All Energy 2010
Connecting Europe session

Working to connect Scotland

Mike McElhinney and Patrick McWilliams

The Scottish Government

Context

Significant energy opportunity across Europe

- Unique potential – particularly in and around Scotland and the UK
- Strategic and political will – in Scotland, UK and EU
- Renewables: driver of economic growth and recovery
- EU Renewables Directive and Member State Action Plans
- Third package of energy reforms
  - interconnections across the EU to help ensure security of supply;
  - transparency and fairness in energy markets;
  - maintain future energy flows across the EU; and
  - meet renewable energy targets

- **Scotland:**
  - Enormous energy potential;
  - Clear industry, political and regulatory will;
  - Already doing it - realising that potential and planning more;
  - Skills harnessed – R&D capacity coordinated – Energy Technology Partnership;
  - Strong energy sector capability and collaboration – eg Scottish Energy Advisory Board;
  - Strong support from our enterprise agencies

- **Partnership working with UK, EU and North Sea partners**

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Available Energy in Scotland

Scotland has around 25% of Europe's wind energy resource, with some of the best potential wind, wave and tidal sites

11% of Scotland's current demand for electricity is generated through hydro-power installations (85% of UK resource)

Scotland estimated to have 10% of Europe's wave resource and 25% of its tidal resource

Source	Available Energy (Estimated)
Onshore Wind	11.5 GW
Offshore Wind	25 GW
Tidal	10 GW
Wave	14 GW

Source "Scotland's Renewable Resource" 2001

Scottish demand is about 6GW

2001 figures….

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Available Energy in Scotland

The Offshore Valuation Group

The Offshore Valuation

A valuation of the UK's offshore renewable energy resource

Published 17th May 2010
Joint project between governments and industry.

of total practical resource of 531 GW in the UK, Scotland has 206 GW of wind, wave and tidal resources (almost 40% of UK total)

Scotland's current renewable energy capacity - installed and under construction – is 3.959 GW.

by 2050, installed offshore capacity could reach 169 GW for the UK as a whole

68 GW in Scotland (40% UK total)

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Available Energy in Scotland

The Offshore Valuation Group

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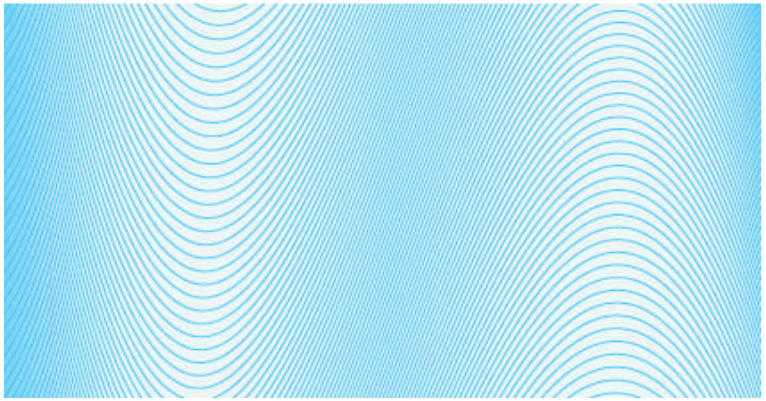
A valuation of the UK's offshore renewable energy resource



- net value of Scotland's 68 GW offshore resource, in terms of UK and EU electricity sales, estimated at £14Bn over the period 2010-50
- potential employment creation - 145,000 direct jobs UK wide by 2050
- strengthens commercial. economic, policy and security of supply arguments for
    - developing our offshore renewable potential
    - for greater interconnection to the rest of the UK and Europe and
    - for the development of an offshore grid for the export of renewable electricity from Scotland direct to continental Europe.

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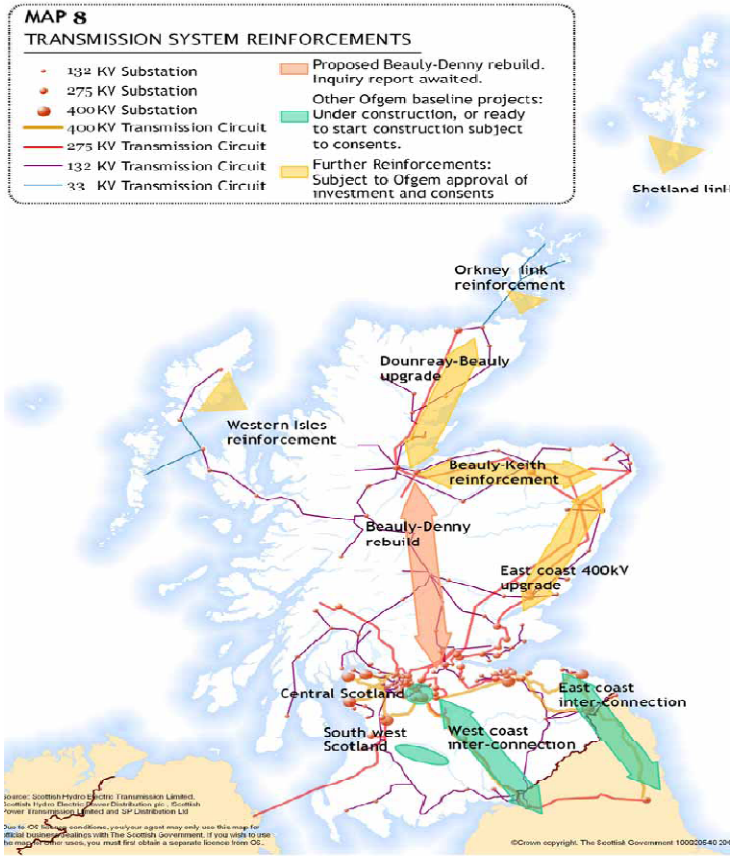
Onshore connections



- 7GW renewables capacity installed, consented and under construction;

- More than Scottish 2011 target of 31% of electricity from renewables;

- Work with UK to help meet UK 2020 target of 15% renewable energy by 2020;

- Getting planning approaches right;

- Reinforcing the UK interconnectors;

- Reinforcing our grid network – e.g. Beauly to Denny;

- Working with National Grid and Ofgem – including to advance connection ahead of system reinforcement;

- And working to address regulatory challenges – in access and in charging.

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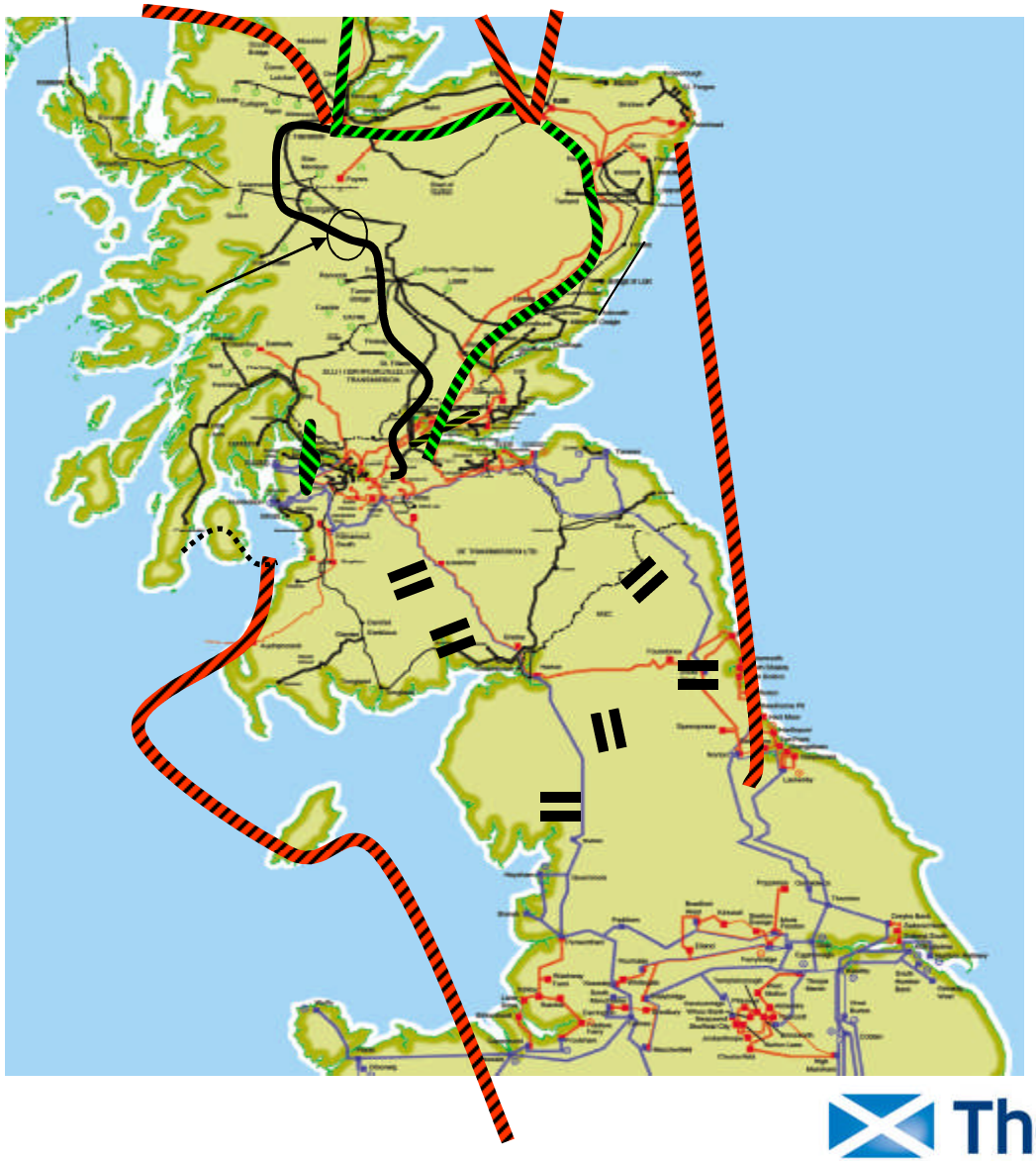
Some of the work in hand

- First Minister's Energy Advisory Board – engaging key players from across the sector to address key sector needs; includes;
  - A National Ports and Infrastructure plan for Scotland;
  - Skills mapping for the energy sector;
  - Financing options for renewable infrastructure projects
- Scottish Low Carbon Investment Project - working jointly with Scottish Enterprise, Arup and local authorities to attract investment in low carbon energy projects.
- Working with the Crown Estate delivering world's first commercial leasing round for wave and tidal energy – up to 1.2 GW of marine energy in the Pentland Firth and Orkney Waters – in addition to Scotland's offshore wind potential.

Accommodating Increased Volume of Renewables from Scotland



UK and Scottish Government, Ofgem and transmission licensees identify transmission reinforcements to deliver UK renewable energy targets.
"Vision 2020" published on 4th March 2009

HVDC circuit

HVDC cable from Hunterston – Deeside (circ 1.8GW)
HVDC cable from Peterhead to Humberside (circ 1.8GW)

Series compensation

Re-conductor or re-insulate existing OHL route

Accommodates ~11.4GW of renewables in the north of Scotland

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Offshore connections and grid

- Work with DECC, Ofgem and National Grid on;
  - Sub-sea links to the Scottish islands;
  - Sub sea link from Hunterston to Liverpool Bay;
  - Sub sea link from Peterhead to Humber Bay.
- North Seas' Countries Grid Initiative – Memorandum of Understanding on North Seas Grid.
- Irish-Scottish Links on Energy Study – with Ireland and Northern Ireland.
- British Irish Council Grid workstream – agreeing joint working and inter-nation collaboration on;
  - R&D and study cooperation in electricity grid infrastructure;
  - sharing best practice in regulation, planning and consenting of grid infrastructure;
  - working together on EU policy on grid infrastructure.

Developing North Sea Grid

- A collaborative and strategic approach to a co-ordinated and connected grid network.
- Needing significant and sustained effort across Member States to standardise electricity transmission systems and energy regulation approaches.
- EU Coordinators appointed – Mr Adamowitsch.
- Scotland is part of the EU Coordinators Group on North Sea grid connections.
- Surfacing some big issues - around interconnection, standardisation of regulatory and legal frameworks, financing development and political will.
- North Seas Member States agreed to develop integrated offshore grid in the North and Irish Seas - Dec 2009
- Scotland now working with UK Government in that – North Seas Countries Grid Initiative.

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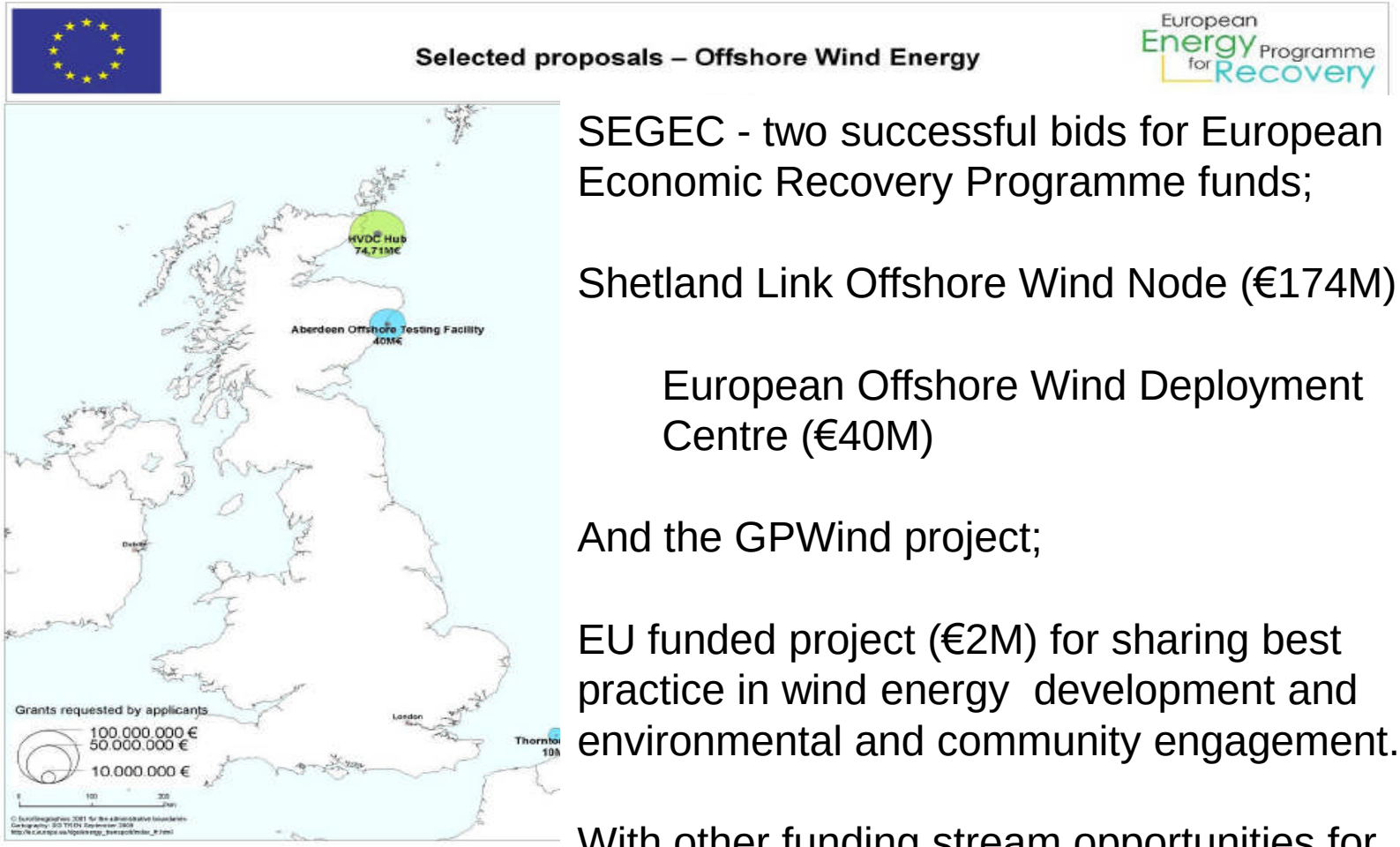
EERP Projects – Offshore wind



SEGEC - two successful bids for European Economic Recovery Programme funds;

Shetland Link Offshore Wind Node (€174M)

European Offshore Wind Deployment Centre (€40M)

And the GPWind project;

EU funded project (€2M) for sharing best practice in wind energy development and environmental and community engagement.

With other funding stream opportunities for good innovative projects from Scotland.

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ISLES (Irish-Scottish Links on Energy Study)

Strategic collaboration, unique in EU, between Scotland, N. Ireland and Ireland governments to accelerate development of renewables across jurisdictions

Project funded by EU INTERREG IVA Programme; £1.6M total budget; 75% grant from EU, managed by SEUPB; balance from the partner governments

Northern Ireland Executive

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Riaghaltas na h-Alba

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INTERREG IVA Eligible Area

Structural Funds 2007 - 2013: Cross-border Cooperation
Northern Ireland, the Border Region of Ireland and Western Scotland

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ISLES (Irish-Scottish Links on Energy Study)

Aim: present a business case for developing an offshore interconnected transmission network - via a subsea electricity grid - off the west coast of Scotland and the Irish Sea, linking potential renewable energy sites (wind, wave and tidal power)?

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ISLES (Irish-Scottish Links on Energy Study)

TIMETABLE

- early 2009: Partnership Agreement between three governments; Steering Group created
- mid-to-late 2009: invitation to tender
- Dec. 2009: RPS Group appointed as project consultants for ISLES feasibility study
- late Jan. 2010: work on feasibility study starts
- Feb. 2010: project manager appointed and stakeholder communications/engagement strategy developed
- early 2011: fieldwork complete
- mid-2011: RPS report to Steering Group

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ISLES Project: Feasibility Study Work-streams

Activity (numbered according to completion date)	What does this involve?	Which partner leads (for the Steering Group)? Who is lead sub-consultant?
1. Project Management and communications strategy	Day to day management of the project; communications strategy and publicity; administration of Steering Group meetings; employment of project manager and consultants; progress chasing etc	Scottish Government – RPS Ltd
2. Regulatory and finance	Examination of funding options, range of network charges and appraisal of the economic viability of the proposed development; appraisal of cross-border regulatory models	Northern Ireland Executive – PPA Energy Ltd
3. Technology and infrastructure	Identify best practice for grid connection and interconnectors; identify sites to be connected; examine transmission capacity in line with current technologies; identify cable design and possible onshore constraints; opportunities for grid construction alongside other services (telecommunications), grid storage issues and outline the most appropriate technology solutions	Irish Government – TNEI Ltd
4 Environmental and planning	Identification of environmental designations within or adjacent to study area to identify constraints to development; outline planning procedures and compatibility with the project; examine project in relation to EU, national and regional policies	Northern Ireland Executive - RPS Ltd
5. Construction and deployment	Examine both onshore and offshore issues; onshore – technology options in relation to cost and capacity, environmental 'footprint' size of options, number and location of connections needed, environmental impact of connection method, manufacturing capacity and inward investment issues. Offshore – current constraints to offshore construction; developments needed in construction techniques; need for robust system to meet future demands and installation capacity; maintenance requirements	Irish Government - TNEI Ltd (onshore); IHC Engineering Business Ltd (offshore)
6. Cost-benefit analysis	Examination of the benefits which an offshore grid is expected to deliver; establish how much such a development would cost	Scottish Government – PPA Energy Ltd

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OPPORTUNITIES

- collective action towards meeting very ambitious renewable energy targets and climate change commitments; ensuring security of supply and addressing technological challenges
- potential for economic/infrastructure development in somewhat peripheral coastal areas
- model for cooperation amongst EU member-states – v. impt for future EU funding
- Strategic fit – connecting and standardisation of EU energy markets
- British-Irish Council goodwill - mechanism for channelling ISLES upwards to govt/EU level, esp. re N Seas context

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Issues to address

- regulatory, territorial and political hurdles
- cost! Multi-billion £
- best combination of £: private, governmental and EU investment?
- technical challenges, e.g. grid reinforcement, and supply-chain capabilities
- Coordination through to implementation?

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ISLES (Irish-Scottish Links on Energy Study)

CONCLUSION

- **manage expectations – ISLES (at present) is a feasibility study – a step towards offshore grid**
- **Implementation of grid/network: probably ≥ 2020!**

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Thank you for listening..

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