

Implementing the EU Energy Efficiency Directive: Case Study - Ireland

Kevin O'Rourke

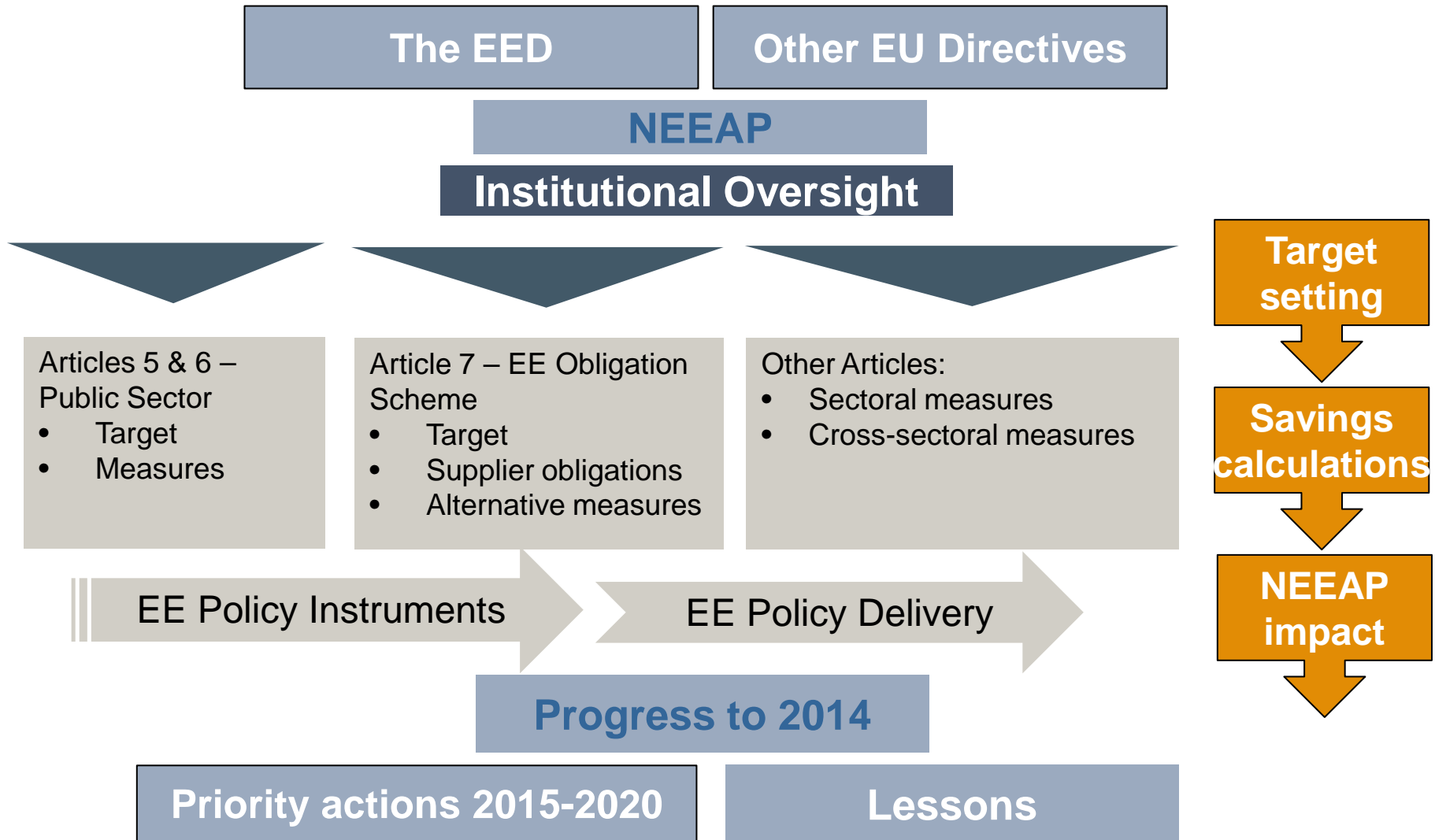
*World Bank – Energy Community Workshop
'Energy Efficiency Directive Implementation and Financing'
Vienna, 2 June 2016*

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Overview



Some conversion factors and terminology

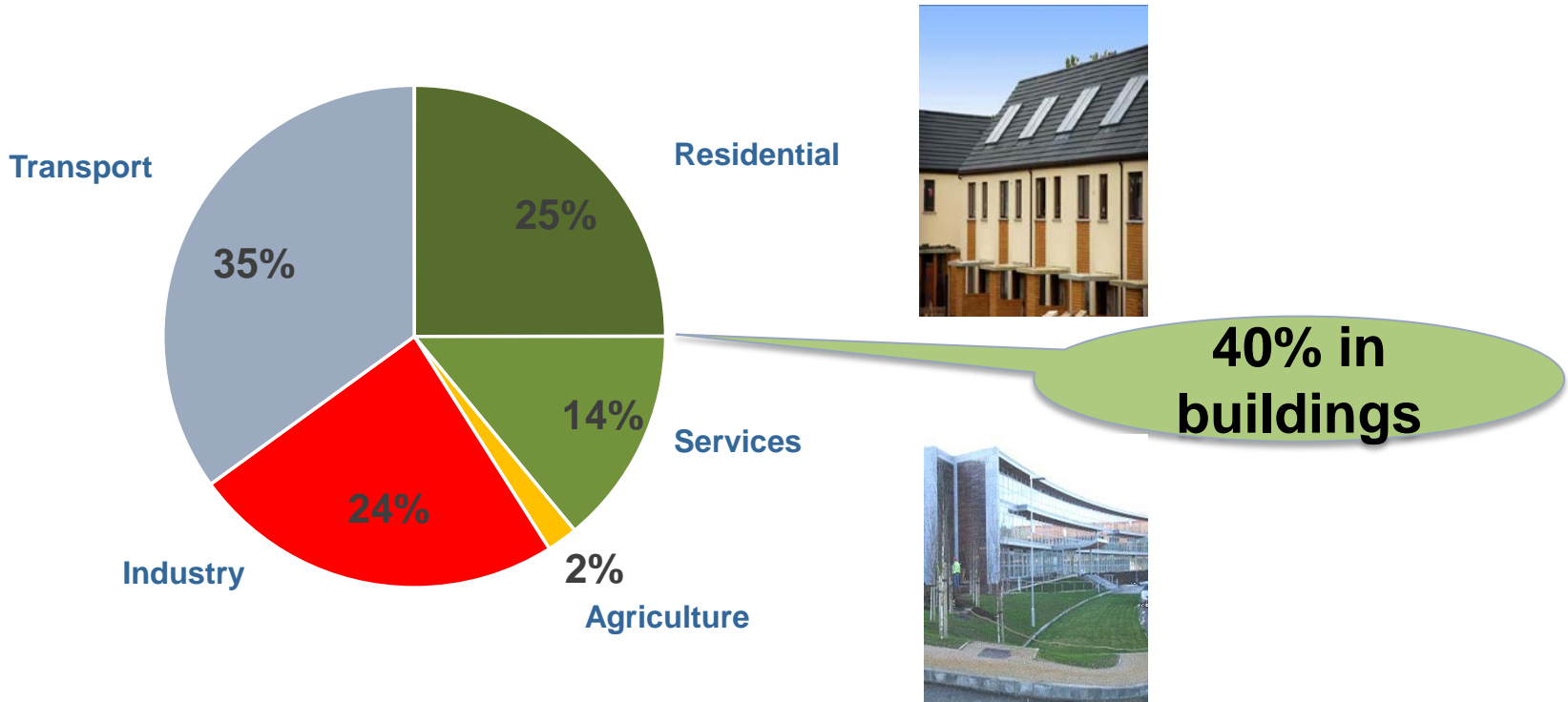
- ▶ 1 toe = 42 GJ
- ▶ 1000 toe = 11.63 GWh
- ▶ 1 GWh = 86 toe
- ▶ 1 GWh = 3600 GJ
- ▶ PEE = Primary Energy Equivalent
- ▶ Tertiary sector = Services sector (commercial and public)

Ireland: Energy efficiency policy and market background

Ireland characteristics

- ▶ **Population 4.6 M**
- ▶ Economy:
 - GDP €172 billion
 - **GDP per capita €37,400**
 - 2007-2010: GDP fell 9.1%
 - 2010-2014: GDP grew 2.3% per annum
 - 2014: GDP grew 5.2%
- ▶ Energy:
 - 2014: **Total Primary Energy Requirement 13.27 Mtoe = 154,330 GWh**
 - Almost 90% import dependency, costing €6 billion per annum
- ▶ Temperate maritime climate
- ▶ 1.8 million homes
- ▶ 150,000 tertiary sector buildings

Primary energy usage by sector



Ref: SEAI Energy in Ireland 1990-2014

Drivers for Energy Efficiency



EU energy agenda 20-20-20

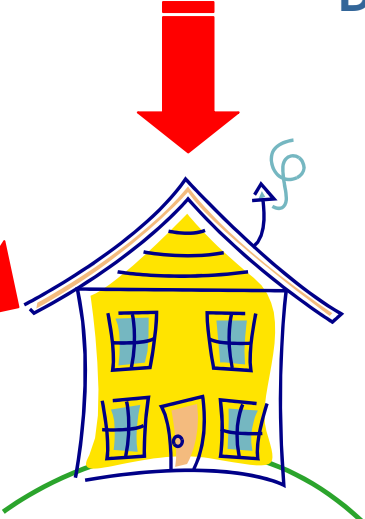
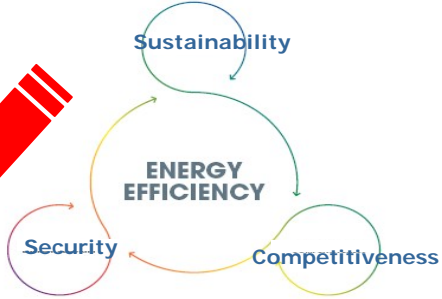


Climate change

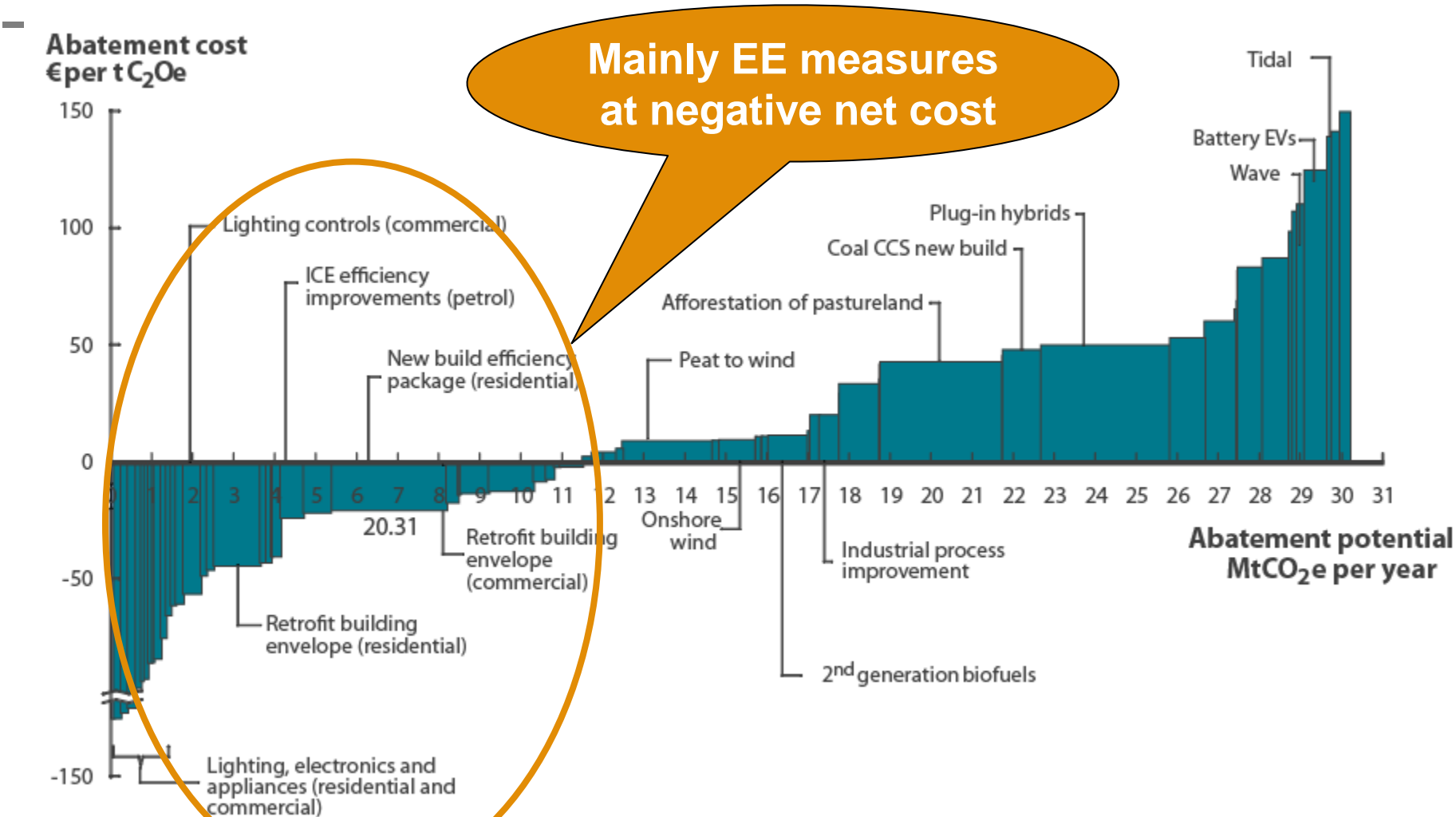


Clonmel 2009, RTE Gallery, Credit:Jacob Zdun

Domestic Environment & Economic Policy



Ireland's GHG Cost Abatement Curve -2030



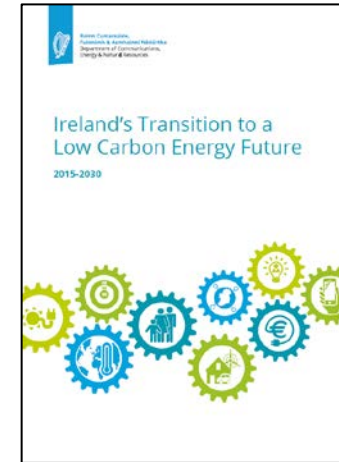
1 Baseline cost curve based on 2007 IEA energy price forecasts (~60 USD / barrel in 2030) and a real cost of capital of 4%

Source: McKinsey study for SEAI

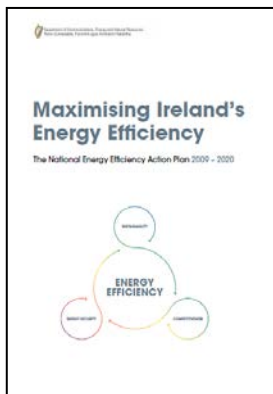


Policies

- ▶ National Climate Change Strategy 2000, 2007, 2015
- ▶ Energy Policy White Paper 2007
- ▶ Energy Policy White Paper 2015: focus on 2030



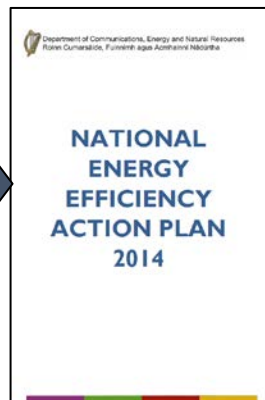
NEEAP 1 (2007)



NEEAP 2 (2012)



NEEAP 3 (2014)



EED transposed into National law by SI 426 of 2014

- ▶ **High level of EE policy consensus and continuity across politics and successive Governments (during an economic recession):**
 - ▶ **Jobs** and economic stimulus benefits as well as energy and money savings, and emissions abatement

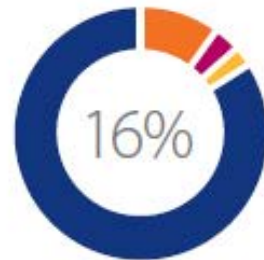
Ireland: Principal energy policy targets 2020

Energy Efficiency

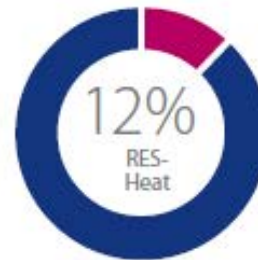
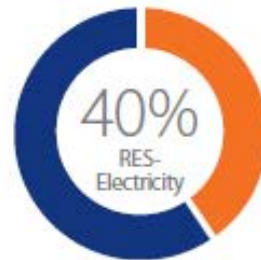


20% energy savings by 2020 (31,925 GWh)

Renewable Energy



Overall **16% RES** of national consumption



Three sub-targets

Emissions



EU Effort Sharing Decision (2013 – 2020)

- **20% reduction** non-ETS emissions relative to 2005
- Annual limits

Ireland: Energy efficiency policy oversight and governance

Responsible authorities (until 2016)

▶ **Inter-Ministerial Co-ordination Group**

- Formed to assist in NEEAP development
- Continued through implementation, reporting, review and updating
- Provides vital route for inter-ministry cooperation
- Meets 3-4 times a year

▶ **Ministry of Communications, Energy & Natural Resources (DCENR)**

- Primary responsibility for developing and implementing energy policy

▶ **Sustainable Energy Authority of Ireland (SEAI)**

- Statutory agency responsible for promoting and assisting EE and RE, publishing national energy statistics and policy 'think tank' to DCENR

▶ **Ministry of the Environment, Community & Local Government**

- Responsible for climate policy, construction policy, building regulatory and control system, and oversight of local authorities

Other responsible authorities (until 2016)

- ▶ Ministry of Transport
 - Responsible for transport policy
- ▶ Ministry of Jobs, Enterprise & Innovation
 - Responsible for industrial policy and lead responsibility for national research policy
- ▶ Other contributing bodies
 - Office of Public Works (OPW)
 - Other public sector entities – education, health, local authorities etc.
 - Commission for Energy Regulation
 - (Environmental Protection Agency)
 - Economic & Social Research Institute

Sustainable Energy Authority of Ireland (SEAI)

- ▶ Established as a statutory agency in 2002
- ▶ Accountable to DCENR and its Minister
- ▶ Tasks include:
 - Informing, implementing & monitoring EE policy and programmes for all sectors - including publishing national energy statistics and forecasts
 - Cooperating with public bodies, energy consumer groups & other stakeholders
 - Administering building energy rating system and retrofit grant schemes
 - Creating energy databases, implementing measures & developing EE indices
 - Developing and promoting standards & frameworks for improving EE
 - Leading the dissemination and awareness raising of EE
- ▶ **A key role in EED/NEEAP implementation:**
 - Independent resource – official statistics, data, analysis to **inform** choices
 - Direct **delivery** of key programmes/ measures
 - Monitoring and reporting on progress – maintains a **register of savings**

Target setting (overall Article 3, and specific for Articles 5 and 7)

ESD and EED : Energy efficiency targets

- ▶ ESD Article 4.1: Member States shall adopt and aim to achieve an overall national indicative energy savings target of 9 % for the ninth year of application of this Directive.....
 - Indicative energy savings target calculated per Annex I methodology – based on final energy consumption over the 5 data years preceding implementation
 - Examples of eligible EE improvement measures in Annex III
 - General framework for measurement & verification in Annex IV
- ▶ **EED Article 3(1):** Each Member State shall set an indicative national energy efficiency target, **based on either primary or final energy consumption, primary or final energy savings, or energy intensity.** Member States shall notify those targets to the Commission in accordance with Article 24(1) and Annex XIV Part 1. When doing so, **they shall also express those targets in terms of an absolute level of primary energy consumption and final energy consumption in 2020 and shall explain how**, and on the basis of which data, **this has been calculated.**

Ireland's target setting process (per EED Article 3)

The indicative national EE target of 20% was established in the Government's Energy White Paper 2007 and detailed in Ireland's NEEAP 1 as 31,925 GWh (PEE)

Top down

- Definitions, baselining options under ESD Annex 1
- Baselining
 - Choice of period 2001-2005
- 'Business as usual' (BAU) forecast projections
- Whole economy - including EU ETS participants
- Interactive effects with NREAP
- Review and adjustment
- Expressed as 20% of baseline



Bottom up – cumulative from individual measures

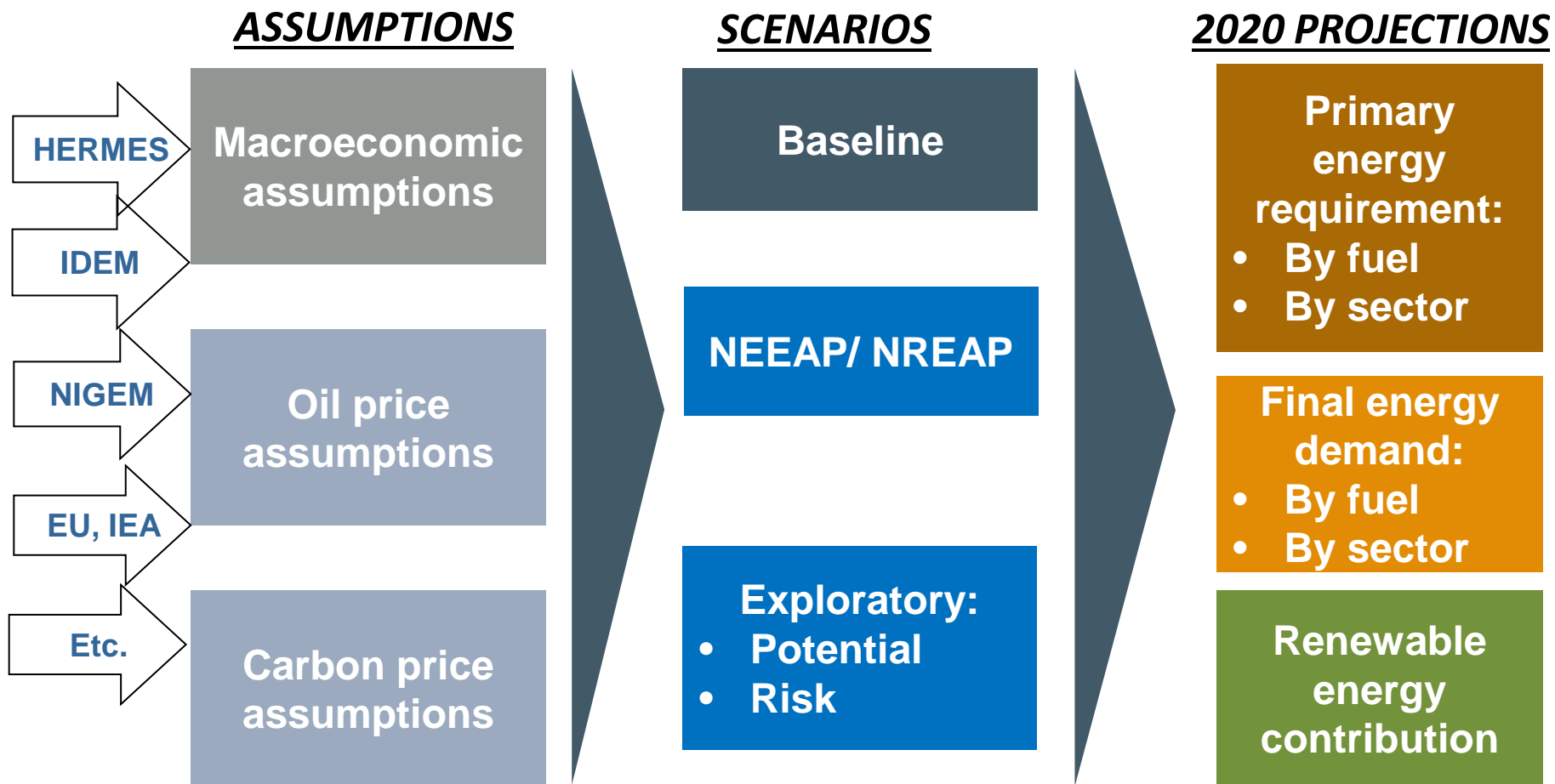
- Baselining
 - Choice of period, BAU scenario
- Menu of measures in all sectors – existing, enhanced, new
- Eligible measures – period, lifetime
- Substantiveness and verifiability of savings
- Avoiding double counting etc.
- Case by case calculation methodologies (Excel workbooks)

▶ **Expressed and aggregated as GWh (primary energy savings)**

▶ **Final energy ----- Primary energy ----- CO2 emissions**

Energy forecasts for Ireland: annual updating

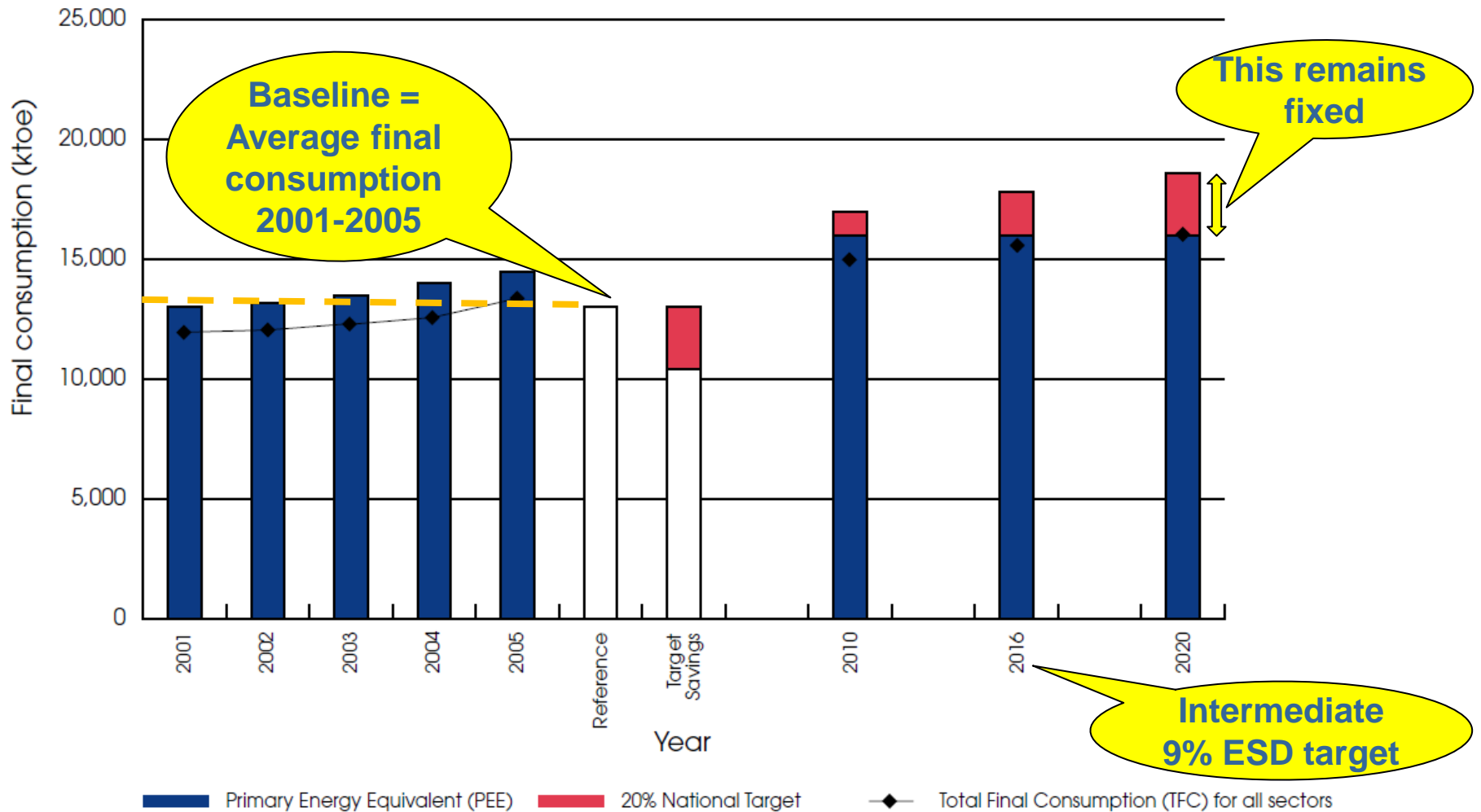
Led by SEAI, with economic modelling input by Economic & Social Research Institute



*This annual update affects the projected PEE and TFC for 2020, but **does not affect the absolute EE target of 31,925 GWh for 2020***

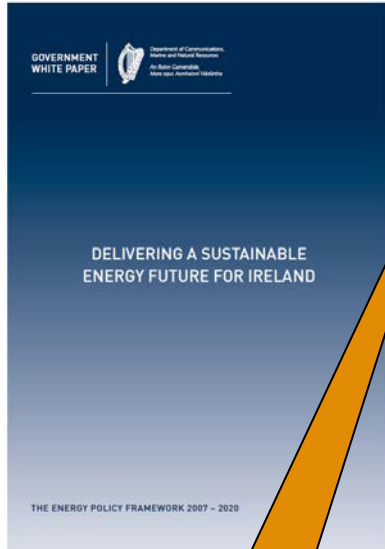
NEEAP 1: Original setting of 20% target for 2020

National 20% Target Energy Savings



Target setting – public sector (EED Article 5)

Target originally set in energy policy White Paper 2007:



A 'top down' target

- ▶ **(EED Article 5 relevance):** We will lead by example setting **a target of 33%** for energy savings across the public sector. This will be achieved by introducing comprehensive Energy Efficiency Programmes (targets and standards) for Government Departments, State Agencies, Local Authorities, the Health Service and the public sector overall. The Programmes which will be rolled out progressively from 2008 will build on the achievements to date
- ▶ **(EED Article 6 relevance):** We will publish an action plan for Green Public Procurement, with the aim of achieving, by 2010, a level of Green Procurement equal on average to that achieved by best performers in Europe. The plan will focus on targets to be achieved, how to drive the adoption of green procurement by public and semi-public authorities, indicators for measuring progress and the legal and administrative framework for public procurement

Target setting trial – energy suppliers (EED Article 7)

▶ 2011-2013: Voluntary scheme

- Operated by SEAI
- Legislation in 2012 empowered Minister to set targets for suppliers
- Consultation, negotiation & participation of 19 energy supply companies and groups
- Governance forum established, 4 meetings per annum
- 3 year savings target set and allocated, adjusted to 875 GWh
- Transfer between years and buyout/trading permitted
- Threshold sales set at 600 GWh
- Aggregators/ 'counter-parties' appointed
- Savings credits calculation framework established for most common EE technologies
- (Higher weighting for homes in energy poverty)
- Achieved 81% of projected savings target set for the voluntary scheme

Only 'low hanging fruit'?

Target setting – energy suppliers (EED Article 7)

► 2014: Mandatory scheme

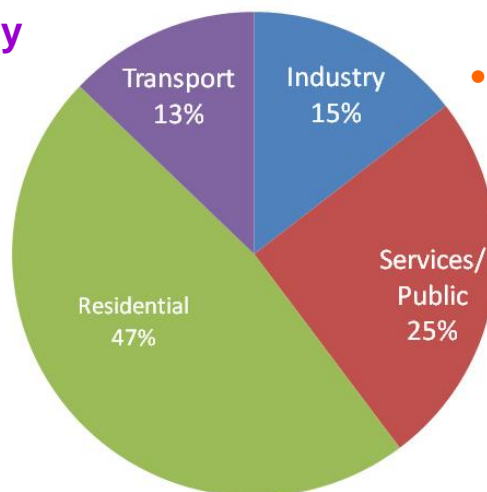
- Operation by SEAI
- Review of voluntary scheme
- Consultation and negotiations with energy supply companies and groups
- Methodological details contained in 2013 report to the Commission
- Decided to avail of alternative measures
- **Targets set at 1.5% = 1020 GWh per annum**
 - **550 GWh p.a. from energy suppliers & similar from alternative measures**
- Threshold sales set at 600 GWh per annum
- 16 obligated parties participating
- Detailed methodologies for energy credits
- Criteria of additionality, materiality, sustainability etc.
- Energy auditors as verifying agents reporting to SEAI
- Energy companies bear the cost of marketing, administration, M&V, reporting

Suite of EE measures

NEEAP targets: contributing actions

- **Modal shift/ infrastructure**
- **Electric vehicles**
- **Improved fuel economy**
- **Motor tax changes**

- **Building regulations**
- **Building energy rating/ labelling**
- **Energy renovation/ retrofit incentive programmes**
- **'Energy poverty' programmes**



- **Carbon tax**
- **Energy Efficiency Obligation schemes for utilities**
- **Model services contract framework to support EPCs/ ESCOs**
- **Energy Efficiency Fund**
- **Smart metering programmes**
- **Research, development and demonstration projects**
- **Training programmes**
- **Public information/ awareness programmes**

- **Voluntary agreements and support with Large Industry Energy Network – ISO 50001 etc.**
- **Initiatives with SMEs**

- **Public sector exemplar actions**
- **Tax incentives for EE products**
- **Grants for energy renovation/ retrofit**
- **Building regulations**
- **Building energy rating/ labelling**
- **Energy product standards**
- **Energy product labelling**
- **Public procurement policies**

Savings calculations

Energy saving calculations: Bottom up case by case

- ▶ **Bottom up – cumulative from individual measures, case by case**
 - Baselineing
 - Choice of period: average of energy consumption 2001-2005
 - Calculation relative to ‘business as usual’ (BAU) trajectory
 - Eligible measures
 - Commencement period
 - Lifetime of measures
 - Substantiveness/ measurability and verifiability of savings
 - (Some savings difficult to quantify – promotional/ informational/ developmental measures)
 - Credit for early actions that have lasting effect, e.g. building standards strengthened in 2002 and 2008
 - Consideration of ‘free rider’ and multiplier effects, and of interactive/ reinforcing effects between different measures
 - Avoiding double counting
 - Case by case calculation methodologies (Excel workbooks)

Primary guidance

EE savings were assessed and calculated on spreadsheets using bottom up methods which complied with Commission guidance

► Commission document:



EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR ENERGY
Directorate C - New and renewable sources of energy, Energy efficiency & Innovation
C.4 - Energy Efficiency

– PRELIMINARY DRAFT EXCERPT –

RECOMMENDATIONS ON
MEASUREMENT AND VERIFICATION METHODS

IN THE FRAMEWORK OF

DIRECTIVE 2006/32/EC ON

ENERGY END-USE EFFICIENCY AND ENERGY SERVICES

Puts forward recommended methods/formulae for calculation/measurement and verification of EE savings – both ‘Top Down’ and ‘Bottom Up’

Other reference guidance

▶ Bottom up calculations:

EMEEES methodologies

www.emeees.eu

20 case examples. Takes account of:

- Avoiding double counting
- Technical interactions between measures
- 'Free rider' effects
- Multiplier effects
- Lifetime of measures
- Treatment of early action

▶ Top down indicators:

ODYSSEE-MURE methodologies

<http://www.indicators.odyssee-mure.eu>

Data tools: key indicators facility, benchmarking, decomposition, energy saving, and indicator scoreboard

The screenshot shows the 'evaluate energy savings EU' website. The main navigation bar includes Home, Evaluation Tools, NEE Action Plans, Events, Publications, Countries, The Project, Service, Contact, and Login. The left sidebar lists 'Bottom-up methods', 'Top-down methods', 'Integration of Top-down and Bottom-up methods', and 'Testing the methods'. The main content area is titled 'Bottom-up methods' and contains the following text:

In the EU Directive on energy end-use efficiency and energy services (ESD), bottom-up evaluation is defined as follows:

"A bottom up calculation method means that energy savings obtained through the implementation of a specific energy efficiency improvement measure are measured in kilowatt-hours (kWh), in Joules (J) or in kilogram oil equivalent (kgoe) and added to energy savings results from other specific energy efficiency improvement measures".

Bottom-up evaluation starts from data at the level of a single energy efficiency improvement (EEI) measure, mechanism, programme, or energy service (e.g. monitoring energy savings per participant and number of participants), and then aggregates results from all EEI measures reported by a Member State to assess its total energy savings in a specific field.

The screenshot shows the 'ODYSSEE-MURE' website. The main navigation bar includes Overview, Data Tools, Publications, News, and Contact. The left sidebar lists 'Market Diffusion', 'Decomposition', 'Benchmarking', 'Energy Saving', and 'Energy Efficiency Indicator Scoreboard'. The main content area is titled 'ODYSSEE DATABASE' and 'KEY INDICATORS' and contains the following text:

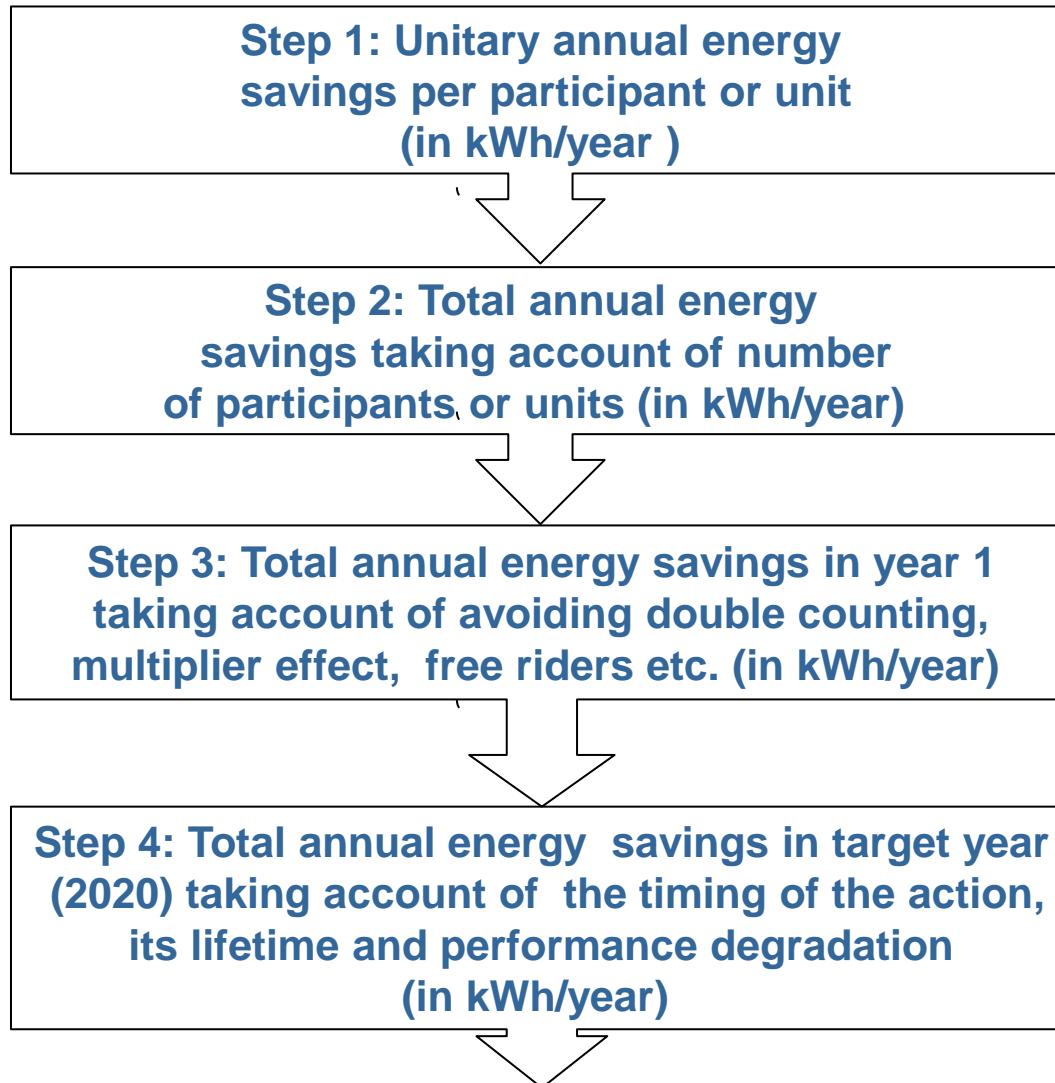
The ODYSSEE indicators are accessible under different data tools: the full data base, the key indicators facility, as well as five specific data facilities that focus on specific issues and provide some interpretation: market diffusion, decomposition, benchmarking, energy saving and indicator scoreboard. The access to the data base is restricted, whereas all other data tools are in public access.

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Typical 4 step calculation process



Reporting requirements

Reporting requirements (EED Article 24 et al)

- ▶ **Timelines**
- ▶ **Annual reports**
- ▶ **NEEAP updates**
 - Detailed templates
 - Transparent tracking
 - **Adjustments** to actions – ongoing, new, completed, discontinued.....
 - Consistency across Member States and EU aggregation
 - SEAI maintains **savings register**
- ▶ **Specific EED Articles**
 - e.g. Articles 4, 5, 7, 14

NEEAP 3

Current actions:

- ▶ 29 ongoing from NEEAP 1
- ▶ 28 new

Completed actions

- ▶ 12 ongoing from NEEAP 1
- ▶ 8 new

Removed or superceded actions

- ▶ 8 ongoing from NEEAP 1
- ▶ 12 new

Precision



Admin costs

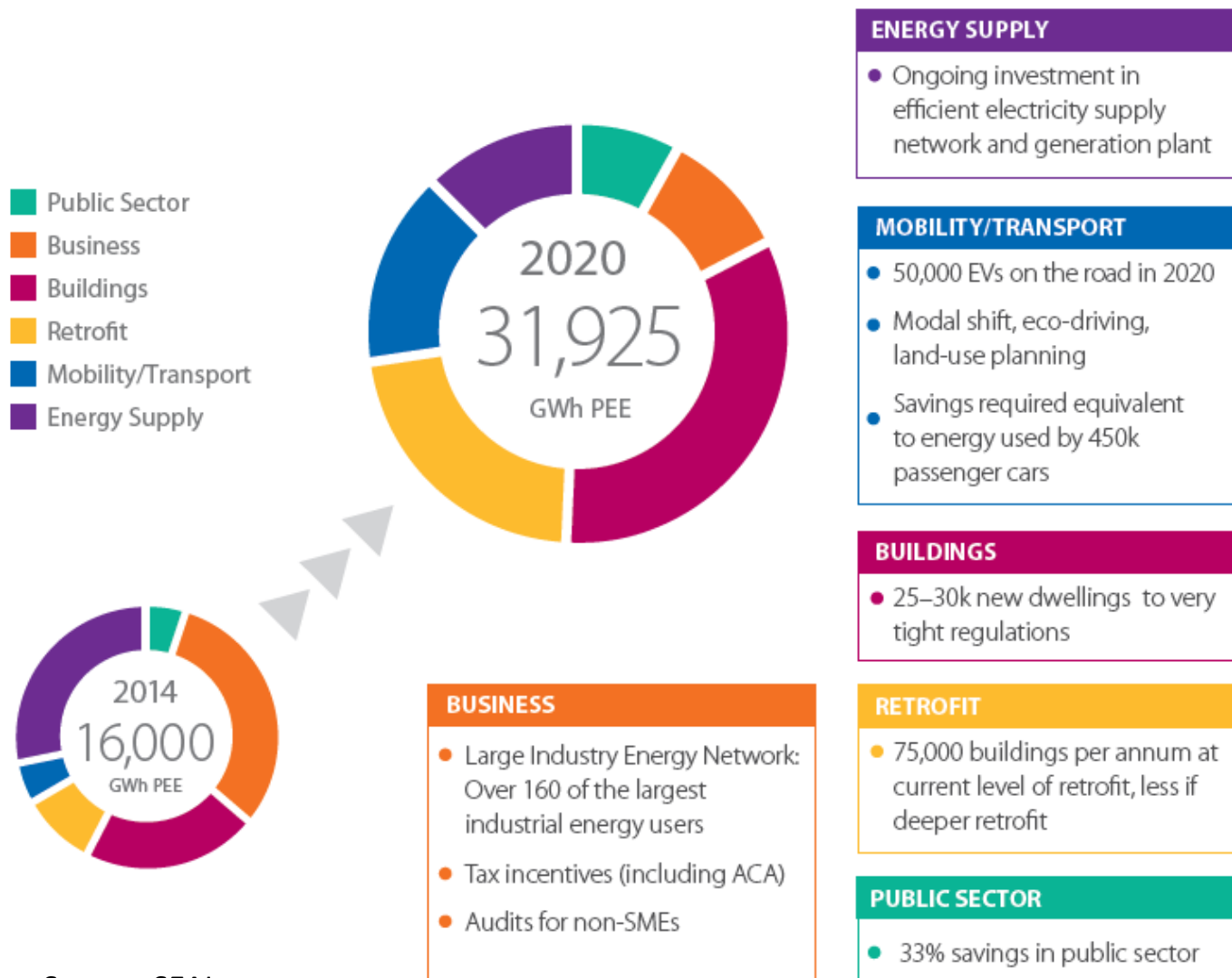
Progress summarised

Final energy measures – summary of measures and projected savings 2012-2020

	Energy savings (GWh, PEE)		
	2012 (achieved)	2016 (expected)	2020 (expected)
Public	1,050	2358	3716
Business (Commercial/Industry)	3,257	5,114	7,594
Buildings	3,778	6,896	10,379
Transport	1342	2746	4548
Energy supply	1,710	1,996	4,418
Cross sectoral (carbon tax)	1,200	1,300	1,300
Total	12,337	20,410	31,955

39% of target

Ireland's EE progress, target trajectory and key actions 2014-2020



Source: SEAI

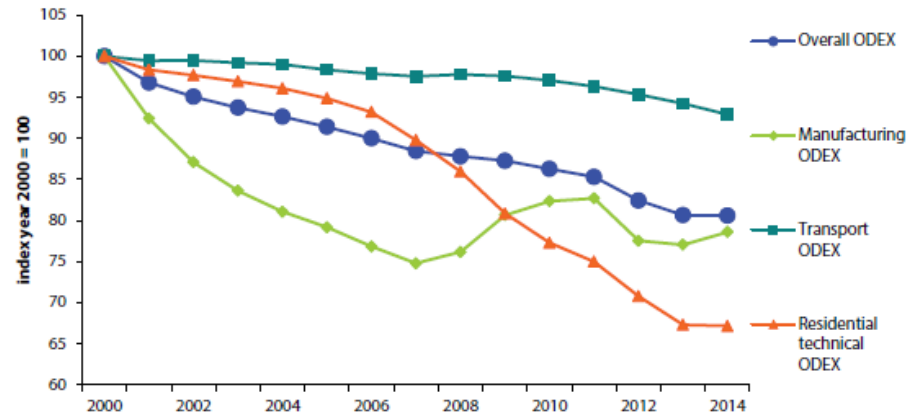
Trends and Indicators of EE improvement 2000 - 2014

Index of GDP, Total Primary Energy (TPER) and Energy-Related CO₂



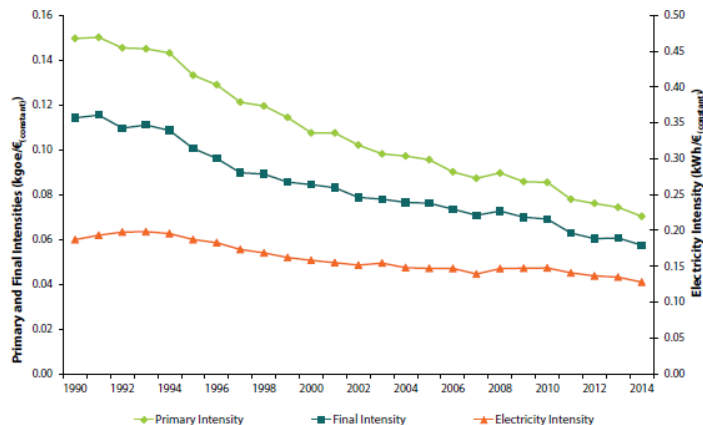
Source: Based on SEAI and CSO data.

ODEX indices: manufacturing, transport, residential and overall economy

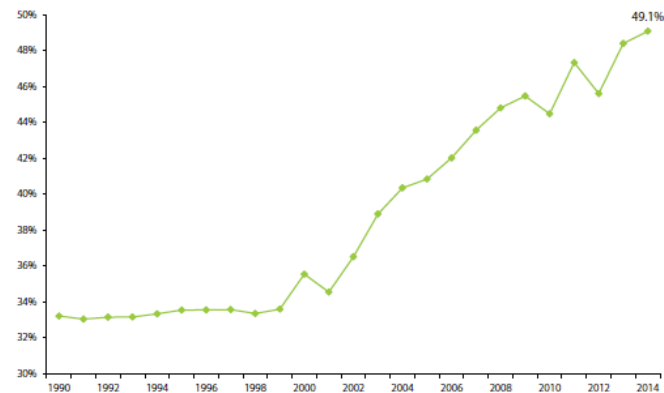


Source: SEAI and ODYSSEE

Primary, Final and Electricity Intensities



Efficiency of Electricity Supply



NEEAP as a policy tool

NEEAP as a policy tool 1

- 1. Pre-EED & pre-NEEAP, energy efficiency already had a high priority within national energy policy:**
 - EE was a major dimension to the National Climate Change Strategy & Energy Policy White Paper (indicative 20% saving already set)
 - E.g. EE targets, building EE standards, public sector programmes, industry programmes
 - Employment stimulus and other co-benefits of EE secured significant EE investment within severely constrained public financial environment 2009-13
- 2. ESD/EED & NEEAPs reinforced and brought **integration** to this commitment**
 - Elevated and embedded the status of EE within overall public policy
 - Effectively **mandatory EE targets**
 - Requires a composite, coordinated suite of measures
 - Broadened and strengthened the **governance** regime – clear tasks, responsibilities, timetable
- 3. It presents challenges to the public sector to lead and act as an exemplar**

NEEAP as a policy tool 2

- 4. EED & NEEAP also introduced new policy obligations/ instruments**
 - E.g. EE Obligations on energy suppliers, buildings renovation strategy, EE financing.....
- 5. Demands a rigorous monitoring, verification and reporting regime**
 - Transparency and rigour in determining energy savings
 - Annual reporting and NEEAP updating
 - Reporting methodology provides a consistent framework for tracking
 - Gap analysis provides guidance on scale and nature of new measures required
- 6. EE policy (NEEAP) is in partnership with Renewable Energy policy (NREAP) – and non-controversial**
 - Highlights a balanced energy policy
- 7. NEEAP & NREAP feed into the annual review, updating and reporting of energy forecasts**
- 8. EED & NEEAP provides a firm platform for continuing momentum to 2030**

Best practice learnings

Lessons

- ▶ **Top level institutional ownership, oversight and coordination**
- ▶ **Macro and disaggregated data – essential market insights**
- ▶ **Sectoral targets and actions, direct and enabling**
- ▶ **A strong matrix of measures, sectoral and cross-sectoral**
- ▶ **Stakeholder engagement, e.g. with building energy renovation strategy**
- ▶ **Partnership agreements, e.g. with industry & public sector bodies**
- ▶ **Smart tools and systems, e.g. public sector on-line monitoring & reporting tool, procurement guidelines and database**
- ▶ **Ongoing analyses and studies to tackle barriers/ risks and inform new or enhanced actions to achieve target**

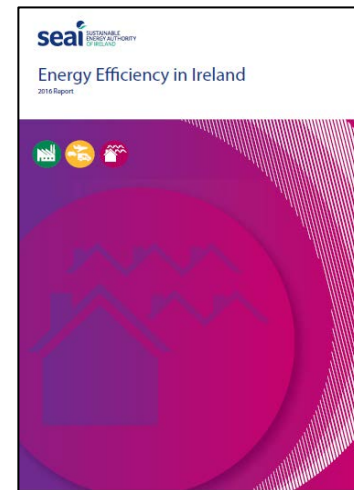
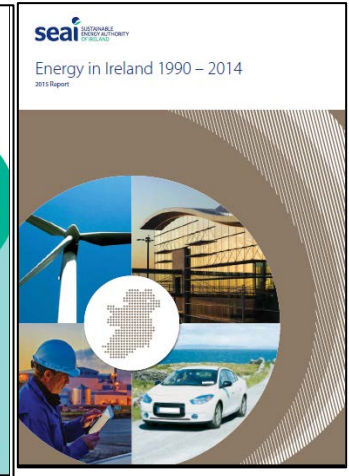
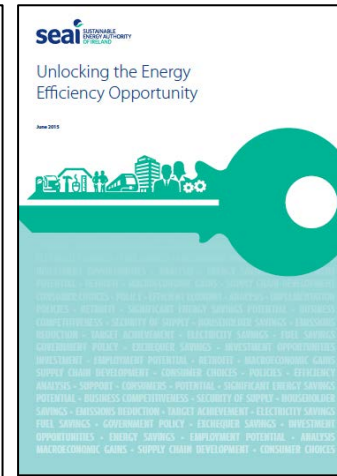
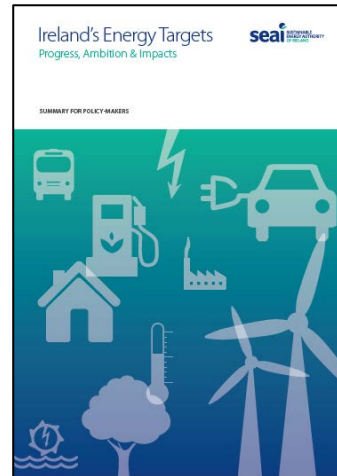
Resources

- ▶ Human
- ▶ Financial

- ▶ Data
- ▶ Systems/ Infrastructure

- ▶ Regular SEAI publications:
 - Energy in Ireland 1990-2014
 - Energy Forecasts for Ireland 2020
 - Energy Efficiency in Ireland 2016
 - Unlocking the Energy Efficiency Opportunity
 - Ireland's Energy Targets – Progress, Ambition & Impacts

<http://www.seai.ie/Energy-Data-Portal>



Summary

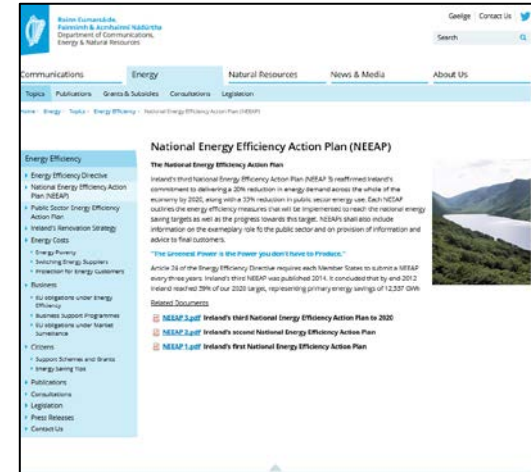
- ▶ EE is embedded in national energy policy and has high political support
- ▶ Target setting process
- ▶ Over 90 individual measures – some with quantifiable EE savings, some in a support/ capacity building/ developmental role
- ▶ Reliance primarily on bottom up methodologies for calculating savings, based on EU Commission guidelines
- ▶ Annual and NEEAP reporting provides a strong discipline and tool for tracking progress and highlighting weaknesses
- ▶ Treatment of EU ETS vs non ETS savings
- ▶ Policy focus on ‘deep’ measures is growing
- ▶ EE progress is steady (half of 2020 target reached by 2014), but further acceleration in deployment of EE technologies is still needed over the period to 2020 – and beyond

References

Further information

▶ DCENR

- www.dcenr.gov.ie



▶ SEAI

- www.seai.ie



Thank you!

Questions?