Europe's Energy Exporter

SUSTAINABLE ENERGY IRELAND

NDP NATIONAL DEVELOPMENT PLAN

Sustainable Energy Authority of Ireland

Board Meeting

Wilton Park House

10th February 2010

Brendan Halligan

Chairman

Neart na Mara

SECTION ONE

The Proposition

The Proposition

- EU member states need green electricity
- Don’t have the resources to meet demand
- Will have to import green electricity
- We can export it to them

Ambition

- Become one of Europe's largest suppliers
- Of Green Energy
- By exploiting the potential of the sea
- And using the latest technology to sell power into
- A Single European Electricity Market

The Strategy

- Keep onshore wind and solar for domestic use
- Split wave and tidal between home and export
- Use offshore wind for export only
- Think of wind as the “New Grass”

Logic of the Small Open Economy

- Build the economy on competitive exports
- We already export 80% of GDP
- It's the logic of the Small Open Economy
- Apply that logic to Green Energy
- And so exploit Wind and marine energies- for export!

Current Natural Resource Exploitation

- GRASS is our only exploitable natural resource
- Dairy exports – €3.5 bn
- Beef exports – €4.5 bn
- Total exports – €8.0 bn
- Total employment – 120,000

Future Natural Resource Exploitation

SUSTAINABLE ENERGY IRELAND

WIND

Bigger Potential

- Wind has a bigger economic potential than grass
- In exports
- Jobs
- Value added
- Revenue generation

Summary

- There will be a major Green Energy Gap in EU
- Ireland can become major EU supplier
- Devote onshore wind, wave and tidal to domestic market
- Use offshore wind for export only
- Exploit the supply chain to the maximum

SECTION TWO

context

Low Carbon Society

- World in transition to the Low Carbon Society
- Driven by Climate Change and energy security
- 80% reduction in GHG emissions by 2050
- Decarbonised power gen central to this ambition
- Peak oil production imminent

EU Policy

- EU is global leader in Climate Change policy
- Renewable Energy mandatory targets for 2020
- Includes mandatory targets for RE electricity
- Many MS will fail to meet them
- Even more ambitious targets for 2020-2050

Supergrid

- EU planning a Supergrid to join national electricity markets
- And to exploit offshore wind in Northern Seas
- Plus solar power in Mediterranean basin
- Ireland working on Celtic Grid for Irish Sea
- Foundations for Single Electricity Market
- Make export of green electricity possible

Offshore Wind

- Societal and technical limits to Onshore Wind
- Bigger RE potential in Offshore
- Technology can now handle “near shore”
- “Deep” offshore in next 10/15 years
- Floating turbines will revolutionise generation
- Can synergise with wave and tidal power
- Create suite of Ocean Energies

EU Developments

- Denmark already has 40% green electricity
- World leader in offshore wind
- UK plans 33 GW in Offshore Wind by 2020
- Including 2 GW in Irish Sea
- Germany plans 6 GW in North Sea
- Offshore wind is currently deployable at scale

SECTION THREE

SUSTAINABLE ENERGY IRELAND

Our Wind Resources

Wind

- Ireland has huge wind resources
- It's an indigenous source of energy
- It's a FREE fuel
- And it is clean and inexhaustible

Meets Our Strategic Aims

- Security of supply
- Reduction of carbon emissions
- Enhancing competitiveness
- Import substitution
- Job creation and economic growth

Our Wind Resources

- Over 1000 TWh pa for ‘near shore’
- This is **30 times** Irish electricity consumption
- Estimates based on Govt and EU reports
- Increase when “deep offshore” included
- Floating turbines add to the estimates

Location

- “Near shore” mainly located in Irish Sea
- Good wind speeds and availability
- Arklow Banks experience most encouraging
- Biggest resource in Atlantic
- Some “near shore”
- But most outside current technology range

Deep Offshore

- Atlantic wind speeds and availability are high
- New technology needed to exploit
- Such as floating turbines
- Likely to come on stream circa 2030
- Will multiply our resources by a multiple

Hywind concept

SECTION FOUR

The economic case

Low Cost Producer

- Ireland has comparative advantage in wind
- High wind speeds and good availability
- Give us the highest capacity factor in EU, and
-
- Make Ireland the **lowest cost producer in EU**

Distance to Market

- Distance to market not a technical problem
- Due to High Voltage Direct Current technology
- HVDC can transmit with minimal power losses
- Over long distances
- That means Ireland can export competitively
- Into the heart of the “Near” Market

Economic Benefits

- End to hydrocarbon imports
- Creation of major export industry
- Revenue benefits – IT, SI, CT, VAT, Rates
- Reduced exchequer payments on SW, health etc
- Increased competitiveness
- Protection against supply shortages and price spikes
- Constant stimulus to job creation
- Regional development – especially coastal areas
- Stimulus for innovation/entrepreneurship
- Continuous need for R&D

New Infrastructure

- New ports needed
- One on east coast and two on west
- Will specialise in servicing and O/M
- But also in manufacturing
- IT services, training and R&D

Bremerhaven

Summary

- EU on once-off transition to **low carbon society**
- **Green Power Generation** is inevitable
- We have **Comparative Advantage** in ocean energies
- **The medium term solution** to decarbonised power gen
- **Huge employment potential** of wind, wave and tidal
- **Huge Export Market** on our doorstep
- This is a **unique economic opportunity**

SECTION FIVE

The market

The Prize

- Size of the EU electricity market is enormous
- We can repeat our export success with grass
- If we settle on a big national ambition

Irish Export Market

- Our nearest neighbours account for two thirds of EU electricity consumption
- That's the natural market for us
- All within reasonable distance
- This "near market" to be our focus

The “Near” Market

- Consists of the UK plus:
    - Germany
    - France
    - Benelux
    - Northern Italy
- All within radius of 1,500 km of Ireland

“Near” EU Electricity Market

• Germany	640 TWh
• France	570 TWh
• UK	390 TWh
• Italy	310 TWh
• Netherlands	100 TWh
• Belgium	90 TWh
• Total “near” market	2,100 TWh
• Total EU	3,360 TWh

Strategy

- Begin by selling into the UK
- Develop 2 GW of Offshore Wind by 2020
- First create an Anglo/Irish electricity market
- Then form a German/Irish market by 2025
- And finally a Single European Electricity Market

2 GW Investment

- Investment of €6 bn required
- €1 bn equity and €5 bn debt
- Plus €1 bn grid investment
- Grid to be owned and developed by the state

2 GW Exports: Basic Stats

- Electricity generated pa 6 TWh
- Annual Revenue €1.0 bn
- Project Revenue (20 yrs) €20 bn
- Permanent Jobs (O&M) 3,000
- Construction jobs 10,000
- Supply Chain(max) 20,000

The 2050 Vision for Ireland

- 50 GW offshore installed capacity
- 2-3% share of “near” market
- 1.5-2% share of total EU market

2050 Irish Export Market

• Electricity exported	155 TWh
• “Near” Market Share	2–3%
• Annual export earnings	€10–20 bn
• Permanent Jobs (O&M)	75,000

Fiscal Benefits

- Each MW installed produces €5k pa in taxes
- More than €100,000 over 20 years of operation
- Each GW produces € 5m in taxes pa
- Every GW produces €100m in taxes over 20 years
- 10 GW will generate €1bn in taxes over 20 years

Staging Post

- 2020 targets are only a staging post
- On long journey to a low carbon society
- Are a learning exercise
- The 2050 potential is transformational

SECTION SIX

How to get there

Basic Requirements

- **Means** of exporting electricity
- **Access** to other Member States' markets
- **Level playing pitch** with brown power
- The right **Policy Infrastructure**
- The **engineering capacity** to build, generate and service offshore wind power

Strategic Positioning

- Need to re-invent our concept of ourselves
- We have the essential Natural Resources
- For the next industrial revolution
- Plus direct access to world's electricity largest market
- The opportunity is real
- The potential is realisable

At the Heart of Europe

- We are not “an island off an island”
- We are at the heart of Europe
- Need three **Power Super Highways** to get us there
- **North**: Scotland–Norway–Denmark–**Germany**
- **East**: Wales–**England**–Netherlands–**Germany**
- **South**: Cornwall–Brittany–France–**Germany**

The Superhighways

- Supergrid provides Ireland with market access
- To the “near “ market
- Transforms the commerciality of linking power generation in remote areas with
- Far distant centres of demand
- The Supergrid is also a Power Superhighway
- To a real export prize like the German market

The German Market

- Berlin is only 1,300 km from Dublin
- Shorter than HVDC interconnection in China
  - Xianjiaba – Shanghai: 2,400km

- Ireland can export into German grid using HVDC
- The biggest electricity market in Europe
- At low cost because of low transmission losses

Single European Electricity Market

- Energy/Electricity last piece of Internal Market to be completed
- Single European Electricity Market will be created
- Probably by 2025
- Based on massive interconnection/SuperSmart Grid
- Plus uniform regulatory regime
- And harmonised support regimes

Actions

- Identify Renewables Development Zones
- Prioritise grid reinforcement
- Ensure socialisation of grid connection costs
- Choose onshore support/supply centres
- Plan labour force training
- Select value-added activities to be developed
- Settle final details on REFIT
- Start the build programme

Creating Critical Mass

- Offshore wind is a new industry
- Need to learn to manage development risks
- And to build the onshore and offshore infrastructures
- First phase –lay the foundations
- Second phase – create the critical mass
- Third phase – start exporting

Timing

- Phase One will take ten years up to 2020
- Installing the first 2 GW
- Phase Two will take fifteen years up to 2035
- Focussed on building 1 GW pa – 15 GW in total
- Phase Three starts around 2035 at 2 GW pa
- Target of about 50 GW in total by 2050

Phased Development

- 2010 – 2020 2 GW
- 2020 – 2035 15 GW
- 2035 – 2050 33 GW
- **2010 – 2050 (total) 50 GW**

Phase One: 2010–2020

- 2 GW to be installed
- Largely in the Irish Sea
- The electricity to be sold into the UK
- On basis of trade agreement with UK
- Single Electricity Market for UK/Ireland
- Export price average double ROCs

Phase One Essentials

- New form of Public Private Partnership
- REFIT giving developers a return to match risk
- Policy certainty for debt providers
- PPAs giving comfort to long term investors
- Fast track planning/consent procedures
- Grid reinforcement to permit timely connection
- Socialisation of grid costs
- Building strategic partnerships with suppliers
- Green Banks

Phase Two: 2020–2035

- 15 GW to be installed
- 10 GW in Irish Sea and 5 MW in Atlantic
- Atlantic development from 2030 onwards
- Sales up to 5 GW into Germany from 2025
- Export price average €100/MWh
- Single European Electricity Market in 2025

Phase Two Essentials

- National Grid: Deepened & Smart
- Supergrid: Interconnection with EU
- Planning: Streamlined
- Regulation: Certainty
- Pricing: Access to ROCs and REFITs
- Finance: Green Bank
  Green Bonds
  Green Investment Funds

Phase Three: 2035-2050

- 33 GW to be installed
- 8 GW in Irish Sea and 25 GW in Atlantic
- Single European Electricity Market in force
- All sales will be into the SEEM
- Export price average at €50/MWh

Here's a thought…

- …the **renewable energy** sector generates more jobs per unit of energy delivered than…
- …the **fossil fuel energy** sector!

Message

- We can become
- Europe's largest Energy Exporter
- and have a bigger industry than grass
- **It is the way to the economic future**