

Roadmaps for Ireland's Sustainable Future

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Energy Systems Modeling Addressing Energy Security and Climate Change
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SEAI Vision and Mission

- **Ireland** a recognised global leader in sustainable energy, a **society** that is fully engaged in the sustainable energy agenda and an **economy** that is fully exploiting the global opportunities in clean, low-carbon solutions
- **SEAI mission** is to play a leading role in the transformation of Ireland to a society based on **sustainable energy** structures, technologies and practices



Key SEAI Priorities

- **Energy efficiency first:** implementing strong energy efficiency actions that radically reduce energy intensity and usage
- **Low carbon energy sources:** accelerating the development and adoption of technologies to exploit renewable energy sources
- **Innovation and integration:** supporting evidence-based responses that engage all actors, supporting innovation and enterprise for our low-carbon future



Collective 2050 challenge

- To develop scenarios to achieve an **80% reduction** in CO₂ emissions by 2050
- To highlight the **potential** to harness **indigenous, clean energy sources** to generate enterprise and employment while delivering the necessary **future sustainable energy system**
- To enable **connections** across sectors, agencies and institutions needed to implement change



Energy technology roadmaps

Residential, Bioenergy, Ocean Energy and Smart Grid

- Facilitate the energy and climate policy analysis required to fast-track the transition to low-carbon energy technologies
- Build a deeper understanding of what has to be done when and by whom; identify priority actions for governments, industry, business, finance and civil society
- Evaluate future technology impacts
- Provide a more secure context for investment



Preparing the next industrial revolution

- Balanced portfolio and risk mitigation as important for us as for larger countries –no magic bullets
- High fossil fuel dependence means we must transition more quickly
- Aim to deliver business solutions for others with poorer clean energy resources
 - Exporting clean energy
 - Hosting energy-intensive enterprise
- Provide pilot scale demonstration and deployment facilities for emerging technologies
- Ensure systems thinking –social and economic as well as technical dimensions



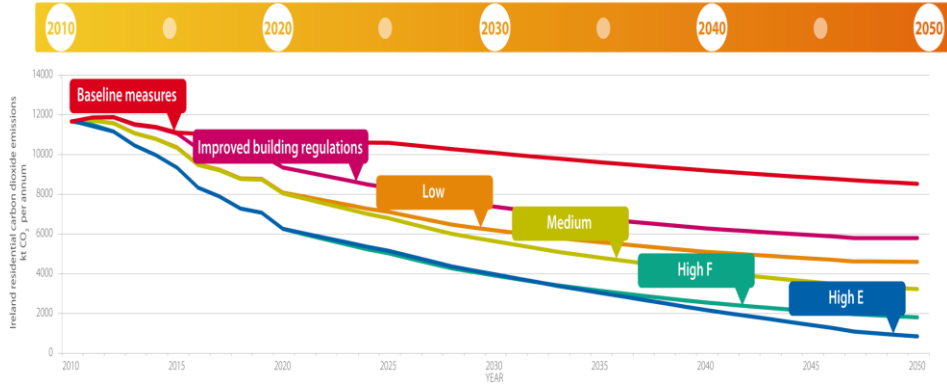
Transforming the energy performance of the Irish residential stock



The opportunity



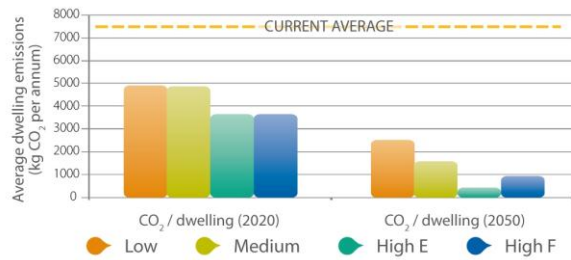
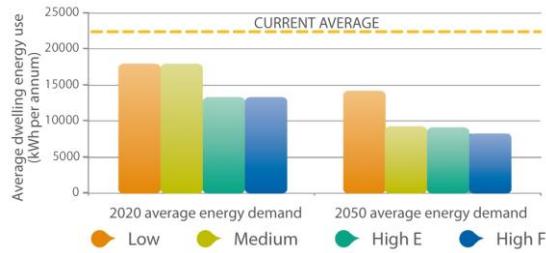
Total residential CO₂ emissions



 Total residential CO₂ emissions could be reduced by up to 90% by 2050 with an extensive programme of energy efficiency retrofit, deployment of renewable energy and low zero carbon (LZC) technologies, plus decarbonisation of the electricity grid



Existing dwelling energy use and CO₂ emissions



Actions Required

- Policies and measures
 - 1 m homes retrofitted via National Retrofit Programme
 - Improvements to building regulations toward LZC
- Technology
 - Develop construction and design techniques for LZC
 - R&D in renewable CHP technologies/biogas upgrade
- Knowledge and Skills
 - Increase capacity for deployment of efficiency upgrades
 - Develop accreditation standards for installers



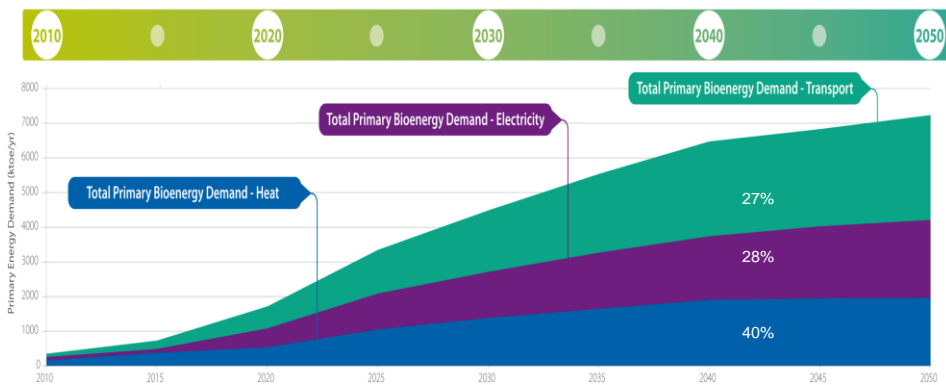
Retrofit programme aims

- Unlock significant energy efficiency potential by enabling owners and occupiers of existing buildings to lead **more energy efficient lives**; inc focus on low income homes
- Generate **employment**
- Improve energy **security**
- Address accredited supply chain, skills, business models
- Engage a wider range of market players under **one brand**
- Explore new ways of **financing** energy efficiency; promote whole life appraisal

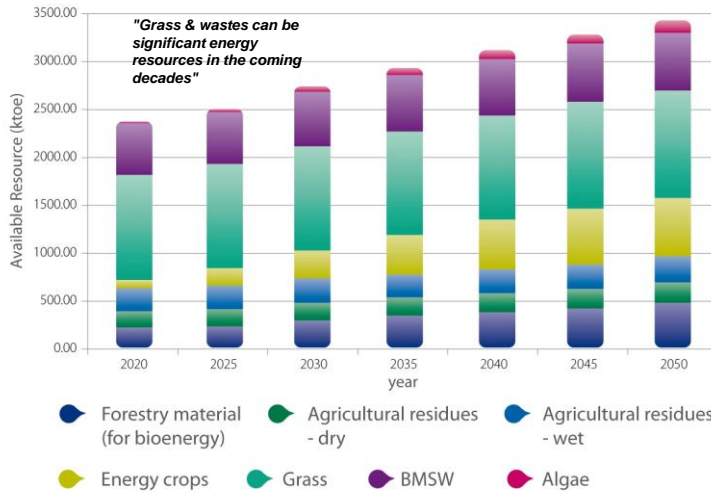


Bioenergy

Total bioenergy primary demand for 80% reduction in CO₂ emissions by 2050



Total biomass resource for bioenergy to 2050



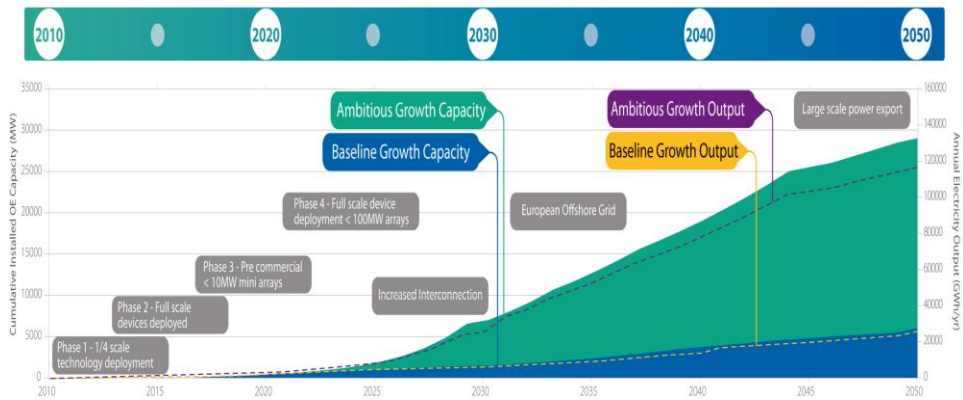
Actions Required

- Policies and measures
 - REFIT for biomass electricity generation
 - Domestic incentives for heat production from biomass
 - Afforestation increased to 20k ha per year
- Technology
 - R&D in bioenergy CHP technologies/biogas upgrade
- Infrastructure
 - Multi-organisational steering group to drive development, regulation and policy implementation
 - Single information source for bioenergy
 - Sustainable bioenergy skills strategy



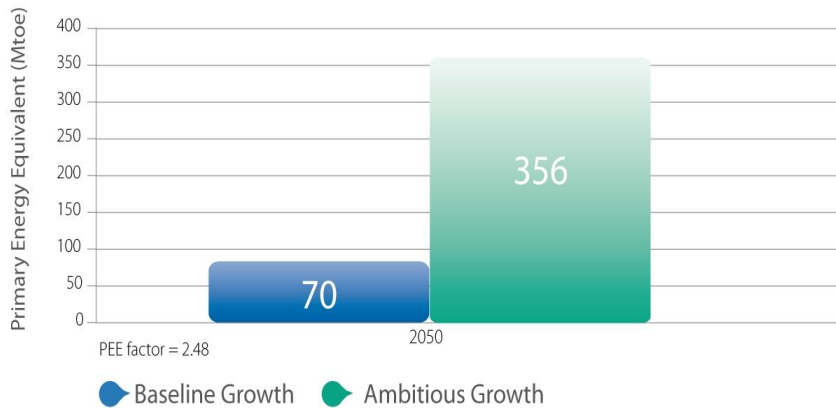
Ocean Energy

Wave and tidal capacity and electrical generation potential to 2050



Ocean energy has potential to grow at differing rates depending on policy, device technology, and infrastructure

Cumulative ocean resource potential to 2050

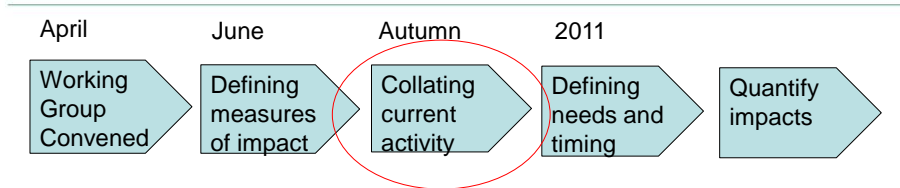


Actions Required

- Policies and measures
 - SEA / effective foreshore lease and consenting process
 - Government strategy to 2030 for 1500MW installed
- Technology
 - Advanced power systems
 - Composite materials developed to reduce cost
 - Commercial Device Demonstration
- Infrastructure
 - Irish-European grid and offshore grids
 - Full scale test site with 10MW grid connection

SmartGrid

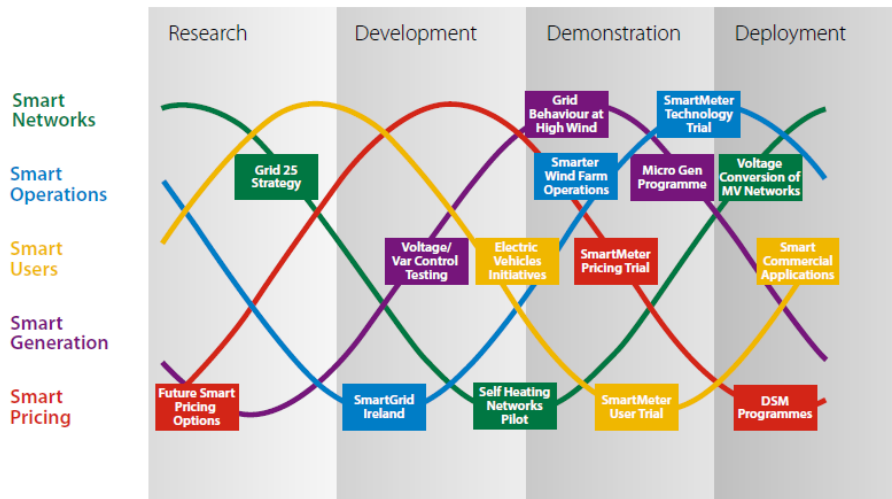
SmartGrid Roadmap process



Working Group Partners



SmartGrid activities in Ireland



Publication launched in Washington DC



IEA Smart Grid Road Map
Workshop 24 Sept. 2010



The Future

More technology roadmaps

- SEAI will assess needs and readiness
 - On-shore Wind
 - Off-shore Wind
 - Residential Renewables
- Long term integrated modelling will be critical
- Engaged stakeholder groups will be consulted

Living technology road maps

- Roadmaps don't self implement
- The landscape is dynamic, roadmaps must be too



Conclusions

- Imagine the future
- Focus on
 - Energy systems innovation
 - Enterprise development
- Articulate options
- Consult and engage
- Roadmaps don't self-implement
- Connect systems to deliver



*Comments etc welcome to
roadmaps @seai.ie*

**“The next great industry will be
Energy Technology.”**

–Thomas Friedman, New York Times



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