

**RENEWABLES TRENDS IN SCOTLAND**  
**STATISTICS & ANALYSIS**

**Scottish Natural Heritage**  
**December 2004**

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## **1. Background**

In December 2003 '[Renewables Trends in Scotland: Statistics & Analysis](#)' was compiled by SNH and made available on our website. The report contains a number of charts and maps, providing an overview of the current picture of renewables activity in Scotland and trends for the future.

This is intended as the first annual update of that report, focusing on some of the key patterns and trends. We aim to continue providing annual updates, and would welcome feedback on key areas which would be of interest.

### **1.1 SNH's Renewable Energy Policy**

Scottish Natural Heritage (SNH) is a Government agency, charged with conserving and enhancing the natural heritage of Scotland, facilitating its enjoyment and understanding, and promoting its sustainable management. Scotland's natural heritage is its wildlife, habitats, landscapes and natural beauty, and includes the rocks, soils, landforms and waters on which these are based. We are statutory advisers and provide advice on how energy policy, development plan policies, and individual renewable energy development proposals will affect natural heritage interests.

SNH's policy on renewables is set out in our Policy Statement No. [01/02](#) "SNH's Policy on Renewable Energy". In general, we support the use of renewables to counter the effects of climate change and promote the development of measures, including energy efficiency measures, to reduce the emission of CO<sub>2</sub>, in line with Government policy. We support the Scottish Executive's aim of achieving 40% of renewable electricity by 2020, using a mix of different technologies, provided there is a suitable mix of renewables technologies within locations best suited to the natural heritage.

SNH has also published Policy Statement No. [02/02](#) "Strategic Locational Guidance for Onshore Wind Farms in Respect of the Natural Heritage", last updated in July 2004, and Policy Statement ([04/01](#)) on 'Marine Renewable Energy and the Natural Heritage' (May 2004).

### **1.2 SNH's Internal Renewables Database**

In 2003, our existing internal casework recording system was expanded to include information on all renewable energy schemes, including all those on which SNH has been consulted. The database records renewable energy proposals of different types within Scotland, SNH's response to them, and the natural heritage issues that were judged critical in our assessment of the scheme. As the data is grid-referenced, it enables data to be transferred into a Geographical Information System (GIS) for mapping at various scales and for selected renewables types.

Following a similar approach to that used in the 2003 report, the data contained in the following sections have been identified by SNH from our database.

## 2. Overview

Government policy is supportive of renewables, as part of a drive to reduce CO<sub>2</sub> emissions, and increasingly as a contribution to a wider green jobs strategy. As a result of the favourable incentives regime provided by the Renewables Obligation (Scotland) (ROS) system, the number of renewables proposals entering the consents system continues to rise. Project studies are underway to increase the capacity of the grid transmission network to the north and west coast of Scotland, and these could result in significant additional potential for renewables developments. The distribution of generating capacity for the various technologies is set out in full in [Annex 1](#).

Of the existing installed renewables capacity, the majority (86%) continues to come from the old large scale hydro schemes constructed in the 1940s and 1950s. This accounts for almost 2047MW of capacity (including the capacity recently refurbished and accredited under ROS). The remainder comes from onshore wind (14%), with 331MW of capacity, and a small 13MW biomass scheme in Fife.

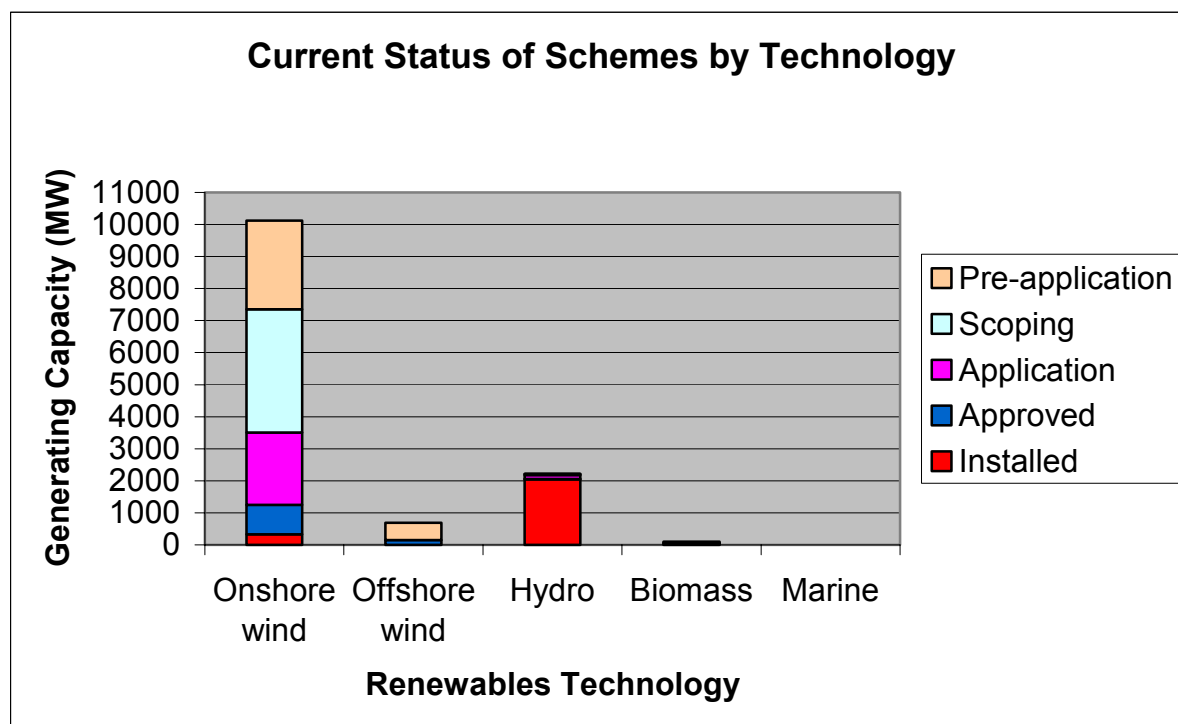
Within the consents system the picture tends to be similar to that shown in the 2003 report, with by far the largest majority (97%) of new proposals entering the consents system being for onshore windfarm developments. This accounts for 7279 MW of planned capacity. The remainder is from small scale hydro developments (2%) and biomass (<1%).

Within this report the term 'consents system' or 'consents process' is used to include both applications to local authorities for planning permission under the Town & Country Planning Acts, and applications to the Scottish Executive for consent to generate under Section 36 of the Electricity Act 1989.

There are also a number of proposals yet to enter the consents system, but which SNH is aware of on a confidential basis. These account for around an additional 3300 MW of potential installed capacity, of which 83% is from onshore wind (2765MW). A number of these proposals may be on sites unsuitable for planning permission. However the number is a good indication of the ongoing level of commercial interest for renewables, and specifically onshore windfarm, developments.

**Chart 1** provides an overview of the current status of the various schemes for different renewables technologies, and highlights the current potential for each. The most significant change from a similar Chart in the 2003 Report is the growth of onshore wind capacity, and the shift in a number of schemes from 'Application' to 'Approved'. **Table 1** provides a breakdown of the installed capacity figures in 2004 for each technology and compares it to those from 2003. **Map 1** also provides an indication of the current spread of renewables, by showing the distribution of technologies installed or approved across Scotland.

**CHART 1**



\* See Glossary for definitions of the various Stages of a renewables scheme

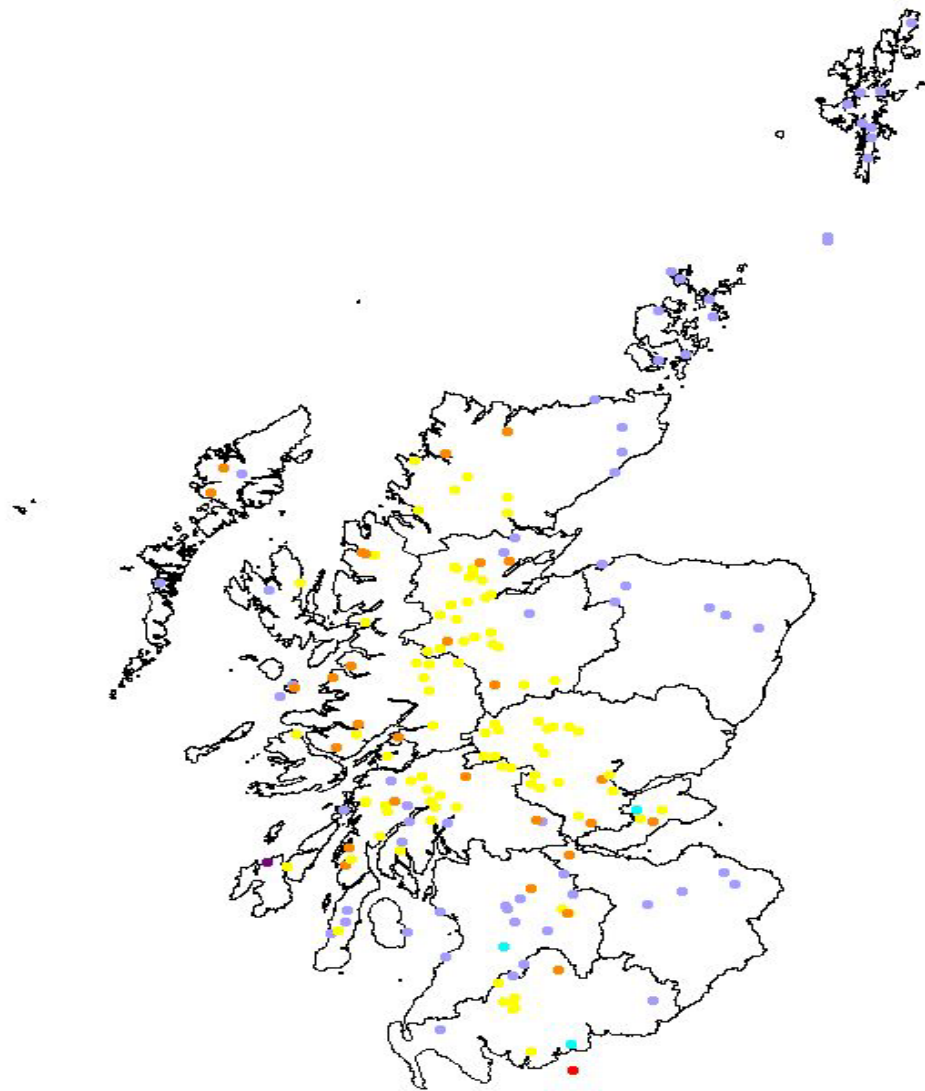
**TABLE 1**

**Generating Capacity (MW) of Renewables Schemes by Technology & Status**

Status	Onshore Wind		Offshore Wind		Hydro		Biomass		Marine	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Pre-application	1986	2765	540	540	3	8	0	30	0	0
Scoping	2553	3956	0	0	9	28	22	22	0	0
Application	2228	2255	0	0	123	124	40	40	0	0
Approved	383	918	150	150	10	12	0	0	0	0
Installed	201	331	0	0	2044	2047 <i>(old large scale 2012)</i>	13	13	0.5	0.5
<b>Total</b>	<b>7351</b>	<b>10225</b>	<b>690</b>	<b>690</b>	<b>2189</b>	<b>2219</b>	<b>75</b>	<b>105</b>	<b>0.5</b>	<b>0.5</b>

## MAP 1

### All Renewables Technologies Installed or Approved in Scotland



#### Technologies

- Biomass
- Hydro - run of river
- Hydro - storage
- Marine
- Offshore Wind
- Onshore Wind

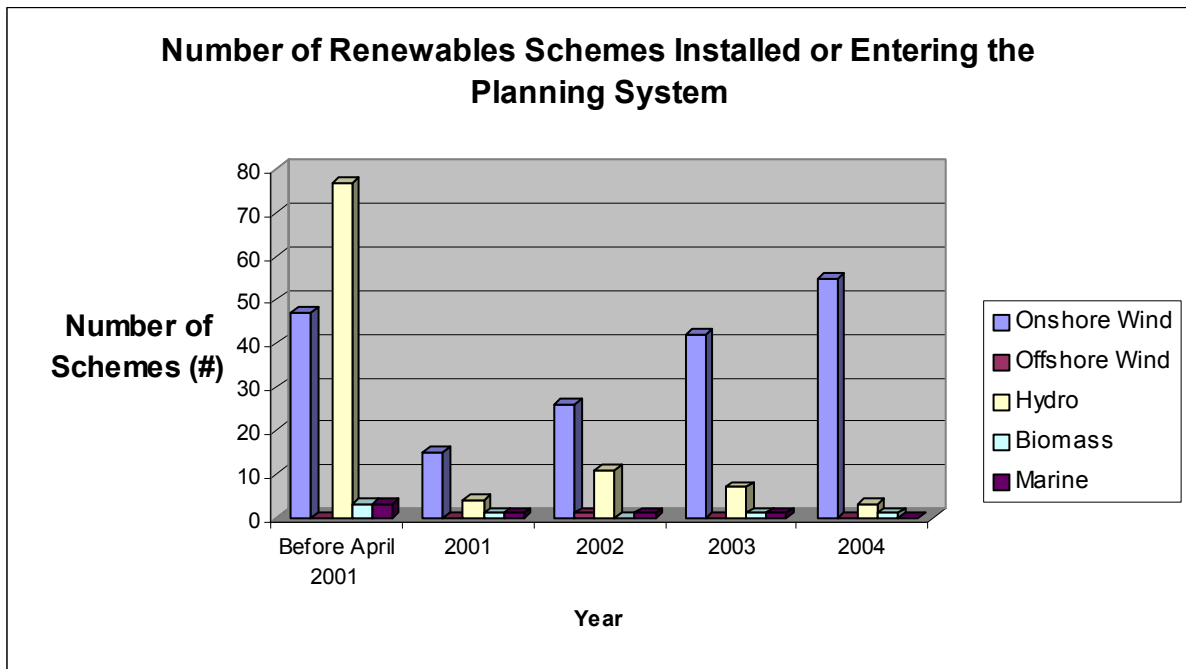
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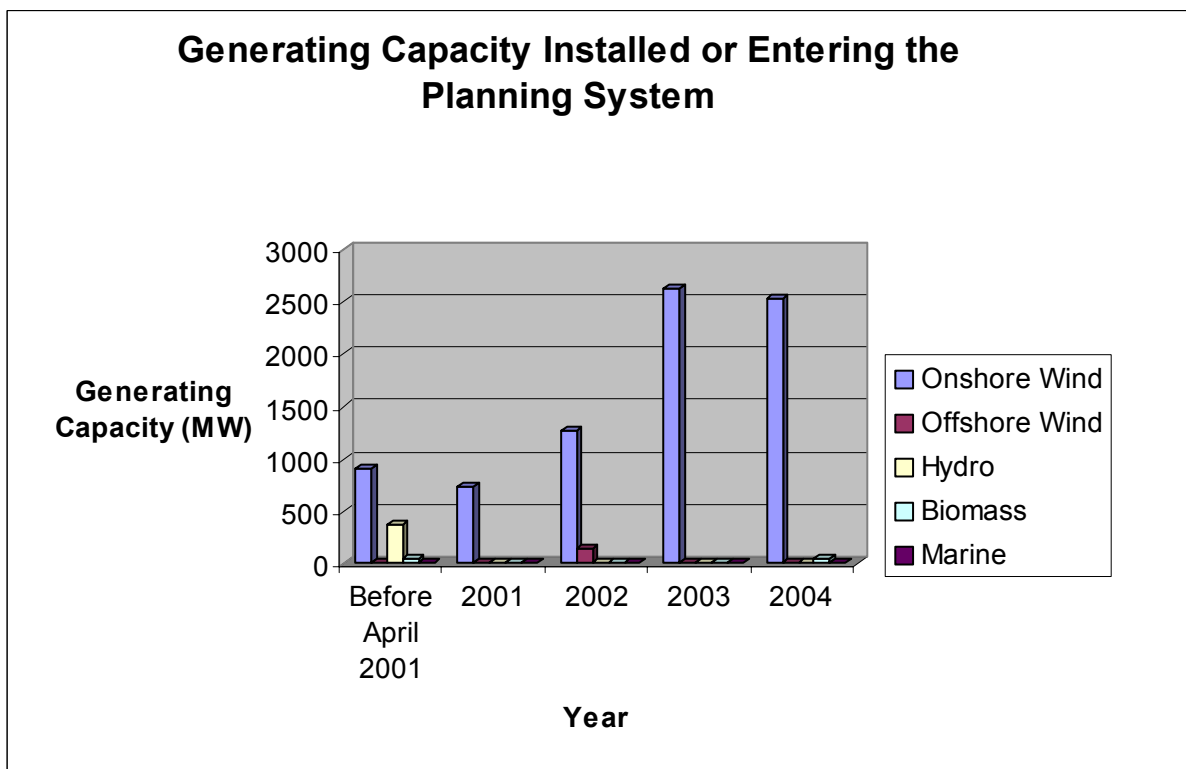
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The following Charts help to highlight this growth of interest in renewables, and particularly onshore wind. **Chart 2** shows the number of schemes which have been installed or have entered the consents system over time. The number of hydro schemes entering the consents system appears to have fallen since 2003. **Chart 3** shows the installed or potential generating capacity by year. This Chart also helps to highlight the dominance of onshore wind applications, whereby the generating capacity entering the system in the nine months to date in 2004 (the full 2004 year is Apr 2004 – Mar 2005) is almost equal to that in the system last year in total and is significantly above the figures seen in 2002.

**CHART 2**



**CHART 3**



*\* The year runs from 1 April- 31 March*

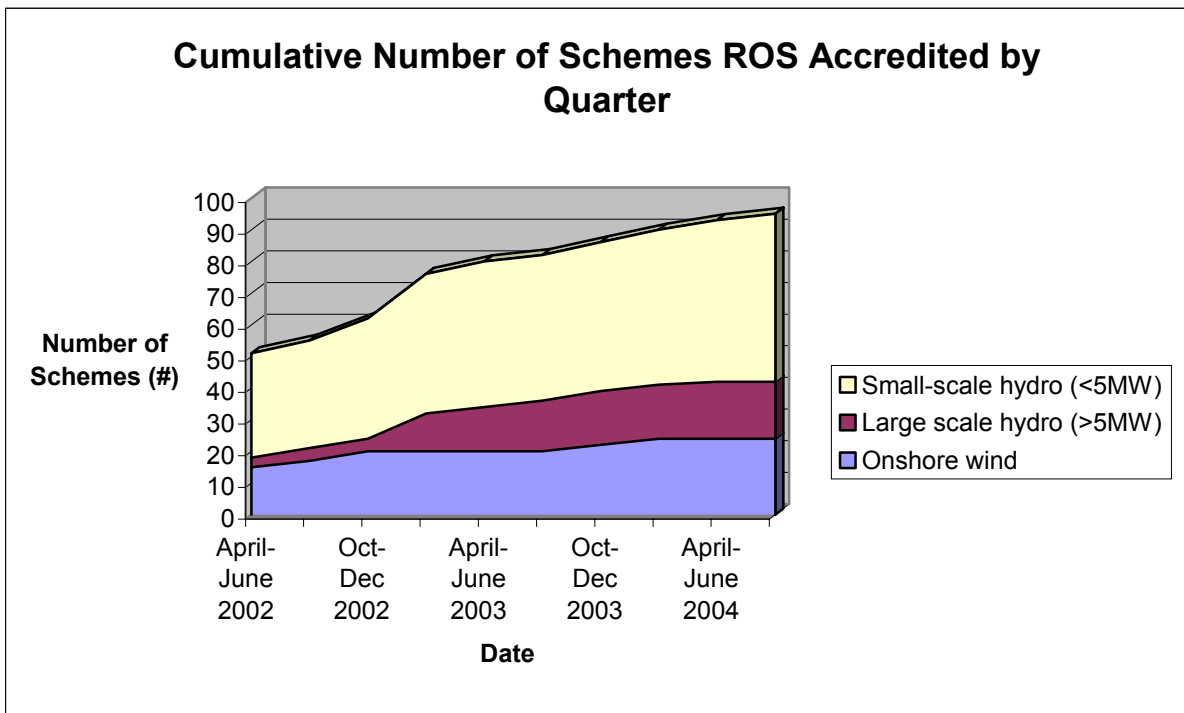
*\* This does not include single turbine schemes and historical large scale hydro schemes except those recently accredited under the ROS scheme.*

### 3. Renewables Obligation (Scotland)

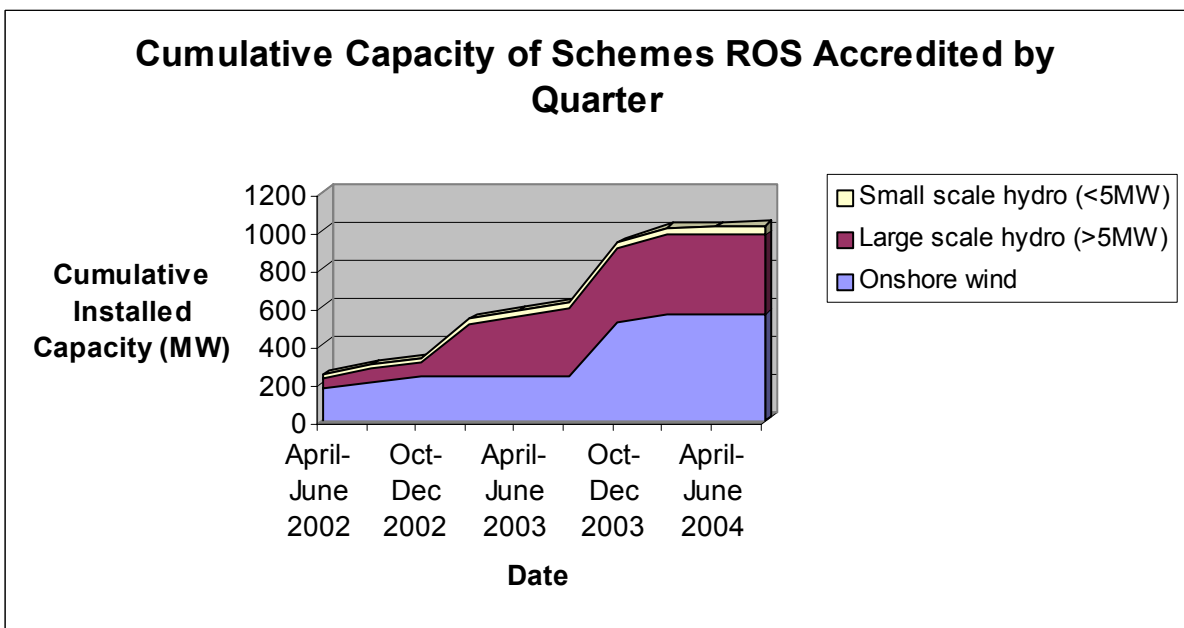
Introduced in April 2002, the Renewables Obligation (Scotland) (ROS) places a requirement upon electricity suppliers to supply to consumers a proportion of electricity generated from renewable sources, which the Executive is in the process of extending up to 15.4% by 2015. Developments only become accredited under ROS once constructed and generating, hence there is usually a substantial delay between planning approval and ROS accreditation.

The following Charts show the number of schemes (**Chart 4**) and the cumulative capacity (**Chart 5**) which have been ROS-accredited since April 2002. These Charts show a steady rise of large scale hydro accreditation, a large proportion coming from the refurbishment of old large scale hydro schemes. A significant amount of onshore wind installed capacity has also been accredited since the 2003 Report, though as with the hydro schemes the trend has levelled off for now. For onshore wind there are also a significant number of approved schemes which have not yet been constructed, such that a substantial amount of ROS accredited capacity is pending. There is also an increase in the number of small scale hydro schemes accredited, which tend to be large in number but much less significant in capacity terms (as seen in the difference between Charts 4 and 5). There has still not been a noticeable increase in operational and accredited biomass schemes in Scotland and this position is unchanged from 2003.

**CHART 4**



**CHART 5**



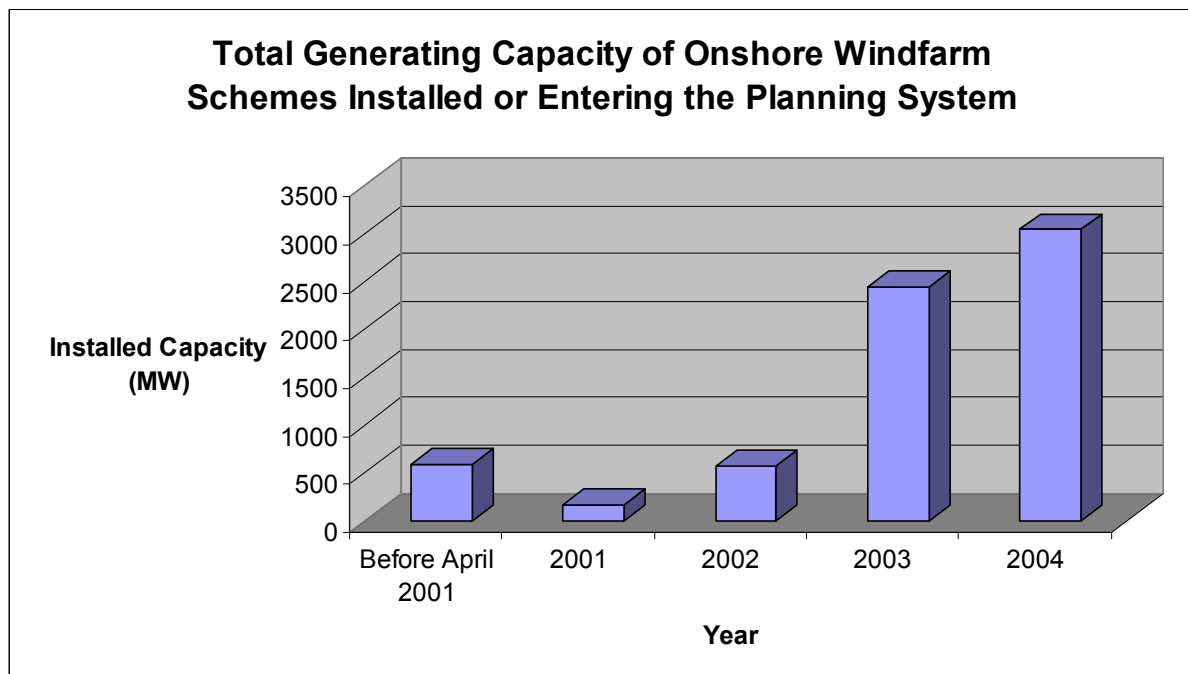
## 4. Analysis by Technology

### 4.1 Onshore Wind

As shown above, onshore wind makes up the majority of recent renewable energy proposals in Scotland. This is considered in more detail in this section.

**Chart 6** below shows the total generating capacity of windfarm scheme proposals over time, based on the year the scheme enters the consents process. Unlike Chart 3 above, this does not include capacity which has been withdrawn or refused and only considers schemes installed or in the consents system. **Chart 7** shows the breakdown of windfarm capacity by status, highlighting the large amount of capacity still at an early preparatory stage or where a consents decision is pending.

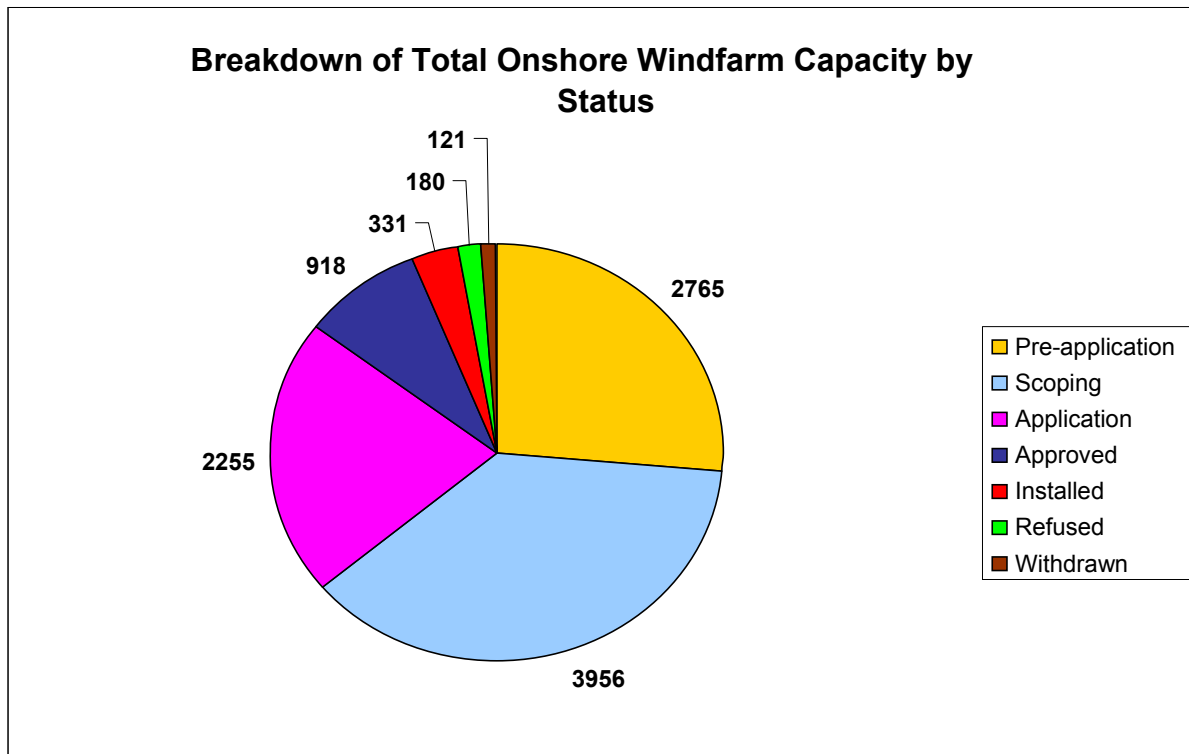
#### CHART 6



*\* The year runs from 1 April- 31 March*

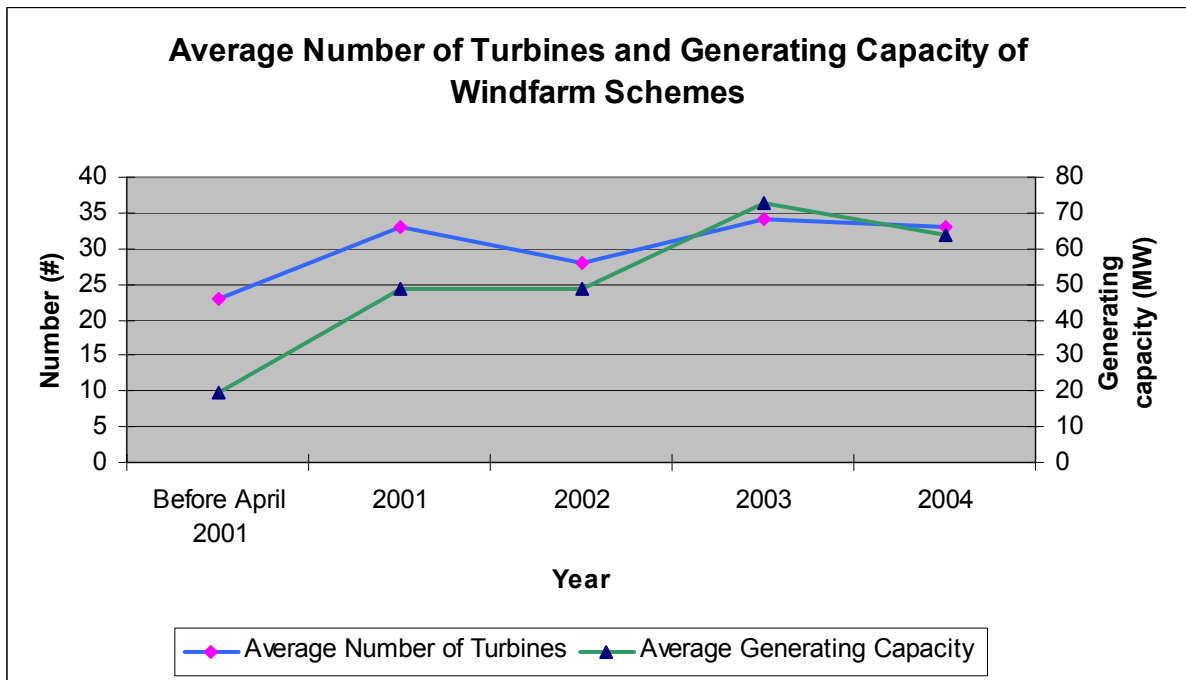
*\*This does not include single turbine proposals or anemometer masts*

## CHART 7



As might be expected, as the technology has developed, the average generating capacity per scheme has increased, as shown in **Chart 8** below. Alongside an increasing capacity, the average number of turbines per scheme also shows a pattern of increase over time. However, since 2003 this trend appears to be slowing or halting.

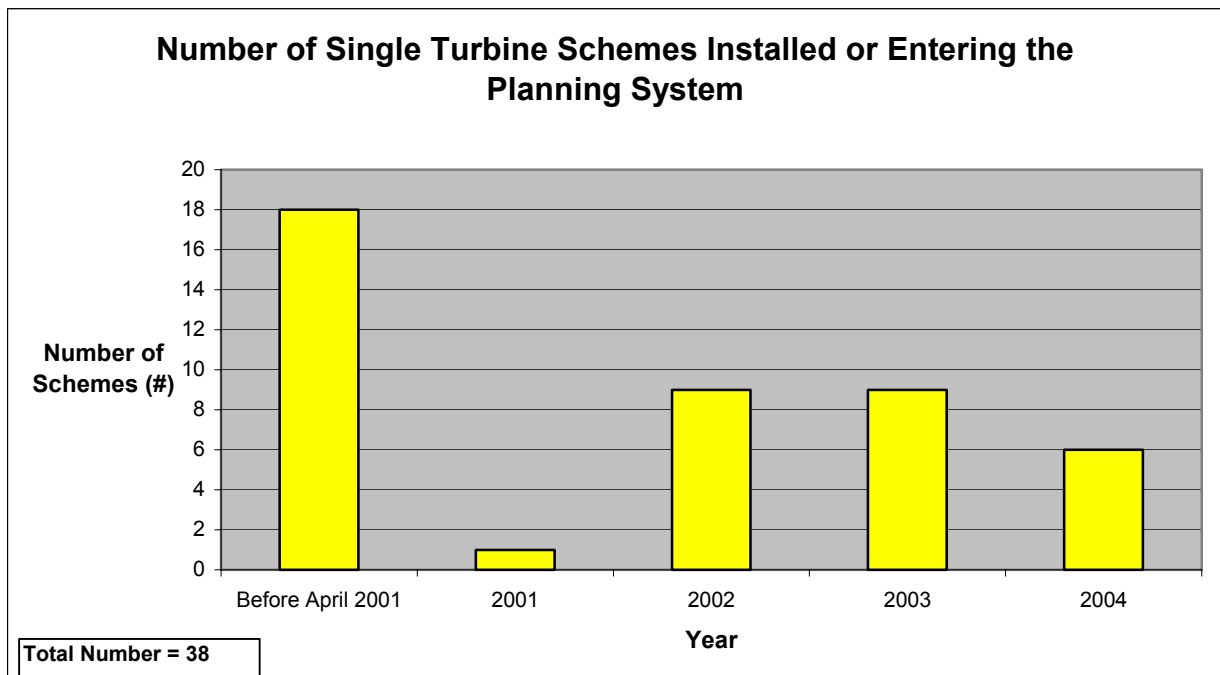
**CHART 8**



\* The year runs from 1 April- 31 March

There are also a number of single turbine proposals. **Chart 9** shows the number of schemes based on when the proposal entered the consents system. The figures for 2004 to date are already higher than 2001 and may still rise.

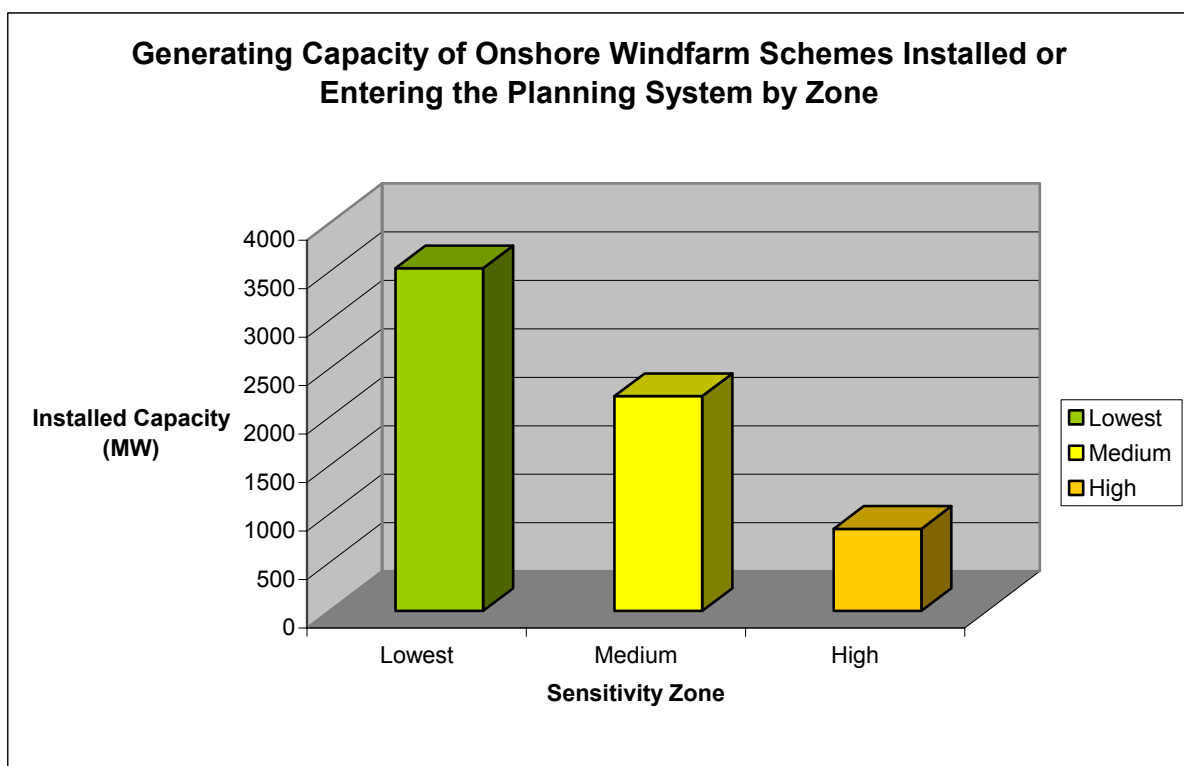
**CHART 9**



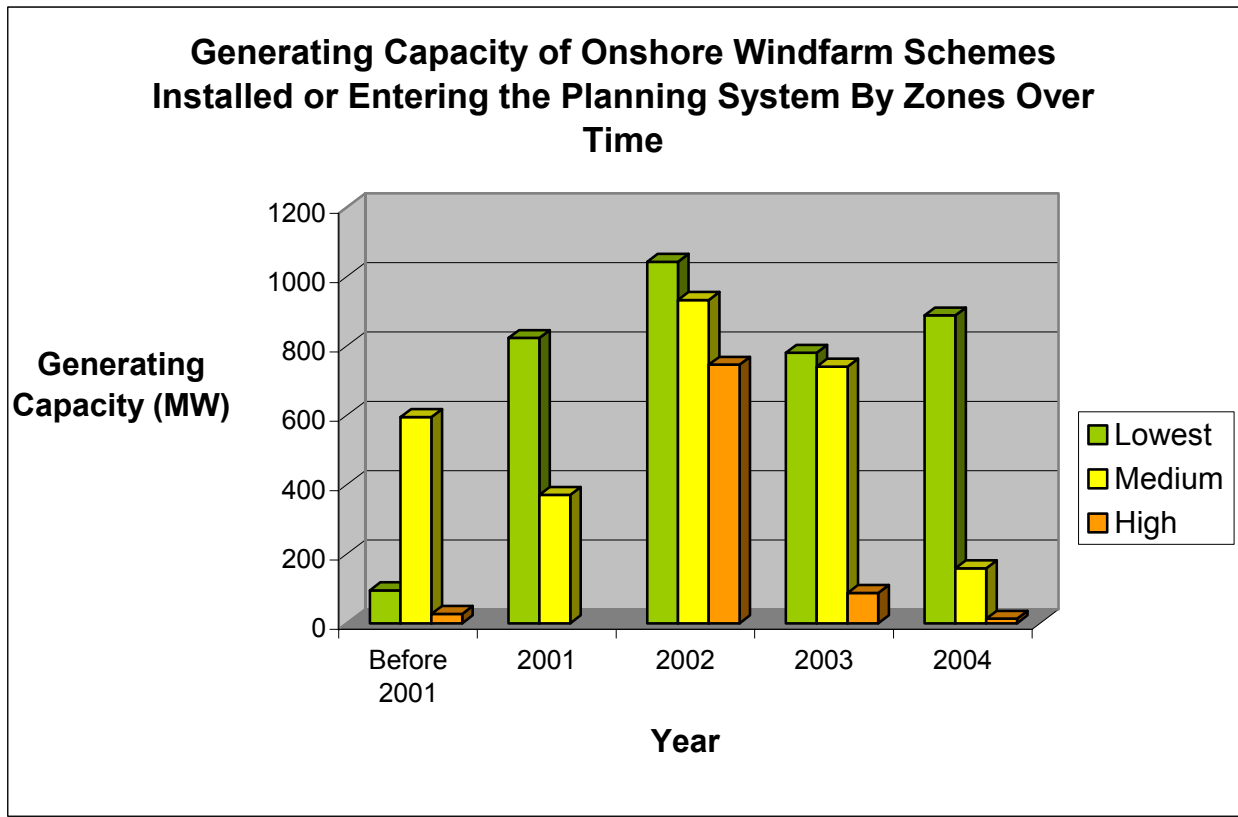
\* The year runs from 1 April- 31 March

In July 2002 SNH published Policy Statement [02/02](#) 'Strategic Locational Guidance for Onshore Wind Farms in respect of the Natural Heritage'. That document set out a national overview of natural heritage sensitivities to windfarm developments, and included a map showing three sensitivity zones: high, medium, and lowest sensitivity. **Chart 10** shows the generating capacity of those schemes installed or proposed within each of these sensitivity zones. Single turbine proposals have not been included in these figures, as the guidance doesn't apply to small scale schemes below 50kW. **Chart 11** shows the generating capacity within each zone, based on the date the scheme entered the consents system. Since 2002, there appears to have been a significant fall in the number of schemes being proposed in Zone 3, the high sensitivity zone. So far in 2004, the majority of proposals appear to be falling in Zone 1.

### CHART 10



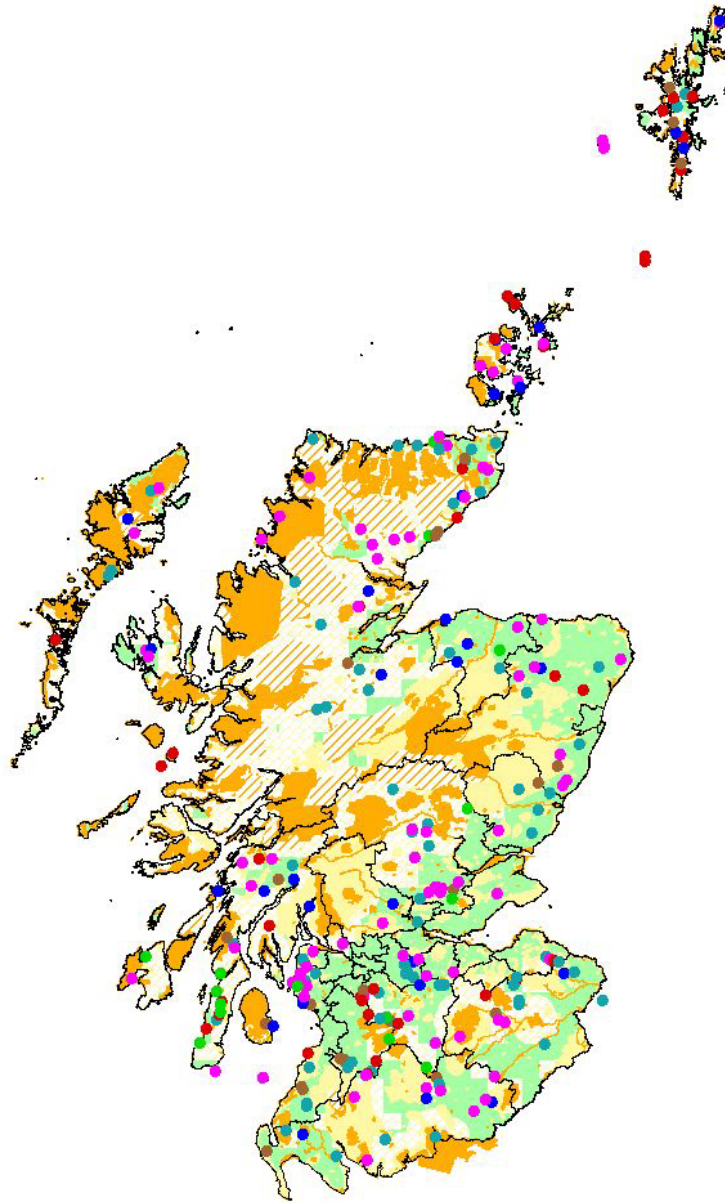
**CHART 11**



The following map, **Map 2**, shows the distribution of windfarm schemes installed or in the consents system in relation to each of the three sensitivity zones.

## MAP 2

### All Onshore Windfarm Schemes Installed or in the Consents System by SNH Zone



- Status
- Scoping
  - Application
  - Approved
  - Rejected
  - Withdrawn
  - Forfeited
- Windfarm Zone 3 (SLO)
- Coastal SSSI
  - NSA
  - Natura
  - Peatland SSSI
  - Wildland
- Windfarm Zone 2 (SLO)
- AGLV
  - IDM, buffer NSA
  - WGL
  - Non-designated
  - Non-designated Peatland
  - Non-designated coastal grass
  - Non-designated dunes
  - National Parks
  - Regional Parks
  - SSSI
  - Windfarm Zone 1 (SLO)

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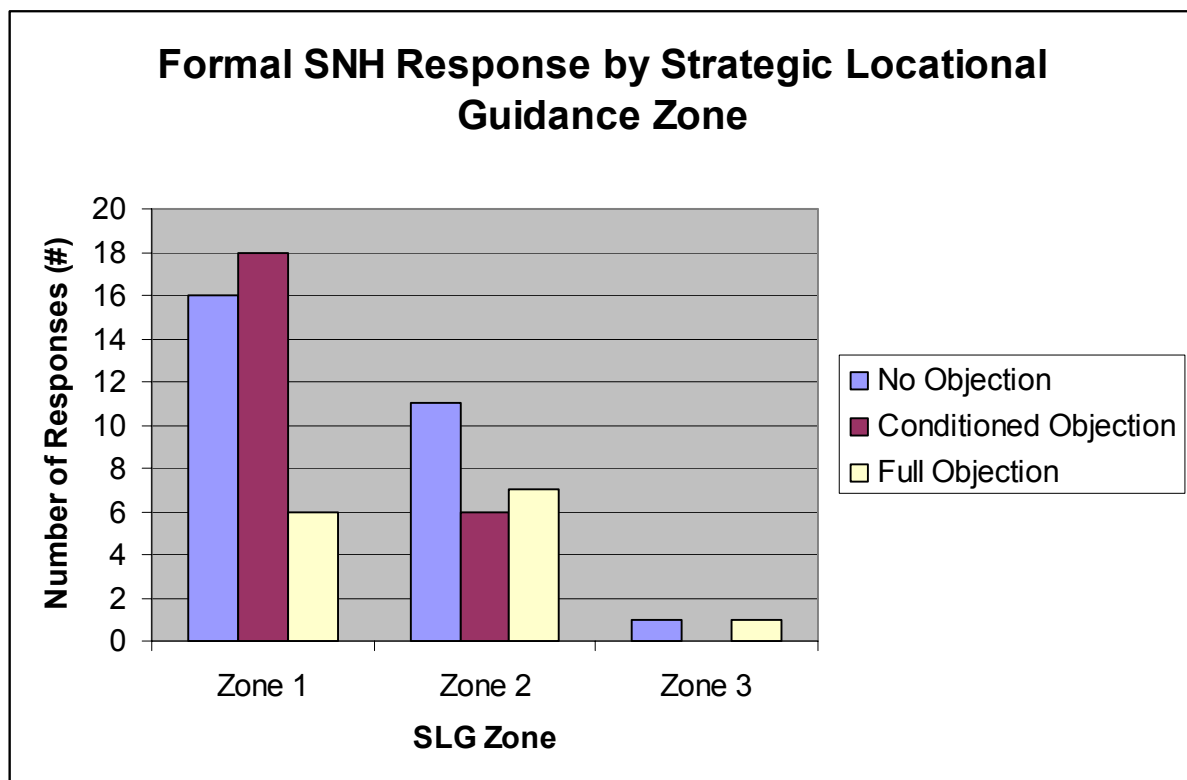


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Overall, of the 67 onshore windfarm applications received and upon which SNH has been consulted since April 2001, SNH has formally objected to 21% of these. We have accepted without objection 40% of these proposals, and made a conditioned objection to a further 37%. A conditioned objection means that SNH regards an application as acceptable in principle but provided some amendment or condition is applied to the project. Such conditional requirements may be standard requirements or mitigation long agreed with the developer, though in some circumstances the amendment required may be substantive.

When considering the pattern of SNH renewables responses to applications against our Strategic Locational Guidance Zones, the majority of applications (59%) fall within Zone 1 (lowest sensitivity). This Zone also accounts for the greatest generating capacity (2007MW). Applications within Zone 3 (high sensitivity) and Zone 2 (medium sensitivity) have received a proportionately higher rate of SNH objection than within Zone 1 (lowest sensitivity). This is shown in **Chart 12** below.

**CHART 12**

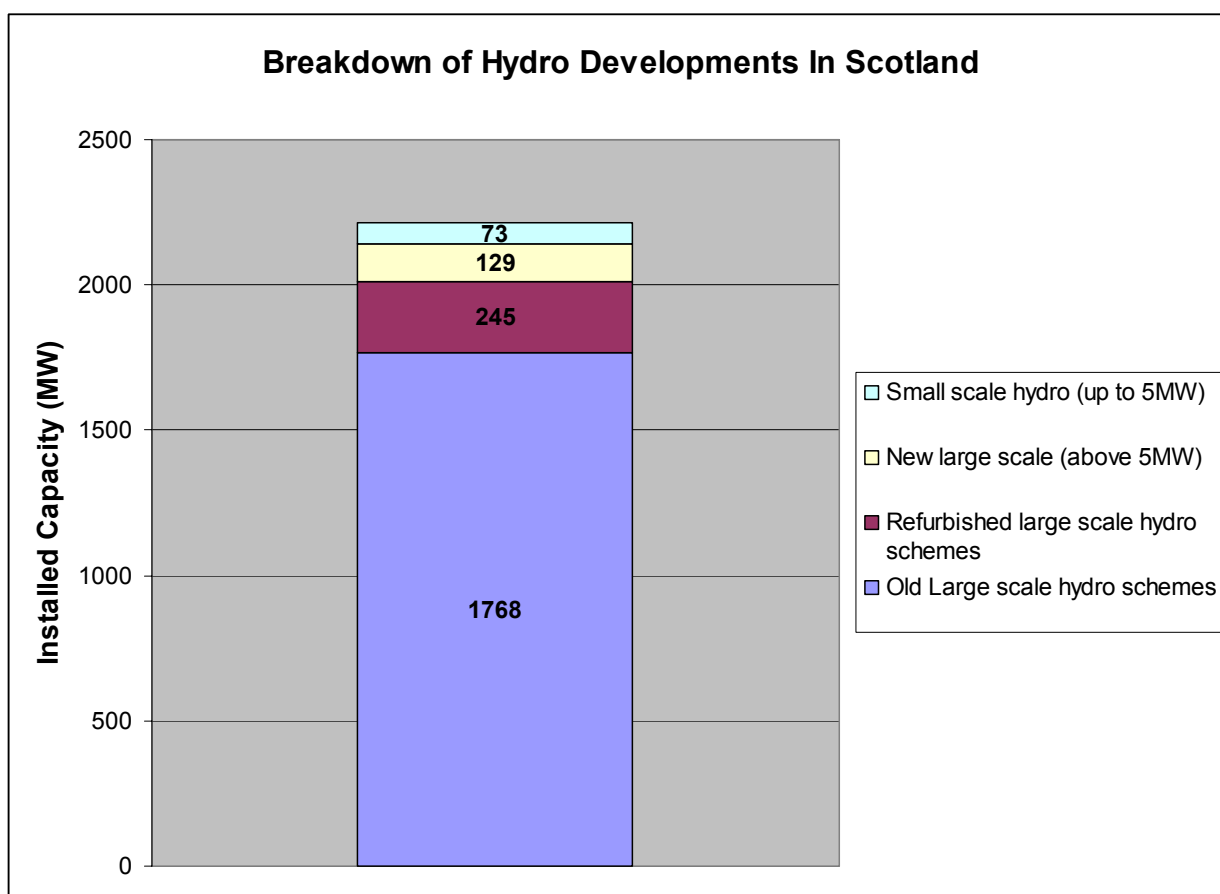


## 4.2 Hydro Electric

Hydroelectric schemes installed or in various stages of the consents process account for about **2219MW** of capacity. **1768MW** is from large-scale hydro schemes developed in the last century. A further **245MW** from such large-scale hydro has received ROS-accreditation following refurbishment. The remaining **202MW** is from small-scale hydro schemes, which are considered further in **Chart 14**.

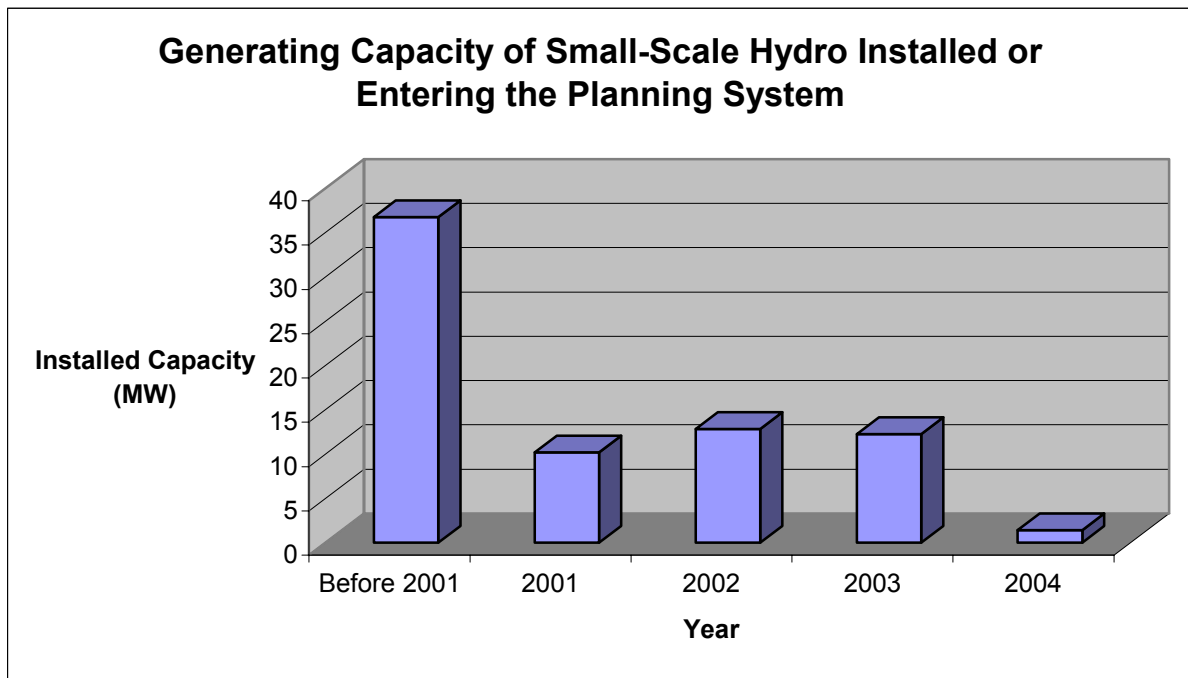
**Chart 13** shows the breakdown of hydro schemes:

### CHART 13



Despite the growing number of small scale hydro schemes gaining accreditation, there is a marked fall in the overall generating capacity entering the consents system as shown in **Chart 14** below. This is likely to be reflected in the future in the pattern of technologies gaining ROS accreditation.

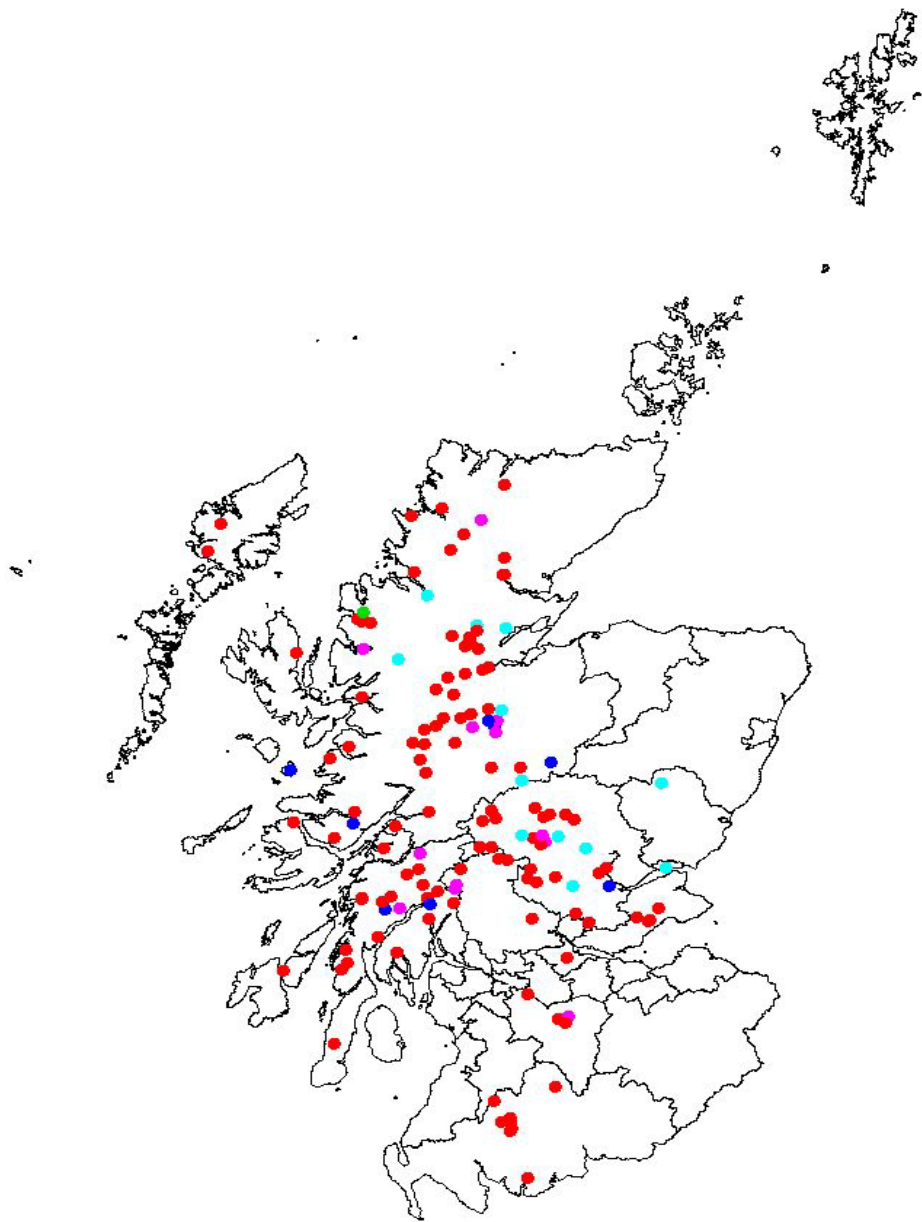
**CHART 14**



**Map 3** shows the distribution of hydro schemes installed or in the consents process in Scotland.

**MAP 3**

**Hydroelectric Schemes Installed or in the Planning System**



- Status**
- Scoping
  - Application
  - Approved
  - Refused
  - Installed

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### 4.3 Other Technologies

Although SNH places a large amount of importance on the development of other renewables technologies, especially appropriately placed wave and tidal schemes offshore, there has been little development to date, and there are no clear trends to comment on. To date there are only three offshore wind proposals in Scottish waters – the Robin Rigg proposal in the Solway estuary, which has received approval, the Talisman proposal in the outer Moray Firth, which is in the early stages of investigation but which has received funding support from the DTI, and a newer 20 turbine proposal 1km off Aberdeen harbour. There has also been little significant uptake in biomass, though the Government and industry are keen to progress this.

## 5. Conclusions

The trends identified point towards a continuing pattern of onshore wind development, with little growth in the less commercial renewables technologies. This is largely due to the favourable incentives regime created by the Renewables Obligation (Scotland), which is sufficient to encourage onshore wind and hydro-electric developments.

There is as yet no indication, in terms of numbers of project applications, of the development of offshore and marine technologies or the expansion of environmentally suitable biomass developments.

## Caveats

The database requires constant updating and verification, and may not always contain the most up to date picture. The figures used above are updated as at **21<sup>st</sup> November 2004**. Greater sharing of information with the bodies involved in decision-making may help improve this information in future.

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## Glossary of Terms

**Generating Capacity-** The actual installed or potential maximum generating capacity of a renewables scheme. This is usually measured in Megawatts (MW), and only relates to maximum output of the scheme when it is operating at full capacity.

**Installed** - generators which have been constructed and are operational.

**Approved** -generators which have received planning or Electricity Act consent, whichever is appropriate, but have not yet been constructed.

**Refused** - generators which have been refused development permission.

**Withdrawn** - proposals which have been formally withdrawn after having been lodged for consent.

**Application** - generators for which consent has been formally applied for.

**Scoping** - generators for which the applicant has initiated a scoping discussion in advance of preparing an Environmental Statement in support of an application; but an application for consent has not been lodged. Such consultations are in the public domain.

**Pre-application** - proposals for which there has not as yet been an application for consent or a request for a scoping opinion, but on which SNH has been consulted by the developer. Such consultations may be in commercial confidence.

## Annex 1

### Technological Breakdown of Installed Capacity within the Consents System

<b>Onshore Windfarms within the consent system (November 2004)</b>		
	<b># of Schemes</b>	<b>Capacity (MW)</b>
Installed	38	331
Approved	30	918
Application made	77	2255
Scoping	76	3956
<b>Total now in consents system</b>		<b>7460</b>
Pre-application	268	2765
Refused	15	180
Withdrawn	26	121
Decommissioned		
<b>Offshore Windfarms within the consent system (November 2004)</b>		
	<b># of Schemes</b>	<b>Capacity (MW)</b>
Installed		
Approved	1	150
Application made		
Scoping		
<b>Total now in consents system</b>		<b>150</b>
Pre-application	2	540
Refused		
Withdrawn		
Decommissioned		
<b>Hydro - storage within the consent system (November 2004)</b>		
	<b># of Schemes</b>	<b>Capacity (MW)</b>
Installed	85	2025
<i>(Installed Old Large Scale Hydro Schemes 2012)</i>	63	
Approved	7	12
Application made	4	102
Scoping	6	17
<b>Total now in consents system</b>		<b>2157</b>
Pre-application	1	5

Refused Withdrawn Decommissioned		
<b>Hydro - run of river within the consent system (November 2004)</b>		
	<b># of Schemes</b>	<b>Capacity (MW)</b>
Installed	29	21
Approved	1	0
Application made	8	21
Scoping	6	11
<b>Total now in consents system</b>		<b>54</b>
Pre-application	15	3
Refused Withdrawn Decommissioned		
<b>Biomass within the consent system (November 2004)</b>		
	<b># of Schemes</b>	<b>Capacity (MW)</b>
Installed	2	13
Approved	1	0
Application made	4	40
Scoping	2	22
<b>Total now in consents system</b>		<b>75</b>
Pre-application	1	30
Refused Withdrawn		
<b>Marine within the consent system (November 2004)</b>		
	<b># of Schemes</b>	<b>Capacity (MW)</b>
Installed	1	0.5
Approved		
Application made	1	0
Scoping	2	0
<b>Total now in consents system</b>		<b>0.5</b>
Pre-application	2	0
Refused Withdrawn Decommissioned	1	0.15

