

AYRSHIRE JOINT STRUCTURE PLAN AND TRANSPORTATION COMMITTEE
2 JUNE 2006

Renewable Generation and Electricity Networks

PURPOSE OF REPORT

- 1 To advise the Committee on the current situation with regard to the electricity transmission and distribution grids in relation to the arrangements for grid access for renewable generators and to detail the current situation with regard to capacity of the network in relation to current developer/generator interest, emerging government advice and Structure Plan Policy.

BACKGROUND

- 2 To meet their 40% aspiration for renewable energy by 2020, the Scottish Executive are promoting 3.4 Gigawatts (GW) of additional renewable generating capacity to achieve an overall Scottish target of 6 GW. Current Government advice does not provide guidance on expected contributions from individual renewable sources or from specific geographical areas. Advice in NPPG6 provides no local or regional targets for renewable generation and the draft SPP6 which is due to be published in final form over the next few weeks appears to be advocating 'bottom-up' locally derived capacity based targets rather than 'top-down' nationally set regional and local targets.
- 3 Defining such a target for Ayrshire at this point, in advance of Government guidance, would be premature and is not the aim of this paper. However an indication of the broad scale of renewable generation implied by the national target would be useful as context for the rest of the report. Assessing what might be Ayrshire's reasonable contribution to the 6GW national target could be approached in a number of ways and would produce a range of figures. However, following the same methodology used to derive the national target in the FREDS report (ie. based on electricity demand by 2020) gives a 2020 Ayrshire 'target' of 649 Megawatts (MW). As there are currently 179 MW of renewable generation either operational, under construction and a further 30 MW fully consented and with a contracted offer for grid connection, an additional 440 MW would be needed by 2020. This could be seen as a guide to Ayrshire's contribution for the additional 3.4GW needed nationally.
- 4 The Finalised Draft Structure Plan is seeking to promote renewable energy generation generally, and to facilitate this specifically identifies two Preferred Search Areas (PSA's) for wind-farms and a Biomass Search Area (BSA) to accommodate larger scale developments. The capacity of these areas to accommodate renewable generation is substantial. The PSA's alone have a theoretical capacity of almost 3GW based on their land area, however allowing

for local topographical and environmental constraints could reduce this by up to 50% to give a practical capacity of some 1.45GW. Capacity in the PSA's is far in excess of Ayrshire's target contribution and is therefore unlikely to be a constraint on renewable generation.

ELECTRICITY SUPPLY

5 Renewable Generators can supply electricity in a number of ways, all contributing to the national target:

- on-site generation;
- on-site generation and private supply;
- connection as embedded generation to the Distribution Grid (DG); and
- connection to the Transmission Grid (TG).

These can be in combinations for example where a generator supplies power for own on-site use and exports surplus power to the Grid. Structure Plan policies are generally encouraging to all these forms of renewable generation. However the principle focus of this report is on generators wanting to connect to either the Transmission or Distribution Grids and who are therefore dependent on the current and planned capacity of these networks.

Transmission Grid Capacity

6 Establishing an up to date position with regard to Transmission Grid capacity for a given geographical area is problematic. National Grid as GB Network Operators publish a Seven Year Statement (SYS) which outlines the existing situation and details programmed investments. The latest SYS is for 2005 and indicates a series of investments in Ayrshire up to 2012. A 2006 version is due to be published in June. However there are confidentiality problems in providing project specific information, particularly regarding grid connections for individual generators, and this means that it can be difficult to establish the current situation in conditions where developer interest is high and the market situation is changing rapidly.

7 Scottish Power are owners of the TG in Ayrshire and have provided information indicating that capacity on the Ayrshire network is becoming very constrained. Although spare capacity exists at present, this capacity is fully committed to projects which are currently planned. There are eight projects which are in the 'grid connection queue' and have formal contracted offers for grid connection up to 2014. Three are planned to connect to the Auchencrosh-Coylton 275kV line and will take it to full capacity. Two of these proposed developments are in Ayrshire within the South Carrick PSA, the third is in Dumfries and Galloway at Balunton but will be connected to the Ayrshire network. There are also five contracted offers for connections to a proposed new transmission line from Coylton to New Cumnock. These projects amounting to 539 MW will take all the capacity of the proposed new line. Three of these wind farms are in Ayrshire and one each in Dumfries and Galloway and South Lanarkshire (see Table 1 Attached). Dates for all connections are given. None of these wind-farm proposals in Ayrshire have planning consent and all three lie outwith the PSA's identified in the Finalised Draft Structure Plan.

Status of Large Scale Wind Farms in Ayrshire (May 2006)

Status:

Operational	49MW
U/C	130MW
Planning Consent	30MW

Contracted Offers for Grid Connection:

Within PSA's	249MW
Outwith PSA's	452MW

- 8 In summary, Ayrshire's share of a 3.4GW Scottish renewable energy generating capacity target to 2020 is of the order of 440MW over and above existing operational and under construction. The new Structure Plan is directing developers of large scale wind farms to two Preferred Search Areas with a combined installed capacity of between 1,450MW and 2,888MW. While more work could be undertaken to refine the practical capacity of the PSA's, this initial analysis would indicate there to be more than sufficient capacity within the PSA's to accommodate the maximum capacity which the transmission grid is currently capable of or, with current investment plans, anticipated to deliver in Ayrshire. To develop the potential which the PSA's represent will require considerable investment in the medium to long term in the form of new transmission lines or significant reinforcement of the Transmission Grid in areas of the network with good accessibility to the PSA's. This would be in line with the National Planning Framework for Scotland which makes specific reference to the need to align investment in the transmission grid with opportunities for developing renewable energy generation and realising renewable energy potential:

"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 resources."

Distribution Grid Capacity

- 9 Electricity has traditionally been generated by large centralised power stations connected to the transmission grid. The lower voltage distribution networks have traditionally delivered electricity in one direction from the transmission network to final consumers at progressively lower voltages. However distributed or embedded generation using renewable power sources is being increasingly connected directly to the Distribution Network. The Distribution System is maintained and operated by 14 Distribution Network Operators (DNO's) in defined geographical areas. DNO's invest in the network by adding, reinforcing, replacing or renewing various elements and connecting new consumers and generators. In Ayrshire Scottish Power is the DNO but currently has no plans for investment in the network to increase capacity.
- 10 Establishing the capacity of the Distribution Grid is also problematic and there is even less information publicly available. Scottish Power are unable to give an overall available capacity figure for Ayrshire as they can only respond to individual project level assessments of network capacity. However they indicate that currently there is spare capacity in the distribution network which in individual cases is capable of connecting renewable generators at up to 30MW per site. How many of these less than 30MW connections could be made

across Ayrshire is unknown, but in total it could be significant. As the capacity of the Distribution Grid is likely to be highest where population and economic activity are located it is unlikely that significant capacity exists in close proximity to the relatively remote PSA's.

CONCLUSION

- 11 The Finalised Draft Structure Plan will create 2 PSA's with potential capacity to accommodate some 1500MW plus of renewable generation in the form of large scale wind farms. Existing transmission grid capacity will realise some 279MW of this potential if current proposals with contracted offers proceed to development. Scottish Power's current Transmission Grid investment plans to 2014 have approved funding for a new line from Coylton to New Cumnock which will provide 450MW of new renewable generating capacity for which formal connection agreements are in place and programmed but which lie outside the PSA's and for which no planning consents have yet been granted.
- 12 The Structure Plan has set the strategic spatial planning context for new on-shore renewable generation in Ayrshire for the next twenty years. This stance is positive towards increased renewable generation whilst ensuring environmental assets are adequately safeguarded. It has ensured the area has a more than adequate capacity in terms of locations which combine landscape and environmental capacity with renewable resource availability. Without confirming an actual renewable generation target and in the absence of national guidance on regional and local targets the Structure Plan policies appear to be more than capable of accommodating a considerable increase in Ayrshire's share of renewable generation and making a significant contribution to the 3.4GW national target for renewable generation.
- 13 However it seems clear that a major constraint on the development of renewable generation will be the capacity of the electricity grid, both transmission and distribution, to accept new connections. Currently there is no spare capacity on the Transmission Network in Ayrshire when existing proposals under construction or with contracted connection offers are taken into account. Contracted offers for connections currently exceed the capacity of the existing transmission network and take up the capacity of Scottish Power's programmed extensions to the network up to 2014. However, there is capacity on the distribution grid for connecting embedded generation. The scale of this is currently unknown but although individually smaller in scale (up to 30 MW per site) it may, in total, be capable of making a significant contribution dependent on available distribution grid capacity. New Government guidance, which is likely to shed further light on the relationship between grid capacity and renewable energy generation, is expected over the next few weeks. A further report will be brought to the Committee after SPP6 is formally issued.

RECOMMENDATIONS

- 14 The Committee are asked to:
- (a) note the contents of this report; and
 - (b) agree to the Structure Plan Manager continuing to liaise with Scottish Power regarding capacity and utilisation of the Transmission and Distribution Grids and their future

development and investment, particularly with regard to developing the generating potential of wind power in the PSA's and the biomass potential of the BSA.

- (c) require a further report to be brought to Committee on the issues surrounding wind energy in Ayrshire once the draft National guidance is available.

Ian Johnson
Manager
Ayrshire Joint Structure Plan and Transportation

Person to Contact: Nigel Wallace - 01292 673762

Wind Farms Operational, Under Construction & with Planning Consent May 2006

Developer / Generator	Location	Planning Authority	Generating Capacity	Status
Scottish Power	Hare Hill, New Cumnock	East Ayrshire	13	Operational
Airtricity	Busbie Muir, Ardrossan	North Ayrshire	24	Operational
Community Wind Power	Wardlaw Moor, Dalry	North Ayrshire	12	Operational
Scottish & Southern Energy	Hadyard Hill, Dailly	South Ayrshire	130	U/C
Scottish Power	Whitelee, Eaglesham Moor	East Ayrshire/ South Lanarkshire/ East Renfrewshire	30 (322)	Approved

Source: Various 16.05.06

Windfarms with Contracted Offers for Transmission Grid Connection from 2006 to 2014

Developer / Generator	Station Name	GSP	Planning Authority	TEC (MW)	Connection Date
CRE Energy	Whitelee	Whitelee	East Ayrshire	30 (322)	16.11.07
Force 9 Energy	Mark Hill Wind Farm	Mark's Hill	South Ayrshire	99	1.10.08
SSE Generation	Hadyard Hill	Maybole	South Ayrshire	130	Current
CRE Energy	Dersalloch	Dersalloch	South Ayrshire	75	26.03.10
E.ON Power	Afton	Afton	East Ayrshire	77	09.12.09
Airtricity Developments (Scotland) Ltd	Whiteside Hill	Whiteside Hill Farm	South Lanarkshire	27	01.12.09
Brochloch Rig Wind Farm Ltd	Windy Standard 2	Windy Standard 2	Dumfries & Galloway	60	01.10.07
CRE Energy Ltd	Arecleoch	Auchencrosh	South Ayrshire	150	10.09.09
Amec Project Investments Ltd	Kyle Wind Farm	Kyle	East Ayrshire	300	01.03.10
?	Balunton	?	Dumfries & Galloway	?	?

Source: National Grid, TEC Position 03.05.06