

5.0 WIND TURBINES IN THE STUDY AREA

This section lists and describes the operating, consented and proposed wind turbine developments in the study area at Spring 2013. A brief explanation of turbine and windfarm size categories used in this study is given below.

5.1 Size of Wind Turbines and Windfarms

There are a number of overlapping and interacting factors which affect the potential landscape and visual effects of wind energy developments. The four main factors are:

- Size of turbine
- Turbine design (shape/ blades/ tower /colour)
- Numbers of turbines (within groups and/ or single turbines spread across an area)
- Distribution of turbine groupings (spacing between groups and/or single turbines)

The effects of these factors will in turn differ depending on the character of the landscape in which the turbines are located. The factors and their effects are discussed in detail in **Appendix 5** of this report. Tables 5.1 and 5.2 below provide a classification of wind turbine sizes and wind energy development sizes. These provide a basis on which turbine size and distribution is mapped and discussed in the following sections.

Table 5.1. Turbine Size Categories in This Study

Size Category	Blade Tip Height	Typical Use
Small	Turbines less than 15m in height	Typically used for domestic FiT schemes
Small-Medium	Turbines 15m to <30m in height	Typically used for domestic and farm FiT schemes
Medium	Turbines 30m to <50m in height	Typically used for farm and industrial FiT schemes
Medium/Large	Turbines 50m to <80m in height	Single turbine FiT schemes and smaller turbines used in commercial schemes
Large	Turbines 80m in height and greater	Typical turbines used in commercial windfarms but also on some single turbine schemes
Very Large	Turbines 125m in height and greater.	Used in commercial onshore windfarms, as well as offshore (up to ca. 200m in the latter)

There is no current 'accepted' classification of commercial windfarm sizes in Scotland. Existing and proposed wind energy developments vary in turbine numbers and turbine sizes; from single small turbines to over 200 large turbines. Individual turbines vary in size from below 15m to more than 140m, with maximum outputs from a few kW to greater than 3MW.

To place Aberdeenshire within context, it is worth considering the wider Scottish context. The table below refers to small, medium, large etc. size wind energy developments. For clarity the wind energy development size categories relate wherever possible to published guidance or planning application procedures. The 20MW size SPP currently refers is shown in the Table 5.2 below, although it should be noted that emerging Government policy is recommending the abandonment of this scale threshold.

Table 5.2. Wind Energy Development Size Categories

Size Category	Size Criteria	Planning Criteria/ Illustrative Examples
Small	A development of 3 or fewer turbines.	As defined by SNH guidance on assessment of small scale wind energy development (<i>SNH 2012</i>)
Small/Medium	A windfarm of more than 3 turbines up to 20MW output	Current SPP recommends windfarms above 20MW are to be covered by SPG. <i>Eg. Between 4 turbines over 50m and 10x2MW turbines or 6x3MW turbines</i>
SPP 2010 'Cutoff' 20MW		
Medium	A windfarm between 20MW and 50MW output	Windfarms up to 50MW are dealt with as local planning authority applications. <i>Eg. Between 7x3MW and 16x3MW turbines</i>
Large	Windfarms greater than 50MW output	Windfarms over 50MW are section 36 Applications dealt with by Scottish Ministers. <i>Eg. A minimum size of 20x2.5MW or 17x3MW turbines</i>
Very Large	Windfarms greater than 100MW output	<i>Eg. A minimum size of 50 turbines over 125m tall</i>

5.2 Wind Turbine Distribution in the Study Area

Consented and proposed wind energy developments within the study area are listed, together with details (where available) of location, number and height of turbines etc, in **Appendix 6**. The locations are shown in **Figures 5.1** (Aberdeenshire) and **5.2** (whole study area).

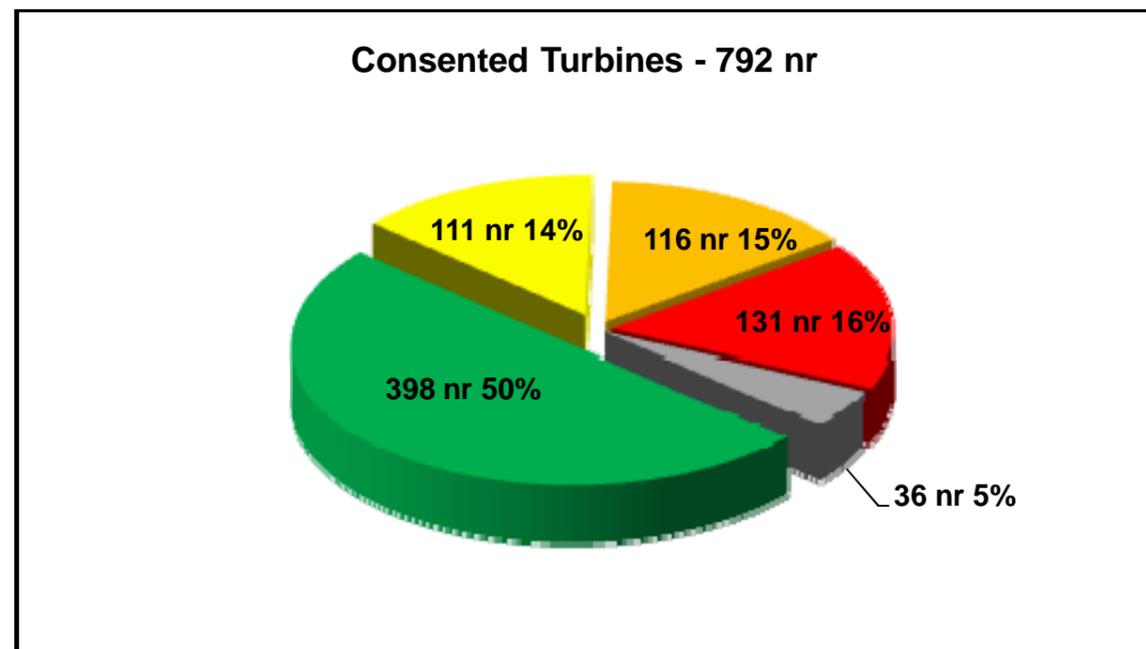
In Spring 2013 there were within Aberdeenshire a total of 792 turbines 15m and taller that are consented and 314 that are planning or S36 applications pending a decision. There are many further turbines consented and at planning stage in Moray to the west, in Angus to the south and in proposed offshore windfarms.

There are also a considerable number of turbines under 15m in height consented or pending approval. These are not included in the study.

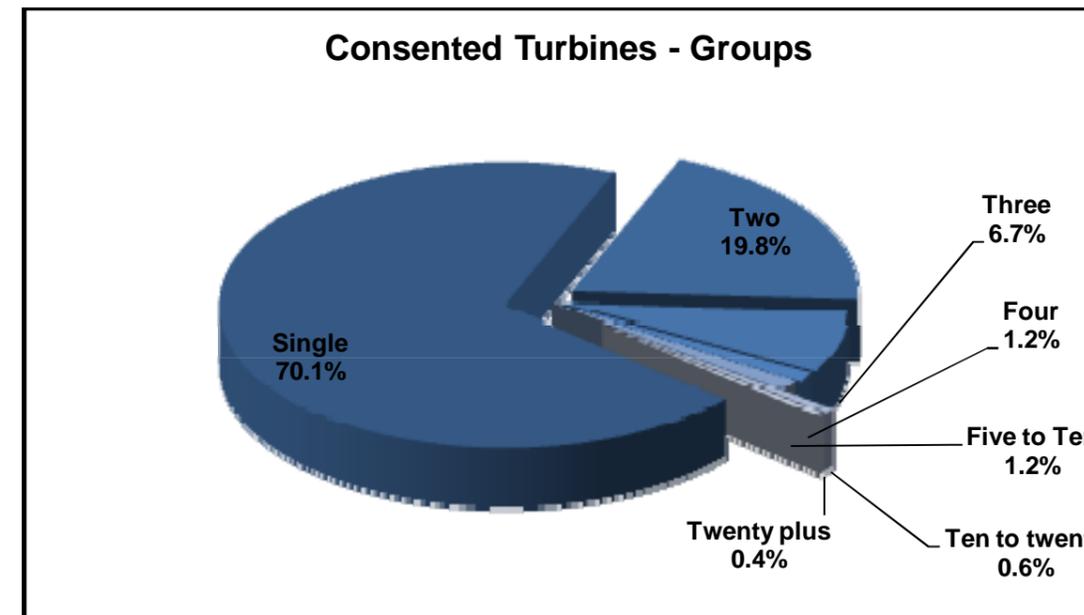
5.2.1 Operating and Consented Wind Turbines within Aberdeenshire

As of Spring 2013 there were within Aberdeenshire a total of 792 turbines consented. Of these half, 50% were in Category 2 which is between 15 to <30m. The remaining 50% are relatively evenly divided between the three next highest height bands, 14%, 15% and 16%. 36 turbines or 5% were in category 6: 125m+, although 11 of these are in the European Offshore Wind Deployment Centre and 25 at Mid Hill are just over 125m in height.

Figure 5.1: Consented Turbine Heights by % (Spring 2013) (Turbine Height: grey=very large; red=large; orange=medium/large; yellow=medium; green=medium/small)



Of those permitted, the majority, just over 70% are single turbines, 20% are in groups of 2 and 7% in groups of 3. Only 1% are in groups greater than 10.



Aberdeenshire has a relatively small number of wind farms in terms of groups of large sized turbines, when compared to other areas in Scotland. The groupings are also in the smaller end of the range. In other parts of Scotland wind farms (such as the one at Clyde) can have over 200 x 125m high turbines. The largest windfarm consented within the study area is 25 x 125m turbines at Mid Hill at 75MW. This is at the large category in Table 5.2. However the vast majority 97% of consents are for 3 or fewer turbines which typically would fall within the small size category, this reflects the restrictions inherent in the Aberdeenshire landscape. Within the wider study area in Moray only Dorenell wind farm of 59 turbines at 126m falls within the very large category.

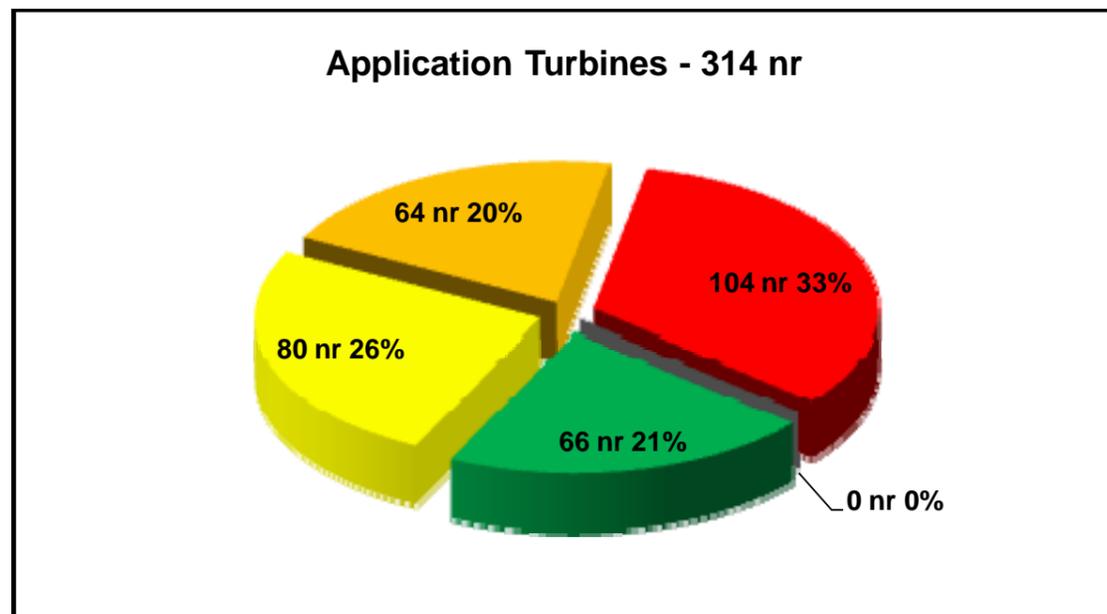
Of those consented and operational within Aberdeenshire, there are four sites that have between 10 and 20 turbines. These include 25 x 125m turbines at Mid Hill, 18 x 110m turbines at Clashindarroch, 14 x 100m height at Tullo Farm and 12 x 70m turbines at Meikle Carewe. There is one wind farm over 20 turbines with 21 x 78m height at Glens of Foudland. The 11 very large 195m high turbines have been consented 2.4km off the coast just north of Aberdeen, the European Offshore Wind Deployment Centre.

These groupings of larger turbines are located in the far south of Aberdeenshire around the Highland Boundary Fault close to Stonehaven or in the north-west near to Huntly. However the overall pattern of wind energy development is far more dispersed than this summary indicates given the high percentage of single turbine consents (around 66%) and with 97% of consented turbines in groups of 3 or fewer.

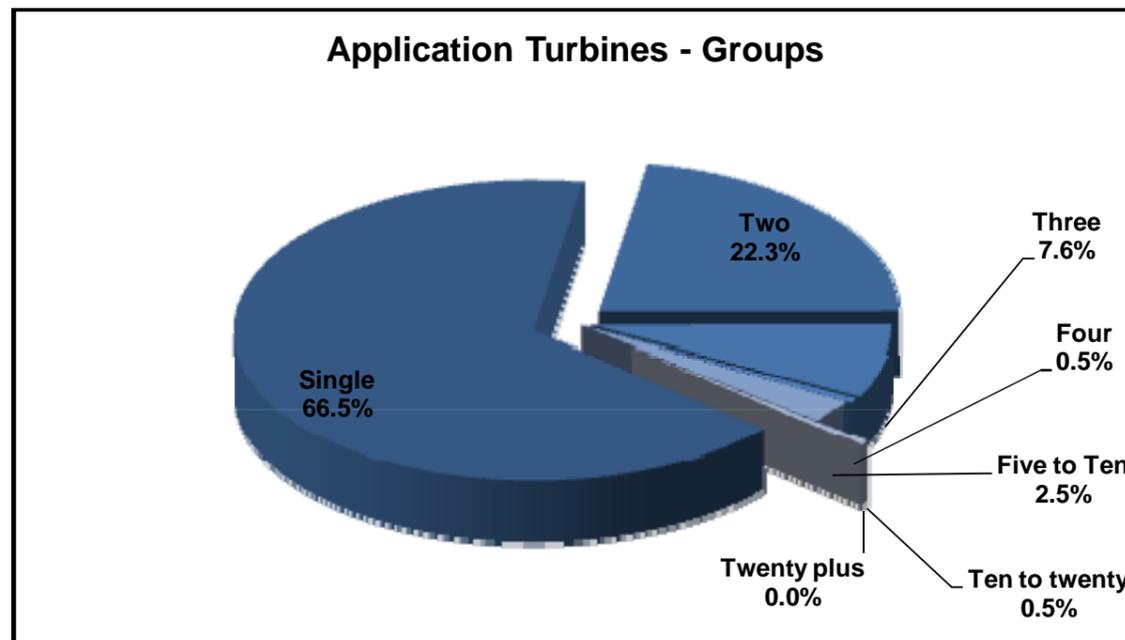
5.2.2 Proposed Wind Turbines in Aberdeenshire

At spring 2013 there were within Aberdeenshire a total of 314 turbines pending consideration/approval. Of these 21% were in Category 2 which is between 15 to <30m. The remaining % are relatively evenly divided between the three next highest height bands.

Figure 5.2: Application Turbine Heights by % (Spring 2013) (Turbine Height: grey=very large; red=large; orange=medium/large; yellow=medium; green=medium/small)



In application 66% of turbines are single and 22% were in groups of 2.



There are further proposals in Aberdeenshire that are at the planning application stage. Of the groups none are greater than 12 in number. Two groups of the large turbines are located in the north of Aberdeenshire in the vicinity of Peterhead, with 8 x 100m turbines at Hill of Braco and 12 x 99.5m at Mormond Hill. Two are groups are proposed close to Alford at Tibberchindy 6 x 115m turbines and Cairnborrow 9 x 110m high turbines.

Again the overall pattern of turbine applications is for groups of 3 or fewer, 97%, with the remaining 3% comprising the larger groups of what could be classified as wind farms.

5.2.3 Consented Wind Turbines in 30km buffer outside Aberdeenshire

Within the 30km buffer area outside Aberdeenshire there are over 220 consented turbines, some of which are situated in windfarms. The majority of these are situated in Moray and a quarter in Angus. There are no consented turbines in the Cairngorms National Park area.

The turbines most relevant to the Aberdeenshire landscape are:

- the windfarm at Dorenell within Moray, within the *Uplands* ten kilometres west of the Aberdeenshire boundary, which is visible from the *Grampian Outliers* in the west of Aberdeenshire
- a number of single turbines of medium to large height located north of *Deveron and Bogie Strath* within the *Uplands* in Moray
- the Hill of Towie Windfarm in Moray, 21 number 100m high turbines which is visible from the *Daugh of Cairnbarrow* within 10km of the Aberdeenshire border

5.2.4 Proposed Wind Turbines in 30km buffer outside Aberdeenshire

Within the 30km buffer area there were applications for a further 109 turbines on land. The most significant of these are as follows:

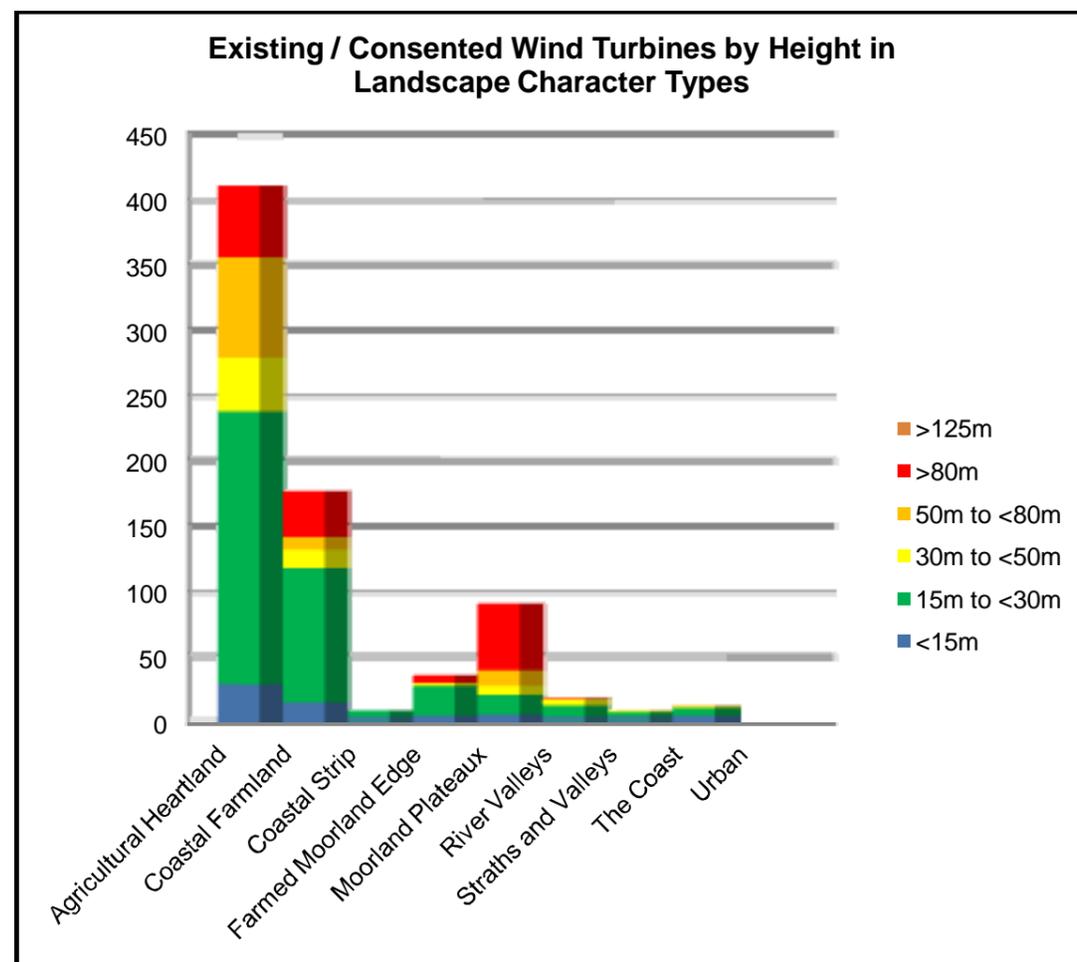
- 16 large turbines at Aultmore wind farm in the Moray *Uplands* 10km from the boundary with Aberdeenshire
- an application for a six turbine windfarm of 110m high turbines in the *Uplands* of Moray within 5km of Aberdeenshire.
- a proposal for 17 very large turbines at Nathro within Angus in the *Highland Summits and Plateaux*, some 10-15km from Aberdeenshire

Further applications are smaller scale and/or further removed from the Aberdeenshire boundary.

5.3 Landscape Character of Turbine Locations

Within Aberdeenshire, the greatest percentage of the operating, consented and planning applications for wind farms/ turbines are within lowland landscapes. The *Agricultural Heartlands LCT* has the greatest number (400+) with the next largest number in the *Coastal Farmlands* (175+). The largest number of consented large scale turbines is within upland landscapes in particular the *Moorland Plateaux* with over 75 turbines consented, in larger groups. The coastal areas and *Straths and River Valleys* are relatively undeveloped. Diagram 5.3 lists the individual developments relative to their locations.

Figure 5.3: Consented Turbine Heights and numbers by Landscape Character Types (Spring 2013)

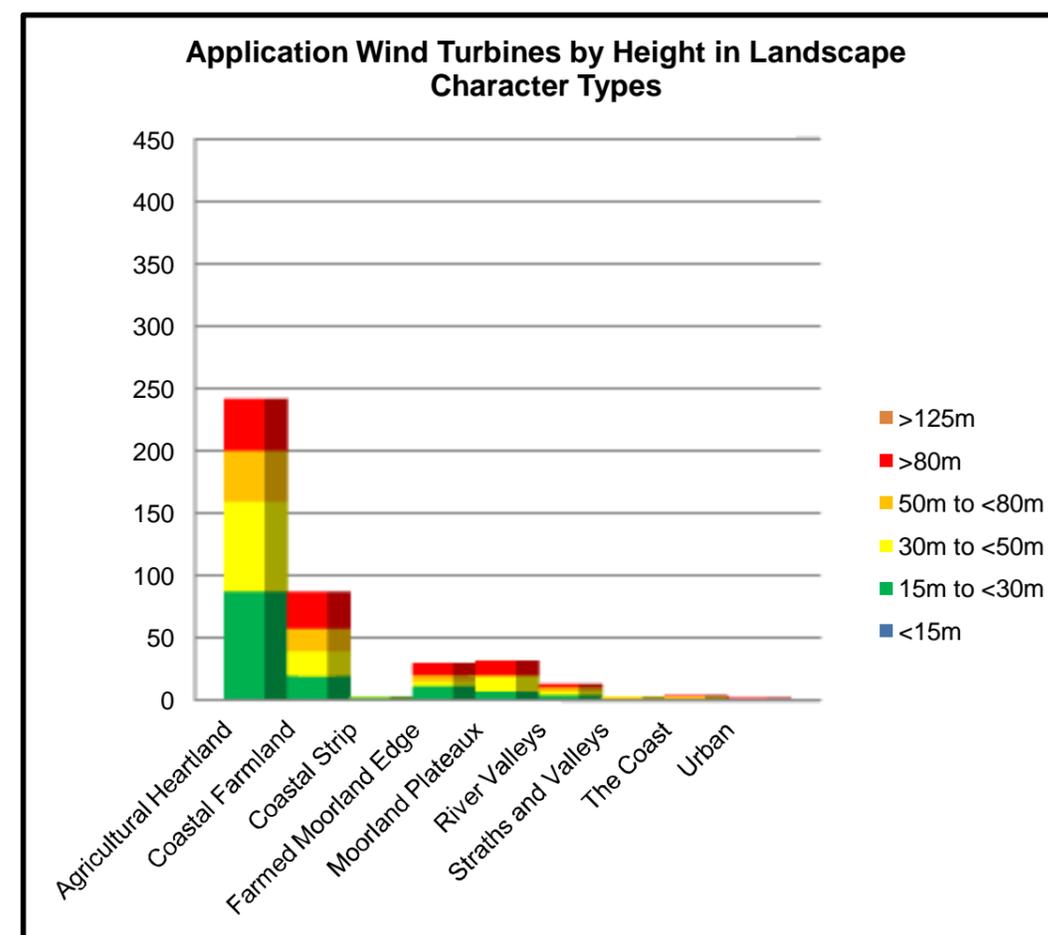


This tendency towards lowland landscapes can be explained by the extent of lowland landscapes within Aberdeenshire (77% of the total area) and partly by the existing SPG and FiTs.

There are and have been a large number of applications for smaller scale (in both turbine groupings and turbine sizes), wind energy development often in relatively close proximity to each other. This is typical of farm scale FiT projects and is linked to the structure of land ownership. In Aberdeenshire there are many farmer owner-occupiers rather than a few larger landownerships typical of other parts of Scotland. Added to this is the entrepreneurial spirit of farmers in the North East, where on farms wind power generation is seen as a major opportunity to counterbalance reductions in agricultural support under CAP reform (Bell & Booth SAC Consulting 2010).

Coastal landscape areas are often of open, simple character and visible from both inland and from the coastal settlements in Aberdeenshire. They are also a relatively rare LCT regionally.

Figure 5.4: Application Turbine Heights and numbers in relation to Landscape Character Types. (Spring 2013)



In landscape terms, upland areas offer a larger-scale landscape, which can accommodate larger turbines and it is rational to locate turbines in open, high and prominent areas to take advantage of higher wind speeds. On the other hand, upland areas often represent “unspoiled” landscapes, with few overtly man-made features, and the construction of wind turbines could be seen as an unwelcome industrial addition. In Aberdeenshire the largest scale upland types are limited in extent compared with much of Scotland (Moorland Plateaux comprises 18% of the study area), and prominently visible from surrounding lowlands and coasts. This means that any significant wind energy development would have a very significant effect.

In lowland areas, the scale and pattern of the landscape is generally smaller, meaning that the largest windfarms and turbines can appear incongruous, particularly given the greater array of “reference features” available with which to compare them. Together with the proximity of settlements and properties there are clear sensitivities in such landscapes. Nevertheless, a location within the lowland area better reflects the relationship between energy production and the consumer, as well as generally being easier to service in terms of both access and connection to the electricity grid. None of the proposals are of the extent and size often seen in upland areas elsewhere in Scotland.

Strategic Landscape Capacity Assessment for Wind Energy in Aberdeenshire

March 2014

7933_ABS_130

Legend

- Study Area
- Study Area 30km Buffer
- Scottish Local Authority Boundaries
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- Cairngorms National Park

Consented Turbines

(Height Category and No. of Turbines)

- Cat 2: 15 to <30m
- Cat 3: 30 to <50m
- Cat 4: 50 to <80m
- Cat 5: 80m+
- Cat 6: 125m+

Application Turbines

(Height Category and No. of Turbines)

- Cat 2: 15 to <30m
- Cat 3: 30 to <50m
- Cat 4: 50 to <80m
- Cat 5: 80m+
- Cat 6: 125m+
- Turbine Locations

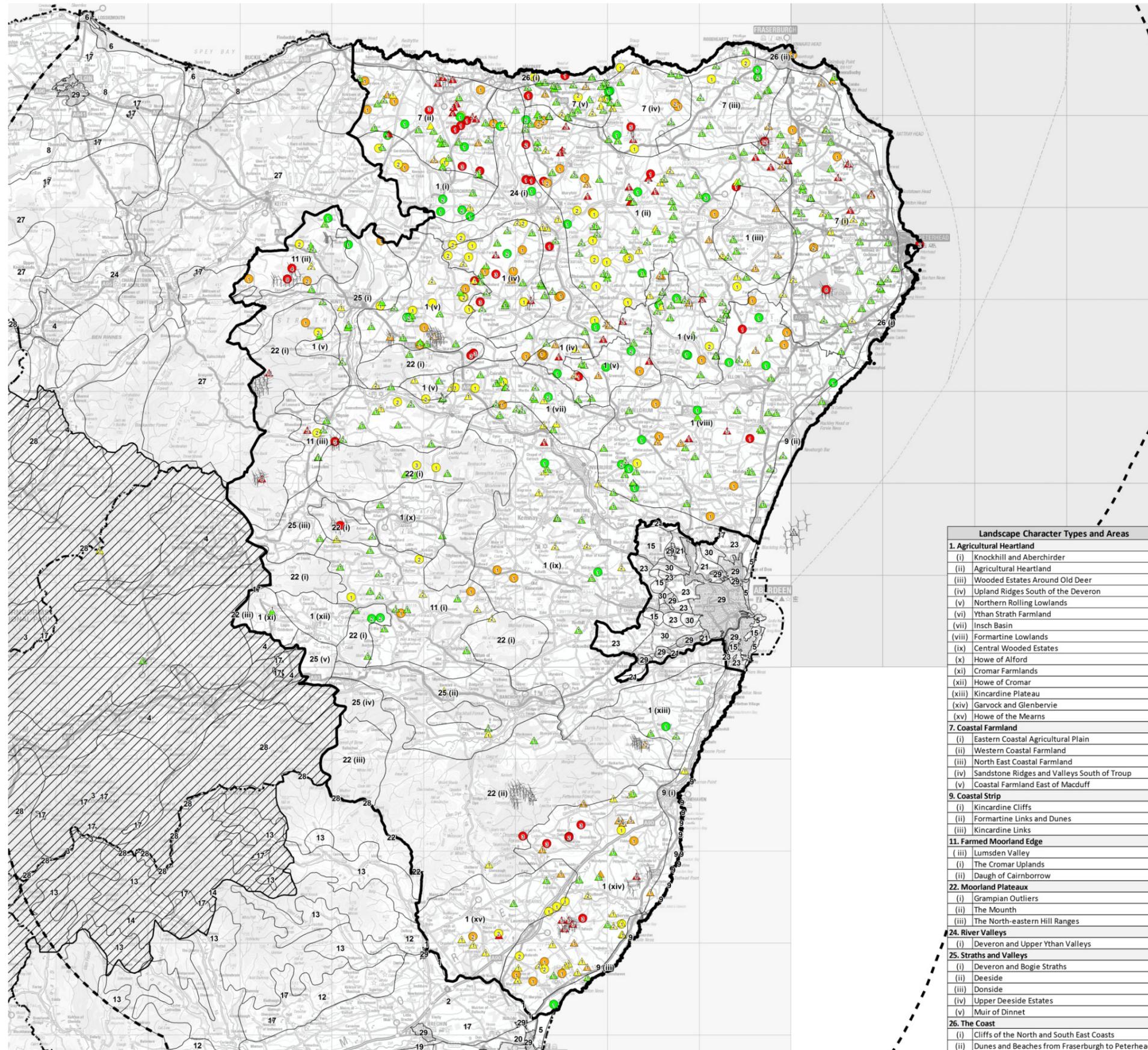
Landscape Character Types and Areas	
1. Agricultural Heartland	
(i)	Knockhill and Aberchirder
(ii)	Agricultural Heartland
(iii)	Wooded Estates Around Old Deer
(iv)	Upland Ridges South of the Deveron
(v)	Northern Rolling Lowlands
(vi)	Ythan Strath Farmland
(vii)	Insch Basin
(viii)	Formartine Lowlands
(ix)	Central Wooded Estates
(x)	Howe of Alford
(xi)	Cromar Farmlands
(xii)	Howe of Cromar
(xiii)	Kincairdine Plateau
(xiv)	Garvock and Glenberrie
(xv)	Howe of the Mearns
7. Coastal Farmland	
(i)	Eastern Coastal Agricultural Plain
(ii)	Western Coastal Farmland
(iii)	North East Coastal Farmland
(iv)	Sandstone Ridges and Valleys South of Troup
(v)	Coastal Farmland East of Macduff
9. Coastal Strip	
(i)	Kincairdine Cliffs
(ii)	Formartine Links and Dunes
(iii)	Kincairdine Links
11. Farmed Moorland Edge	
(i)	Lumsden Valley
(ii)	The Cromar Uplands
(iii)	Daugh of Cairnborrow
22. Moorland Plateaux	
(i)	Grampian Outliers
(ii)	The Mounth
(iii)	The North-eastern Hill Ranges
24. River Valleys	
(i)	Deveron and Upper Ythan Valleys
25. Straths and Valleys	
(i)	Deveron and Bogie Straths
(ii)	Deeside
(iii)	Donside
(iv)	Upper Deeside Estates
(v)	Muir of Dinnet
26. The Coast	
(i)	Cliffs of the North and South East Coasts
(ii)	Dunes and Beaches from Fraserburgh to Peterhead

Figure 5.5a

Existing, Consented & Proposed Wind Turbines in Aberdeenshire



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Strategic Landscape Capacity Assessment for Wind Energy in Aberdeenshire

March 2014

7933_ABS_131

Legend

- Study Area
- Study Area 30km Buffer
- Scottish Local Authority Boundaries
- Landscape Character Type / Area Boundary (see Table 3.1 for list)
- Cairngorms National Park

Consented Turbines

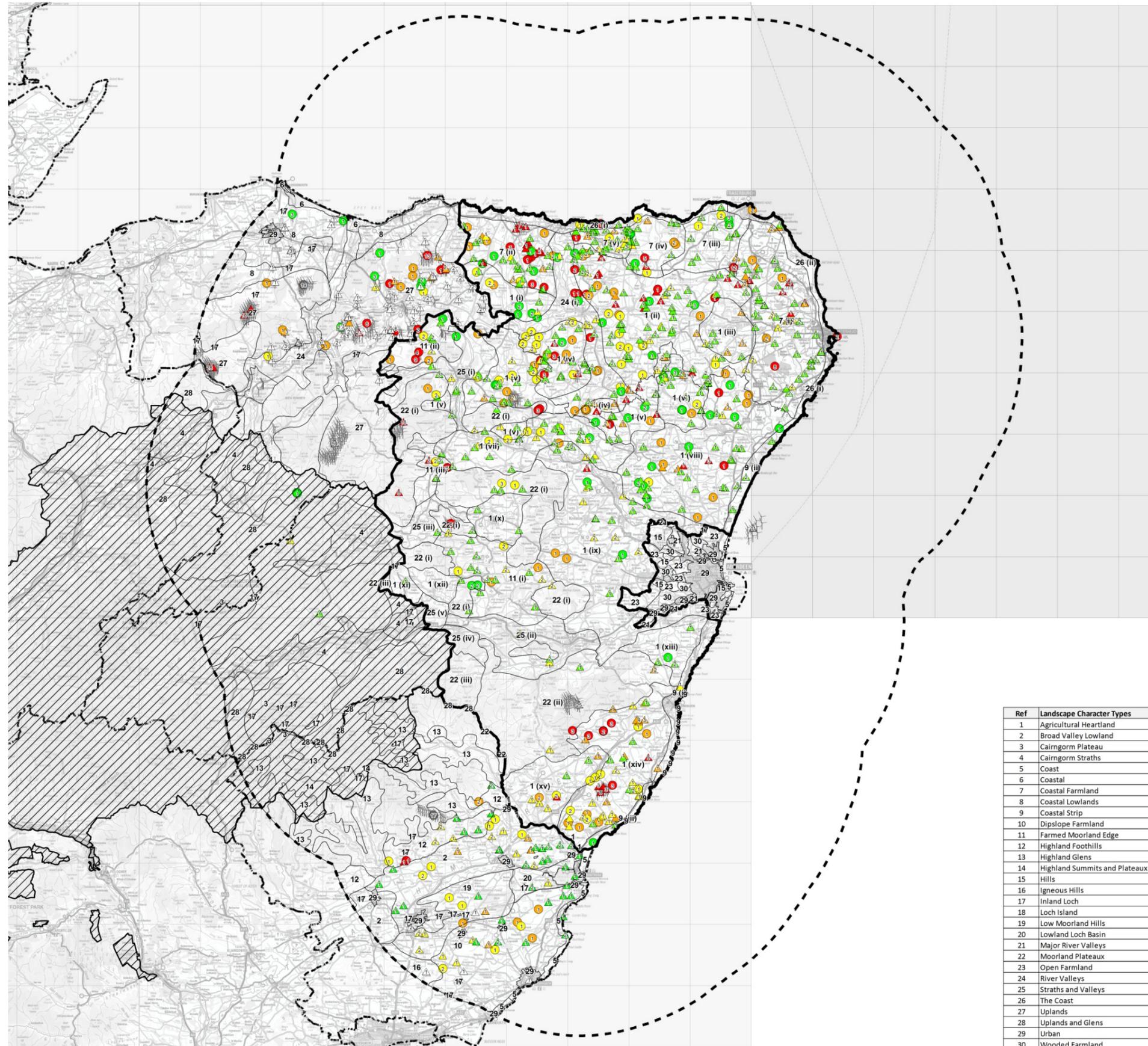
(Height Category and No. of Turbines)

- Cat 2: 15 to <30m
- Cat 3: 30 to <50m
- Cat 4: 50 to <80m
- Cat 5: 80m+
- Cat 6: 125m+

Application Turbines

(Height Category and No. of Turbines)

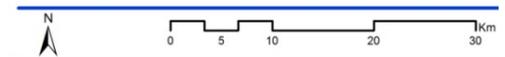
- Cat 2: 15 to <30m
- Cat 3: 30 to <50m
- Cat 4: 50 to <80m
- Cat 5: 80m+
- Cat 6: 125m+
- Turbine Locations



Ref	Landscape Character Types
1	Agricultural Heartland
2	Broad Valley Lowland
3	Cairngorm Plateau
4	Cairngorm Straths
5	Coast
6	Coastal
7	Coastal Farmland
8	Coastal Lowlands
9	Coastal Strip
10	Dipslope Farmland
11	Farmed Moorland Edge
12	Highland Foothills
13	Highland Glens
14	Highland Summits and Plateaux
15	Hills
16	Igneous Hills
17	Inland Loch
18	Loch Island
19	Low Moorland Hills
20	Lowland Loch Basin
21	Major River Valleys
22	Moorland Plateaux
23	Open Farmland
24	River Valleys
25	Straths and Valleys
26	The Coast
27	Uplands
28	Uplands and Glens
29	Urban
30	Wooded Farmland

Figure 5.5b

Existing, Consented & Proposed Wind Turbines in 30km Study Area



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