-up generation/storage	Developers will need to show the required volume of dry or wet waste required for their development and their ability to obtain it.	Details of mass of storage to be kept at any one time should be considered along with any adverse effects of storing the material. Requirement for information on the appropriate design and siting of storage facilities
	Site servicing requirement	The developer will be required to provide evidence that the cost of remote site servicing, with reasonable mitigation measures, does not substantially compromise the economics of the proposal.	Consideration will need to be given to the economic implications of remoteness and accessibility of the site regarding servicing requirements. Access tracks and roads, grid connections, accommodation for workers, weather conditions.
Areas and types of development	Synergy between technology developments	Some combinations of technologies will provide mutual opportunity to each other, maximising the energy yield from a particular area of land or water.	Examples are hydro schemes with wind turbines, wind farms with biomass crops, combinations of commercial and community wind farms.
The planning process	Alternatives to development	Developers must fully consider appropriate alternatives to the proposed development according to policies J1 to J3 of the Highland Council Renewable Energy Strategy[55], prior to scoping and planning application.	The Council have created a new planning pathway which allows substantial confidential conceptual screening advice to developers prior to project scoping. During this phase it is expected that the developer fully considers appropriate alternative development options for the concept prior to production of scoping documents.
	Alternative technologies	Developers will be expected to have considered alternative renewable technologies to achieve the same aim.	Where there is a choice of renewable technologies available justification must be provided in the planning application for the proposal of biomass developments over other options.
	Appropriate technology	The developer must provide evidence that any proposed technology is appropriate for operation at the proposed location.	Highland Council may wish to receive information and reassurance from the developer that the proposed generation equipment and its supporting infrastructure is suitable for operation under the Highland climatic regime and the particular proposed location. This could include questioning of equipment on the grounds of insufficient safety documentation or particular technologies that would have significantly increased impact per unit of production, due to operation at a substantially sub-optimal level at its proposed location. In the case of some biomass schemes the developer may have to prove that the development is carbon neutral
	Alternative locations	Developers will be expected to have considered the impacts of reasonable local alternative locations in locating the proposed development.	Where there is a choice of locations available to the project, the developer will need to have considered the appropriateness of the proposal and the relative impacts of reasonable alternatives. The impacts will include environmental, social and economic sensitivities.
The planning process	Cumulative Impacts	The cumulative effects of potential impacts from the new proposal, in the context of existing developments, applications and other development types, will need to be considered in the EIA process for incinerator plants.	Cumulative impacts include interactions of the proposal with other bio-energy developments and other industries. Unless otherwise allowed for in the Strategy a proliferation of individual plant and generators in an area will not be acceptable, nor will it be acceptable for generators to be sequentially continuously visible along popular transport routes. Consider other impacts, both positive and negative e.g. socio-economic factors (employment), infrastructural improvements, environmental impacts (traffic, hydrology, birds, ecology etc), nuisance Indications how the proposed scheme supports policy and assists reduction of future cumulative impacts will be welcomed and can be discussed at an early stage.
	Re-populating/ powering existing projects with new devices	A new planning application will normally be required if the project involves increasing size of incinerator plant.	Any new proposal is expected to take account of the changes in sensitivities since the previous application and development of understanding of impacts. Planning permission when granted is usually valid for 25 years. Difference in physical size is considered more significant than the model or power of the devices.
Possible positive effects	Areas of economic impact	Details of the economic effects of the project need to be presented as part of a planning application for larger developments. Some community based local projects may be exempt at the discretion of the planning authority.	Extra revenue from selling fertiliser and fibre products can have a positive effect on rural development.
	Employment	Details of the employment effects of the project need to be presented as part of a planning application for larger developments. Some community based local projects may be exempt at the discretion of the planning authority.	Biomass offers the greatest potential for job creation among all the renewable technologies. A switch from traditional food crop production to non-food biomass production can potentially help reduce the decline of jobs in agricultural regions.
	Support/facilitation of community involvement	Economic models which favour community involvement in the financing of projects will be preferred	Passive and active options. Individuals, group, council. Possible link to community energy company. Possibility of CHP for industries and small communities.
	Trans-boundary impacts	It is expected that the developer considers effects that cross Highland council boundaries.	The developer will need to take account of any potential increase in traffic from the transportation of raw materials and wastes, as well as any downwind carrying of smoke, fumes, and odours across local authority boundaries.
Possible negative effects	Land take	Within each project classification, the developer should design overall projects that make (minimise) appropriate and efficient use of land.	Development of land already used for agriculture/forestry will be favoured over proposals to develop from scratch.
	General animal and plant species	All projects requiring planning permission should demonstrate any potential significant impact on significant and sensitive animal and plant species during the lifecycle of the project is minimised if it is not able to be avoided.	Energy crops require very little input of herbicides and pesticides, and when established on agricultural land usually result in an increase in bio-diversity. Developers should make sure that such changes are not detrimental to established species. The planting of pine forest will cut out light and out compete other species.
	Habitats	All projects requiring pl. permission should demonstrate any potential significant impact on significant and sensitive habitats during the lifecycle of the project is minimised if it is not able to be avoided.	Establishing or changing crops will ultimately lead to changes in habitat. Any protected species in potential areas need to be noted and consultation with SNH may be required.
	Specific bird sensitivities	All projects requiring planning permission should demonstrate any potential significant adverse impacts on birds is minimised if it is not able to be avoided.	See above
	Specific mammal sensitivities	All projects requiring planning permission should demonstrate any potential significant adverse impacts on mammals is minimised if it is not able to be avoided.	See above
	Designated conserved species, areas and habitats	Projects impinging on (a) locally and nationally designated sites should ensure that the conservation objectives of the site are not compromised and any effects are minimised., (b) European designated habitats and species may need to provide additional information for any Appropriate Assessment undertaken by the LPA	See Section 3.4

[55] Highland Council Renewable Energy Strategy 2005

Topic	Issue	Planning requirement	Guidance
Possible negative effects	Alteration of: meteorology	The developer must take due care to check that the project does not have any negative impact on natural heritage through alteration of the local meteorology.	Introduction of forestry will increase transpiration. Incinerator plants will be emitting carbon dioxide and possible methane into the atmosphere. Developers will need to make sure that their development is carbon neutral.
	Modifications to surface and groundwater'	All developments must demonstrate any potential significant adverse impacts on surface water and groundwater (both quality and quantity) and their dependant ecosystems An assessment of whether the development will have an impact on other water users including existing public and private water supplies in the area accompanied by proposed mitigation measures, if required.	After a forestry site has been cleared there is more water run-off, which could lead to soil erosion. However, this is a characteristic of forest clearing generally and does not arise specifically as a result of the activity associated with the collection of forestry residues for energy use. As such these are manageable by using good forestry practice. The introduction of Short Rotation Coppice (SRC) can have an impact on the local water table. Any engineering works (including culverting), abstraction or impoundment will require a licence from SEPA under the Water Environment (Controlled Activities) Regulations 2005.
	Pollution	There should be no pollution of soils or water in the development area. Emissions from combustion of the biomass in the power plant must be within acceptable limits. Siltation can be a significant problem in any bio-crops development which requires roadworks/earthworks.	Energy crops require very little input of herbicides and pesticides. However, the introduction of any such chemicals should be controlled and kept within legislative guidelines. Large wood chip or other material piles may produce leachate which could run-off to ground or surface waters. Suitable surface water drainage facilities should be designed in any case for larger plants, given the transport movements that such power plant will generate. It should be demonstrated how all environmental legislative requirements will be met. Developers should provide a systematic assessment of the carbon balance of the development during construction, operation and decommissioning demonstrating how this balance has been maximised. A specific comment on peat is appropriate due to its high carbon content and specific management requirements. Construction method statements will also be required by condition and these should outline all aspects of site work that might impact upon the environment, containing further preventative action and mitigation to limit siltation impacts, Refer to SEPA's Pollution Prevention Guideline (PPG) Notes
	Drainage	Impacts on surface water and groundwater (both quality and quantity) sedimentation, and their dependant ecosystems An assessment of whether the development will have an impact on other water users including existing public and private water supplies in the area accompanied by proposed mitigation measures, if required.	Consider the scale, type and potential effects of the discharge from water run-off. Avoid significant impacts of foundations on groundwater where they could affect established utilisation of this resource. Avoid culverting of watercourses at any access track crossings. Include a systematic table of watercourse crossings or channelising, with photography, providing detailed justification for any engineering works and information on how to minimise impact. Where unavoidable, culverts to be designed in accordance with the Scottish Executive guidance on River Crossings and Migratory Fish. SEPA licence requirements.
	Soil impacts including disposal of combustion ash by-product	Disturbance to and changes in soils within the site/development area should be minimised. Ash by-product is a valuable by-product for which productive use should be specified, failing which provision must be made for safe disposal to landfill	Forestry machinery can compact the soil and water run off due to forestry clearing can led to soil erosion. Also refer to the Forestry Commission's 'Forests and Water Guidelines' Fourth Edition (2003) and the 'Prevention of Environmental Pollution From Agricultural Activity' (PEPFAA) code for guidance in relation to impact on soils from crops and forestry and to SEPA's PPG notes (see above) in relation to impacts from the plant development site
	Geo-morphology	Care should be taken to ensure that surface land features such as roads, tracks, ditches do not fragment fragile habitats/populations.	Projects should blend in with or are sensitive to local geo-morphological characteristics.
	Decommissioning provisions	Provision for decommissioning should be addressed in the planning application. Decommissioning bond will be required in respect of the power plant.	Short Rotation Coppicing occurs over 2 to 5 years. After harvesting the entire coppice should be over-sprayed with a glyphosphate-based contact herbicide. The field can then be grassed for the first year following removal and (if appropriate) used for standard arable cropping the following year. Using this method, final harvest to re-seeding, will take 18-24 months.[56] Developers should be aware of this period when there is no growing of raw materials.
	Noise	Developers will need to provide details of noise levels.	Noise levels from the transportation of materials, anaerobic digester plants, condensers, chippers and incinerator plants as well as kept animals will need to be considered in areas close to dwellings and conurbations. Efforts can be made to mitigate these through appropriate design and technology.
	Light	Developers will need to provide details of light pollution.	Light pollution from a development that is operational around the clock can impact on local residents and wildlife. Measures can be taken to reduce unnecessary obtrusive light.

[56] Growing Short Rotation Coppice – DEFRA Best Practice Guidelines

Topic	Issue	Planning requirement	Guidance
Possible negative effects	Emissions to air	Developers will need to provide details of any emissions and include an assessment of what impacts these emission could have on the environment and human health.	Early discussions with SEPA should be undertaken to determine licensing requirements for anaerobic digestion plants. The combustion emissions from biomass incinerator plants include particulates in the flue gas, CO, CO_2, SO_2, nitrogen oxides and water. Air quality impacts should be addressed by the developer as part of EIA.
	Odour and allergy	Developers will need to provide details of odours and pollen levels.	Increased pollen levels from both crops and forestry will need to be assessed, particularly in areas close to dwellings and conurbations. Odour from anaerobic digester plants is regulated under the Environmental Protection Act. Odour can be controlled using containment in buildings with negative ventilation systems fitted with bio-filters.
	Nearby properties	Developers must take account of local dwellings in their proposals.	Developers should aim, wherever possible to design their project in a way that minimises disruption or adverse effects on local properties especially with regard to the power plant (including emissions) and to the transportations of fuel to the plant and ash from the site.
	Public safety	Developers need to consider public interaction with developments both in negative and positive impacts.	Areas of hazard to the public e.g. areas of forestry where felling is occurring and fields where crops have been treated to chemicals need to well signed and in the majority of cases fenced. The developer should be aware that the installation of fencing may require visibility assessments.
	Landscape character	Developments which are sympathetic to key landscape characteristics are more likely to be approved	The siting of crops is not likely to be an issue if the land is already used for agriculture (however, see above point on oil seed rape). Also refer to the forestry commission guidelines on SRC and the landscape.[57] The siting of incinerator plants will be a key issue. Consideration needs to be given into the trade off between low landscape impact siting and distance for transportation to plant will need to be given.
	Visual design	Developments that use attractive architecture and scale development into the landscape will be favoured.	The main issue will be with the incinerator plant. Consideration should also be given to the forestry commission guidelines.[4]
	Built and cultural heritage	Developers need to take account of any adverse affects on areas of historical context.	Developments that avoid or are sympathetic to areas of built or cultural heritage will be looked on favourably. Prior to the commencement of development, a specification, detailing a programme of archaeological work for the preservation and recording of any archaeological features affected by the proposed development, including a timetable for investigation, shall normally be required to be submitted to, and approved in writing by, the Planning Authority. Developers need to demonstrate that they have assessed the likely impact and have developed a mitigation strategy which focuses on minimum intervention; avoidance with excavation as a last resort. This should also deal with the masking effect of deep peat.
	Specific transmission and support structure impacts	Developers need to consider power line routes near settlements.	Developments that avoid or bury powerlines within close proximity to dwellings will be favoured to those that use overhead powerlines.
	Visual impact	All developments must consider the visual impact of the project	Alterations to forestry tree lines. SRC grows tall enough to create a 3-dimensional mass in the landscape and, unlike most conventional field crops, may impede views. However, because it is fast growing, visual changes take place more rapidly than in conventional coppice or woodland. SRC might not cause visual problems in some landscapes but in others care will be needed both in the siting of the crops and in the way in which they are managed. The growing of oil seed rape dramatically alters the agricultural landscape. The visual impact of such crops is outside planning control. The growing of crops on previously uncultivated land is unlikely to require EIA unless it covers more than five hectares. I considering whether particular development is likely to have significant effects, consideration should be given to impacts on the surrounding ecology, hydrology and landscape. The burning of dry and wet wastes will require purpose built buildings for incineration. The visual impacts of these sites need to be considered. For wet wastes, the main concerns will be the size of the building and particularly the size of the digester tank in relationship to surrounding buildings. Dividing the tank up can reduce visual impact. Dry wastes sites will need to consider the visual impact of generation plants, especially chimneys. Existing industrial land will be favoured for such buildings.

[57] Short Rotation Coppice in the Landscape – Forestry Commission 2001

Topic	Issue	Planning requirement	Guidance
	Cooling water	Developers will require to submit full details where thermal generation requires use of cooling water involving fishery interests.	Reference to specific Fisheries Committee Guidance 2005 is expected. Developers attention is drawn to the need for good quality data collection over a sufficiently long time period, together with post-development longitudinal studies.
Infrastructure and other issues	Local transport infrastructure	Developers will need to provide details of intended routes for construction/access to sites and then for the regular delivery of biomass material to the power plant.	Consideration will need to be given to road width, weight capacity, bridges, bends, docks and height restrictions and passage of traffic both during construction and operation through communities. Consideration will also need to be given to the possible development of new roads and tracks and the impact this may have on the local area e.g. possibility of increased traffic through town centres.
	Grid connection logistics	The developer will need to provide evidence that the cost of providing appropriate grid connection with reasonable mitigation measures does not substantially compromise the economics of the proposal. The developer will also need to provide details of operations regarding grid connection and laying of power lines.	For developments that intend to put electricity into the national grid, those that make use of existing 11kV/33kV lines will be looked on more favourably than those requiring new infrastructure. Timing may be critical, certain routes may be more advantageous or problematic, certain technologies may be more or less appropriate depending on circumstances.
Infrastructure and other issues	Energy distribution capacities	All projects have to demonstrate that there are sufficient mechanisms available to distribute the expected energy production. The scope for combined heat and power schemes (CHP) should be investigated and reported.	Irrespective of the mechanism proposed for energy supply the developers will be required to demonstrate that there is either existing infrastructure available or provision of resources within the project plan to allow full utilisation of the generated energy and avoid unnecessary installation of excessive generation capacity. Depending on the scale and design of the proposal this could be in the form of on or near-site domestic, communal and/or commercial private electricity use, grid distribution capacity or alternative mobile energy carrier systems such as hydrogen supply networks.
	Predictability and reliability of resource	The developer will need to demonstrate the viability of crop/waste.	The developer should be aware of previous years' statistics for crop productions and failures. For example: A 6MW station with a plant efficiency of 20% would consume the material from between 430 and 2,150 hectares a year of sustainably managed forest at harvest. The wide range indicates the extremely variable yield of forest residues, which in turn depends on factors such as terrain and accessibility, tree species and age, and the use to which the timber – as opposed to the residues – will be put.[58] There is less variation in animal wastes, however, the developer should consider the need to import waste if there is a short fall and should also consider the implications of pandemics such as foot and mouth, which can not only prevent waste production, but may also change legislation into the handling of animal waste in the future.
	Market for supplied energy	All projects have to demonstrate that there are sufficient markets for the energy produced.	As with distribution capacities (above) the local authority is keen to avoid excessive impacts as local projects would need to demonstrate local supply needs. Export projects would need to identify the market to be served by the power purchase agreement (PPA) Note: Need to verify whether local projects can be developed for export supply only.

[58] PAN 45 Planning Advice Note – Renewable Energy Technologies

4.2 Hydro-Electricity

Planning issues for hydroelectric schemes incorporate run of river schemes as well as larger reservoir stored flow through generators and pumped storage schemes. The main issues associated with the generation plant are connected to landscape and amenity, the disruption of existing water flows and the general ecology and specific migratory fisheries associated with them.

There are potential common access, infrastructural, and noise issues associated with construction of plant, however these are more prevalent with larger operations where there are associated significant requirements for raw material acquisition and transport, and concrete production for reservoir structures and substantial power distribution requirements.

Additional impacts of reservoir construction of reservoirs and water flow damming are the effects that this has on recreation and amenity in the area, land and habitat loss, flooding, and groundwater patterns and careful liaison with the appropriate agencies and stakeholders (e.g. Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA), Fisheries Committee and local Fisheries Trusts) in the area will be necessary.

The list below initially summarises where these possible headline issues can fall under Highland Council planning control and table G4.2.2 expands specific requirements and guidance:

Hydro-electricity

- ☑ Landscape and scenic issues from dam wall and valley flooding
- ☑ Cumulative impacts including feeder areas/inter-catchment transfers, and landscape impacts in areas of high recreational value
- ☑ Dam impact on freshwater courses and ground water
- ☑ Specific migrating fish sensitivities (salmon,sea trout, lamprey, arctic charr, trout and eel) from flow diversion
- ☑ Specific habitat, invertebrate, and habitat-specific animal sensitivities
- ☑ Connection infrastructure
- ☑ Distribution grid capacities and upgrades
- ☑ Disruption of freshwater fisheries and other river/valley users
- ☑ Impact on tourism and recreation amenities
- ☑ Localised dwelling and built heritage losses and wider flood management issues.

Key	☑	Usually fall under local authority jurisdiction	?	May fall under local or national jurisdiction depending on project and permitting pathway	☒	Usually outside of local authority jurisdiction

Table G4.2.2 : Specific Planning Requirements and Guidance for Hydroelectric Development

Topic	Issue	Planning requirement	Guidance
Targets for development	CO_2	Developers need to consider production of greenhouse gases during construction and operation.	As with economic appraisal of the proposed development, a developer will be expected to have conducted suitable assessment of how the project is optimised to minimise local, regional and global greenhouse gas emission and help reduce the potential effects of climate change. Most renewable energies are generally favourable with regard to these emissions but care should be taken to maximise the benefit of the proposed project.
	Project efficiency and productivity	The developer will be required to demonstrate at the scoping stage that the proposal is an efficient and productive use of the available resource.	During early screening and scoping business plans should be presented to the planning authority which outline the justification of the development from an efficiency point of view. The later planning application should provide figures for the installed capacity per unit area, the expected capacity factor for the proposed technologies and the predicted power output per unit area.
	Need for back-up generation/storage	Projects will be required to provide details of anticipated capacity factors and patterns of production.	Consideration needs to be given to the possibility of low/no production periods. Procedures and plans for alternative production in such periods need to be considered to prevent short falls of production.

Topic	Issue	Planning requirement	Guidance
	Site servicing requirement	The developer will be required to provide evidence that the cost of site servicing, with reasonable mitigation measures, does not substantially compromise the economics of the proposal.	Consideration will need to be given to the economic implications of remoteness and accessibility of the site regarding servicing requirements. Access tracks and roads, grid connections, accommodation for workers, weather conditions
	Synergy between technology developments	Some combinations of technologies will provide mutual opportunity to each other, maximising the energy yield from a particular area of land or water.	Examples might be hydro schemes with wind turbines, wind farms with biomass crops, combinations of commercial and community wind farms.
	Zoning of development	The planning assessment of the proposed project will be dictated by the zoning principles laid out in policies E2 to E4of the Highland Council Renewable Energy Strategy[59].	Hydro projects will be assessed on a case by case basis with due regard to ancillary requirements such as access roads, grid and aggregate winning. Spatial and technology synergy with existing infrastructure and developments will be favoured[59].
The planning process	Alternatives to development	Developers must fully consider appropriate alternatives to the proposed development according to policies J1 to J3 of the Highland Council Renewable Energy Strategy[59], prior to scoping and planning application.	The Council have created a new planning pathway which allows substantial confidential conceptual pre-application advice to developers prior to project scoping. During this phase it is expected that the developer fully considers appropriate alternative development options for the concept prior to production of screening or scoping documents.
	Alternative technologies	Due to the policies D1 and D2 of the Highland Council Renewable Energy Strategy[59] encouraging technology mix, developers of major and national projects will be normally be expected to have considered alternative renewable technologies to achieve the same aim. This may also be applicable to local scale projects.	There is no routine requirement for technological justification of minor and local hydro schemes. For large export projects, where there is a choice of renewable technologies available, justification must be provided in the planning application for the proposal of hydro developments over other options. In a scenario where there have already been high levels of local hydro projects, this topic may also need to be considered for additional developments.
	Appropriate technology	The developer must provide evidence that any proposed technology is appropriate for operation at the proposed location.	Highland Council may wish to receive information and reassurance from the developer that the proposed generation equipment and its supporting infrastructure is suitable for operation under the Highland climatic regime and the particular proposed location. This could include questioning of equipment on the grounds of insufficient safety documentation or particular technologies that would have significantly increased impact per unit of production, due to operation at a substantially sub-optimal level at its proposed location.
The planning process	Alternative locations	Developers will be expected to have considered the impacts of reasonable local alternative locations in locating the proposed development.	Where there is a choice of locations available to the project, the developer will need to have considered the appropriateness of the proposal and the relative impacts of reasonable alternatives. The impacts will include environmental, social and economic sensitivities.
	Re-populating/ powering existing projects with new devices	A new planning application will normally be required.	Difference in Dam size is considered more significant than the model or power of the devices. Any new proposal would be expected to take account of the changes in sensitivities since the previous application and development of understanding of impacts. Planning permission when granted may be valid for 75 years. Special attention should be given to the effects on the river from any changes incorporated.
	Cumulative Impacts	The cumulative effects of potential impacts from the new proposal, in the context of existing developments, applications and other development types, will need to be considered in the EIA process. Additional future developments will not need to be considered by the developer at this stage. Holistic scenario considerations will be the responsibility of Highland council strategy.	Cumulative impacts include interactions of the proposal with other hydro developments on the same river system, other water abstraction uses (e.g. drinking water, fish farming) and other hydro developments in terms of visibility impact and other industries. Other impacts such as negative neighbour interactions and, potentially positive, avoidance of developmental spread, socio-economic factors and infrastructural improvements, should also be considered.

[59] Highland Council Renewable Energy Strategy 2006

Topic	Issue	Planning requirement	Guidance
	Decommissioning provisions	Provision for decommissioning should be addressed in the planning application. An indicative decommissioning restoration plan will be required upon any approval.	Hydro schemes are expected to have long lives, however, developers must be aware of the impacts of infrastructure at the end of their lifespan. Consideration needs to be given to the use of the site, potential users and measures taken to ensure restoration of natural flows once the power station stops operating (see guidance under Natural Heritage, Alteration of surface and subterranean water courses)
Possible positive effects	Areas of economic impact	Details of the economic effects of the project need to be presented as part of a planning application for larger developments. Some community based local projects may be exempt at the discretion of the planning authority.	An investigation of the potential benefits and negative economic impacts at local, regional, and wider levels should be included in applications. This includes the effects on neighbouring authorities, 3rd party and government revenues. Projects that are in line with development proposals within current local plans or the regional Structure Plan[60] will be considered favourably.
	Employment	Details of the employment effects of the project need to be presented as part of a planning application for larger developments. Some community based local projects may be exempt at the discretion of the planning authority.	An investigation of the potential employment benefits and negative impacts at local, regional, and wider levels should be included in applications. This includes the effects on neighbouring authorities, 3rd party and government revenues. Projects that are in line with development proposals within current local plans or the regional Structure Plan[60] will be considered favourably.
	Support/facilitation of community involvement	Economic models which favour community involvement in the financing of projects will be preferred.	Passive and active options. Individuals, group, council. Possible link to community energy company
	Trans-boundary impacts	It is expected that the developer considers effects that cross Highland council boundaries.	Although the proposal location lies within and any application for planning permission is lodged within this local authority, any effects which impact areas outwith Highland jurisdiction (e.g. visibility, employment etc.) should be included and will be considered as part of the planning approval process. It needs to be noted that a hydro scheme on the upper reaches of a river will have affects on the river system downstream which could potentially be located in another council area. Careful consideration also needs to be given to the source of aggregates for the construction of dam walls, especially if this is detrimental to neighbouring regions. In the unusual situation that a development site spans more than one authority but is still of a scale to be assessed by the local authority agreement will have to be reached between relevant Councils on how the process will proceed, on a case by case basis.
Possible negative effects	Predictability and reliability of resource	The developer will need to demonstrate the viability of the river resource.	A minimum period of 6 months (preferably a full year) continuous monitoring in the period April-October to be essential, calibrated with gaugings to give a continuous record of flow. Details should be provided of a) methods used (reference), b) mean daily flows for period of record used, c) stage – discharge curve, d) dates and results of calibration gaugings, e) links to analogue gauging stations.
Possible negative effects	Riparian interests'	The developer will need to provide evidence that other hydro schemes and other users of the system are not adversely affected by development.	The developers will need to take actions to prevent energy being diverted away from other existing/potential schemes/users down stream.
	Energy shadow	The developer must check that any energy lost downstream from the development does not have a detrimental effect on the environment.	Migrating fish can become trapped in pools when a power station stops operating, the agreements on compensation flows for new developments should be written to ensure that this does not occur.[61] Reservoirs substantially reduce the amount of suspended material which is transported down stream. This can lead to altered patterns of erosion and sedimentation, particularly on shallow rivers, which can impact significantly on a range of species including the rare freshwater pearl mussel.[62]
	Land take	Within each project classification, the developer should design overall projects that make (minimise) appropriate and efficient use of land. The developer will need to gain the permission of the landowner.	If there are no other overriding sensitivities, the developer should clearly demonstrate that land has been used in an appropriate manner to minimise potential impact on natural heritage, and optimise the physical footprint of generation and ancillary structures and servicing infrastructure. This can include an assessment of energy production per km^2 land take as an indication. Permission will need to be granted in order to build and have access to the powerhouse, intakes and discharge channels.

[60] Highland Council Structure Plan (2001)
[61] PAN 45 Planning Advice Note – Renewable Energy Technologies
[62] Guidelines on the Environmental Impacts of Windfarms and Small Scale Hydroelectric Schemes – SNH 2001

Topic	Issue	Planning requirement	Guidance
	General animal and plant species	All projects requiring planning permission should demonstrate any potential significant impact on significant and sensitive animal and plant species during the lifecycle of the project is minimised if it is not able to be avoided.	It will be necessary for the developer to carry out some level of assessment of the proposed location to identify if there are any threats of significant potential negative impacts on animals and plants. It may be beneficial for the developer to provide any evidence of positive impacts on flora and fauna. This would include interaction with significant populations of sensitive species, specific breeding and reproductive locations and times, evaluation of adjacent areas and the zone of influence the proposal will have on the area, and other indirect impacts by interaction with key supporting species for sensitive animal and plants(i.e. food sources or key pollen/seed transporters). SNH have identified bats, otters, wild cats, Atlantic salmon, arctic charr, brown trout and water voles. Any assessment would need to take into account all activities across the lifecycle of the project and should inform active management, mitigation and optimisation plans. It is most likely that significant displacement impacts will occur during the construction and decommissioning phases of the development, and there may be opportunity for re-colonisation of areas and provision of wildlife havens during the operational phase. Developers should consult SNH's checklist[62] and consider the questions asked. • *What will be the range of water level changes? What will be the frequencies of these changes? Will the levels and frequencies of drawdown impact upon wildlife and vegetation in shore areas?* • *What species will be affected by reduced storage capacity?* • *Can the storage scheme be managed to mimic natural conditions?* • *How will the proposed development affect migratory species?* • *Is a fish pass proposed? What type of pass is this and what are the likely landscape and visual impacts of it?* • *Will discharge be regulated?* • *Will the patterns of erosion and sedimentation be affected?* • *Will the hydro scheme change water temperatures? What species will be affected by this and how can the effects be minimised?* • *Will the chemical composition of the waters change? What species will this affect and how?* • *How will run of river schemes affect sedimentation and flow rates?* • *Will vegetation need to be removed and will the river banks be affected?* • *What controls will be laid in place to prevent and limit pollution?* Also specific DTI guidance should be consulted with regard to intake fish screening[63]
Possible negative effects	Habitats	All projects requiring planning permission should demonstrate any potential significant impact on significant and sensitive habitats during the lifecycle of the project is minimised if it is not able to be avoided.	As with animal and plant species, it will be necessary for the developer to carry out some level of assessment of the proposed location to identify if there are any threats of significant potential negative impacts on habitats. This would include degree of expected habitat change, interaction with significant sensitive habitats, specific geographical and seasonal sensitivities, and indirect impacts by interaction with key supporting habitats for sensitive habitats (i.e. donor water sources to wetlands). Any assessment would need to take into account the impact of all activities across the lifecycle of the project and should inform active management, mitigation and optimisation plans.
	Specific bird sensitivities	All projects requiring planning permission should demonstrate any potential significant adverse impacts on birds is minimised if it is not able to be avoided.	The presence of species on Annex 1 of EEC Directive 74/409 on The Conservation of Wild Birds and on Schedule 1 of the Wildlife and Countryside Act 1981 needs to be accounted. The provisions of Article 4 of the Birds Directive require that, outside classified Special Protection Areas, member states must strive to avoid pollution or deterioration for birds listed in Annex 1.
	Specific mammal sensitivities	All projects requiring planning permission should demonstrate any potential significant adverse impacts on mammals, is minimised if it is not able to be avoided.	Some mammals may have specific sensitivities to Stored hydro operations that need to be considered. These will include: seasonal breeding patterns of significant populations, and disturbance and displacement from breeding, hunting, and territorial grounds of scarce species; of particular concern would be water voles, wild cats, bats and otters. It is likely that site specific survey data will be necessary to assess presence and potential sensitivities of such species.

Topic	Issue	Planning requirement	Guidance
	Designated conserved species, areas and habitats	Projects impinging on (a) locally and nationally designated sites should ensure that the conservation objectives of the site are not compromised and any effects are minimised., (b) European designated habitats and species may need to provide additional information for any Appropriate Assessment undertaken by the LPA	See Section 3.4
	Alteration of micro-climate	The developer must take due care to check that the project does not have any negative impact on natural heritage through alteration of the local micro-climate, e.g. in downstream gorges.	Due to the large volume of dammed water for stored hydro schemes, spray in downstream gorges may be reduced. Any alteration to the micro-climate for bryophytes etc needs to be considered.
	Modifications to surface and groundwater	The Water Framework Directive will require the assessment of the impact of significant schemes on the ecological status of the whole water body. Where the case, the Directive may still permit the scheme to proceed provided it meets certain socio-economic and environmental criteria. These derogations, where allowed, require that mitigation measures be put in place to achieve the highest ecological status possible. All developments must demonstrate any potential significant adverse impacts on surface water and groundwater (both quality and quantity) and their dependant ecosystems An assessment of whether the development will have an impact on other water users including existing public and private water supplies in the area accompanied by proposed mitigation measures, if required..	SEPA interprets this as requiring the operator to apply Best Practice management and engineering methods for the initial design and long-term operation of the scheme. The developer will also be required to submit information on proposed compensation flows (including how this will be achieved) and for dam schemes, for the reservoir, a threshold level must also be presented below which no generation will take place; Morphological baseline data and an assessment of the potential impact will be required; With stored hydro schemes it will not be possible to avoid changes to the water system. However, any water systems not immediately affected by the scheme should be unaffected by construction of access tracks and generation buildings. Removal of water from any water course requires permission from the Scottish Environment Protection Agency in the form of a licence. These licenses are likely to be time limited to 15 to 20 years.
	Chemical pollution	There should be no pollution of soils or water in the development area.	Special care needs to be taken of development within watercourses (e.g. weir construction), any bulk fuels or chemicals used onsite during construction, operation or maintenance. Stored hydro schemes are only likely to have pollution impacts in the construction stage.
	Soil impacts	Disturbance to and changes in soils within the site/development area should be avoided.	Local products should be used wherever possible, the area of disturbance should be minimised, excavated material for infill should be used where possible, contamination should be avoided, actions should be taken to avoid triggering of erosion by wind or water, desiccation of peat through direct or indirect changes to drainage should also be avoided.
	Geo-morphology	Care should be taken to ensure that surface land features such as roads, tracks, ditches do not fragment fragile habitats/populations.	Projects should blend in with or are sensitive to local geo-morphological characteristics.
Possible negative effects	Forestry woodland alteration/loss	Evidence of any possible positive and/or negative alterations to forestry needs to be provided.	Schemes which require cutting down of native woodlands must provide for compensatory planting of new native woodland. Commercial forestry is not considered particularly sensitive. Some stored hydro schemes may wish to plant trees to mitigate the visual impact of a stored hydro development.
	Access tracks	New access tracks should conform to land form, seek to avoid watercourse crossings and minimise disturbance to important habitats and species.	Detailed construction proposals should be provided in the Construction Method Statement Avoid culverting of watercourses at any access track crossings. Include a systematic table of watercourse crossings or channelising, with photography, providing detailed justification for any engineering works and information on how to minimise impact. Where unavoidable, culverts to be designed in accordance with the Scottish Executive guidance on River Crossings and Migratory Fish. SEPA licence requirements. The scope for recreational use of tracks should be examined.

[63] A UK guide to intake fish screening legislation, policy and best practice

Topic	Issue	Planning requirement	Guidance
	Noise	Developers will need to provide details of noise levels.	Turbines can produce some noise but this can be mitigated relatively easily.
	Public safety	Developers need to consider public interaction with developments both in negative and positive impacts.	Stored hydro schemes may lower the risk of flooding by managing water volumes. The creation of a reservoir can offer recreational and tourist opportunities. Adequate warnings and safety equipment will need to be provided.
	Nearby properties	Developers must take account note of local dwellings in their proposals.	Developers should aim, wherever possible to design their project in a way that minimises disruption or adverse effects on local properties. Developments may have the positive effect of lowering the risk of flooding.
	Landscape character	Developments which are sympathetic to key landscape characteristics will be favoured. Developments which encroach into areas possessing qualities of wildness will need to be carefully assessed to minimise the impact on the "wildness" of an area.	The siting of a hydroelectric development, including turbine buildings, electricity transmission lines, penstock, and possibly a dam, will appear most appropriate where its scale relates to the sense of containment within the surrounding landscape, determined by both landform and land cover. This will be judged not only in terms of whether the development appears to dwarf its setting, but also whether it appears as the dominant feature or focus within this[64].
	Visual design	Developments that use attractive architecture and scale development into the landscape will be favoured.	As hydroelectric developments are often associated with distinct landform features – either a basin or glen to contain or route water, it is important that the development is seen to directly relate to this landform. Particularly, if structures are to be built upon slopes or between opposite sides of a glen, their landscape and visual impact will depend on whether these appear visually balanced and stable. If this is not the case, the development may appear to contrast to the characteristic visual movement and appear precarious, conveying a negative image[64]. Size and scale may be affected by proximity to settlement, should be in keeping with townscape character.
	Built and cultural heritage	Developers should seek to minimise any adverse affects on areas of historical context. Any potential interaction with sites or items of archaeological importance needs to be carefully monitored and/or avoided	Developments that avoid or are sympathetic to areas of built or cultural heritage will be looked on favourably. Prior to the commencement of development, a specification, detailing a programme of archaeological work for the preservation and recording of any archaeological features affected by the proposed development, including a timetable for investigation, shall normally be required to be submitted to, and approved in writing by, the Planning Authority. Developers need to demonstrate that they have assessed the likely impact and have developed a mitigation strategy which focuses on minimum intervention; avoidance with excavation as a last resort. This should also deal with the masking effect of deep peat.
	Specific transmission and support structure impacts	Developers need to consider power line routes near settlements.	Developments that avoid or bury powerlines within close proximity to dwellings will be favoured to those that use overhead powerlines.
	Fisheries	Projects will need to show evidence for the level of disturbance to fisheries, both commercial and sport downstream of the scheme. The siting of tailrace outfalls should be at the upstream end of spawning/nursery reaches or close to a corresponding impassable barrier.	Reference to specific Fisheries Committee Guidance 2005 is expected. Developers attention is drawn to the need for good quality data collection over a sufficiently long time period, together with post-development longitudinal studies. Measures would need to be taken to ensure fish species are not significantly reduced in numbers. Fish ladders and screens should be used to promote migratory species spawning runs and to prevent interactions between fish and turbines. It may also be possible to benefit fish communities with the release of freshets to aid fish movement (simulated spate) and oxygenation of the water. Also see general animal and plant species section.

[64] Guidelines on the Environmental Impacts of Windfarms and Small Scale Hydroelectric Schemes – SNH 2001

Topic	Issue	Planning requirement	Guidance
Possible negative effects	Visual impacts	All developments should seek to minimise visual impact.	It will be desirable to choose a location for the development where the built elements can be integrated into the landscape. It will be relatively simple to conceal hydropower facilities with existing woodland, particularly if existing cover is supplemented by new planting. Where development is taking place in a more open location, built elements should either be designed to be as small as possible, having regard to operational considerations, or should be designed to contribute positively to the landscape. In the case of schemes proposed for hillsides or other prominent locations, the landscape impact of the development, in close and distant views, should be appraised[65]. In some cases the visual impact can be minimised by siting the turbine house away from the headworks. However, the greater the separation is, the longer and potentially more prominent will be the headrace connection between the two. There will also be significant cost implications. The remote siting of a turbine house will rarely be justified by landscape considerations alone, and can become self-defeating if the headrace pipe or channel becomes a visually obtrusive feature in its own right. In most cases it will be advantageous to underground pipelines from the intake to the turbine house but careful restoration of the ground is necessary. Preferably, access tracks to weirs should be reinstated once the construction stage has been completed[65].
	Traffic and transport	Proposals should have due regard to the impact of construction on the local roads network.	Agreements will be sought under the Roads (Scotland) Act 1984 for any necessary improvement works prior to development and a "Wear and Tear Agreement" for post-construction damage repair works both at the developers' expense.
	Tourism	Developments which aim to provide opportunities to or directly improve the local employment will be favoured. Awareness of obligations under the Outdoor Access Code	The creation of a reservoir can offer recreational and tourist opportunities (see guidance on public opinion). New tracks can offer new walking opportunities. Other tourist activities and sports such as white water rafting and kayaking can be both positively and negatively affected.
Infrastructure and other issues	Local transport infrastructure	Developers will need to provide details of intended routes for construction/access to sites and their capability to take heavy and abnormal loads.	Consideration will need to be given to road width, weight capacity, bridges, bends, docks and height restrictions. Consideration will also need to be given to the possible development of new roads and tracks and the impact this may have on the local area e.g. possibility of increased traffic through town centres.
	Grid connection logistics	The developer will need to provide evidence that the cost of providing appropriate grid connection with reasonable mitigation measures does not substantially compromise the economics of the proposal.	As hydro schemes have limited geographical range developers will need to assess the lengths of powerline required to connect their developments to the grid.
	Energy distribution capacities	All major/national projects have to demonstrate that there are sufficient mechanisms available to distribute the expected energy production.	Irrespective of the mechanism proposed for energy supply the developers will be required to demonstrate that there is either existing infrastructure available or provision of resources within the project plan to allow full utilisation of the generated energy and avoid unnecessary installation of excessive generation capacity. Depending on the scale and design of the proposal this could be in the form of on or near-site domestic, communal and/or commercial private electricity use, grid distribution capacity or alternative mobile energy carrier systems such as hydrogen supply networks.
	Market for supplied energy	All major/national projects have to demonstrate that there are sufficient markets for the energy produced.	As with distribution capacities (above) the local authority is keen to avoid excessive impacts. Local projects would need to demonstrate local supply needs. Export projects would need to identify the market to be served by the power purchase agreement (PPA) Note: Need to verify whether local projects can be developed for export supply only

[65] Guidelines on the Environmental Impacts of Windfarms and Small Scale Hydroelectric Schemes – SNH 2001

4.3 Onshore Wind

Onshore wind power generation is perhaps the most widely recognised form of renewable technology. The scale of development ranges from small individual 100KW domestic turbines attached to dwellings to national scale 400MW wind farm proposals. There already is a significant level of domestic and commercial development within Scotland and Highland, and, due to the maturity of its technology and its present economic viability, it is likely to have the strongest pressure for development in the near future.

Key planning issues are derived from a number of factors associated with the nature of the technology. The generator usually takes the form of rotating bladed turbines mounted on a supporting tower. There are a number of important neighbour interaction issues associated with the safety, noise, shadow throw and flicker, and electromagnetic interference potentially caused by this type of structure. Development is usually sought on clear raised terrain due to the advantages of clear wind profiles and the "hill effect" on increased production. This location can increase neighbour interaction, and visibility and landscape effects of the structures and their movement.

Additionally, suitable windfarm sites are prone to locations in remote and undeveloped areas which have a landscape value because of these very qualities and where associated animals, birds, habitats, watercourses and soil types are sensitive to disruption caused by construction or operational activities. Extensive, otherwise suitable, areas are affected by the interaction of development with aviation and military use. The remote hill location and nature of sites can further create difficult access, transport infrastructure and downstream power distribution issues.

When considering landscape and visibility issues, the scale of the development is often a key factor and the cumulative effects of development are often important to consider at the planning stage. SNH have carried out considerable work in this area and their guidance should be consulted at an early stage.

The list below initially summarises where these possible headline issues can fall under Highland Council planning control and table G4.2.3 expands on specific requirements and guidance:

Onshore wind

- ☑ Visibility and landscape issues from siting in wild and scenic areas
- ☑ Mechanical and aerodynamic noise
- ☑ Shadow throw and flicker
- ☑ Electromagnetic interference of communications
- ☑ Foundation impact on ground water
- ☑ Specific bird sensitivities
- ☑ Supporting and connection infrastructure
- ☑ Construction and servicing road traffic and infrastructure
- ? Distribution grid capacity and upgrades
- ☑ Aviation interaction

Key	☑	Usually fall under local authority jurisdiction	?	May fall under local or national jurisdiction depending on project and permitting pathway	☒	Usually outside of local authority jurisdiction

Table G4.2.3 : Specific planning requirements and guidance for onshore wind development

Topic	Issue	Planning requirement	Guidance
Targets for development	Contribution to meeting local capacity targets	The proposed development should be aligned with local capacity targets described in the Highland Council Renewable Energy Strategy[66], and, specifically, as laid out in policy A1.	Developers should use the new early pre-scoping stage to provide information supporting the application which will inform the planning authority how the project assists the local targets that have been set. There will be presumption against projects which are significantly in excess of established targets.
	Project efficiency and productivity	The developer will be required to demonstrate at the scoping stage that the proposal is an efficient and productive use of the available resource.	A business case should be presented early in the planning process that includes energy efficiency, installed capacity per unit area, the expected capacity factor for the proposed technologies and the predicted power output per unit area.
	Cost of electricity	Low generation cost will not be considered as a deciding factor for acceptance of an otherwise unfavourable plan.	Given the high availability of site options within the region and competitiveness of unit costs for onshore wind, cost alone is unlikely to be sufficient justification for not proposing alternatives utilising the same technology or implementing mitigation/optimisation.
Areas and types of development	Synergy between technology developments	Some combinations of technologies will provide mutual opportunity to each other, maximising the energy yield from a particular area of land or water.	Examples might be hydro schemes with wind turbines, wind farms with biomass crops, combinations of commercial and community wind farms
	Zoning of development	The planning assessment of the proposed development will be dictated by the zoning principles laid out in objectives E5 to E11 of the Highland Council Renewable Energy Strategy[66].	The Highland Council have classified 3 types of development zone for major and national scale onshore wind farms across Highland.
The planning process	Alternatives to development	Developers must fully consider appropriate alternatives to the proposed development according to objective B1 to B3 of the Highland Council Renewable Energy Strategy[66], prior to scoping and planning application.	The Council have created a new planning pathway which allows substantial confidential conceptual pre-scoping advice to developers prior to project scoping. During this phase it is expected that the developer fully considers appropriate alternative development options for the concept prior to production of scoping documents.
	Alternative technologies	Policies J1 to J3 in the Highland Council Renewable Energy Strategy[66] encourage technology mix, and developers of major and national projects may be expected to have considered alternative renewable technologies to achieve the same aim. This may also be applicable to local scale projects.	There is no routine requirement for technological justification of micro and local onshore wind schemes. For large export projects, where there is a choice of renewable technologies available, justification must be provided in the planning application for the proposal of onshore wind developments over other options. In a scenario where there have already been high levels of local onshore wind projects, this topic may also need to be considered for additional developments.
	Appropriate technology	The developer must provide evidence that any proposed technology is appropriate for operation at the proposed location.	The Highland Council Renewable Energy Strategy encourages the most efficient use of technology to maximise generation and minimise negative impacts (environmental, visual etc). The developer is expected to deploy modern technology that is appropriate for the regional environmental conditions. Major and national projects will be expected to provide sufficient information on aspects such as generator power curves, wind regimes, product survivability and reliability to assure the planning authority of the appropriateness of the proposed technology.
	Alternative locations	Developers of local, major and national projects will be expected to have considered the impacts of reasonable local alternative locations in locating the proposed development and use a transparent process to justify their choice of the location.	Where there is a choice of locations available to the project, the developer will need to have considered the appropriateness of the proposal and the relative impacts of reasonable alternatives. The impacts will include environmental, social and economic sensitivities. NPPG 6[67], Renewable Energy, sets out the framework for the siting and control of renewable energy projects.

[66] Highland Council Renewable Energy Strategy 2006
[67] NPPG 6 National Planning Policy Guideline – Renewable Energy

Topic	Issue	Planning requirement	Guidance
The planning process	Cumulative Impacts	The cumulative effects of potential impacts from the new proposal, in the context of existing developments, applications and other development proposals, will need to be considered in the EIA process. Predictive impacts of additional future developments by other parties will not need to be considered routinely by the developer as such considerations will normally be the responsibility of Highland Council strategy	Cumulative impacts include interactions of the proposal with other onshore wind developments and other industries. SNH provide substantial documentation on cumulative visual and landscape effects of windfarms[68]. Unless otherwise allowed for in the Strategy a proliferation of individual windfarms in an area will not be acceptable, nor will it be acceptable for windfarms to be sequentially/continuously visible along popular transport routes. Consider other impacts, both positive and negative e.g. socio-economic factors (employment), infrastructural improvements, environmental impacts (traffic, hydrology, birds, ecology etc), and nuisance. Indications how the proposed scheme supports policy and assists reduction of future cumulative impacts will be welcomed and can be discussed at an early stage.
	Re-populating/ powering existing projects with new devices	A new planning application will normally be required.	Any new proposal would be expected to take account of the changes in sensitivities since the previous application and development of understanding of impacts. Planning permission when granted is usually valid for 25 years. Difference in physical size is considered more significant than the model or power of the devices. Revised turbine layouts to substitute more modern turbines should seek to use existing track and foundation layouts as much as possible to avoid further ground disturbance.
Possible positive effects	Local socio-economic impacts	Positive and negative socio-economic onshore impacts should be addressed in the planning application. Some community based local projects may be exempt at the discretion of the planning authority.	Scope for additional jobs especially in fragile remote areas, skills and training, inflation of labour rates, house prices, shortage of key skills for traditional activities such as farming and fishing. However invariably this has to be balanced against any impacts on tourism, green tourism, field sports economy and traditional estate management to the local area.
	Regional and national economic impact	Details of the economic effects of the project need to be presented as part of a planning application for larger developments. Some community based local projects may be exempt at the discretion of the planning authority.	An investigation of the potential benefits and negative economic impacts at local, regional, and wider levels should be included in applications. This includes the effects on neighbouring authorities, 3rd party and government revenues. Projects that are in line with development proposals within current local plans or the regional Structure Plan[69] will be considered favourably.
	Support/facilitation of community involvement	Economic models which favour community involvement in the financing of projects will be preferred	Community involvement can range from receipt of gratuity payments to shareholding to direct ownership by the community at large or by private local investors. Risk assessment.
	Community Benefit	Conformity with Policy G4 of the Highland Structure Plan[70].	There are a number of ways in which local communities can benefit from renewable developments from passive programmes with *ex gratia* payments, to shared ownership from developers. Direct involvement by the community is encouraged with shared risks and rewards. See also Highland Council's Community Toolkit
	Trans-boundary impacts	It is expected that the developer considers effects that cross Highland Council boundaries.	Although the proposal location lies within and any application for planning permission is lodged within this local authority, any effects which impact areas outwith Highland jurisdiction (e.g. visibility, employment etc.) should be included and will be considered by all affected planning authorities as part of the planning approval process. In the unusual situation that a development site spans more than one authority but is still of a scale to be assessed by the local authority, agreement will have to be reached between relevant Councils on how the process will proceed, on a case by case basis.
Possible negative effects	Land take	Within each project classification, the developer should design overall projects that minimise, and make appropriate and efficient use of land.	If there are no other overriding sensitivities, the developer should clearly demonstrate that land has been used in an appropriate manner to minimise potential impact on natural heritage, and optimise the physical footprint of generation and ancillary structures and servicing infrastructure. This can include an assessment of energy production per km^2 land take as an indication. The Highland Council renewable energy resource assessment[69] suggests an average of 25+ GWh per km^2 per annum as a guide figure for major developments.

Topic	Issue	Planning requirement	Guidance
Possible negative effects	General animal and plant species	All projects should demonstrate any potential significant impact on important animal and plant species during the lifecycle of the project is minimised if it is not able to be avoided.	It will be necessary for the developer to carry out some level of assessment of the proposed location to identify if there are any threats of significant potential negative impacts on animals and plants. This would include interaction with significant populations of sensitive species, specific breeding and reproductive locations and times, evaluation of adjacent areas and the zone of influence the proposal will have on the area, and other indirect impacts by interaction with key supporting species for sensitive animal and plants(i.e. food sources or key pollen/seed transporters). Any assessment would need to take into account all activities across the lifecycle of the project and should inform active management, mitigation and optimisation plans. It is most likely that significant displacement impacts will occur during the construction and de-commissioning phases of the development, and there may be opportunity for re-colonisation of areas and provision of wildlife havens during the operational phase. Developers for larger projects will be expected to gather baseline environmental data and monitor changes over the lifecycle of the project. Given indications of the effects of environmental modification as a result of present climate change, it may be advisable to use control station monitoring as part of the assessment of project impacts.
	Habitats	All projects should demonstrate any potential significant impact on important habitats during the lifecycle of the project is minimised if it is not able to be avoided.	As with animal and plant species, it will be necessary for the developer to carry out some level of assessment of the proposed location to identify if there are any threats of significant potential negative impacts on habitats. This would include degree of expected habitat change, interaction with significant sensitive habitats, specific geographical and seasonal sensitivities, and indirect impacts by interaction with key supporting habitats for sensitive habitats (i.e. donor water sources to wetlands). SNH have identified blanket bog, sand dune and machair, coastal grassland and heathland as of particularly sensitivity to onshore wind farm developments[71] Any assessment would need to take into account the impact of all activities across the lifecycle of the project and should inform active management, mitigation and optimisation plans.
	Specific bird sensitivities	All projects should demonstrate any potential significant adverse impacts on birds is minimised if it is not able to be avoided.	Over and above general animal impacts, birds may have specific sensitivities to onshore wind operations that need to be considered. These will include: seasonal breeding patterns of significant populations, potential mortality from collision risk, and disturbance and displacement from breeding, hunting, territorial grounds and migratory routes. SNH provide additional guidance[71] on the location and concentrations of 8 indicative Bird Directive Annex 1 breeding species considered sensitive to onshore wind development in Highland, however it is likely that site specific bird survey data will be necessary to assess potential sensitivities. It is advisable for all developers to utilise and make reference to the latest SNH Bird Survey Methodology and mortality Guidance[72,73].
	Specific mammal sensitivities	All projects should demonstrate any potential significant adverse impacts on mammals is minimised if it is not able to be avoided.	Over and above general animal impacts, some mammals may have specific sensitivities to onshore wind operations that need to be considered. These will include: seasonal breeding patterns of significant populations, potential bat mortality from collision risk, and disturbance and displacement from breeding, hunting, and territorial grounds of scarce species; of particular concern would be water voles, wild cats, otters and bats. It is likely that site specific survey data will be necessary to assess presence and potential sensitivities of such species.
	Designated conserved species, areas and habitats	Projects impinging on (a) locally and nationally designated sites should ensure that the conservation objectives of the site are not compromised and any effects are minimised., (b) European designated habitats and species may need to provide additional information for any Appropriate Assessment undertaken by the LPA	See Section 3.4

[68] SNH (revised 2005) Guidance: cumulative effect of windfarms
[69] Highland Renewable Energy Resource Assessment 2005
[70] Highland Council Structure Plan (2001)

[71] SNH (2002) Strategic locational guidelines for onshore wind farms in respect of the natural heritage.
[72] SNH bird mortality guidance 2005
[73] SNH Bird survey guidance 2005

Topic	Issue	Planning requirement	Guidance
Possible negative effects	Chemical pollution	There should be no pollution of soils or water in the development area	Special care needs to be taken of any bulk fuels or chemicals used onsite during construction, concrete batching, operation or maintenance or oil cooling of underground high voltage cables in very large projects.
	New access roads	New access roads should be kept to a minimum where possible. The provision of site access can be a major secondary impact, by opening up the area to a host of users and associated habitat disturbance, together with the risk of attracting further development.	If new access required it should be routed out of sight of popular view points, away from watercourses and sensitive habitats and designed to reflect the contour gradient. Positive opportunities should be sought for recreational usage of access tracks.
	Modifications to surface and groundwater'	Impacts on surface water and groundwater (both quality and quantity) sedimentation, and their dependant ecosystems An assessment of whether the development will have an impact on other water users including existing public and private water supplies in the area accompanied by proposed mitigation measures, if required.	Consider the scale, type and potential effects of the discharge from water run-off. Avoid significant impacts of foundations on groundwater where they could affect established utilisation of this resource. Avoid culverting of watercourses at any access track crossings. Include a systematic table of watercourse crossings or channelising, with photography, providing detailed justification for any engineering works and information on how to minimise impact. Where unavoidable, culverts to be designed in accordance with the Scottish Executive guidance on River Crossings and Migratory Fish. SEPA licence requirements.
	Soil impacts	Disturbance to and changes in soils within the site/development area should be avoided. Developers should provide a systematic assessment of the carbon balance of the development during construction, operation and decommissioning demonstrating how this balance has been maximised. Peat has a high carbon content and specific management requirements	This should consider use local products, minimise area of disturbance, use excavated material for infill where possible, avoid contamination, avoid triggering erosion by wind or water, avoid desiccation of peat through direct or indirect changes to drainage, avoid disturbance to dune systems, and should also consider loss of carbon sinks and carbon release by disturbance to peat.
	Peat stability	Schemes on peatland must provide a risk assessment covering peat slide.	A detailed report on peat depth, slopes, strength and best practice proposed will be required.
	Borrow pits	Full details of proposed borrow pits should be included in any application if aggregate is not to be sourced off-site or if borrow pits are to be the subject of later applications. that proposed locations of borrow pits should be determined by site investigation rather than. desktop study	Even when to be the subject of later applications, sufficient detail should be provided to allow the likely environmental impacts to be assessed. Where simultaneous consent is sought, full details should be provided as if for a minerals application, e.g. dimensions of working, materials balance drainage arrangements, cross-sections, reinstatement, and noise/dust/blasting.
	Geo-morphology	Care should be taken to ensure that surface land features such as roads, tracks, ditches do not fragment fragile habitats/populations	Projects should blend in with or are sensitive to local geo-morphological characteristics
	Site servicing requirement	The developer will be required to provide evidence that the cost of site servicing, with reasonable mitigation measures, does not substantially compromise the economics of the proposal or cause unacceptable environmental impacts through improved access.	Consideration will need to be given to the economic implications of remoteness and accessibility of the site regarding servicing requirements. Access tracks and roads, grid connections, accommodation for workers, weather conditions
	Decommissioning provisions	Decommissioning bond will be required plus indicative site restoration plan.	A suggestion would be for part of the bond to be paid as cash into regional fund, or a regional fund accumulated on the basis of productivity payments could be used to cover the bond. There can be opportunity for possible buy out of site/technology at end of lifecycle by local communities
	Forestry woodland alteration/loss	Schemes requiring cutting down of native woodlands will require compensatory new tree planting. Commercial forestry is not considered particularly sensitive and may be compatible with larger wind farms	
	Archaeology	Every effort should be made to identify and preserve archaeological sites, including significant host landscapes.	Coastal sites with good landing may be rich in archaeology. Consider working closely with local archaeologists & carrying out site surveys. Obtain Specification from Archaeology Unit.
	General neighbour interaction		General guidance on the planning of onshore wind developments is available in Planning Advice Note 45 Renewable Energy Technologies[74] and in SNH documents available on-line[75].

[74] PAN 45 Planning Advice Note – Renewable Energy Technologies
[75] SNH renewables resources

Topic	Issue	Planning requirement	Guidance
Possible negative effects	Safety	Wind turbines must not present an unacceptable safety hazard	The main safety hazards are ice throw, blade throw and lightning. Consideration should be given to ice throw arising from the build up of ice on blades. Vibration sensors can be used to detect icing and shut down the turbine if required. Lightning strike should be controlled with appropriate earthing. Consideration should be given to the possibility of catastrophic failure of all or part of the turbine blades and the tower itself. Turbines are normally sited at least 10 rotor diameters from the nearest occupied dwelling. Companies supplying products and services should meet industry standards (IEC 16400) and the associated British set of standards BS EN 61400-1: 1995.
	Proximity to dwellings	Routine assessment of noise, shadow flicker, ice and blade throw, visibility and EMF impacts will be required for all developments if generator is located within 1000m of a dwelling. There is potential for similar requirements at greater distances if initial assessments indicate that these factors may have wider influence or there is reasonable concern from property occupants. Also, if the project is classified as major or national then, the proposed minimum distance for separation will be 1km, and there will be presumption against developments where this cannot be achieved.	The distance should be measured from the nearest turbine to the outer limit of the house and its designated adjoining grounds and treated as a minimum requirement. Where the development involves more than one generator in proximity to a property it may be appropriate to extend this distance. These requirements may be relaxed in cases of part/whole community ownership of wind farms.
	Noise	For local, major or national projects, evidence must also be provided for no significant mechanical and aerodynamic noise impact across all wind conditions to other dwellings outside the 1000m proximity distance; this includes low frequency noise and infrasound effects.	Actual background noise measurements at nearest noise sensitive properties should be made unless otherwise agreed. Noise levels assessment should be based on the ETSU-R-97 guidelines adapted from BS4142 and set out in PAN45[76]. Further planning guidance is available in SODD Circular 10/1999[77] and PAN 56[78].
	Electromagnetic interference with TV, radio, aircraft, microwave links, radar, airport landing systems etc.	Evidence of consultation with all relevant parties should be provided, including any possible adverse affects and measures taken to alleviate any adverse affects on broadcast communications and signals.	Presently it is necessary to consult with a wide range of parties on communication matters. Normally this includes: the Office of Communication, the BBC, Ministry of Defence, Civil Aviation Authority, National Air Traffic Services, Emergency services, Utility companies The Local Authority.
	Shadow flicker and throw	Evidence must be provided for no significant shadow flicker (strobe effect from light passing through the blades) and throw (shadow cast by the turbine).	National guidance indicates that the usual acceptable distance is greater than 10 rotor diameters from any dwelling[76]. However research indicates there is considerable variability in effect depending on bearing from the rotor. This variability is further increased with more northerly latitudes. It may be necessary to examine SE and SW properties further than this distance and, exceptionally closer properties on a northerly bearing may be exempted.
	Landscape character	The context and character of the surrounding landscape where of sensitive or rare character should be safeguarded. Special consideration should be given to areas where the particular nature of the existing landscape has an established economic value, e.g. scenic tourism, film and media use, etc.	The shape, form and scale of the development should be in keeping with the surrounding landscape. Large windfarms are best suited to open landscapes. Use terrain to reduce visibility Consider the historical perspective – historic sites of interest (battlefields etc) should be avoided, whilst setting a development in a modern context could be beneficial. Areas valued for their wildland qualities should be avoided, and views from these areas to adjacent proposals will also be considered for their indirect effects on wildland character.
	Seascape character	The context of seascapes should be considered	Consider sensitivity of scenic coastal road/rail routes and ferry routes. Avoid undeveloped and isolated coast.
	Layout of turbines	Match the site layout of the turbines with the landscape. Site layout should result in the lowest possible env. impact	In flat locations, linear layout patterns should follow features such as field boundaries or tracks
	Colour	Colour should be in keeping with landscape	A white, off-white or grey semi-matt finish is recommended. It may be appropriate to use other colours in industrial parks.

[76] PAN 45 Planning Advice Note – Renewable Energy Technologies
[77] SODD Circular 10/1999 Planning Noise
[78] PAN 56 Planning Advice Note - Planning & Noise

Topic	Issue	Planning requirement	Guidance
Possible negative effects	Visual design	Need attractive patterns, scales & layout	Avoid outliers
	Visual impacts	Windfarms should avoid being a dominating and overpowering visual feature from sensitive locations, e.g. residences and formal tourism viewpoints.	There are a number of techniques that can be used to inform visual assessment of the proposed development – Zones of Visual Influence (ZVI) maps, viewpoint analysis, animated 3D models and photographic / video montages. Accepted that turbines will be visible for local systems. It is strongly advised that all developers utilise and make reference to the latest SNH guidance on visual and landscape impact assessment.
	Cumulative visibility	Clustering is generally preferred to dispersal, as are corridors in which there are no visual impacts from wind farms.	Use of cumulative ZVI maps to create corridors on zero visual influence.
	Sequential visibility	Linking of visual impacts of different developments on a journey (road / rail)	Consider use of imaging techniques such as 3D animations
	Visual horizon	Consideration should be given to the impact that turbine blades have on the horizon	Avoid prominent ridges, shrinkage of surrounding hills, popular viewpoints, historic buildings and clutter with other vertical features like pylons.
	Townscape Impact	Presumption in favour or micro-renewables and community schemes	Size and scale may be affected by proximity to settlement and should be in keeping with townscape character
	Low flying aircraft	Any development that is situated in a designated military low flying practice area or in a way that could potentially interfere with military training must establish with MOD Defence Estates that it will have no impact on these activities.	All applications for wind turbines that could potentially interfere with military training are referred to the MOD for consultation and approval[79].
	Proximity to road and rail – safety	Pre-application discussions are advisable with the Scottish Executive (Road Network Management And Maintenance Division) for developments near trunk roads and the local roads authority for minor roads. Likewise consultation with Railtrack for sites near railway property.	Siting turbines away from road and rail is advisable for safety in the very unlikely event of catastrophic failure of the turbine tower. Establish minimum x turbine height safety distance from roads and railways.
	Access for site construction – existing infrastructure	Demonstrate that the implications associated with access to the site have been considered and set out measures to safeguard road infrastructure.	Consider - road width, weight capacity, bridges, bends, docks, height restrictions. Consider the use of road, sea, canal for part of journey.
	Integrated land management	Developers are encouraged to view projects from a wider context of integrated land management and demonstrate that this has been taken into account. Active land management and compensatory replacement land allocation may be acceptable to mitigate impacts. Conformity with Policies RD1,3,5,7 & 8 of the Highland Structure Plan[80] will also be expected with regard to rural management and ownership issues.	Mitigation of impacts on habitats and species can include overall improved land management proposals to improve the prospects for habitats and species over a larger area.
Infrastructure and other issues	Energy distribution capacities	All projects have to demonstrate that there are sufficient mechanisms available to distribute the expected energy production.	Irrespective of the mechanism proposed for energy supply, the developers should demonstrate that there is either existing infrastructure available or provision of resources within the project plan to allow full utilisation of the generated energy through a power purchase agreement (PPA) or an alternative energy export route such as hydrogen.
	Grid connection implementation and logistics	The impacts arising from the construction of the grid connection should be addressed within the planning application.	Provision of access, new roads, road widening/ strengthening, quarrying, new bridges, increased public access. Timing may be critical, certain routes may be more advantageous or problematic

[79] MOD online advice
[80] Highland Council Structure Plan (2001)

4.4 Offshore Wind

Planning consents for offshore wind between the 12 mile territorial limit and low water mark are managed by the Scottish Executive[81] (applications under CPA 49 (34)).and are therefore presently outwith the direct control of the Highland Council. However, any associated onshore structures such as cable landfall, power distribution infrastructure and coastal modifications may fall under local jurisdiction. It is unlikely that there will be any minor, or even local, scale developments, and an Environmental Impact Assessment will almost certainly be required for offshore developments that should cover both onshore and offshore impacts.

The National Planning Policy Guideline on Coastal Planning NPPG 13[82] also provides information on coastal and shoreline developments and recommends careful consideration of the relationship between onshore and offshore activities.

The list below initially summarises where these possible headline issues can fall under Highland Council planning control and table G4.2.4 expands on specific requirements and guidance:

Offshore wind

- ☑ Visibility and seascape issues from shoreline will likely require siting where other onshore neighbour interactions will not be prevalent
- ☒ Foundation impact on benthos
- ☒ Sea bird sensitivities similar to onshore wind
- ☒ Seabed cable impacts
- ☑ Onshore supporting and connection infrastructure
- ☑ Onshore fabrication and assembly of components
- ☒ Shipping traffic and disturbance during offshore construction and assembly
- ? Distribution grid capacity and upgrades
- ☒ Interaction with other sea users (fisheries, transport routes, recreation, MoD)

Key	☑	Usually fall under local authority jurisdiction	?	May fall under local or national jurisdiction depending on project and permitting pathway	☒	Usually outside of local authority jurisdiction

Table G4.2.4 : Specific Planning Requirements and Guidance for Offshore Wind Development

Topic	Issue	Planning requirement	Guidance
Areas and types of development	Zoning of development	The Planning Authority's stance on the proposed development will be informed by the zoning principles laid out the Highland Council Renewable Energy Strategy [83].	At present the permitting process for offshore structures is outwith the jurisdiction of the local authority but, on consultation, the guidance will be based on the Highland Renewable Energy Resource Assessment and as provided in this Strategy.
	Pattern and scale of development	Offshore developments are presently limited to the 12 mile limits.	Additional guidance on development further offshore can be obtained centrally from the DTI.
The planning process	Alternatives to development	Developers must fully consider appropriate alternatives to the proposed development according to objective J1to j3 of the Highland Council Renewable Energy Strategy[83], prior to scoping and planning application.	The Council have created a new planning pathway which allows substantial confidential conceptual pre-scoping advice to developers prior to project scoping. During this phase it is expected that the developer fully considers appropriate alternative development options for the concept prior to production of scoping documents.
	Alternative technologies	Developers will be expected to have considered alternative renewable technologies to achieve the same aim.	Where there is a choice of renewable technologies available justification must be provided in the planning application for the proposal of offshore wind developments over other options.

[81] Guidance Notes, Offshore Windfarm Consents Process
[82] NPPG 13 National Planning Policy Guideline – Coastal Planning
[83] Highland Council Renewable Energy Strategy 2006

Topic	Issue	Planning requirement	Guidance
	Alternative locations for energy production	Offshore marine developments beyond the low water mark also fall out with the Highland Council planning system. However, the developer should engage in a transparent process within the planning application to justify the choice of location of the landfall for the cable(s) that are exporting electricity to the grid. Whilst the choice of the location will be largely governed by the licensing process, the sub-station landfall for the cables that are exporting electricity to the grid will be subject to the Highland Council planning consent. The choice of the landfall should be addressed within the planning application, identifying options and using a transparent process to justify the choice of the location.	Some guidance should be available from the licensing rationale. NPPG 6[84], Renewable Energy, sets out the framework for the siting and control of renewable energy projects. In planning for these developments, careful consideration needs to be given to potential impacts on the natural and cultural heritage interests. NPPG 13[85] recommends careful consideration of the relationship between onshore and offshore activities
	Alternative locations for support operations	Offshore developments will require operational support. The developer should engage in a transparent process within the planning application to justify the choice of location for support operations. There will be a presumption against development of the isolated coast.	Provision of additional berths in harbours, equipment laydown areas, warehousing. New buildings and structures associated with the provision of renewable energy should be allowed on the developed coast where they are primarily aimed at meeting local demand and, as far as is practicable, are sited in an unobtrusive location[84]. A location on an undeveloped section of coast would need to demonstrate that there is no alternative possible on the developed coast.
	Cumulative Impacts	Offshore elements are out with the Highland Council planning jurisdiction. Onshore impacts of support and maintenance and the impacts of grid connection(s) should be considered in the planning application, together with appropriate mitigation measures.	Consider the cumulative impacts of site servicing requirements and the provision of grid infrastructure. Offshore windfarms may also have cumulative impacts with onshore windfarms nearby, and these too must be assessed in the cumulative Landscape and Visual Impact Assessment.
	Re-populating/powering existing projects with new devices	A new application to the Scottish Executive will normally be required. If re-populating/powering an existing development is considered to result in any significant alteration of the nature of the project then it will be required to go through a full Environmental Impact Assessment (EIA) as part of the planning approval process.	Any new proposal would be expected to take account of the changes in sensitivities since the previous application and development of understanding of impacts. Difference in physical size is considered more significant than the model or power of the devices. Permission when granted is usually valid for 25 years.
The planning process	Project management plans and procedures	Developers should provide emergency response plans to cover accidental events, which is linked to the Highland Council coastal emergency response plans.	Consultation with the Marine & Coastguard Agency and preparation of contingency plans (Contingency Planning for Marine Pollution Preparedness and Response[86]) is advised. An application will be better supported with details of the financial competence of the developer.
	Decommissioning provisions	Provision for decommissioning should be addressed in the planning application including removal and reinstatement of above-ground onshore elements. A decommissioning bond will be required.	A method statement, including evidence for decommissioning options, will be expected to be integral to the design process.
Possible positive effects	Socio-economic impact	Positive and negative socio-economic onshore impacts should be addressed in the planning application	Additional jobs especially in fragile remote areas, skills and training, inflation of labour rates, house prices, shortage of key skills for traditional activities such as farming and fishing.
Possible negative effects	Land take	Minimise land and disturbance arising from the laying of cables and provision of grid substation and switchgear. Planning permission for the onward overhead power line to the grid network is covered by Section 57(2) of the Town and Country Planning (Scotland) Act 1997[87]	Shore landing of cable should not be visible after installation is complete. Associated buildings should be sited in unobtrusive locations and avoid sensitive habitats. There will be a presumption against developments on isolated coast.

Topic	Issue	Planning requirement	Guidance
	Coastal erosion	Areas prone to coastal erosion should be avoided.	Consider the potential for increased erosion with climate change
	Flooding	Avoid locations that may be at risk from flooding from storm surges	Consider the potential for increased flooding with rise in sea levels & violent storms arising from climate change.
	Pollution	Avoid construction, operation and maintenance activities which may cause contamination.	Refer to CIRIA C584 entitled 'Coastal and marine environmental site guide
	Flora, fauna and habitats	Planning applications should take account of the servicing and maintenance of plant – some of which may take place on beaches in sheltered locations with good access	Care should be taken to avoid disturbing sensitive species or habitats during the installation and construction of grid infrastructure.
	Archaeology	Every effort should be made to identify and preserve archaeological sites	Coastal sites with good landing may be rich in archaeology. Consider working closely with local archaeologists & carrying out site surveys. Historic Scotland advise that for any associated onshore structures such as cable landfall, power distribution infrastructure, coastal wave generators and other coastal modifications, developers should demonstrate that they have made a sufficient assessment of likely impacts on the site and setting of historic environment assets and have developed a strategy for all necessary mitigations.
	Visual impact	Offshore windfarms should avoid unacceptable visual impact onshore.	Avoid close proximity to settlements, onshore areas designated for landscape and scenery, remote "wild" coastline and recognised coastal viewpoints.
	Traffic and Transport	The impact on roads and ports of the construction phase should be assessed as part of the application.	Early discussions as necessary should take place with the relevant Area Transport Economic and Community Services.
Infrastructure and other issues	Grid connection	The onshore aspects of the construction and provision of the grid connection should be addressed in the planning application. There will be a presumption against development of the isolated coast and good justification required for new developments on the undeveloped coast. Grid connection is covered by the section 37 of the Electricity Act (1989)[88]	Provision of access, new roads, road widening / strengthening, quarrying, new bridges, increased public access will be necessary. Onshore landing site, coastal erosion, implications of greenfield sites, new buildings / substations, routing and nature of grid connection, provision of public access. Buildings and structures associated with the provision of renewable energy will only be allowed on the undeveloped coast where they are primarily aimed at meeting local demand and, as far as is practicable, are sited in an unobtrusive location[89].
	Market for supplied energy	All projects have to demonstrate that there are sufficient markets for the energy produced.	Irrespective of the mechanism proposed for energy supply the developers will be required to demonstrate that there is either existing infrastructure available or provision of resources within the project plan to allow full utilisation of the generated energy through a power purchase agreement (PPA) or an alternative energy export route such as hydrogen.

84 NPPG 6 National Planning Policy Guideline – Renewable Energy
85 NPPG 13 National Planning Policy Guideline – Coastal Planning
86 Marine & Coastguard Agency
87 Section 57 of the Town and Country Planning (Scotland) Act 1997

88 Electricity Act (1989)
89 NPPG 6 National Planning Policy Guideline – Renewable Energy

4.5 Other Marine

Like offshore wind, planning consents for other offshore marine developments between the 12 mile territorial limit and low water mark are managed by the Scottish Executive[90] (applications under CPA 49 (34)).and are therefore presently outwith the direct control of the Highland Council. Presently the main other marine developments are based around tidal and wave generators, sited either on the coast, inshore or offshore. Given the resource patterns of Highland there is most likely to be potential for tidal stream devices within the region, followed by coastal wave. It is unlikely that there will be any minor, but a small potential for local, scale developments, and an Environmental Impact Assessment will almost certainly be required for offshore developments that should cover both onshore and offshore impacts. However, any associated onshore structures such as cable landfall, power distribution infrastructure for offshore generators and tidal dams, coastal wave generators, and other coastal modifications may fall under local jurisdiction.

The National Planning Policy Guideline on Coastal Planning NPPG 13[91] again provides information on coastal and shoreline developments and recommends careful consideration of the relationship between onshore and offshore activities.

The list below initially summarises where these possible headline issues can fall under Highland Council planning control and table G4.2.5 expands on specific requirements and guidance:

Other marine (Tidal & Wave)

- ☑ Potential visibility and scenic issues especially with coastal and inshore wave devices
- ☒ Impacts on surface wave patterns and energy shadows on water bodies
- ☑ Impacts on surface wave patterns and energy shadows on shoreline
- ☑ Coastline, cliff and heath disruption for construction of coastal wave and tidal devices
- ☒ Impacts on tidal flow patterns and energy shadows on benthos, water bodies, and shoreline
- ☒ Inshore and offshore foundation and mooring impact on benthos
- ☒ Submerged sea bird, fish, and mammal sensitivities
- ☒ Underwater noise
- ☒ Seabed cable impacts
- ☑ Onshore supporting and connection infrastructure
- ☑ Onshore fabrication and assembly
- ☒ Shipping traffic and disturbance during offshore installation
- ? Distribution grid capacity and upgrades
- ☒ Interaction with other sea users (fisheries, transport routes, recreation, MoD)
- ☑ Other specific shoreline disruption associated with tidal head devices

Key	☑	Usually fall under local authority jurisdiction	?	May fall under local or national jurisdiction depending on project and permitting pathway	☒	Usually outside of local authority jurisdiction

Table G4.2.5 : Specific Planning Requirements and Guidance for Other Marine Development

Topic	Issue	Planning requirement	Guidance
The planning process	Alternative technologies	The developer should select the best practicable technology option for the site in question, however Offshore marine developments beyond the low water mark also fall out with the Highland Council planning jurisdiction.	The permitting process will be assisted with the supply of a description of the technology selection process in line with the Best Practicable Environmental Option selection process - Royal Commission on Environmental Pollution (RCEP). 12th Report (1988)[92]
	Alternative locations for energy production	Offshore marine developments beyond the low water mark also fall out with the Highland Council planning system. However, the developer should engage in a transparent process within the planning application to justify the choice of location of the landfall for the cable(s) that are exporting electricity to the grid.	Some guidance should be available from the licensing rationale. NPPG 6[93]. Renewable Energy, sets out the framework for the siting and control of renewable energy projects. In planning for these developments, careful consideration needs to be given to potential impacts on the natural and cultural heritage interests. NPPG 13[94] recommends careful consideration of the relationship between onshore and offshore activities.
	Alternative locations for support operations	Offshore developments will require operational support. The developer should engage in a transparent process within the planning application to justify the choice of location for support operations. There will be a presumption against development of the isolated coast.	Provision of additional berths in harbours, equipment laydown areas, warehousing, and beach based maintenance areas, access roads and buildings. New buildings and structures associated with the provision of renewable energy will only be allowed on the undeveloped coast where they are primarily aimed at meeting local demand and, as far as is practicable, are sited in an unobtrusive location. A location on an undeveloped section of coast would require to demonstrate that there is no alternative possible on the developed coast.
	Cumulative Impacts	Offshore elements are out with the Highland Council planning jurisdiction. Onshore impacts of support and maintenance and the impacts of grid connection(s) should be considered in the planning application, together with appropriate mitigation measures.	Consider the cumulative impacts of site servicing requirements and the provision of grid infrastructure. Also any cumulative effect with other offshore projects, including offshore windfarms, fish farms.
	Re-populating/powering existing projects with new devices	A new application to the Scottish Executive will normally be required.	Any new proposal would be expected to take account of the changes in sensitivities since the previous application and development of understanding of impacts. Permission when granted is usually valid for 25 years.
	Project management plans and procedures	Developers should provide an emergency response plan to cover accidental events, which is linked to the Highland Council coastal emergency response plans.	Consultation with the Marine & Coastguard Agency and preparation of contingency plans (Contingency Planning for Marine Pollution Preparedness and Response[95]) is advised. An application will be better supported with details of the financial competence of the developer.
	Decommissioning provisions	Provision for decommissioning should be addressed in the planning application including removal and reinstatement of above-ground onshore elements. Decommissioning bond will be required.	A method statement, including evidence for decommissioning options, will be expected to be integral to the design process.
	Site servicing requirement	Offshore elements are out with the Highland Council planning jurisdiction. Onshore impacts of support and maintenance should be considered in the planning application, together with appropriate mitigation measures.	Provision of additional berths in harbours, equipment laydown areas, warehousing, and beach based maintenance areas, access roads and buildings will need to be considered for planning issues and environmental impacts. Buildings and structures associated with the provision of renewable energy will only be allowed on the undeveloped coast where they are primarily aimed at meeting local demand and, as far as is practicable, are sited in an unobtrusive location[93]. Consideration of the storage, use and disposal of paints, oils and other materials used in maintenance operations.
Possible positive effects	Socio-economic impact	Positive and negative socio-economic onshore impacts should be addressed in the planning application	Additional jobs especially in fragile remote areas, skills and training, inflation of labour rates, house prices, shortage of key skills for traditional activities such as farming and fishing.

[90] Guidance Notes, Offshore Windfarm Consents Process
[91] NPPG 13 National Planning Policy Guideline – Coastal Planning
[92] Royal Commission on Environmental Pollution
[93] NPPG 6 National Planning Policy guideline – Renewable Energy
[94] NPPG 13 National Planning Policy Guideline – Coastal Planning
[95] Marine & Coastguard Agency

Topic	Issue	Planning requirement	Guidance
Possible negative effects	Land take	Minimise land and disturbance arising from the laying of cables and provision of grid substation and switchgear. Planning permission for onward overhead power lines to the grid network are covered by Section 57(2) of the Town and Country Planning (Scotland) Act 1997[96]	Shore landing of cable should not be visible after installation is complete. Associated buildings should be sited in unobtrusive locations and avoid sensitive habitats. There will be a presumption against developments on isolated coast.
	Flooding	Avoid locations that may be at risk from flooding from storm surges	Consider the potential for increased flooding with rise in sea levels & violent storms arising from climate change.
	Pollution	Avoid construction, operation and maintenance activities which may cause contamination.	Refer to CIRIA C584 entitled 'Coastal and marine environmental site guide
	Flora, fauna and habitats	Planning applications should take account of the servicing and maintenance of plant – some of which may take place on beaches in sheltered locations with good access	Care should be taken to avoid disturbing sensitive species or habitats during the installation and construction of grid infrastructure.
	Fisheries	The Fisheries Committee's statutory remit extends to wave and tidal schemes, and consultation ishould be undertaken.	Reference to specific Fisheries Committee Guidance 2005 is expected. Developers attention is drawn to the need for good quality data collection over a sufficiently long time period, together with post-development longitudinal studies.
	Archaeology	Every effort should be made to identify and preserve archaeological sites	Coastal sites with good landing may be rich in archaeology. Consider working closely with local archaeologists & carrying out site surveys. Historic Scotland advise that for any associated onshore structures such as cable landfall, power distribution infrastructure, coastal wave generators and other coastal modifications, developers should demonstrate that they have made a sufficient assessment of likely impacts on the site and setting of historic environment assets and have developed a strategy for all necessary mitigations.
	Traffic and Transport	The impact on roads and ports of the construction phase should be assessed as part of the application.	Early discussions as necessary should take place with the relevant Area TEC Services.
Infrastructure and other issues	Grid connection	The onshore aspects of the construction and provision of the grid connection should be addressed in the planning application. There will be a presumption against development of the isolated coast and good justification required for new developments on the undeveloped coast. Grid connection from the sub-station landfall is covered by the section 37 of the Electricity Act (1989)[97] The impacts arising from the construction of the grid connection should be addressed within the EIA in the planning application	Provision of works access, new roads, road widening / strengthening, quarrying, new bridges, increased public access will probably be necessary to support the construction phase of development. Onshore landing site, coastal erosion, implications of greenfield sites, new buildings / substations, routing and nature of grid connection, provision of public access are all key aspects to address when considering these types of coastal works. Buildings and structures associated with the provision of renewable energy will only be allowed on the undeveloped coast where they are primarily aimed at meeting local demand and, as far as is practicable, are sited in an unobtrusive location[98].
	Market for supplied energy	All projects have to demonstrate that there are sufficient markets for the energy produced.	Irrespective of the mechanism proposed for energy supply the developers will be required to demonstrate that there is either existing infrastructure available or provision of resources within the project plan to allow full utilisation of the generated energy through a power purchase agreement (PPA) or an alternative energy export route such as hydrogen.

4.6 Other Technologies

At present, Highland has little potential for larger scale developments using other renewable technologies. The remaining technologies that could be developed are most likely to centre around domestic and small communal and local installations based on photovoltaic and direct solar and borehole and surface ground source heat pump technology and will be positioned near or on buildings mostly in built up areas. Normally, only features that are installed on the outside surface of buildings may require planning permission. It is expected that most of these installations will fall under minor planning classification and the generally permitted planning process.

The 2 lists below summarise where possible headline issues can fall under Highland Council planning control for each technology.

Ground heat

- ☒ Heat pump plants small, internal and unlikely to require specific planning permissions
- ☑ Possible other user and traffic disruption on larger scale surface lattice installation
- ☑ Noise impacts during borehole excavation
- ☑ Construction and operational impacts on soil and ground water
- ☑ Risk to archaeology during either excavations
- ☑ Energy generators likely to be contained within existing built properties

Solar

- ☑ Possible disruption during installation
- ☑ Possible neighbour nuisance from light reflection during operation
- ☑ Specific impacts on built heritage and valued townscapes

Key	☑	Usually fall under local authority jurisdiction	?	May fall under local or national jurisdiction depending on project and permitting pathway	☒	Usually outside of local authority jurisdiction

Where any development is proposed it is best to get early advice of the local planning authority to clarify, both the planning position and any need to comply with specific town and building conservation area requirements on a case by case basis.

96 Section 57 of the Town and Country Planning (Scotland) Act 1997
97 Electricity Act (1989)
98 NPPG 6 National Planning Policy Guideline – Renewable Energy

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