Smart Grid Roadmap... the Development Experience

Joe Durkan SEAI
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The basic concept:

- maximizing throughput of the electricity delivery system while reducing the energy consumption
  - monitoring, analysis, control, communication

“Borrow” a working definition
Smart Grid

Or, more simply...

Balancing variable supply with demand without breaking the system
Smart Grid Roadmap

IEA – Guide to Roadmap Development

- Goals – set clear and concise set of targets
- Milestones – specific dates for interim performance targets
- Identify Gaps and Barriers
- Action items – to overcome gaps and barriers
- Priorities and timelines.
Assess for fitness
Big picture too broad...

Figure 13. Regional CO₂ emissions reduction from smart grid deployment

- **Direct reductions**: energy savings from peak load management, continuous commissioning of service sector loads, accelerated deployment of energy efficiency programmes, reduced line losses and direct feedback on energy usage.

- **Enabled reductions**: greater integration of renewables and facilitation of EV and PHEV deployment.

Over emphases on EV / PHEV
Ireland’s target is 40% by 2020

Figure 4. Portion of variable generation of electricity by region (BLUE Map Scenario)

KEY POINT: All regions will need smart grids to enable the effective integration of significantly higher amounts of variable resources to their electricity grids.
Roadmap:
Know where you’re starting from
by 2020:

- 40% of electricity to come from renewable sources
- 10% of transport energy to be renewable and 10% of passenger vehicles to be electric
- 20% increase in energy efficiency
- Commitment to deploy smart meters on a national basis
- Funding of over €10 billion on grid and network development
Ireland’s Unique Characteristics

- **Small, Advanced Electricity System**
  - Relatively small isolated system
  - 40% renewable challenging
  - New operational strategies and market mechanisms required

- **Single Electricity market**
  - One market
  - One transmission system operator
  - One distribution system operator
  - One great opportunity
Ireland’s Unique Characteristics

• **ICT Infrastructure**
  - IBM, Cisco, Ericsson, Google, Intel …
  - proven record

• **Research Structure**
  - Focus on industry partnership
  - Electricity Research Centre, IERC…

• **Innovative Smart Grid Companies**
  - Software development
  - Energy services
  - Network technologies
Smart Grid – Current Activities

- Smart Generation
- Smart Pricing
- Smart Grid
- Smart Operations
- Smart Users
- Smart Networks
Smart Grid – Activities

Research
- Grid 25 Strategy
- Future Smart Pricing Options

Development
- Grid Behaviour at High Wind
- Smarter Wind Farm Operations
- Voltage/Var Control Testing
- Electric Vehicles Initiatives

Demonstration
- SmartGrid Ireland
- Self Healing Networks Pilot
- SmartMeter Pricing Trial
- SmartMeter Technology Trial
- Micro Gen Programme
- Voltage Conversion of MV Networks

Deployment
- Smart Meter User Trial
- Smart Commercial Applications
- DSM Programmes
Assemble steering committee and stakeholders....
Roadmap – Steering Group

- Roinn Cumarsáide, Fuinnimh agus Acmhainní Nádúrtha
  Department of Communications, Energy and Natural Resources

- EirGrid

- SFI Science Foundation Ireland

- Enterprise Ireland

- ESB Networks

- IDA Ireland

- Smart Grid Ireland

- CER Commission for Energy Regulation

- SEAI Sustainable Energy Authority of Ireland
Industry consultation

Logos of various companies:
- BT
- Ericsson
- Gridline
- GE
- Northern Ireland Electricity
- SSE Renewables
- Vodafone
- SONi
- Oracle
- IBM
- SEAI
Outputs
The Smart Grid
The Smart Grid

**Smart Renewables:**
Maximised renewable generation; Matching demand and load to wind availability; Enabling micro generation (CHP / PV); Enabling prosumers; Virtual Power Plants...

**Smart Places:**
Smart Meter enabled
Automated Load Control / Smart Appliances / Demand Side Management / Variable Tariffs; Home Area Networks / Building Energy Management systems; EV charging; Renewable electrification of Space and Water Heating and Cooling systems; Renewable electrification of industrial heating and cooling process loads...

**Smart Transport:**
Smart Meter enabled electric vehicle (battery, plug-in hybrid) charging; Vehicle to Grid charging (V2G); Large scale electrification of transport...
The Smart Grid

Smart Grid: The smart grid provides the infrastructure, policy and market conditions that will efficiently and intelligently integrate the behaviour and actions of all users connected to it...

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SMART MARKET

SMART GRID
Closing comments:

When developing a roadmap, keep in mind:

• One size doesn’t fit all

• Roadmap should not be stand alone

• Work within existing policy
Thank You:

joe.durkan@seai.ie