

Orkney Grid Presentation



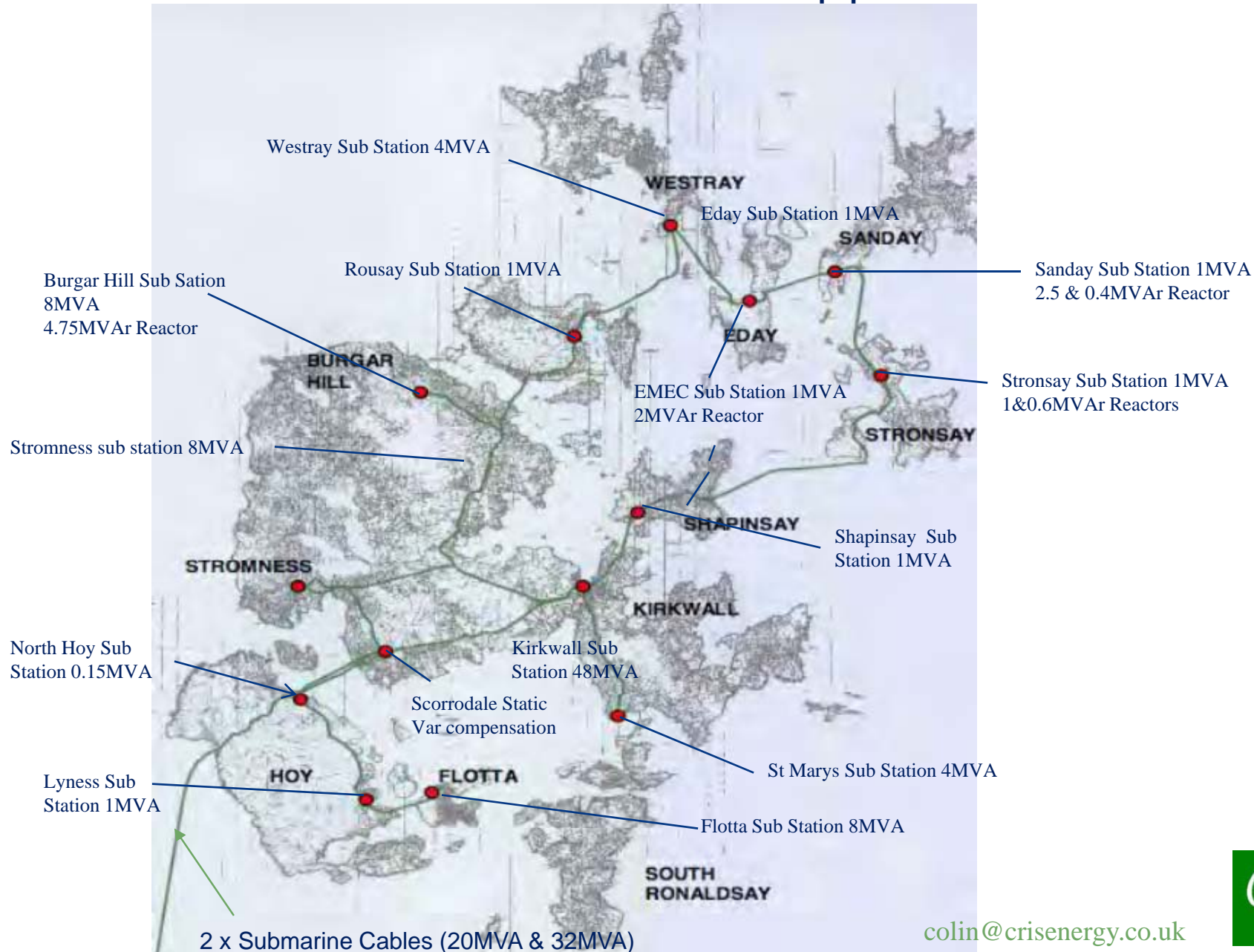
Presentation for OREF by Colin Risbridger

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Orkney Distribution Network March 2013

33/11kV substations and other equipment



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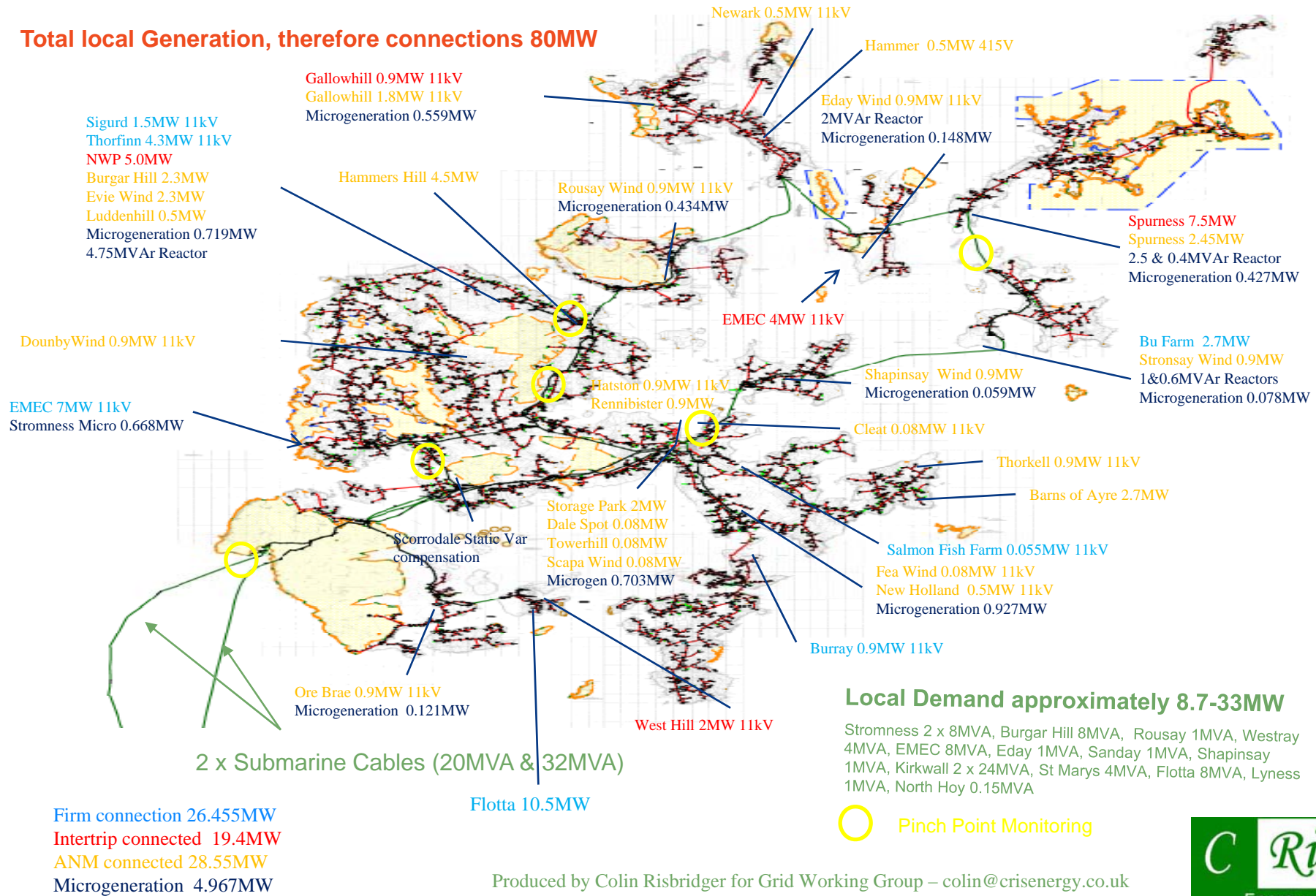


Orkney Generators - March 2013

Orkney generators									
Firm Connections									
<i>Generator</i>	<i>Location</i>	<i>Capacity</i>	<i>Zone</i>	<i>Local/Community</i>	Active Management/RPZ				
EMEC	Billia Croo	7.000 MW	Core	No	Dounby Wind	Dounby	0.9 MW	Core	Yes
Salmon Fish Farm	Inganess	0.055 MW	Core	No	Cleat	St Ola	0.08 MW	Core	Yes
Various small gen.	Kirkwall	0.703 MW	Core	Yes	Scotrenewables	Hatston	0.9 MW	Core	Yes
Various small gen.	Stromness	0.668 MW	Core	Yes	Scotrenewables	Rennibister	0.9 MW	Core	Yes
Microgenerators	Rousay	0.434 MW	Zone 1	No	SSE	Kirkwall	2 MW	Core	No
Various small gen.	Westray	0.559 MW	Zone 1	No	S&JD Robertson	Dalespot	0.08 MW	Core	Yes
Various small gen.	Eday	0.148 MW	Zone 1	No	S&JD Robertson	Scapa Wind	0.08 MW	Core	Yes
Sigurd	Burgar Hill	1.500 MW	Zone 1a	Yes	Groundwater	Towerhill	0.08 MW	Core	Yes
Thorfinn	Burgar Hill	4.300 MW	Zone 1a	Yes	New Holland	Holm	0.5 MW	Core	Yes
Various small gen.	Burgar Hill	0.719 MW	Zone 1a	Yes	Hammers Hill	Rendall	4.5 MW	Zone 1	Yes
Various small gen.	Shapinsay	0.059 MW	Zone 2	Yes	REW Dev Trust	Rousay	0.9 MW	Zone 1	Yes
SSE	Bu, Stronsay	2.700 MW	Zone 2a	Yes	Westray WP	Westray	1.8 MW	Zone 1	Yes
Various small gen.	Stronsay	0.078 MW	Zone 2a	Yes	Dist Gen Ltd	Westray	0.5 MW	Zone 1	No
Various small gen.	Sanday	0.427 MW	Zone 2a	Yes	Hammer	Westray	0.5 MW	Zone 1	No
Flotta	Terminal	10.000 MW	Zone 3	Yes	Eday Partnership	Eday	0.9 MW	Zone 1	Yes
Various small gen.	Flotta	0.086 MW	Zone 3	Yes	Luddenhill	West Mainland	0.5 MW	Zone 1a	Yes
Various small gen.	North Hoy	0.038 MW	Zone 3	Yes	Evie Wind	Burgar Hill	2.3 MW	Zone 1a	Yes
Various small gen.	Lyness	0.121 MW	Zone 3	Yes	Burgar Hill Renewe	Burgar Hill	2.3 MW	Zone 1a	Yes
ORE Ltd	Burray	0.900 MW	Zone 4	Yes	Shapinsay Dev Tru	Shapinsay	0.9 MW	Zone 2	Yes
Various small gen.	St Marys	0.927 MW	Zone 4	Yes	SSE	Sanday	2.45 MW	Zone 2a	No
		31.422 MW			Stronsay Dev Trust	Stronsay	0.9 MW	Zone 2a	Yes
					Island of Hoy Dev T	Hoy	0.9 MW	Zone 3	Yes
					ORE Ltd	Deerness	0.9 MW	Zone 4	Yes
Inter trip connections					Ayre Energy	Deerness	2.7 MW	Zone 4	Yes
Westray Dev Trust	Westray	0.9 MW	Zone 1	No	Fea Wind	Holm	0.08 MW	Zone 4	Yes
EMEC	Eday	4 MW	Zone 1	Yes			28.55 MW		
National Wind Power	Burgar Hill	5 MW	Zone 1a	No					
SSE	Sanday	7.5 MW	Zone 2a	Yes					
ScotRenewables	Flotta	2 MW	Zone 3	No			79.372 MW		
		19.4 MW							
Zone 1	6.041 MW				Community/Local	57.826 MW	73%		
Zone 1a	11.519 MW				Other	21.546 MW	27%		
Zone 2	0.059 MW								
Zone 2a	10.705 MW								
Zone 3	12.245 MW								
Zone 4	1.827 MW								
Core	8.426 MW								

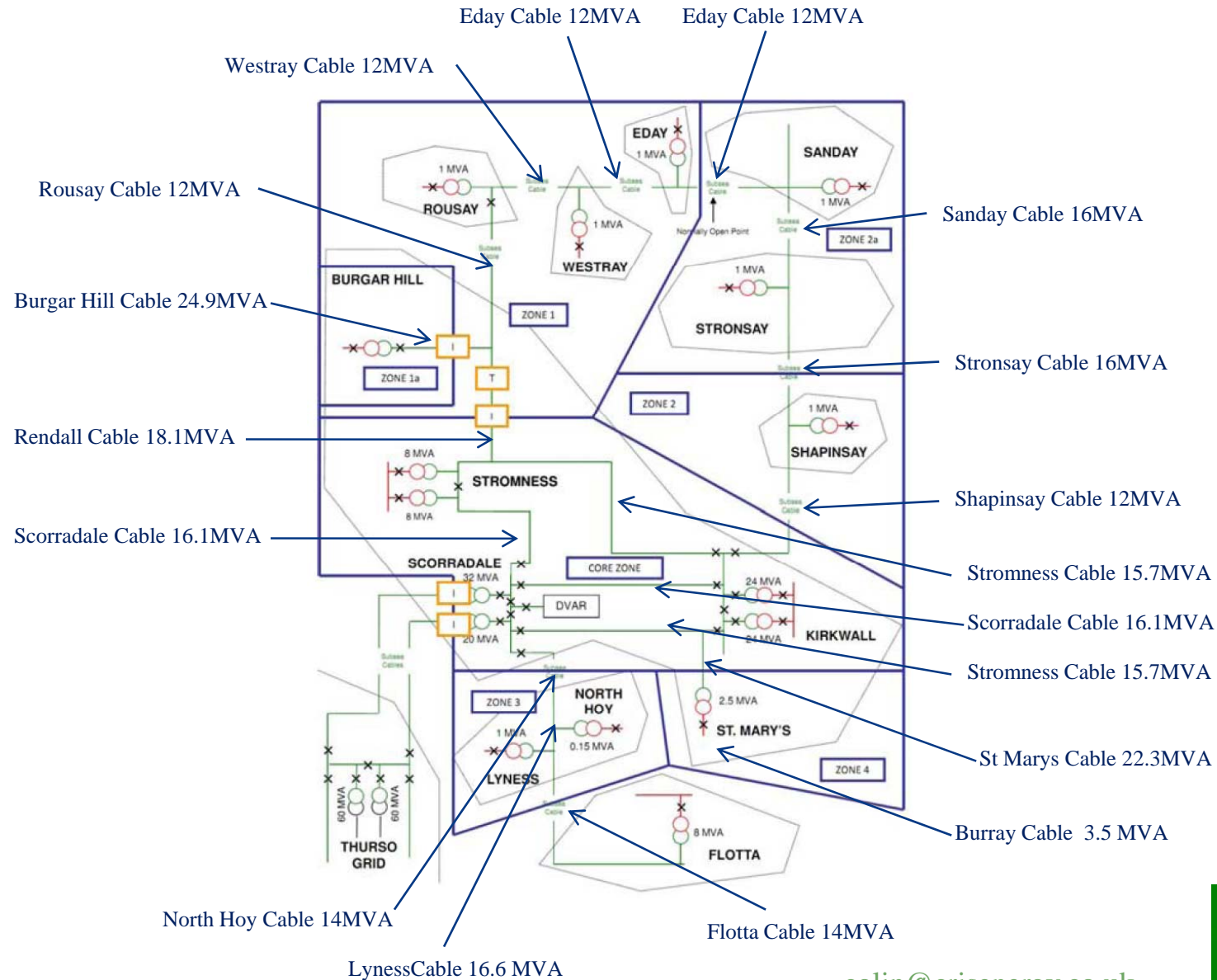
Orkney Generation - March 2013

Total local Generation, therefore connections 80MW



Orkney Distribution Network March 2013

Cable Capacities (Spring/Autumn)



Orkney Distribution Network March 2013

Power Flows

Zone 1 – 15.141MW

Zone 2a – 14.055MW

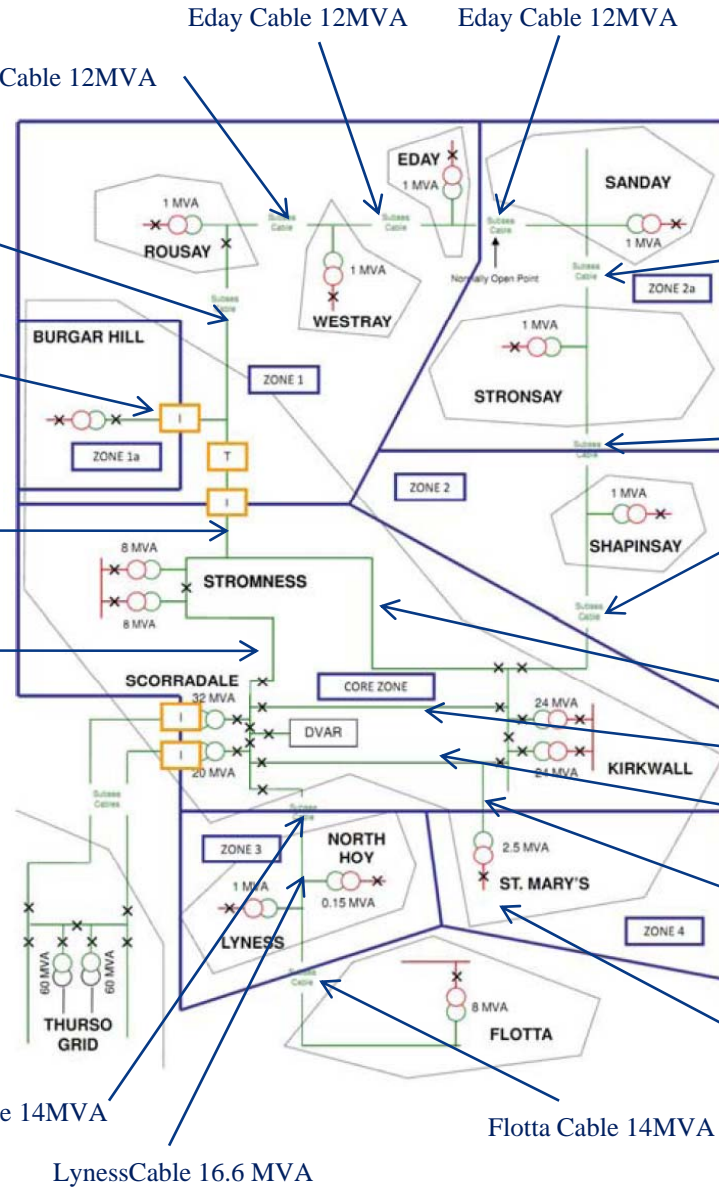
Zone 1a – 16.619MW

Zone 2 – 0.959MW

Zone 3 – 13.145MW

Core Zone – 13.946MW

Zone 4 – 5.507MW



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Generation in red

Orkney Grid Presentation

Performance in terms of kWh – Large Scale ROC Generators



Renewables Obligation Generators

Your search returned 9 sites with a capacity of 27 MW. In the year to the end of Sep-2012 these sites generated 66,286 MWh and received 66,286 ROCs.

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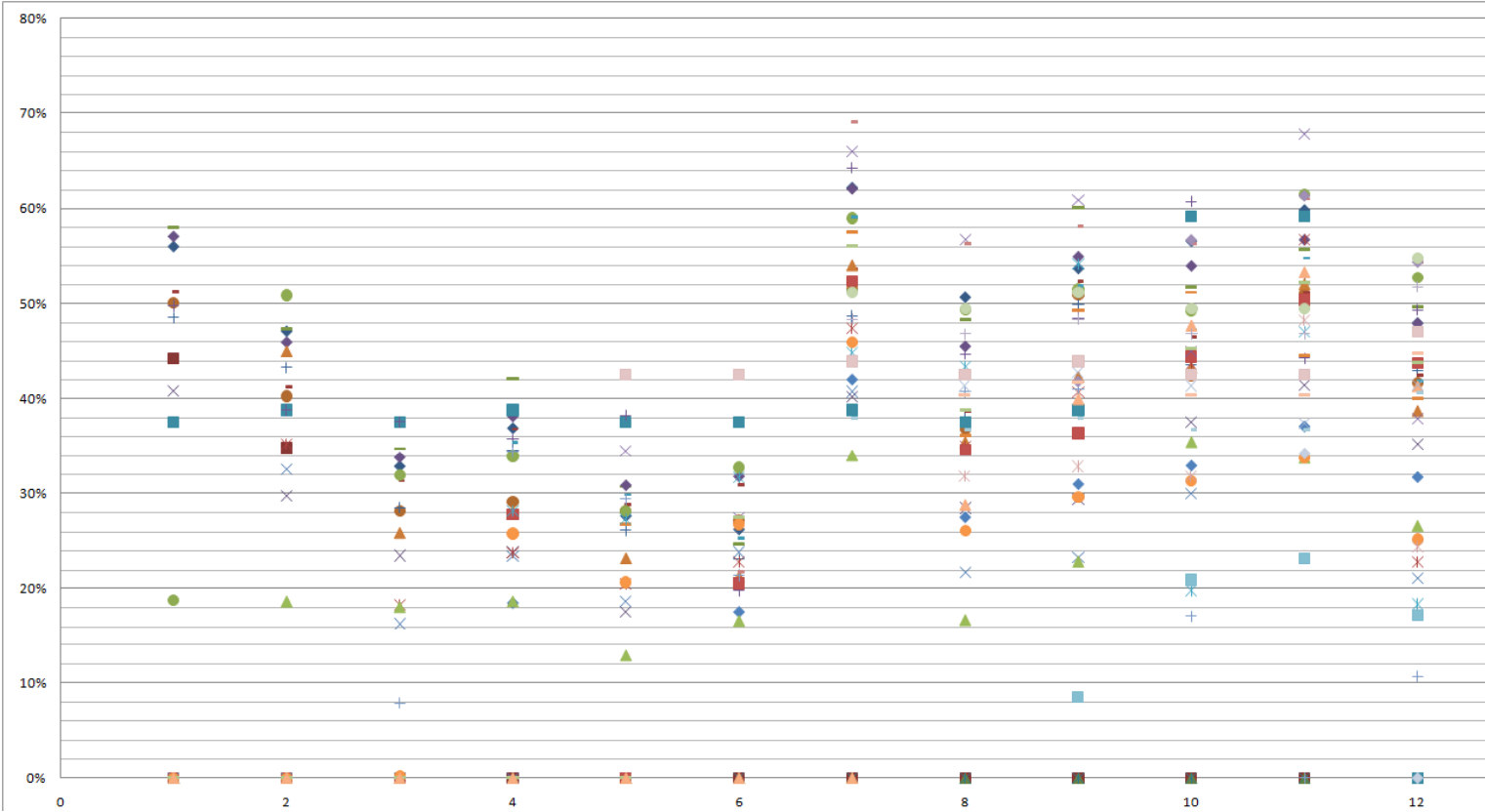
<u>RID</u>	<u>Generator Name</u>	<u>Country</u>	<u>Installed Capacity (kW)</u>	<u>Technology Group</u>	<u>Technology Sub-group</u>	<u>CHP</u>	<u>Accreditation Date</u>	<u>Rolling LF</u>	<u>Annual LF</u>	<u>Latest ROC Date</u>	<u>Latest MWh p.a.</u>	<u>Latest ROCs p.a.</u>
R00056SQSC	Spurness Windfarm - A,C	Scotland	8,250	Wind	On-shore wind		2004-12-01	24.3%	28.0%	Feb-2012	9,560	9,560
R00077SQSC	Burgar Hill Wind Farm - A	Scotland	5,000	Wind	On-shore wind		2006-12-01	36.6%	36.6%	Aug-2012	14,250	14,250
R00118SQSC	Hammars Hill	Scotland	4,500	Wind	On-shore wind		2010-08-23	48.1%	49.3%	Aug-2012	18,135	18,135
R00048SQSC	Bu Farm	Scotland	2,325	Wind	On-shore wind		2003-03-01	35.1%	29.5%	Jul-2011		
R00104SQSC	Burgar Hill Renewables 1	Scotland	2,300	Wind	On-shore wind		2009-10-01	45.5%	54.1%	Sep-2012	10,919	10,919
R00132SQSC	Flotta Wind Farm	Scotland	2,000	Wind	On-shore wind		2010-06-18	39.2%	43.7%	Sep-2012	7,668	7,668
R00072SQSC	Burgar Hill	Scotland	1,300	Wind	On-shore wind		2006-04-01	35.5%	39.9%	Sep-2012	4,553	4,553
R00057SQSC	Northfield Wind Energy Project Burray- A,C	Scotland	850	Wind	On-shore wind		2005-02-01	36.6%	16.1%	Sep-2012	1,201	1,201
R00106SQSC	Birsay Energy	Scotland	900	Wind	On-shore wind		2009-09-01			Mar-2010		

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Orkney Grid Presentation

Numbers – SmallScale FiT Generators <50kW



Capacity Factors for small generators taken from Orkney Database of 47 of the 444 small scale generators.
Email me if you would like to join the database and share information with others.

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Orkney Grid Presentation

What about the future?

- We need to think kWh and not kW – Income based on kWh, grid costs on kW
- We need to think about kVAr and not just kWh – Flexible commercial connection terms
- We need to think Volts not just kVAr – Stability of network and security of supply
- We need to think about thermal limits – Cable Failures and Equipment failures
- We need to think about safety of those working on the network – Switching to keep power on
- We need to distribute the benefits from RE wider in society – Fuel Poverty scandalous
- We need to identify the short term fixes and implement solutions – Not just Transmission
- Look for demand solutions where sensible as they cause harm – Electric heating for microgen

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