Implementing Ireland’s OE Strategy – Protocols and Testing
Summary Evolution of Ocean Energy Programme

- **2003**
  - Public Consultation Document

- **2004**
  - Agencies collaboration on development of an OE strategy
  - Increased funding to HMRC

- **2005**
  - Build economic case for OE
  - Wave Atlas commissioned
  - Galway Bay test site initiated

- **2006**
  - First device deployed in test site in March
  - OE development strategy endorsed by Government

- **2007**
  - Increased OE targets
  - Start planning for offshore test site
  - 2 devices on test site
  - Further build capacity at HMRC
  - OEDU announced
2006 - OCEAN ENERGY STRATEGY

15 Year Plan of R&D, infrastructure and industry support measures:

**Objectives:**

- Support the introduction of Ocean Energy to the Renewables ‘portfolio’ in Ireland.
- Develop an Irish OE industry sector.

**Targets:**

- 200MW installed by 2020
- 1900 jobs created by 2020.

**Three Phases**

- Development -2005-2007
- Pre-commercial (1)-2007-2010
- Pre-commercial (2)-2010-2015
- Commercial –2010-2015
2007- Revised Strategy & Targets

• Overall - 33% electricity from renewables by 2020
• 500MW ocean energy by 2020
• Actively support industry development
Mechanism for Delivery - OEDU

Dedicated Ocean Energy Development Unit to co-ordinate actions of all public agencies

Objectives

• Promote and develop Ocean Energy
• Support the emerging industry
• Develop research and test facilities
• Co-ordinate the activities of public agencies
OE Development Roadmap

Support Pilot projects, new concepts

Full scale demonstrators

Small-scale arrays 10MW/20 devices

Arrays of 100s MW

2009 2010 2011 2012 2015 2020

Government Targets

75MW installed

500MW installed
Plan OE Programme Actions

- Issue temporary investigation/test licenses
- Undertake SEA and establish new planning system
- Intensify resource and site assessment
- Establish grid-connected test facilities
- Fund industry research, development and demonstration
- Enhance HMRC and develop NOTF
- Assist development of engineering and other capabilities

2009 → 2010 → 2011 → 2012 → 2015 → 2020
Protocol links to Testing

**Phase One**
- **VALIDATION MODEL**
  - Fundamental testing in regular waves
  - Scale ($\lambda$): 1: 25 - 100

**Phase Two**
- **VALIDATION & DESIGN MODEL**
  - Testing in realistic sea conditions
  - Scale ($\lambda$): 1: 10 - 25

**Phase Three**
- **PROCESS MODEL**
  - Testing in conditions representative of deployment site
  - Scale ($\lambda$): 1: 10 – 15 or 1:1 - 4

**Phase Four**
- **PROTOTYPE MODEL**
  - Large scale pilot plant at sea
  - Scale ($\lambda$): 1: 1.25

**Phase Five**
- **DEMONSTRATION**
  - Pre-production prototype
  - Scale ($\lambda$): 1: 1 (Full Scale)
Marine Institute-Galway
RVs Celtic Voyager & Celtic Explorer
MI Wave Domain Model
MI- Weekly wave forecast

www.marine.ie/home/services/operational/oceanography/WaveForecast
Seabed Mapping – MI and Geological Survey
OE Strategy - PHASE 1: ¼ Scale Test Site

¼ Scale Test Site Spiddle

- Site area 37 Hectares
- Located 1.5 miles ESE of Spiddal new pier on north side of Galway Bay
- Water depth 20-24 metres
- Directional wavebuoy recently installed
HMRC
Spiddle Wave Buoy Data

Mean daily significant wave height,
Winter ‘06-'07
Locations considered for grid-connected Test Site

- Frenchport, Co Mayo
- Slyne Head, Co. Galway
- Goleen Bay, Co. Clare
- Ballydavid, Co. Kerry
Nature of sea-bed – a critical issue
Distance from Proposed Test Site to:
Frenchport – 4.6Nm, 8.5km
Annagh Beach Slipway Site – 5.1Nm, 9.5km
Blacksod Pier – 13Nm, 24km
Ballyglass Pier – 15.5Nm, 28.6km
Assessment of Piers, Harbours and Landing Places, Co Mayo.
Kirk, McClure Morton 2004
Wave Climate in the area

Mean wave periods at Offshore point in Mayo from SWAN model

Significant wave heights at Offshore point in Mayo from SWAN model
EM3002 multibeam bathymetry image produced in Caris processing software with proposed cable route and KP’s
Annagh Beach, Looking West

- Proposed cable Landfall

- 5.1 Nm from proposed test site

Improvement Option:

Install Slipway (€ 500k) at sheltered Western End (See Arrow) and private access road (100k)
Blacksod Pier, looking South
Wharf at Killybegs
Other infrastructure Killybegs:

- Shipyard
- Marine electronics, supply & service
- Marine engineering
- Experienced work force
Transmission Grid

- High capacity, efficient, reliable link between
  - Generation
  - Demand centres
  - Interconnections to other systems

- Grid needs to be developed when any of these change
Primary Corridors for Reinforcement
SmartBay- Platform for development of products for the OE industry
Example of ICT Competences - Partnership with IBM - Linking SmartBay and OE Development

Phased approach to providing a new class of global services to support the development of ocean energy via SmartBay infrastructure/platform

**Develop Wave Energy Portal**
- Provide detailed wave energy measurements as a function of relevant parameters to product developers

**Ocean Energy Support Services**
- Establish new ocean energy test sites for vendors at request
- Evaluate new ocean energy products
- Advanced modeling Site selection consulting
- Benchmarking/evaluations for products; vendors, governments, power companies making purchase AND location decisions

- Provide specialized calculations and/or reports, including efficiency calculations for wave energy products and provide access via secure website
- Provide advanced modeling Site selection consulting
- Benchmarking/evaluations for products; vendors, governments, power companies making purchase AND location decisions
Looking ahead- Example of a Development Site