



Industry Pathways to Net Zero

- Declan Meally – Director of Business, Public Sector and Transport
- Wednesday 20th March 2024

20–21 March 2024

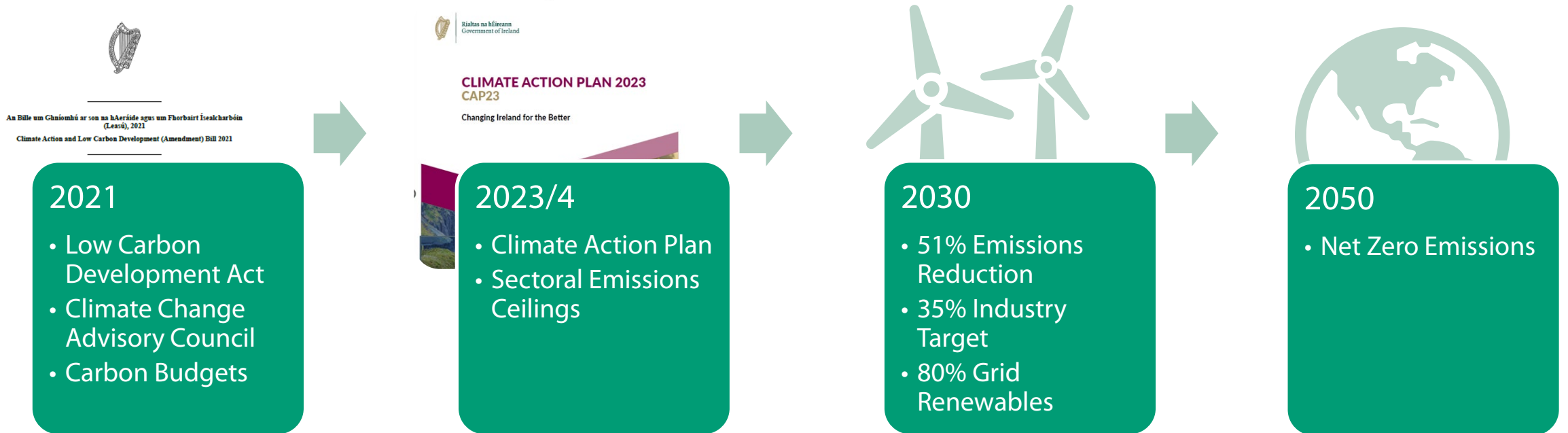


Rialtas na hÉireann
Government of Ireland

Agenda

- Policy Context
- Climate Action Plan 2024 KPIs
- Industry Progress to Date
- Pathway Forward
- SEAI's Support for Industry

Policy Context: Key Milestones



Climate Action Plan 2024: Industry Targets

**Overall, 35%
Direct Emissions
Reduction by 2030**

2025 Target

2030 Target

**Carbon Neutral
Heating for
industry**

50% Share

75% Share

**Energy Efficient
Measures**

**7% reduction
in fossil fuel
demand**

**10%
reduction**

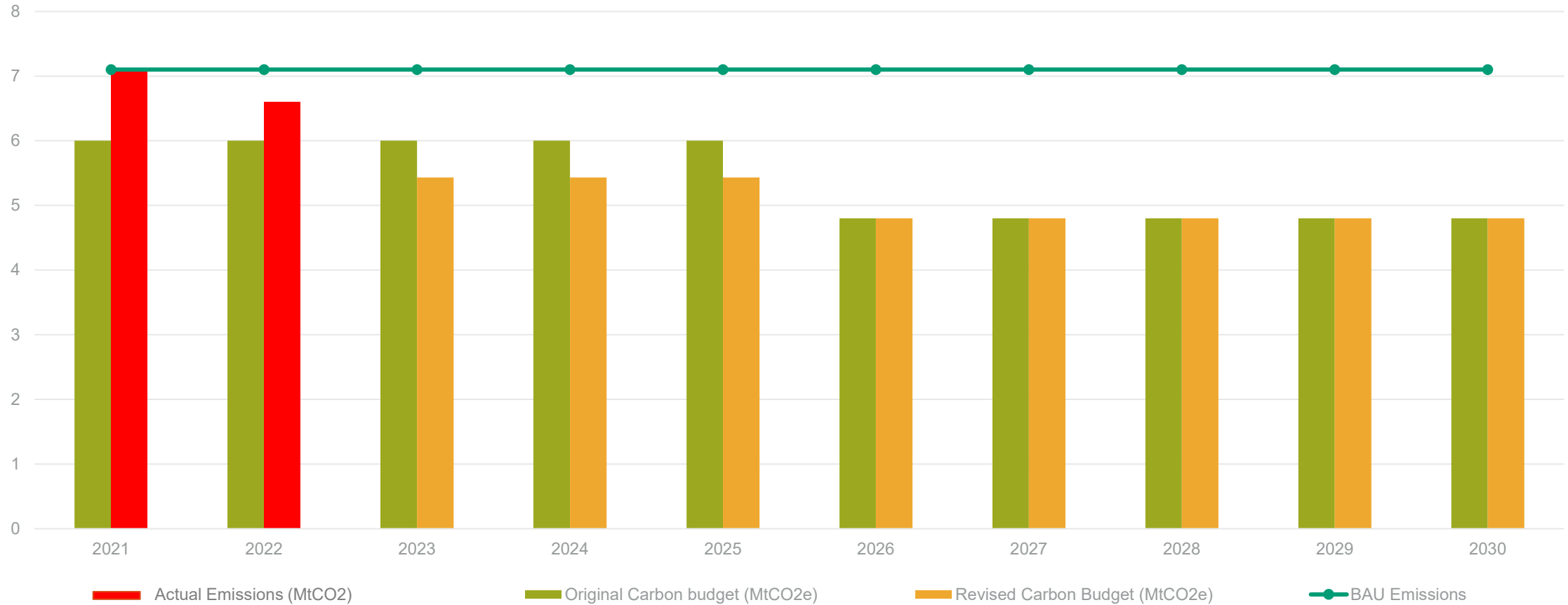
**Zero emissions
gas for industrial
heating**

1.2 TWh

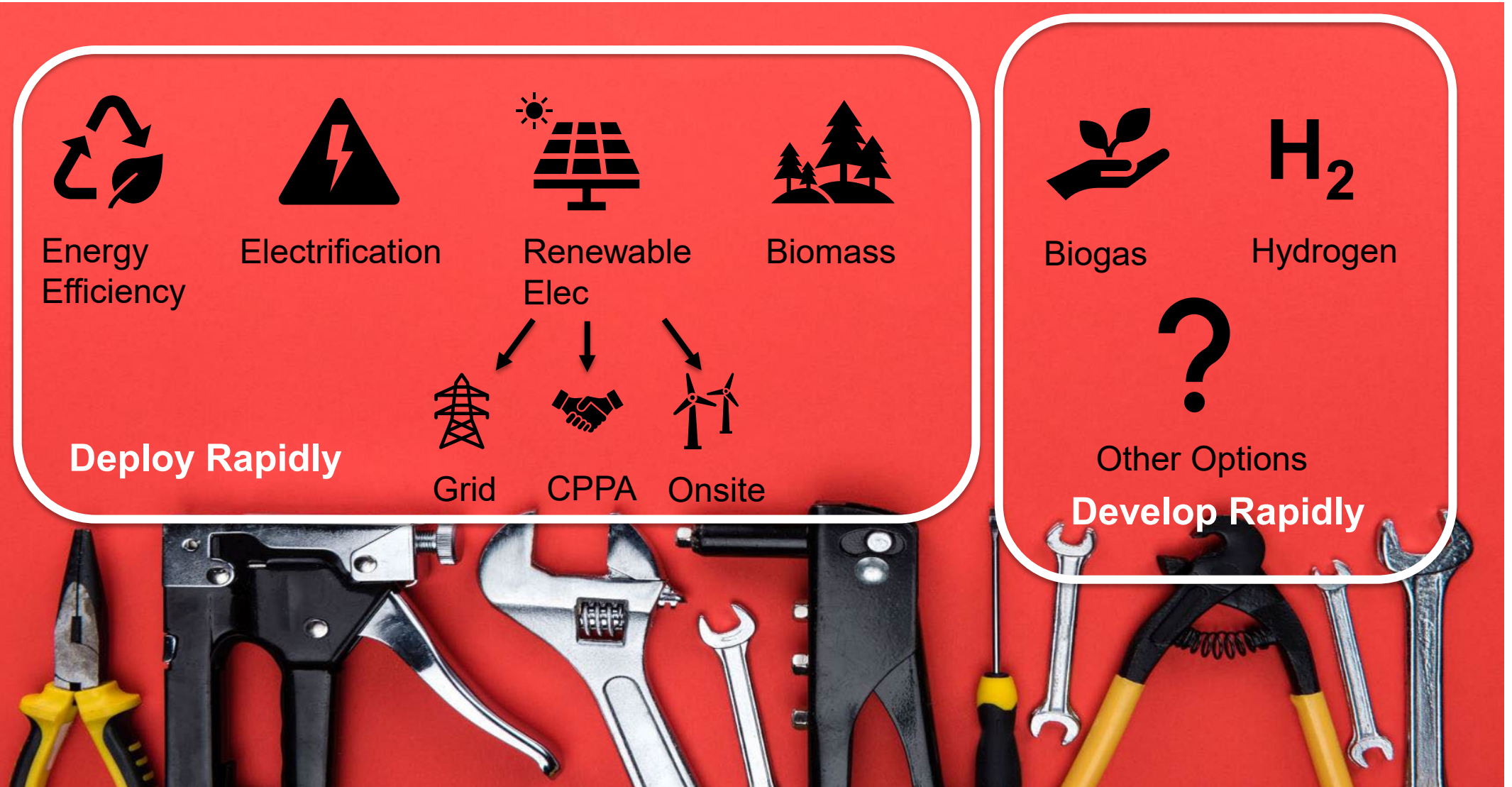
2.1 TWh

Industry Progress to Date

Carbon Budgets (Target v Actual), MtCO₂e



Industry Pathway Forward



SEAI's Supports to Industry

Large Industry Energy Network

Best Practice
Workshops, Site
Visits, Training

Special Working
Groups

Partnership

Standards and Tools

ISO 50001+

I.S. 399 EED

Grant Support

SSRH – 40%
support for heat
pumps

EXEED – up to €3m

Solar PV up to
1MW

Other Financial Supports

EEOS

Accelerated
Capital Allowance



"The future depends on
what you do today."

Mahatma Gandhi

20–21 March 2024



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Government of Ireland

Thank You!



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Government of Ireland

Renewable Heat Policy

Tony Collins

Department of the Environment, Climate and Communications

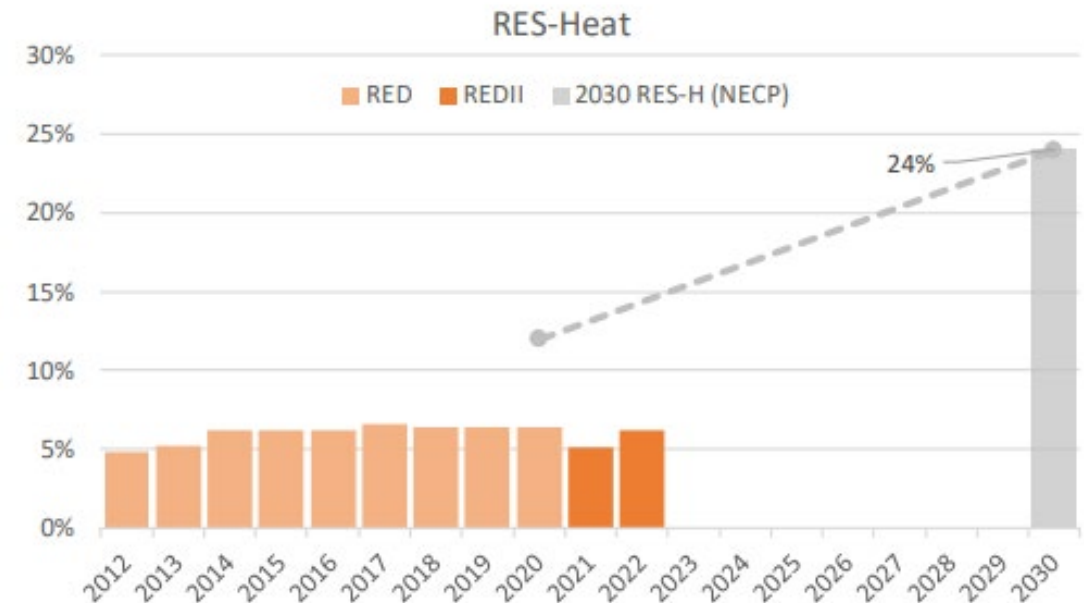
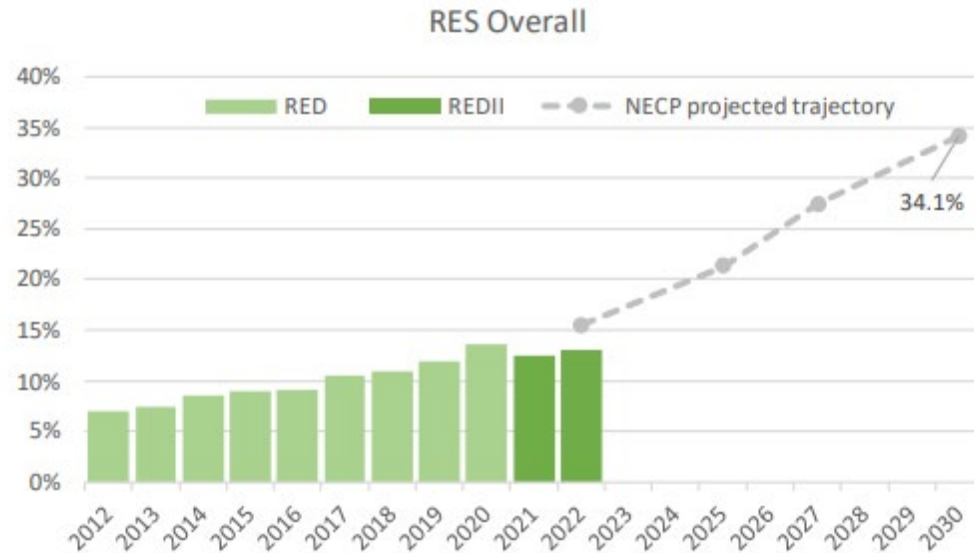
20th March 2024

Renewable Energy Directive (RED)

Under RED III the EU-wide RES target for 2030 increases from 32% to at least 42.5%.

Ireland's overall renewable energy share (RES-O) is calculated under a methodology set out in the EU's second Renewable Energy Directive (REDII).

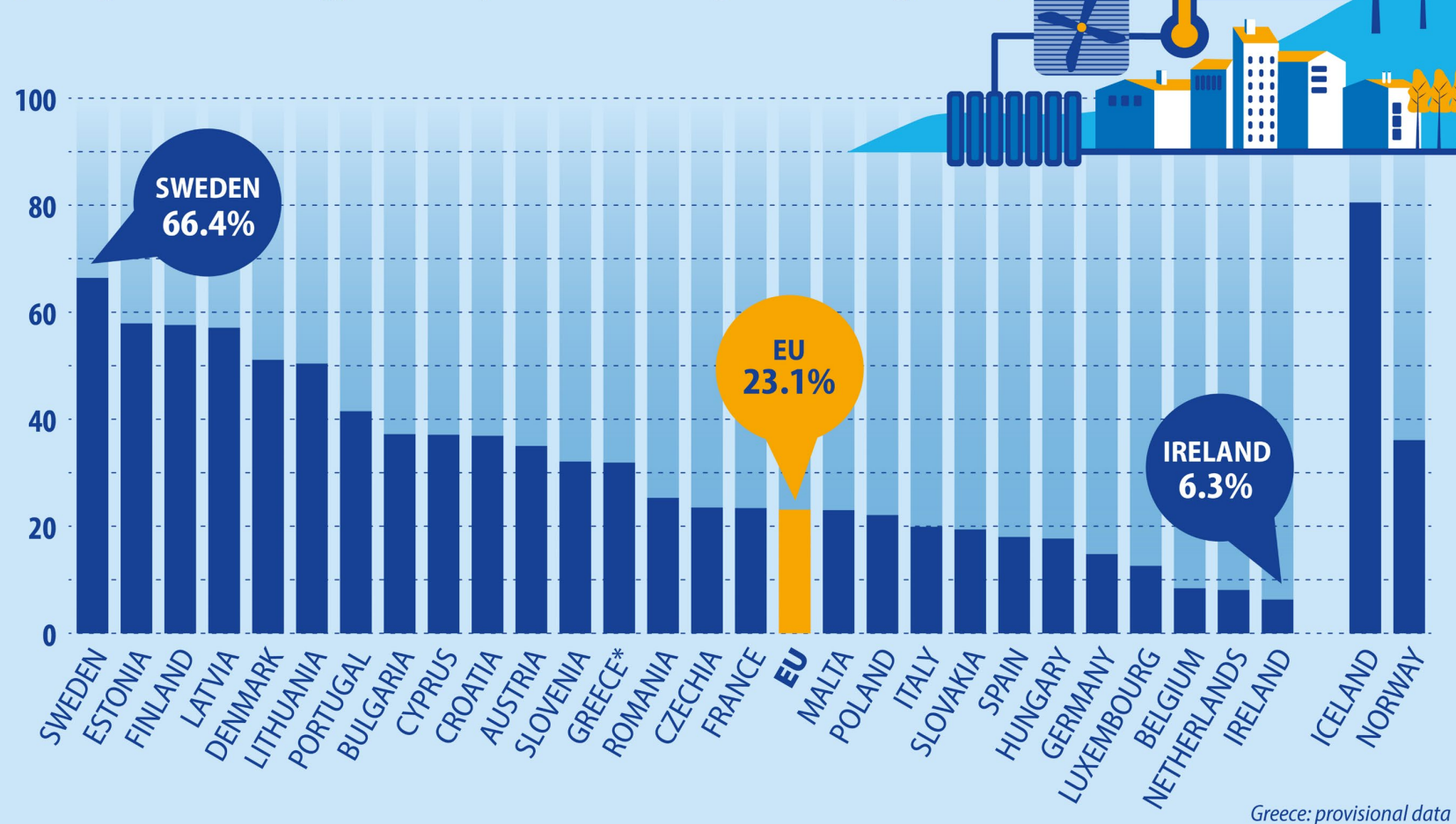
Ireland's 2022 renewable energy share in heating and cooling (RES-H) was 6.2%.





Renewable energy used for heating and cooling

(% of gross final energy consumption for heating and cooling, 2020)



#EUIndustryDays

ec.europa.eu/eurostat

Heat and Built Environment Taskforce



Established to accelerate and drive delivery in relation to –

- *retrofitting,*
- *renewable heat,*
- *district heat and*
- *decarbonisation of the building stock*
- *industrial heat*

The overarching aim is to –

- identify work on the critical path to key targets under each area,
- ensure alignment in the development of policies and activities underway across Government Departments,
- and proactively manage risks to ensure targets are achieved.

WG2 - Commercial Built Environment Group



Roadmap development:

- Voluntary Code
- Communications Plan
- Skills Gaps
- Review supports

WG3 - Public Sector



Public sector targets:

- improve its energy efficiency by 50%
- reducing energy-related GHG emissions by 51% by 2030.



WG 4 - Residential Retrofit

- CAP target: 400,000 heat pumps to be installed in existing homes by 2030.
- up to 50,000 heat pumps to be installed each year as we move through the decade.
- 2019 – 2023: 10,600 heat pumps installed under SEAI energy efficiency upgrade schemes
- 3,769 installed in 2023, up 66% on 2022
- 2021 – 2023: a further 4,863 installed under the Local Authority Energy Efficiency Retrofit Programme
- In 2022, grant support for the installation of a heat pump increased significantly from €3,500 to up to €6,500.
 - *National Home Energy Upgrade Scheme*
 - *Community Energy Grant Scheme*

Low-cost loan scheme

- Climate Action Plan and the National Retrofit Plan - committed to the introduction of a new residential retrofit low-cost loan scheme.
- Will help reduce the financial challenges for many homeowners and will play a crucial role in helping homeowners to invest in energy efficiency, making their homes warmer, cheaper to run and helping to lower emissions.



First scheme of its
kind for both
Ireland and the
EIB.

€500m

Homeowners will be able to
borrow from €5,000 to €75,000
on an unsecured basis for a
term of up to 10 years.

Biomethane



- scale up indigenously produced biomethane to 5.7TWh per annum by 2030.
- National Heat Study – analysis of bioenergy resources in Ireland.
- Development of biomethane production for use within the heat
- Relating directly to decarbonising the heat sector, Government has agreed to the introduction of a Renewable Heat Obligation by 2024.



District Heating



- Key role in improving energy efficiency and reducing emissions in Ireland.
- District Heating Steering Group Report
- SEAI Centre of Excellence
- Tallaght District Heating Scheme

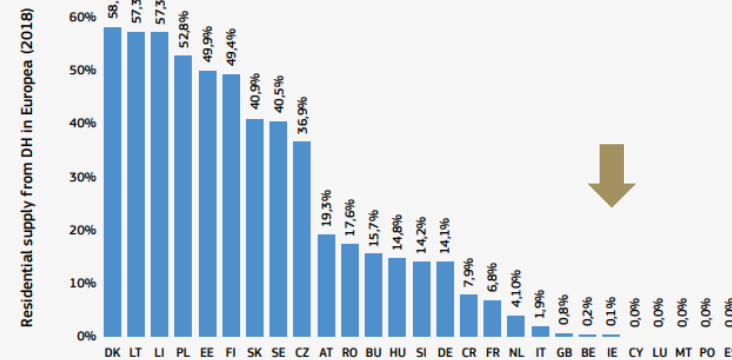
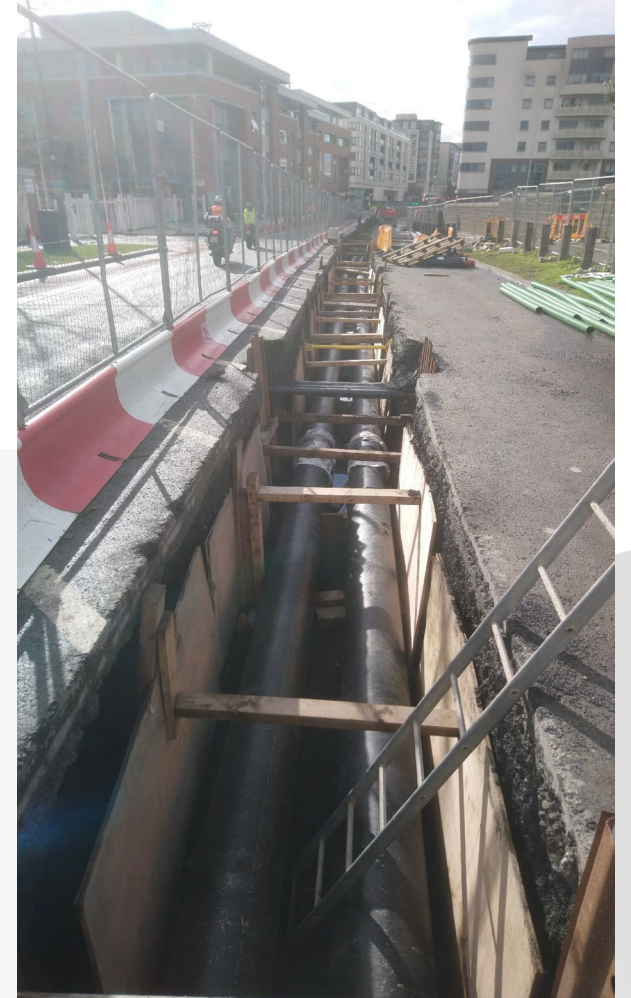


FIGURE 1: SHARE OF RESIDENTIAL HEAT SUPPLY FROM DH IN EU COUNTRIES.

Source: [Sayegh et al. 2023](#)

District Heating Projects in Europe



Amager Resource Centre/CopenHill, Copenhagen

Pit Thermal Energy Storage

Aalborg, Denmark

A Pit Thermal Energy storage (PTES) using a large water reservoir used for storing thermal energy.

Benefits

- Utilization of excess heat and energy
- Increased system flexibility
- Cost-efficient energy storage
- Possible integration with solar, biomass, and heat pump technologies
- Can be used as both cold and heat storage



PIT THERMAL ENERGY STORAGE

for increased efficiency and flexibility



AALBORG CSP
- Changing Energy

Heat Policy Statement



- Under remit of the Heat and Built Environment Taskforce
- Undergoing a full Environmental Assessment
- A public consultation is being planned for 2024.



Phase out of Fossil Fuel Heating Systems Roadmap



- CAP commits to develop and publish a roadmap to phase out fossil fuel heating systems in all buildings.
- DECC is currently working with SEAI and consultants to prepare a draft Roadmap.
- A public consultation is also being planned for later in 2024.



Renewable Heat Obligation



- Incentivise suppliers of fossil fuels used for heat to ensure a percentage of the energy they supply is from a renewable source.
- In terms of a natural gas replacement, biomethane will play a key part in supporting the decarbonisation of Ireland's heat sector through this scheme.
- Following key stakeholder engagement, the parameters of the RHO are currently undergoing design, with a high level scheme expected to be published later this year.





Thank you

Contact: Heatpolicy@decc.gov.ie



An Roinn Fiontar,
Trádála agus Fostaíochta
Department of Enterprise,
Trade and Employment

Decarbonising Industry Emissions Policy & Pathways

SEAI Energy Show
6th March 2024

Joseph Cummins

joseph.cummins@enterprise.gov.ie

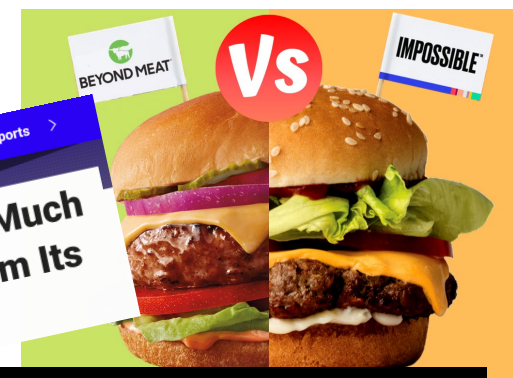
Policy

- Climate Act 2021
- EU Green Deal & Fit for 55
 - CSRD
 - Industrial Emissions Directive
 - Circular Economy Action Plan
 - EcoDesign Directive
 - Renewable Energy Directive
 - CBAM
- Sustainable Activities Taxonomy
- REPowerEU

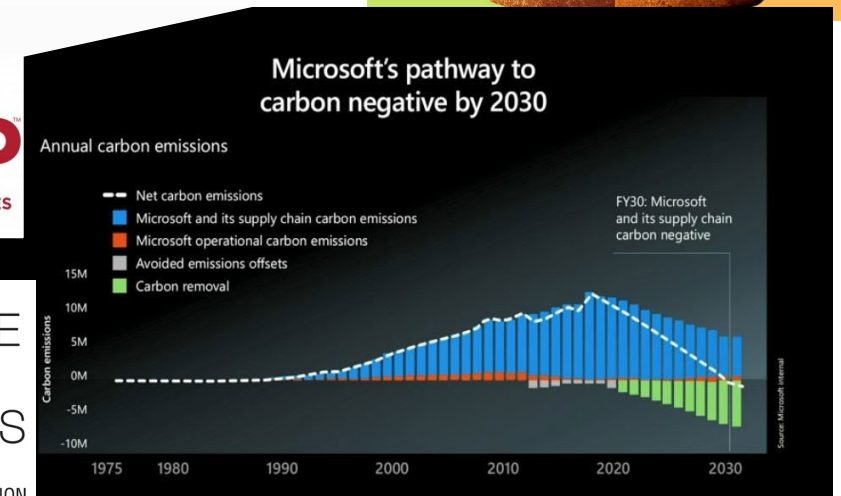


Markets

- Carbon pricing
- Changing customer preferences
- Increasing prominence of ESG

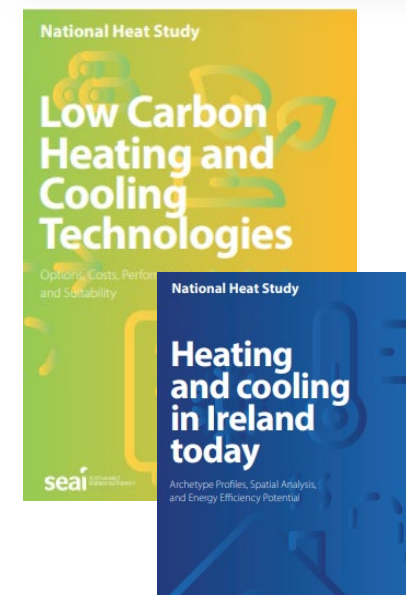


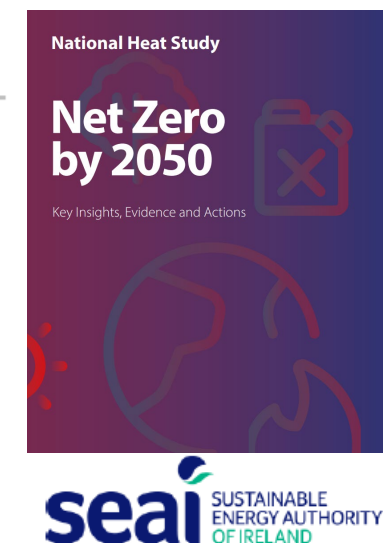
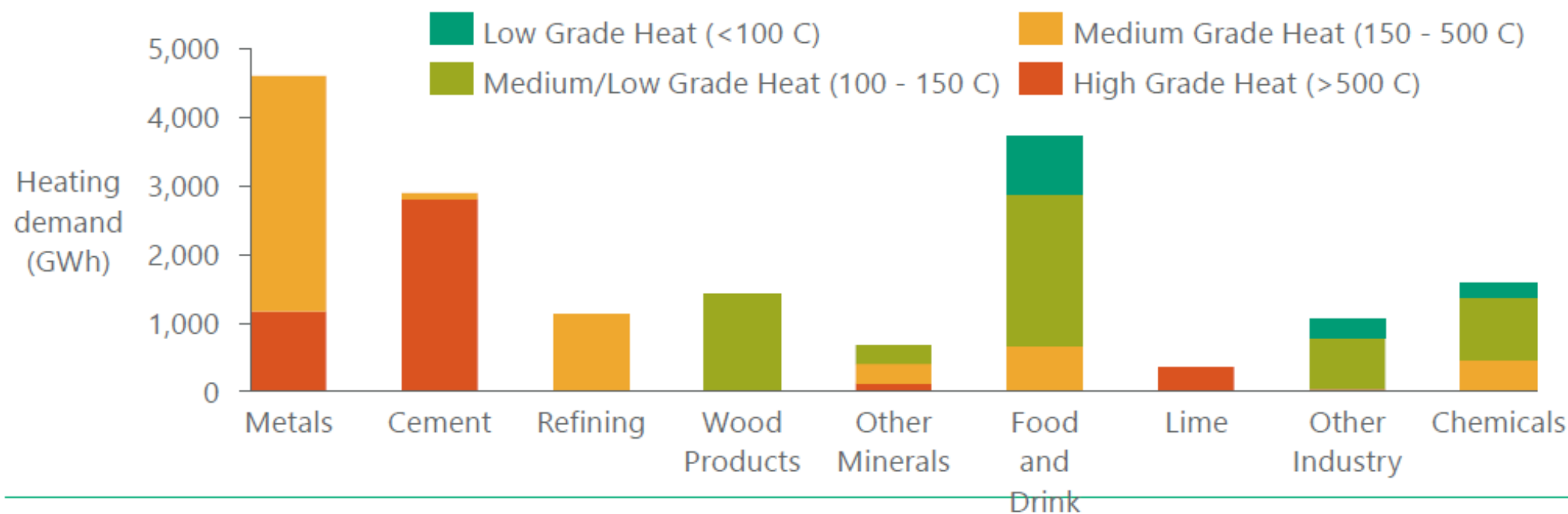
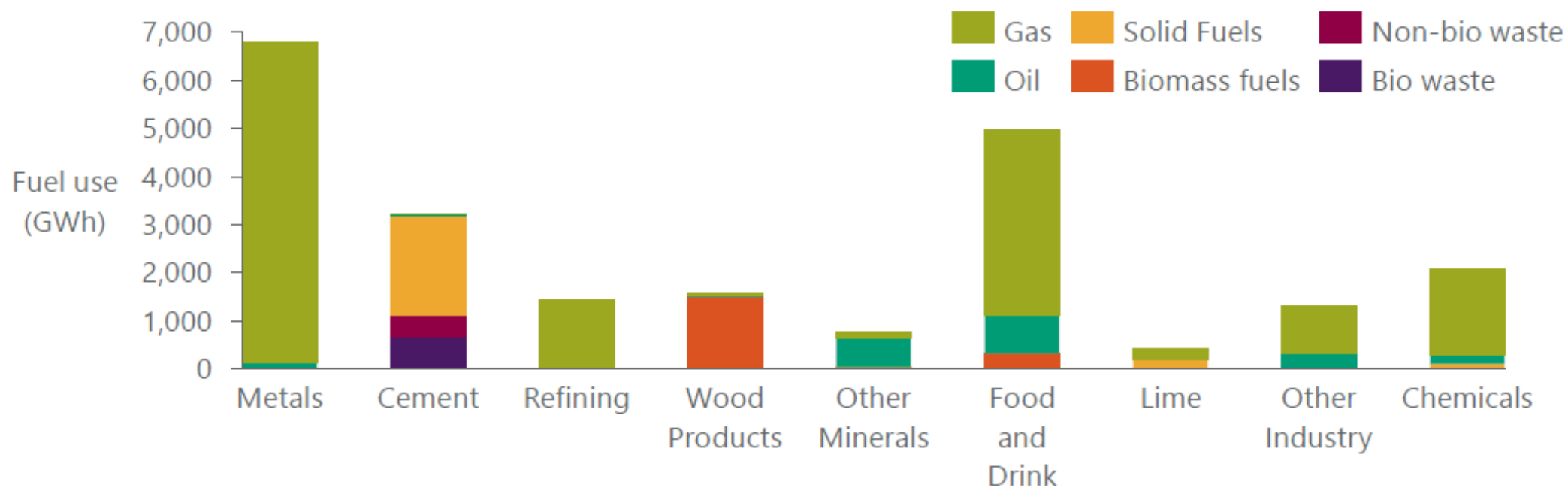
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION



Key Messages

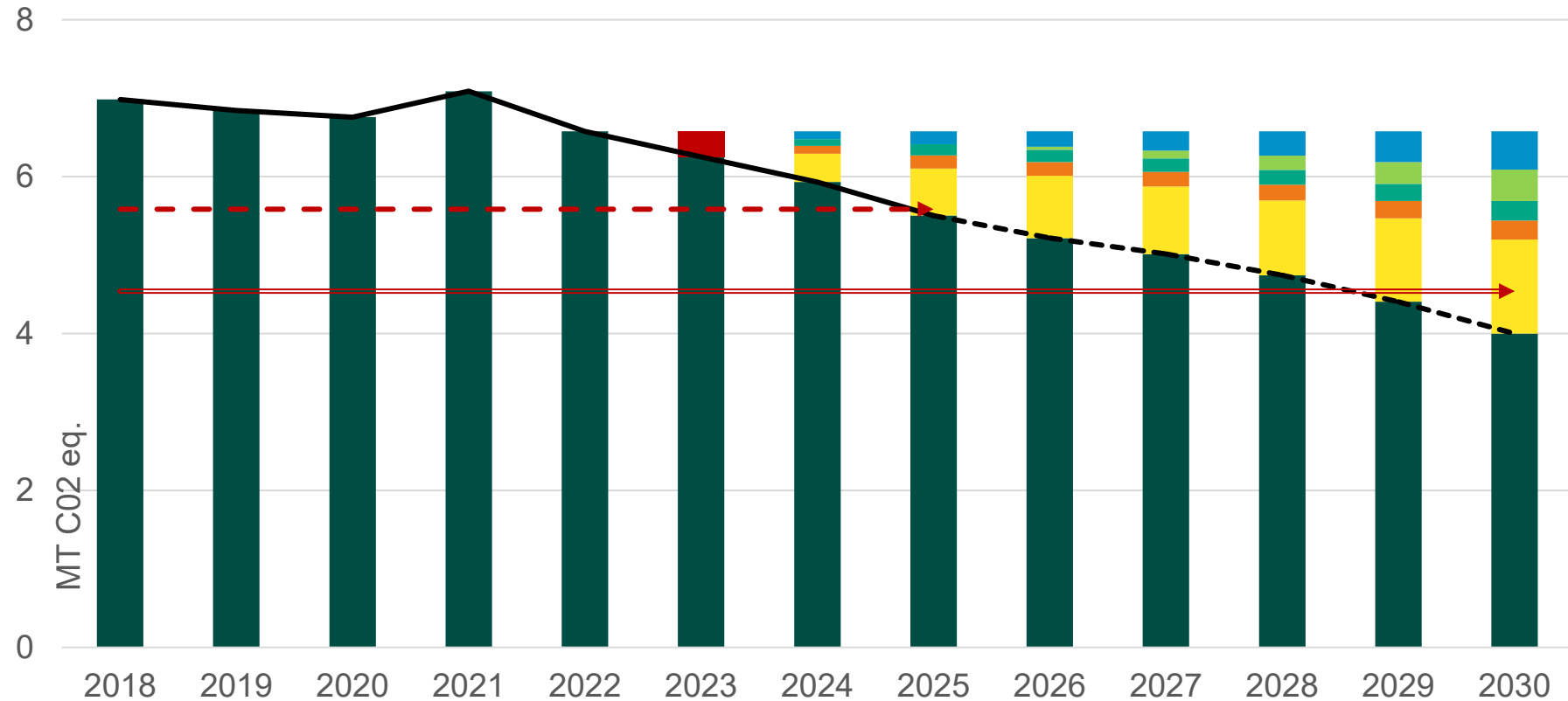
- Green transition is central to industrial policy – and key to future competitiveness
- Decarbonisation pathways are varied - each facility will need to assess its requirements
- Agencies targeting high impact projects – significant support now available.
- Electrification primarily through heat pumps for heating requirements up to $\sim 150^{\circ}\text{C}$ (or higher!)
- Biomethane for high heat processes difficult to electrify.
- Efficiency measures, including through fuel switching – opportunities in heat recovery, thermal storage and flexible electrification.





Industry Emissions Pathway

- Between 2018-2022, manufacturing and industrial emissions have fallen by approximately 5.8%, led by an 8.6% reduction in manufacturing combustion.
- Compared to industrial processes, manufacturing combustion has greater potential emission reductions in the earlier budget periods.
- Technologies key to decarbonisation will be electrification, biomass and biomethane - plus energy efficiency.



■ Expected CO2 Reductions 2023
■ Carbon Reductions in Cement
■ Biomethane

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graph TD; A[Audit] --> B[Monitor / Digitalise]; B --> C[Plan (Efficiency & Fuel Switching)]; C --> D[Invest]; D --> E[Monitor]; E --> F[Communicate]; E --> D;
```

A vertical flowchart illustrating the stages of a digitalisation project. The stages are represented by blue rectangular boxes with white text, connected by downward-pointing blue arrows. The stages are: Audit, Monitor / Digitalise, Plan (Efficiency & Fuel Switching), Invest, Monitor, and Communicate. A feedback loop is shown with a curved blue arrow pointing from the Monitor stage back to the Invest stage.

- Climate Toolkit 4 Business
- Energy Audit Scheme
- Green for Business
- Green Transition Fund
- EXEED / SSRH
- Accelerated Capital Allowance
- Environmental Aid Programme



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035		
	Carbon Budget Period 1				Carbon Budget Period 2					Carbon Budget Period 3						
Regulation	EEOS	Revised EEOS - expands across all energy markets and sets new thresholds and targets														
	EU ETS Directive	EU ETS II Directive - increases minimum requirements for energy users to decarbonise									ETS Free Allocation phase out/expiration					X
	EU EED Directive	Revised Energy Efficiency Directive - mandates 4-year energy audits on all SMEs														
	RED II Directive					RED III Directive										
	REPowerEU															
					Renewable Heat Obligation - incentivising energy suppliers to ensure a proportion of energy supplied is renewable											
					Private Wires Legislation - Framework for the operation of private electricity lines and cables											
Policy	CAP21	CAP23	CAP24	Future Climate Action Plans		Future Climate Action Plans		Future Climate Action Plans		Future Climate Action Plans		Future Climate Action Plans		Future Climate Action Plans		
	White Paper on Enterprise															
	National Hydrogen Strategy				Potential niche use for small scale industry					Large scale deployment envisaged for industry						
	Biomethane Strategy				Rapid scale up to 5.7 Twh by 2030											
	Industrial Heat Roadmap				(subject to ongoing monitoring/review)											
	National Heat Policy Statement															
	Roadmap for the Phase Out of Fossil Fuels															

Cement & Construction Sector Decarbonisation

Cross-Govt coordination and aligned policy. Key areas of focus:

- **Green Public Procurement – more detailed guidance imminent**
- **Enterprise Ireland direct engagement with the cement sector**
- **National Whole Lifecycle Carbon assessment, methodology, under the Energy Performance of Buildings Directive (EPBD)**
- **Promotion of Modern Methods of Construction (MMC)**
- **Promoting alternative construction materials including timber**
- **Improved circularity of material use in construction**
- **Carbon Capture Utilisation and Storage feasibility assessment (CCUS)**

Reducing Embodied Carbon through Procurement

Reduce embodied carbon in construction projects, by:

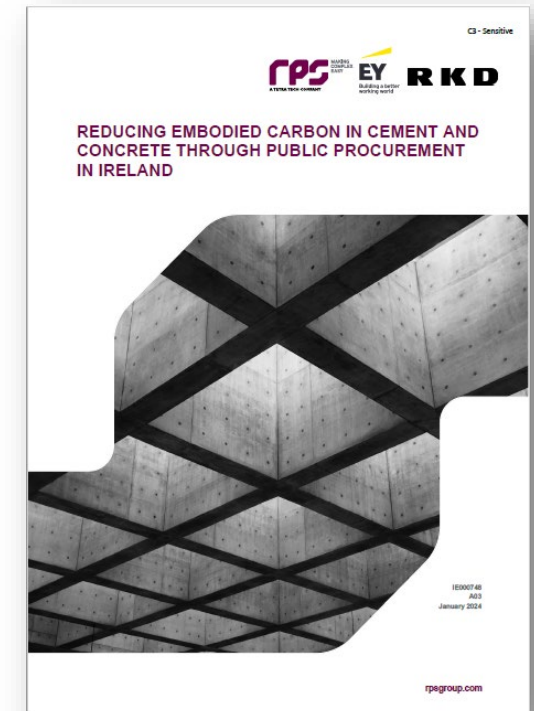
- **Using less concrete, and less cement by designing, specifying and managing products on site better**
- **Specify lower carbon concrete**
- **Specify lower carbon cement**
- **Carbon Management systems for large infrastructure projects.**

Phased approach:

- **Short Term (2023-24)** - work within existing codes and standards
- **Medium Term (2025-30)** - expanding range of codes and standards.
- **Long Term (post 2030)** - fully performance-based specifications.

Cement Sector Actions:

- Fuel switching
- Efficiency / heat recovery
- Alternative cementitious materials
- CCUS (medium-term)



Challenges to Industrial Decarbonisation

- Awareness, understanding and activation across all enterprise sectors
- Spark Gap – price of electricity relative to gas
- Technology and cost viability timeframe in some sectors (CCS, Hydrogen)
- Locked-In capital investments and path dependency
- Scale-up of biomethane production

Energy Policy & Industry

- Security of Supply, REPowerEU implementation, EU Market Reforms, RESS
- DETE lead on Offshore Wind Industrial Strategy
- Electricity Demand Side Strategy, Demand flexibility and grid decarbonisation work ongoing with CRU, DECC, Eirgrid, SEAI & others
- Emerging energy policy areas such as Private Wires, Energy Parks, Hydrogen to align decarbonisation of industry and renewable energy infrastructure

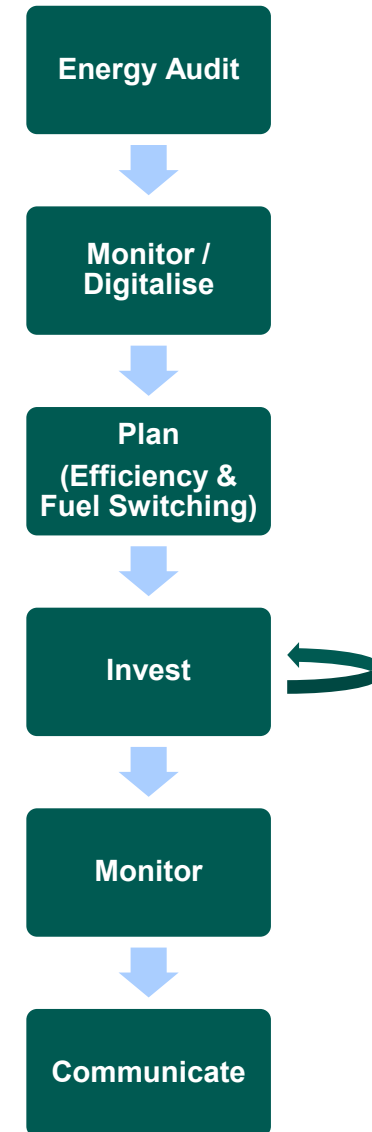


You're in a race to remove emissions.

Prioritise it!

Assign it an owner and a target.

Ask your agency for support.





Wednesday 20th March

Ann Fingleton

Targets

CAP 21 Industry targets 29% - 41%

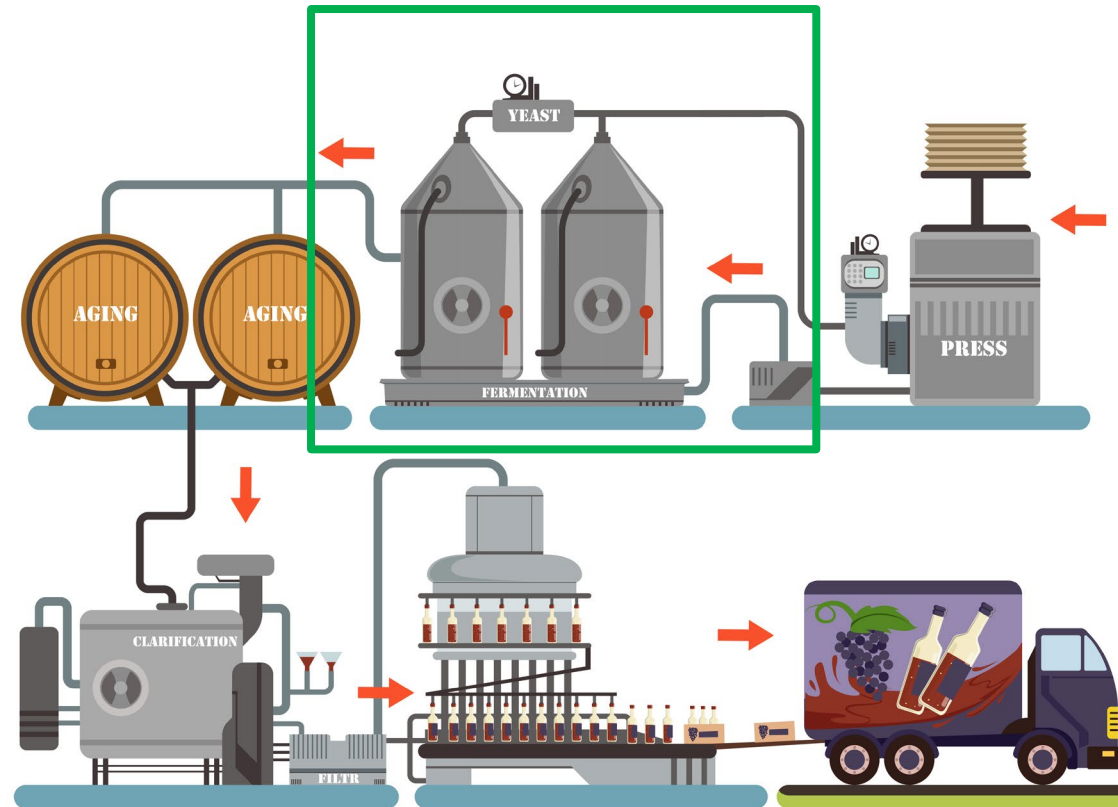
CAP 23 Industry targets 35%

3 Key Points

1. What to **measure**
2. How to **count** carbon
3. Don't forget **energy efficiency**

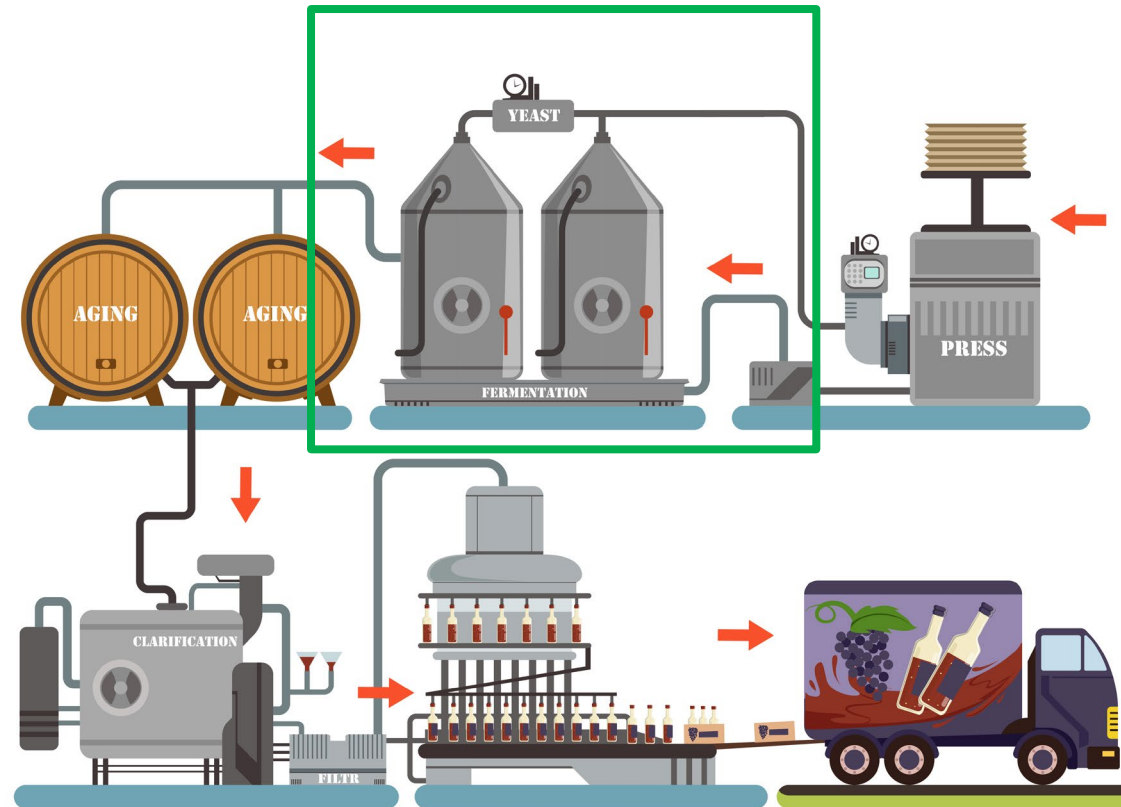
1. What to measure

Ensure the envelope is the right size



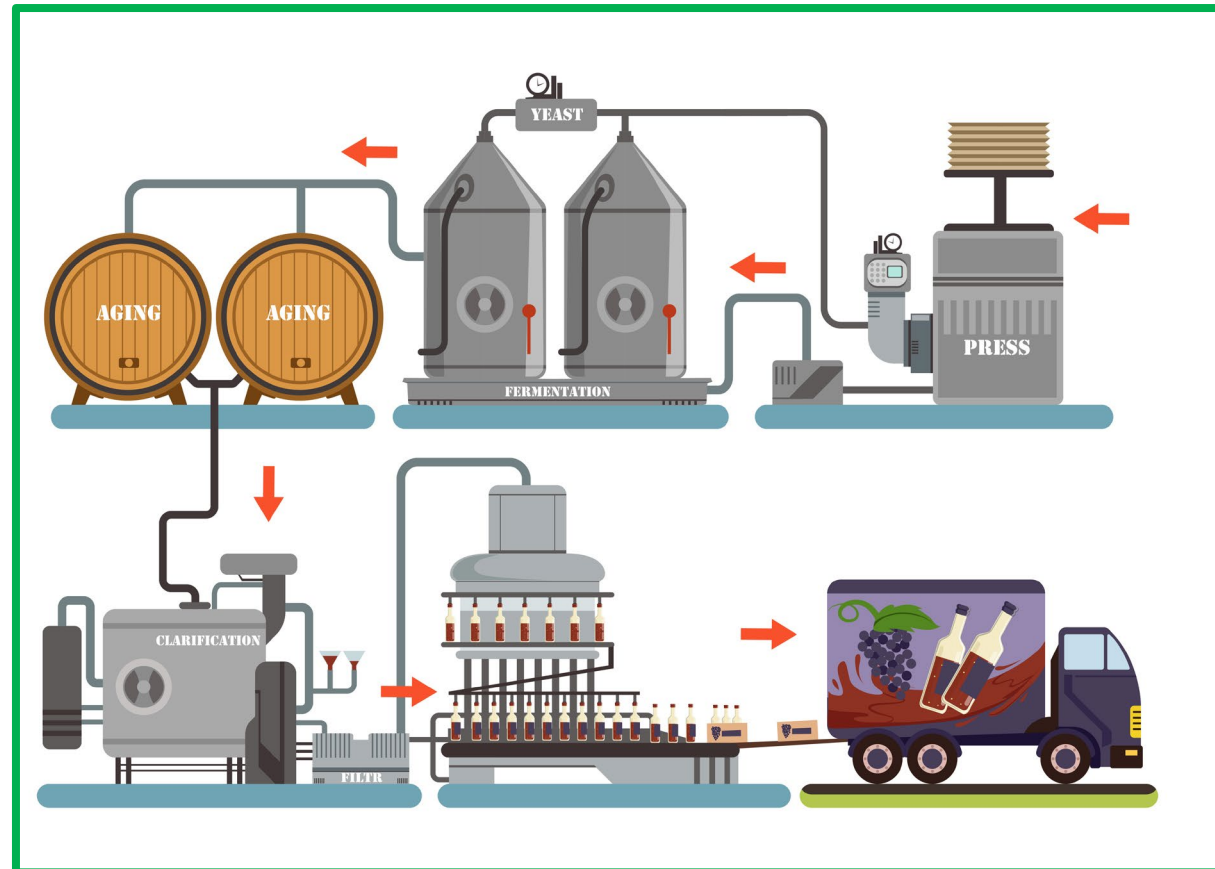
1. What to measure

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1. What to measure

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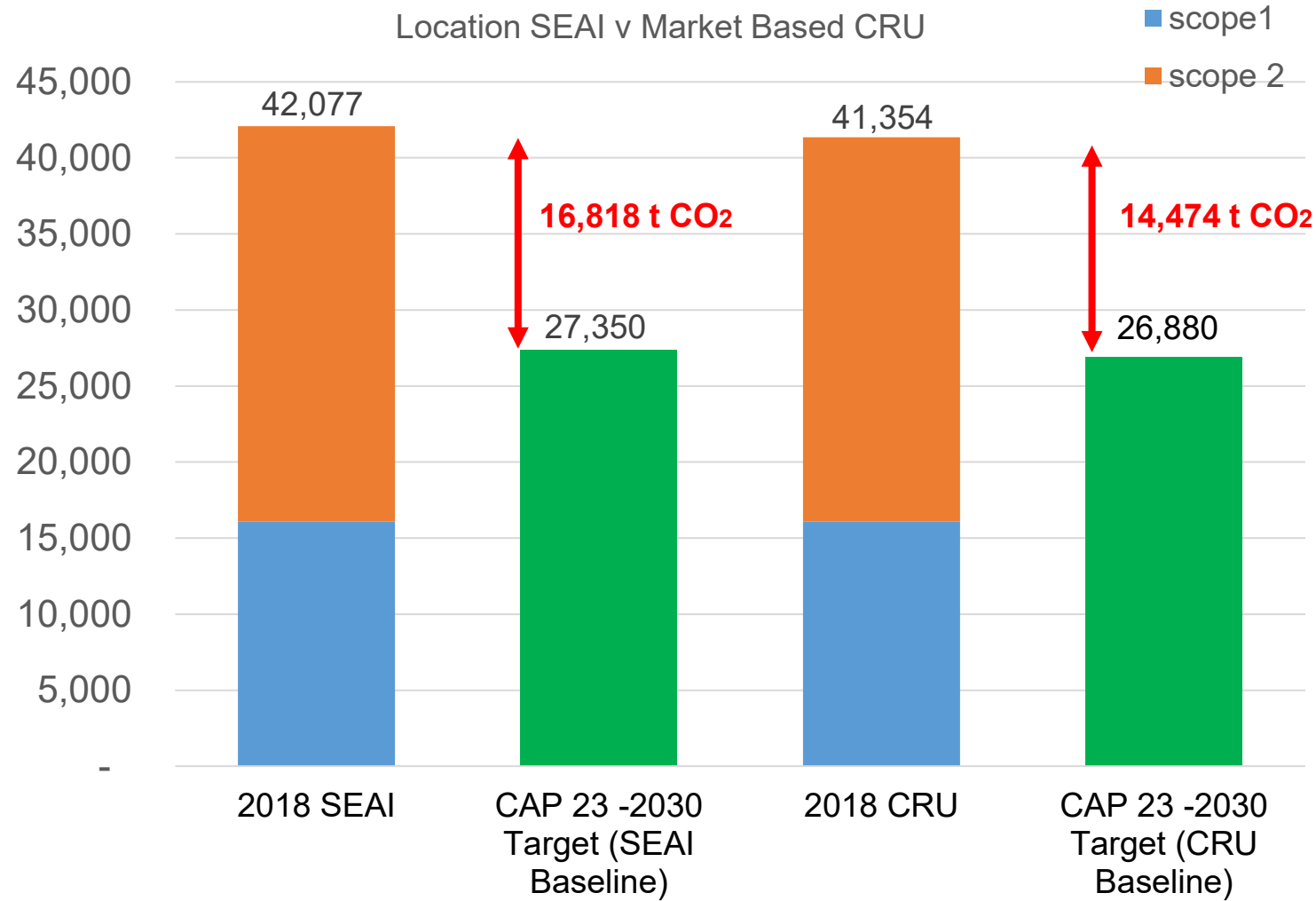
1. What to measure

$$\begin{array}{c} \text{Raw material + Energy in} \\ = \\ \text{Product + Waste} \end{array}$$

2. How to Count Carbon



2. Counting Carbon



Electricity Grid Emission Factor (gCO ₂ /kWh)		
Year	SEAI Location Based	Electric Ireland ROI Market Based
2018	375.2	333
2019	324.6	284
2020	295.8	142
2021	347.8	158

7% reduction from 2018

47% reduction from 2018

3. Energy Efficiency

Pathway	Electricity EF 2030 (gCO ₂ /kWh)	Natural Gas EF 2030 (gCO ₂ /kWh LCV)	Required Carbon Reduction by Client Actions (Tonnes)
1	347.8	202.9	14,100
2	66.52	202.9	9,100
3	66.52	180.8	6,500
4	150	202.9	10,600

Pathway 1: No Grid Reductions

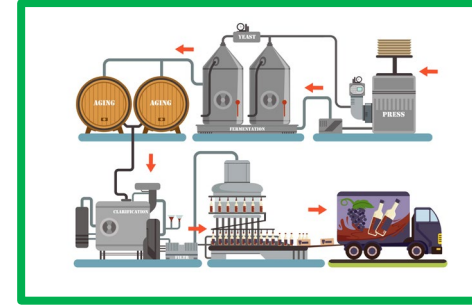
Pathway 2: Assume natural gas grid emission factors remains the same as 2022
Assume electricity grid emission factor reaches the 2030 projections in CAP 23

Pathway 3: Assume electricity grid emission factors reach the 2030 projections in CAP 23
Assume gas grid emission factors reach the 2030 projections in CAP 23

Pathway 4: Electricity Grid Reductions to 150 gCO₂/kWh
Gas grid emission factor remains unchanged

Key Points

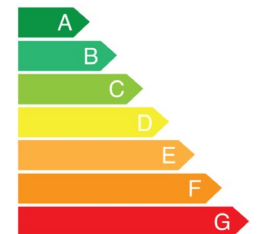
1. Ensure the envelope is the right size



2. Take your time to determine how to count your carbon impact



3. Energy Efficiency Projects - don't wait for the energy grids to decarbonise



Alexion AstraZeneca Decarbonisation Journey & EXEED



Eddie Garry - EHS & Sustainability Manager Alexion
Pharmaceutical Dublin

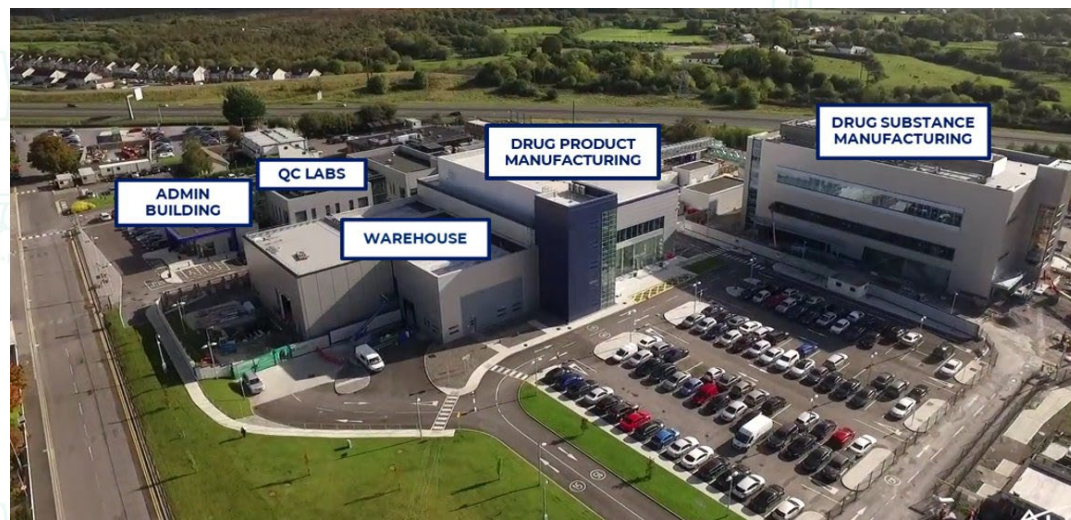
20-21 March 2024

AstraZeneca Alexion – Dublin & Athlone



Dublin - BioPharma

- Bulk Drug Substance Manufacturing
- Commercial & Clinical Secondary Packaging
- QC Global Centre of Excellence
- Quality Assurance Release & Certification
- External CMO Management
- Global Supply Chain
- HR , IT & Finance

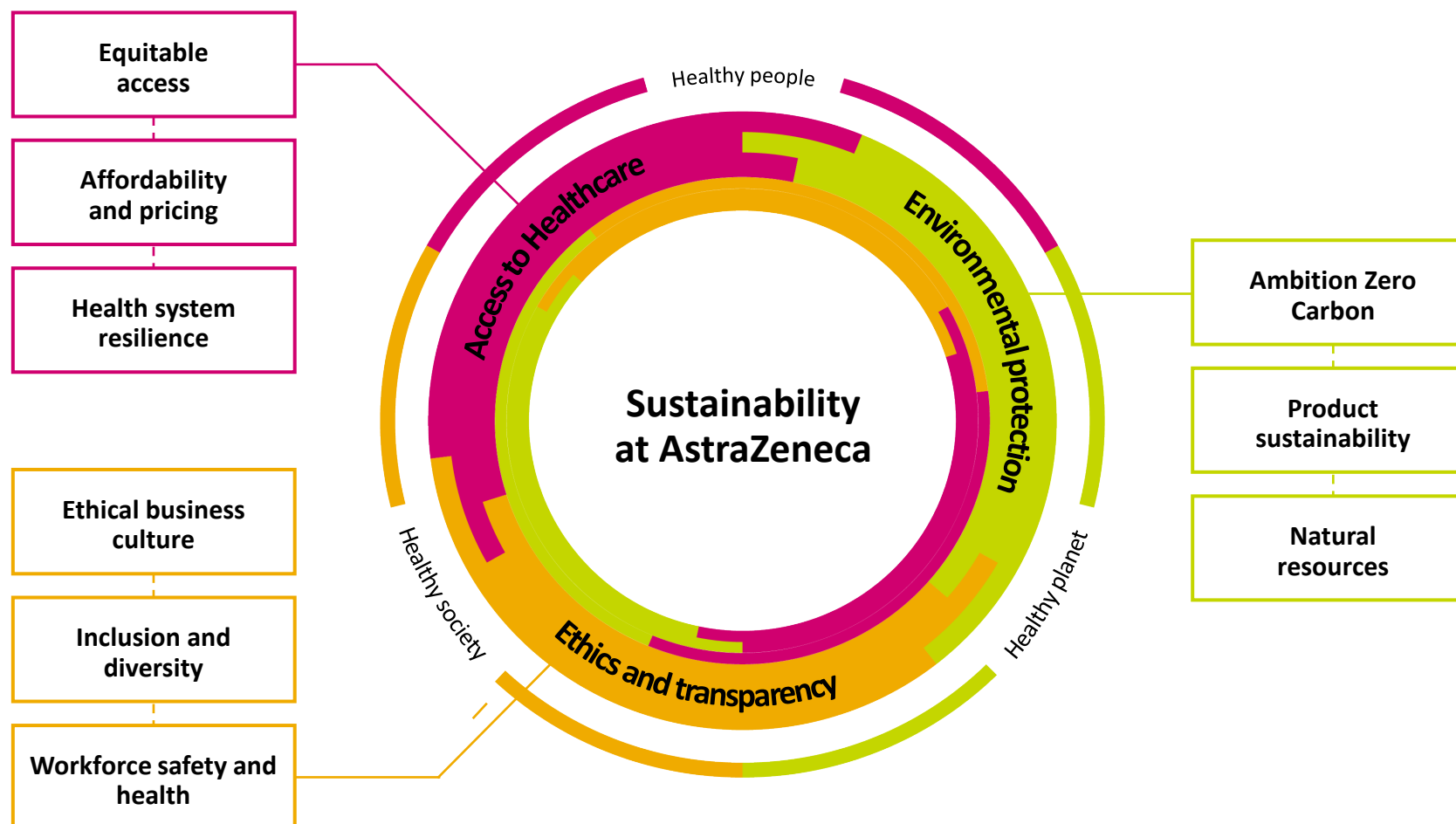


Athlone - BioPharma

- Aseptic Drug Product Biologics Manufacturing
- Commercial Drug Substance Biologics Purification
- Clinical Drug Substance Biologics Manufacturing

AZ Sustainability Strategy

For AZ there are three interconnected sustainability priorities **Access to healthcare**, **Environmental protection**, and **Ethics and transparency** are underpinned by nine material focus areas where we can make the most impact.



Environmental Protection

We are accelerating the delivery of net zero healthcare, proactively managing our environmental impact, and investing in nature and biodiversity



Ambition Zero Carbon

Through our flagship, science-based climate strategy we will deliver deep decarbonisation across our global business and value chain



Product sustainability

We will design and deliver medicines in a way that is respectful of our planet, and ensure the environmental safety of our life-changing medicines throughout their life cycle



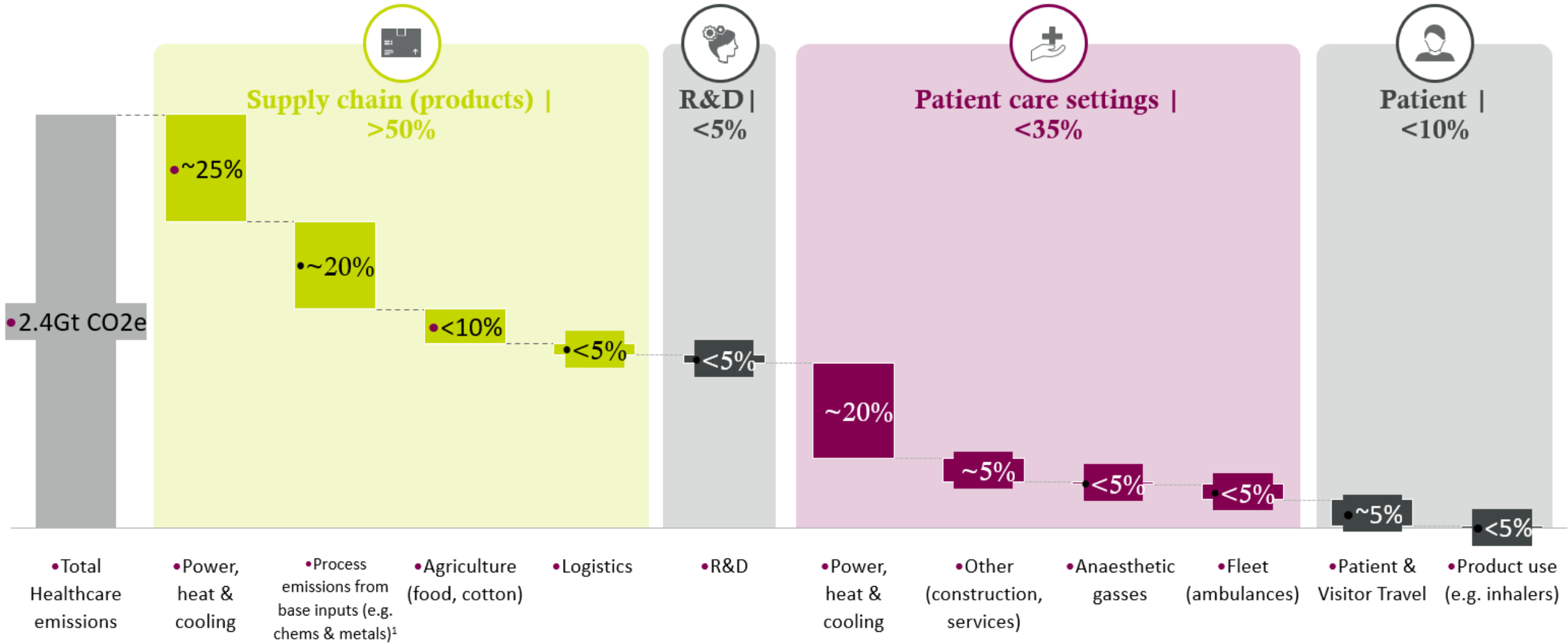
Natural resources

We are committed to reducing our reliance on natural resources, integrating a circular approach across our value chain, and investing in nature and biodiversity, incl. through AZ Forest.



Healthcare drives ~2.4Gt CO₂e p.a. (~4-5% global emissions)

Most emissions are created in supply chains (products) and patient care settings



¹ Includes manufacturing of metals, textiles, mining, food, equipment (and also expected to include glass for packaging).

Source: Healthcare without harm/ Arup (2019); Healthcare without harm/ world bank (2017); UK National Health Service/ Lancet (2020); The Lancet countdown (2020, 2018); Environmental research letters (2019); Health affairs (2020); BCG analysis.



Ambition Zero Carbon

Through our flagship science-based climate strategy we will deliver deep decarbonisation across our value chain.

From 2026 we will have eliminated, reduced and substituted our Scope 1 and 2 GHG emissions by:

- Switching to a fully electric vehicle fleet
- Using 100% renewable energy for heat and power and heat
- Doubling energy productivity
- Eliminating F-Gas emissions at our sites

What is happening at Alexion:

- At our Manufacturing and R&D sites we have: implementing projects to reduce energy, sourced renewable electricity and are investigating solutions for renewable heat
- In International & Japan, where we have fleet vehicles they are being converted to EVs
- Our Procurement team are working with our suppliers to ensure our value chain is carbon negative by 2030

We will become carbon negative across our value chain by 2030, our Scope 3, and have committed to:

- 95% of key suppliers and partners to have science-based targets by end of 2025
- Transition to next-generation respiratory products with near-zero climate impact propellants
- ‘Design in’ sustainability across product lifecycles and embed net zero into cost of goods

We were one of the first seven companies worldwide to have our net zero, science-based Scope 1-3 GHG emissions reduction targets, verified under the new Science Based Targets initiative Net-Zero Corporate Standard, and aim to be net zero by 2045

Product Sustainability

We proactively manage the environmental impact of our life changing medicines across their lifecycle through:

- Maximising the resource efficiency of our API manufacturing processes
- Conducting life cycle assessments (LCA) to determine the type and magnitude of environmental impacts across our product value chains
- Ensuring our active pharmaceutical ingredient (API) discharges are safe
- Conducting environmental risk assessments and making those data transparent
- Developing a Product Sustainability Index
- Conducting ecopharmacovigilance (EPV) to track the environmental risks associated with the patient use of our products
- Cutting edge research to understand the environmental impact of our products
- Integrating clinical and environmental data in a care pathway context (respi and CKD)

An example of product sustainability within Alexion

- Alexion has completed Life Cycle Assessments (LCAs) on Soliris to fully understand the impact and opportunities to improve sustainability
- Patients treated with Soliris® are required to be infused every 2 weeks (26 times per year), patients treated with Ultomiris® require infusion every 8 weeks (6-7 times per year)
- Patient have 19-20 less trips to their infusion centre every year – this saves on emissions associated with transport to get to and from the infusion centre

We launched an internal Product Sustainability Index (PSI) in 2021 to advance product environmental performance and innovation across our therapy areas

We are committed to protect natural resources that are essential for the production of our medicines, and the health of our planet and society by:

- Driving resource efficiency in everything we do
- Maximising opportunities to embed circularity across our value chain to minimise our water and natural resource consumption
- Embedding responsible sourcing, consumption, production and disposal practices across our business and value chain
- Protecting and restoring ecosystems to improve health outcomes
- Tackling environmental drivers of disease, such as water and air quality

**Our leadership
in tackling
climate change
and protecting
water security
has been
recognised by
CDP-worldwide
with a double A
rating, for the
sixth
consecutive
year**

Delivering Ambition Zero Carbon



CO₂ SF₆ CH₄ N₂O HFCs PFCs

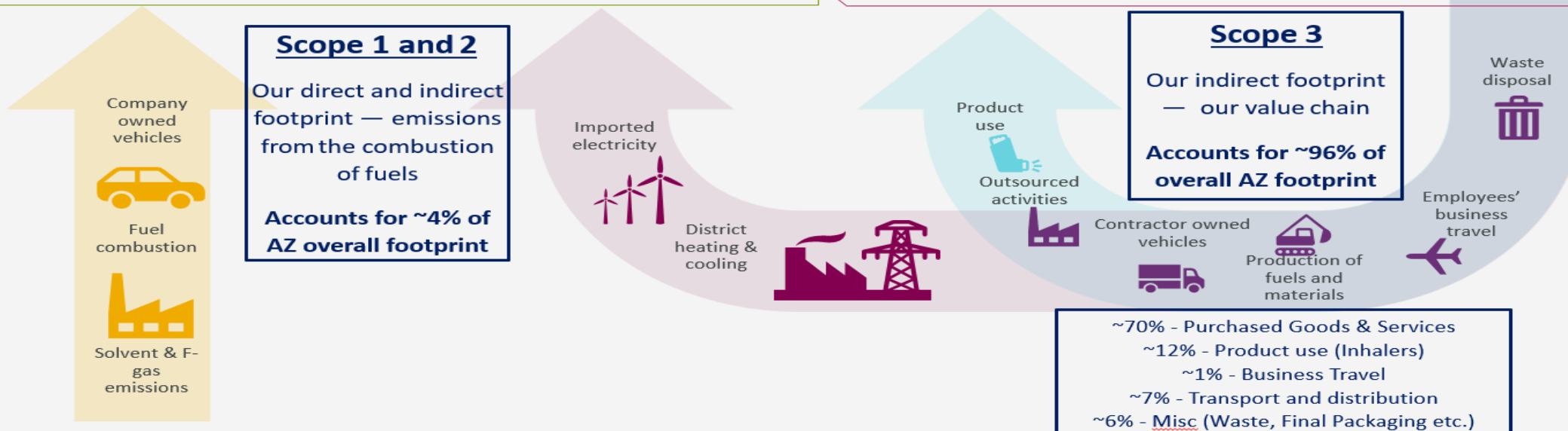
**Ambition Zero
Carbon 2025**

Scope 1
Direct

Scope 2
Indirect

Scope 3
Indirect

**Carbon Negative
Value Chain 2030**



Site Expansions @ Alexion AstraZeneca Dublin & Excellence in Energy Efficiency Design

- In 2022 AstraZeneca announced the investment of > €350 Million in a new Active Pharmaceutical Ingredients (API) facility @ Alexion's Dublin Campus . This was followed an announcement construction of a new QC Lab & Warehouse Expansion to support Alexion & AstraZeneca operations
- This was a significant site expansion and had the potential to greatly increase the campus energy & carbon footprint .
- To ensure that new facilities were designed and would be operated to the highest sustainability standards an EXEED Programme was initiated to run in parallel with the various design stages of the three respective new build projects

Stage 1 - Complete

Stage 2 - Application Submitted & Letter of Offer Issued



Significant Energy Savings:

- Cumulative electric energy savings (Scope 2) of 1,276,569 kWh.
- Substantial thermal energy savings (Scope 1) of 6,468,111 kWh.

Cost Efficiency and Return on Investment (ROI):

- Total annual savings of > €500,000
- Demonstrates a strong business case for investment in energy-efficient initiatives.

Environmental Impact and Sustainability:

- Contribution to decarbonization efforts with 430 T CO₂ eq reductions with reduced energy consumption.
- Preservation of natural resources through efficient energy management.

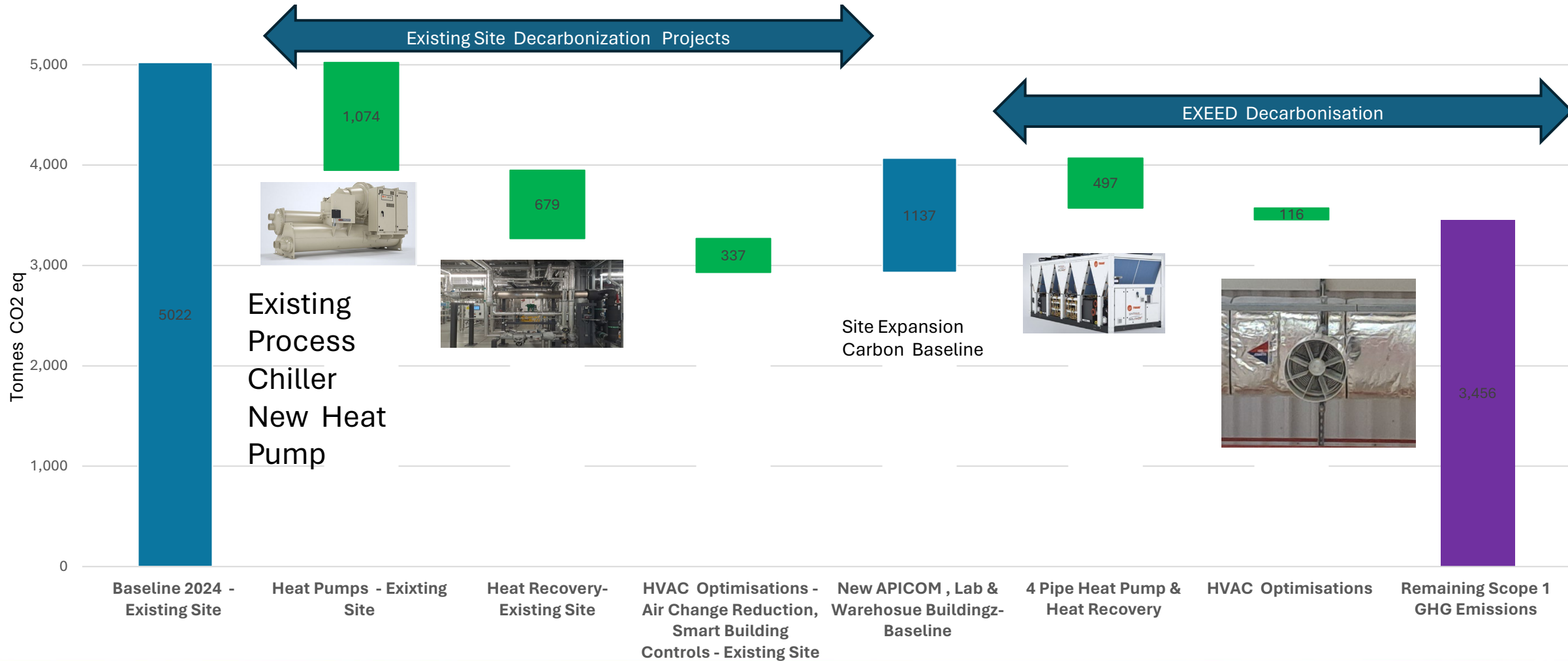
Technological Advancements and Innovation:

- Adoption of cutting-edge technologies such as 4-Pipe Heat Pumps , IE4 motors, and smart factory controls.
- Setting industry standards for energy-efficient design and operation.

Enhanced Operational Performance:

- Improved efficiency in HVAC systems and process equipment.
- Streamlined operations leading to increased productivity and reduced downtime.

Carbon Emission Baseline & Reductions



Boston Scientific – Boston Scientific Journey



**Boston
Scientific**
Advancing science for life™



Decarbonisation through
Electrification of Heat

Sergio Contreras – Snr. Energy Engineer – March 2024

Boston Scientific

Advancing science for life™

Our Mission + Values

Boston Scientific is dedicated to **transforming lives** through **innovative medical solutions** that **improve the health of patients** around the world.

Caring

*Meaningful
Innovation*

*High
Performance*

*Global
Collaboration*

Diversity

*Winning
Spirit*





Transforming Lives Across the Globe

**Boston
Scientific**
Advancing science for life™

- 
- Approximately **130 countries** with commercial representation
 - **45,000** employees at **147** sites including **15** principal manufacturing facilities
 - Approximately **40%** of our net sales in 2022 were outside the U.S.



Boston Scientific

Focusing on Category Leadership

NEUROMODULATION

Electronic implantable technologies that help patients manage debilitating chronic pain and neurological conditions

PERIPHERAL INTERVENTIONS

Leading devices for diagnosis and minimally-invasive treatments of peripheral vascular disease and cancer

ENDOSCOPY

Minimally invasive devices for diagnosing and treating gastrointestinal and airway conditions

UROLOGY

Comprehensive solutions to support kidney stone removal, prostate health, erectile restoration and urinary continence

CARDIAC RHYTHM MANAGEMENT

Groundbreaking technologies that monitor, support diagnosis, and treat irregular heart rhythms, heart failure and sudden cardiac arrest

ELECTROPHYSIOLOGY

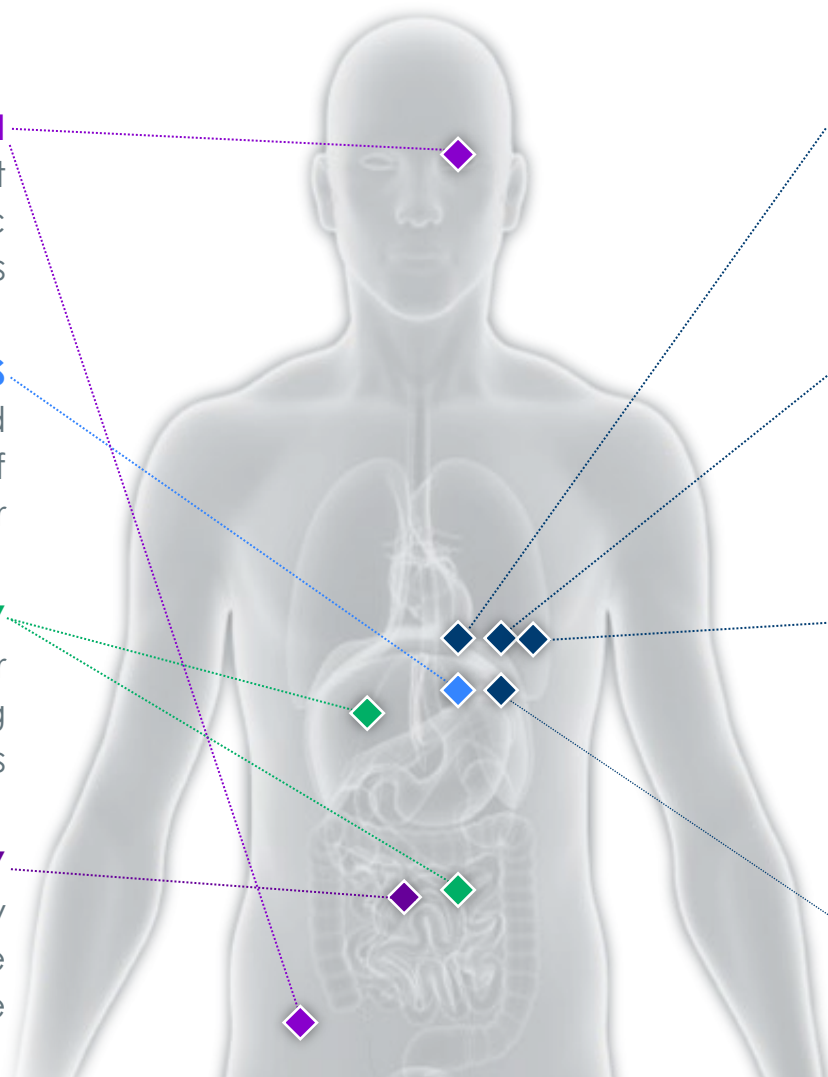
A broad range of technologies for diagnosing and treating heart rhythm disorders

WATCHMAN

The WATCHMAN FLX™ Implant is built on the most studied and implanted left atrial appendage closure device in the world, designed to advance procedural performance and safety

INTERVENTIONAL CARDIOLOGY THERAPIES

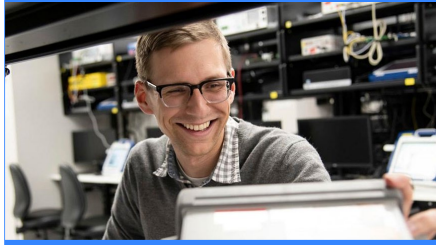
Minimally invasive technologies to improve the lives of patients living with heart and vascular conditions





Living Our Values

Transforming Care



33+ million
patients served

\$1.3+ billion
invested in R&D for products
to advance patient care¹

Zero findings
resulting in action following
325+ external audit days

Investing in Our People



80%
overall employee
engagement score

42.6%
supervisor and manager
roles held by women (*global*)

22.6%
supervisor and manager
roles held by multicultural
employees (*U.S./Puerto Rico*)

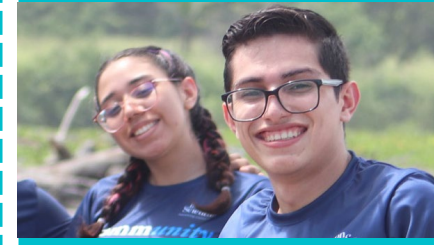
Accelerating Possibilities



\$67 million
donated to fund medical
research, fellowships,
education and charitable
organizations globally

121,000+
women and people of color
identified in health action plans
to advance equitable care in
underserved U.S. communities

Protecting the Environment



**Targets
Approved**

net-zero and greenhouse gas
(GHG) emission reduction
targets approved by Science
Based Targets initiative (SBTi)

76%
renewable electricity²

Creating Value Responsibly



~37 million
products
delivered in 2022

99%+
of all employees have
completed Code of
Conduct training

1. Represents GAAP R&D expense per 2022 Annual Report on Form 10-K.

2. Purchased electricity matched with electricity from renewable sources, inclusive of all manufacturing and key distribution sites only.



Protecting the Environment

Reducing our environmental impact



Key Targets and Milestones

Carbon neutrality by 2030



Decarbonising our energy systems in manufacturing sites and key distribution centres

CN2030 is a sub-set of BSC Net-zero goal

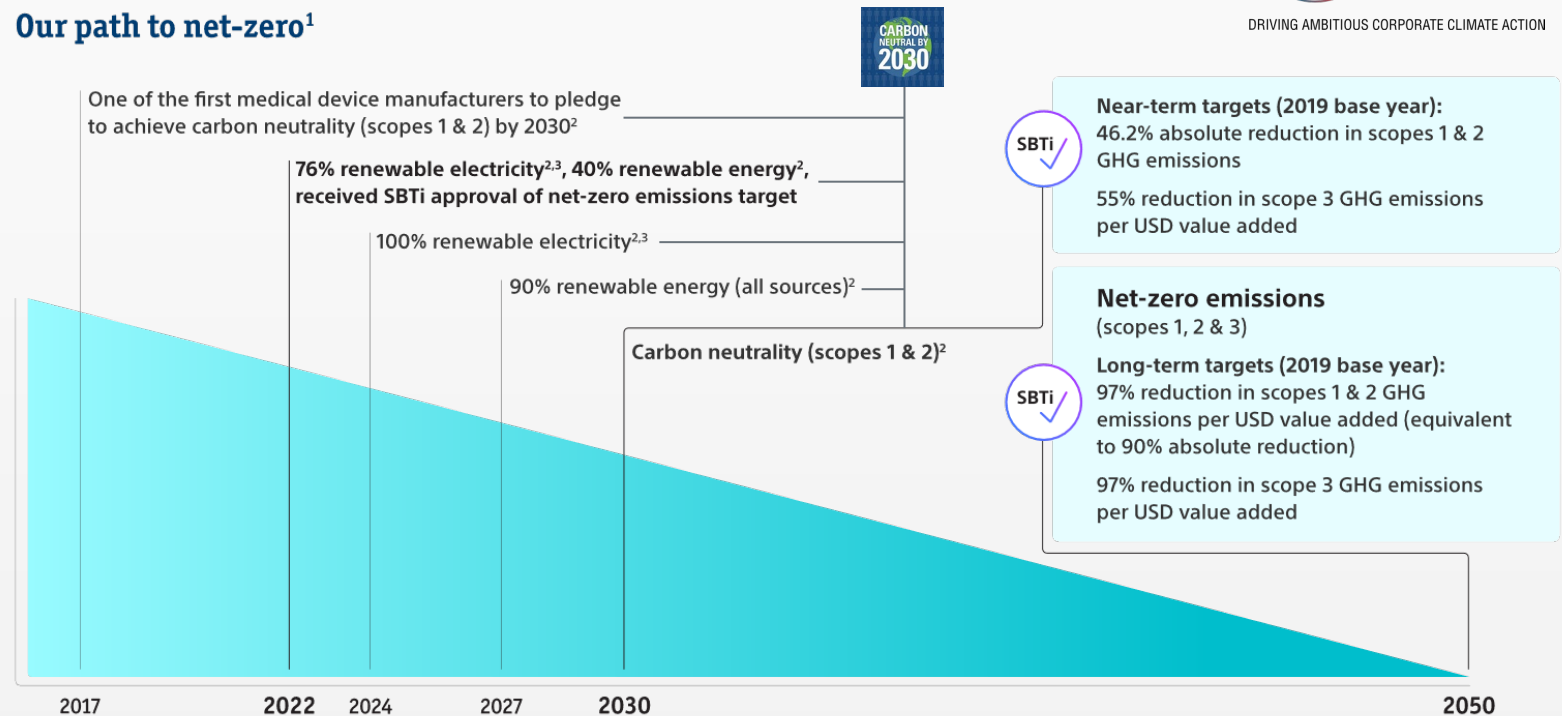
Net-zero greenhouse gas emissions by 2050



Decarbonising BSC activities company-wide, including our supply chain

Transformation of our supply chain

Our path to net-zero¹



¹ Trajectory to net-zero emissions defined by science-based targets to reach net-zero greenhouse gas emissions across the value chain by 2050 from a 2019 base year.

² Inclusive of all manufacturing and key distribution sites only.

³ Purchased electricity matched with electricity from renewable sources.



Protecting the Environment

Boston Scientific alignment with national goals



3 manufacturing sites in Ireland



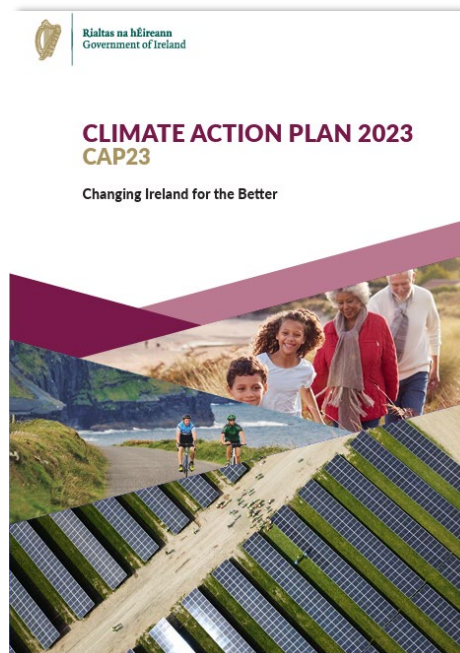
~7,000 employees



~30% of BSC energy
use globally¹



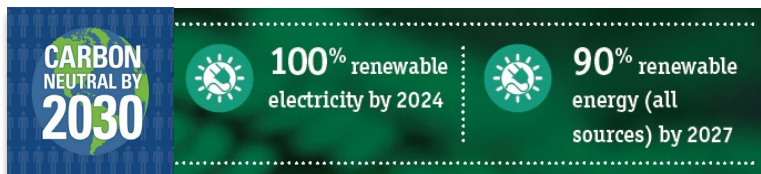
~45% of BSC scope 1
GHG emissions
globally¹



Climate Action Plan for Ireland

Reduce country's
greenhouse gas
emissions by 51%
by 2030

Incl. 35% reduction for industry



Boston Scientific decarbonisation goals are aligned with Ireland's Climate Action Plan

Boston Scientific aims to reduce its Scope 1 & Scope 2 GHG emissions by ~90% by 2027
in our 3 sites in Ireland.

In collaboration with IDA and SEAI, we are working towards Ireland's decarbonisation goals while
ensuring a **competitive position for our Irish manufacturing sites in the global MedTech industry**

¹ Inclusive of all manufacturing and key distribution sites (scopes 1 & 2) only.



Protecting the Environment

Our approach to carbon neutrality by 2030¹



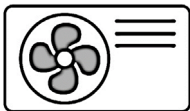
Cut
energy use



Efficiency
ISO 50001:2018 certified

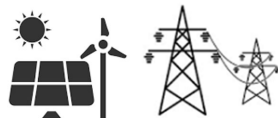


Convert
to renewable energy



Electrification of heat*

Heat pumps, electric boilers



Renewables

PPA, vPPA, GOs purchases,
Green tariffs, On-site PV solar



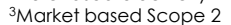
Compensate
for unavoidable emissions



Carbon removals
Only after cut & convert

* **Heat needs:** mostly low temperature (<100 degC) for HVAC / controlled environments, clean rooms and office spaces

¹ Inclusive of all manufacturing and key distribution sites (scopes 1 & 2) only.





Protecting the Environment

Electrification of heat – capex & opex

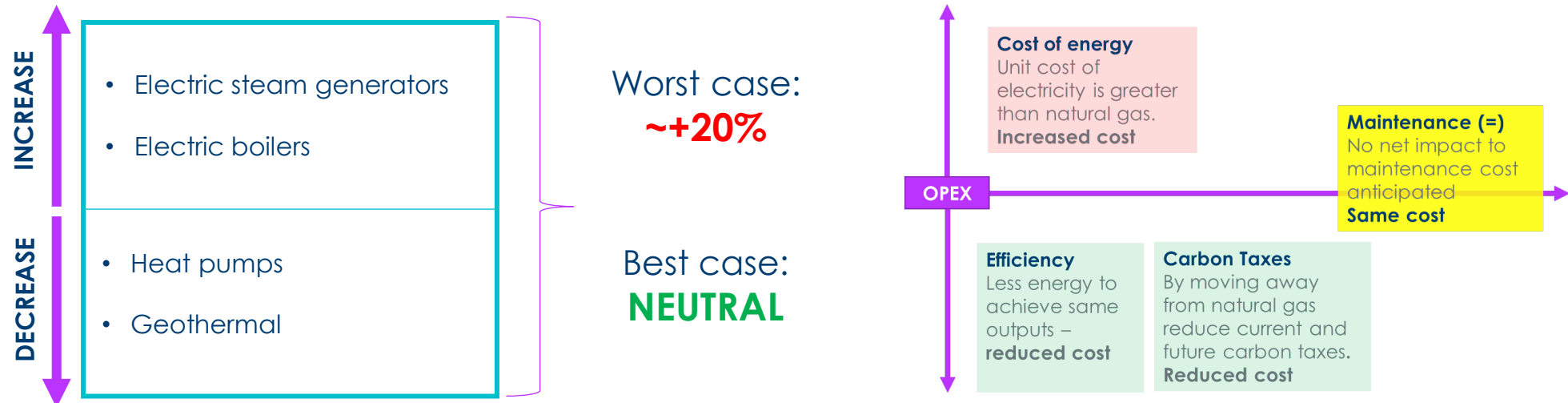
Electrification for existing sites

CAPEX

Average **16%** Facilities capital spend.

OPEX

Opex Impact





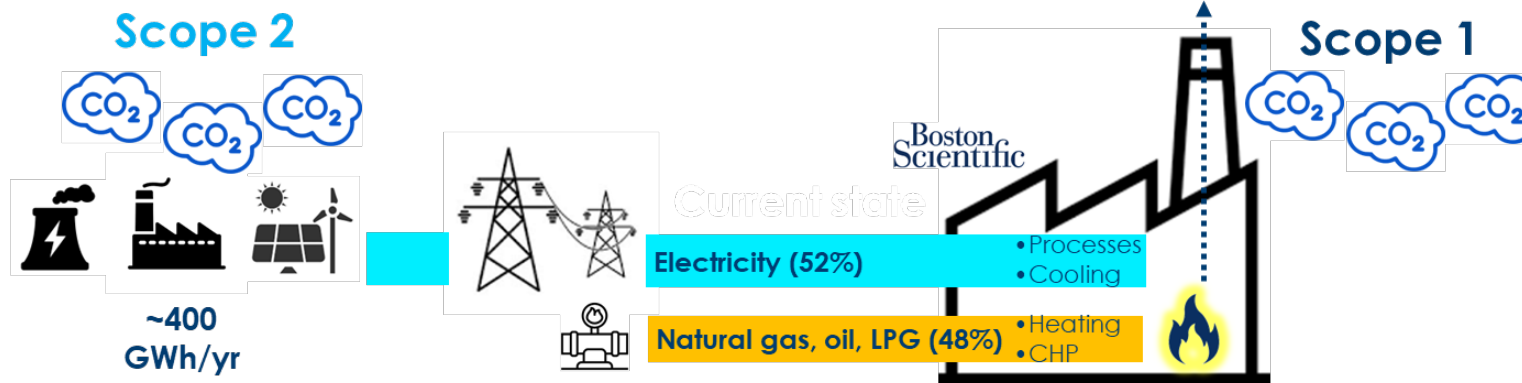
Protecting the Environment

Interim goal - 90% renewable energy by 2027

Boston
Scientific



Current
state

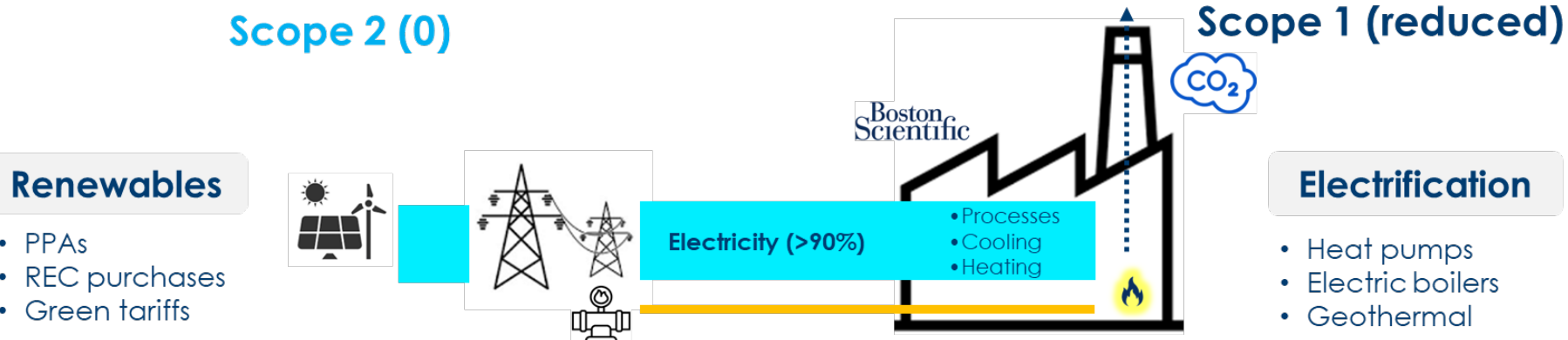


Strategy

Electrification of heat supported by renewable electricity



Future
state

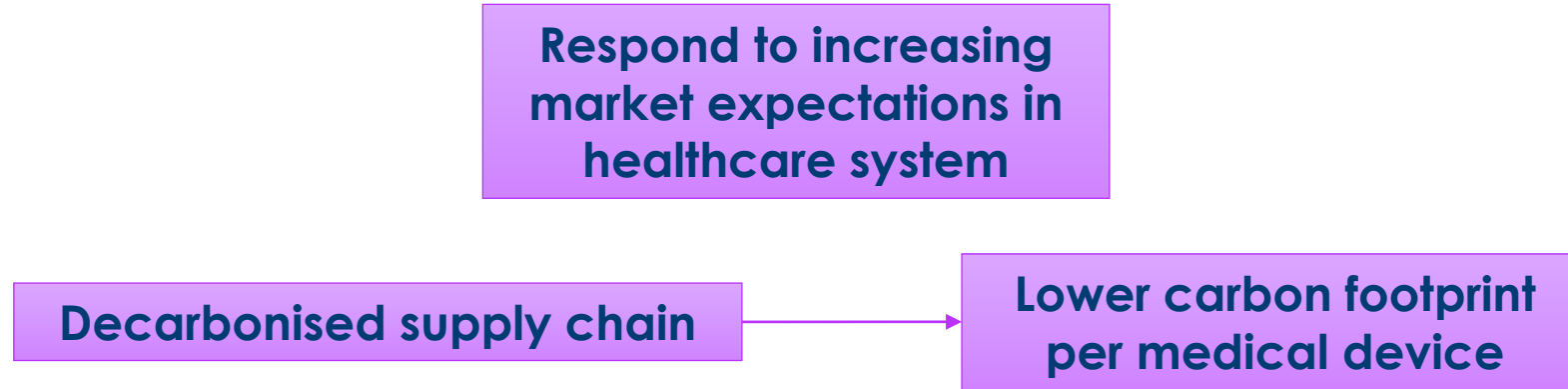




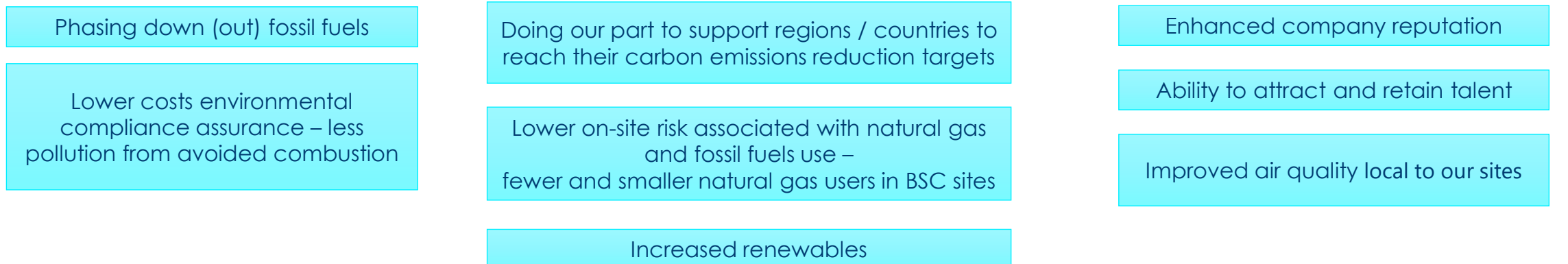
Protecting the Environment

Electrification of heat – Benefits

Key benefit



Other benefits



eHEAT Ireland



A member trade association established in 2021 to accelerate the decarbonisation of heat through electrification

www.eheat.ie



seai SUSTAINABLE
ENERGY AUTHORITY
OF IRELAND
**ENERGY
SHOW**

20–21 March 2024



Rialtas na hÉireann
Government of Ireland

Thank you

 seai.ie/energyshow

 [#seaienergyshow](https://twitter.com/seaienergyshow)

Industry Pathways to Net Zero - Bioenergy

Bioenergy Technology Overview

Seán Finan B.E. C.Eng MIEI

Irish Bioenergy Association (IrBEA)

About the Irish Bioenergy Association (IrBEA)

- ESTABLISHED IN 1999.
- REPRESENTATIVE VOICE FOR THE IRISH BIOENERGY INDUSTRY ON THE ISLAND OF IRELAND.
- WORKING ON BEHALF OF: THE BIOMASS, BIOGAS/BIOMETHANE, BIOFUELS, BIOCHAR, WOODFUELS & ENERGY CROP SECTORS.
- POLICY, LOBBYING & ADVOCACY, KNOWLEDGE TRANSFER.
- BROAD AND DIVERSE MEMBERSHIP INCLUDING: FARMERS, FORESTERS, SMEs, TECHNOLOGY PROVIDERS, ENERGY USERS, CONSULTANTS, SEMI STATE BODIES, FUEL SUPPLIERS, ACADEMIC BODIES, FINANCIAL INSTITUTIONS ETC.
- CURRENT PROJECTS: WFQA, EIP SBDP, JTF MBDP, CASCADE
- FIND OUT MORE AT WWW.IRBEA.ORG



“Working Towards a Sustainable Energy Future with Bioenergy”

Bioenergy - The Largest Source of Renewable Energy Globally

In 2023

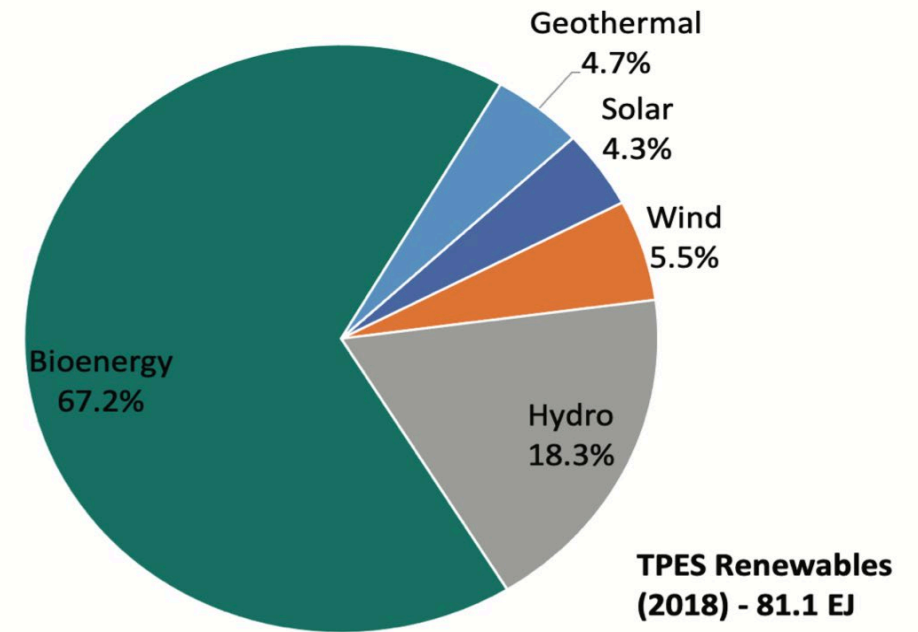
Bioenergy is the largest source of renewable energy globally

Accounting for 55% of renewable energy due to growth in the intermittent renewables

Over 6% of global energy supply

Source (IEA, 2023)

Total primary energy supply of renewables globally in 2018



Source: World Bioenergy Association

Bioheat in Europe

Figure 4 Contribution of the different energy sources in heating and cooling in EU27 in 2021* (in %)

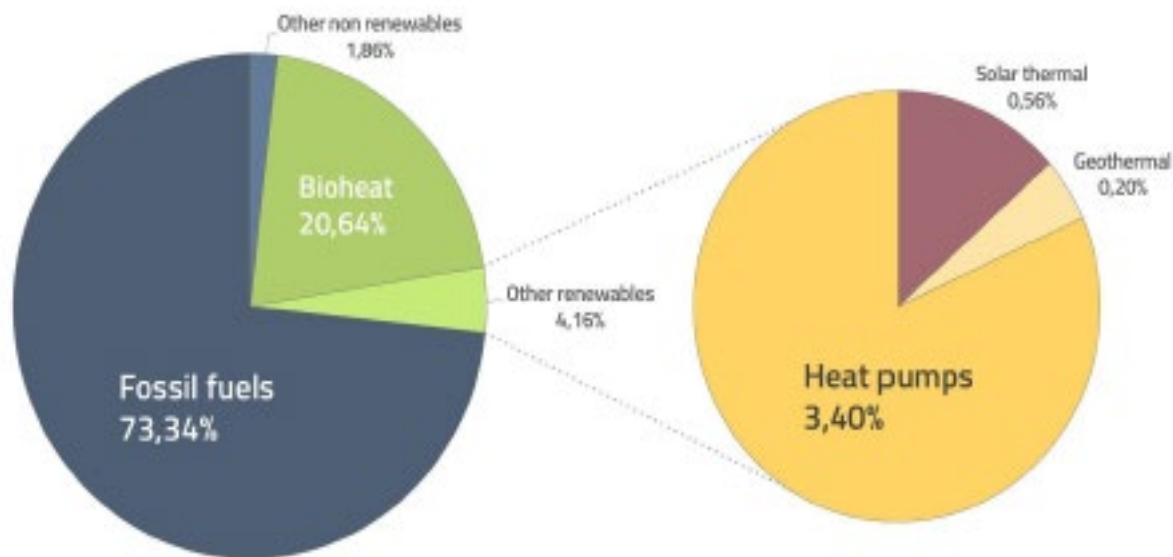
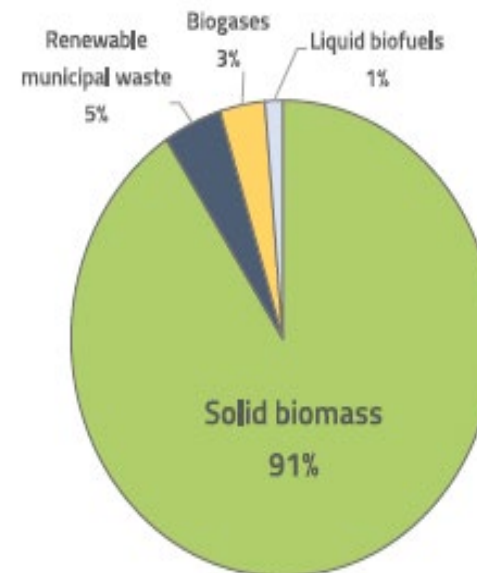


Figure 6 Type of biomass used for bioheat in EU27 in 2021 (in ktoe, %)



Source: Eurostat

Source: Bioenergy Europe – Bioheat Statistical Report 2023 & Eurostat

Industry Pathways to Net Zero – Technology Options in Ireland

- Broad range of technology and fuel options will be required including:
 - Solid Biomass
 - Biomethane
 - Electrification
- The Climate Action Plan focuses more strongly on electrification of medium and high-grade industrial heat rather than the use of biomass
- Solid Biomass is the cheapest option for renewable industrial heat decarbonisation



Solid Biomass Resource Capacity in Ireland

- Abundant resource of Irish solid biomass available
 - Biomass resource – Coford figures confirm the resource availability
 - Renewable energy from Biomass is a key outlet for sustainable forest management thinning material which adds value to the final timber harvest to complements the drive to low carbon construction materials
 - Wood fuel Quality Assurance Scheme members are mobilising the biomass resource



Wood Pellet



Wood Chip

Wood Fuel Quality Assurance (WFQA) Scheme

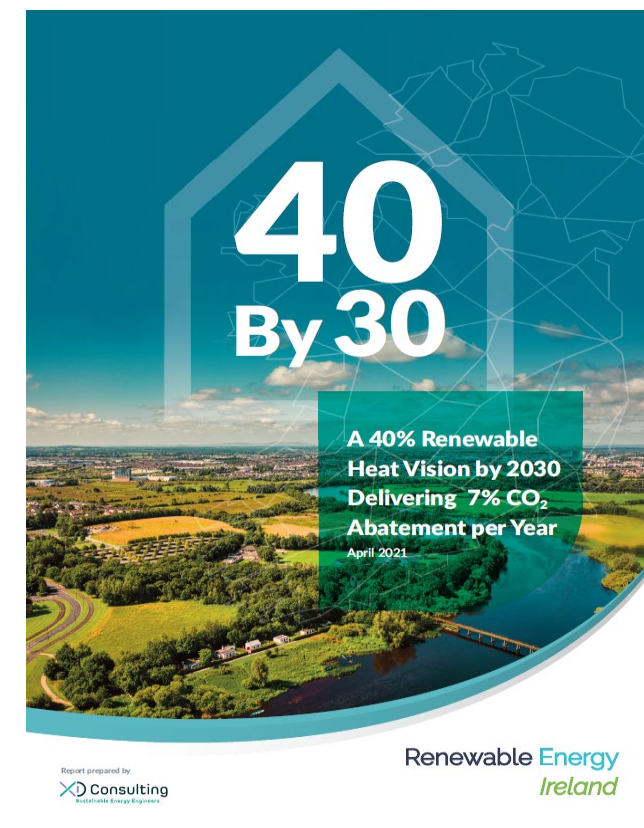
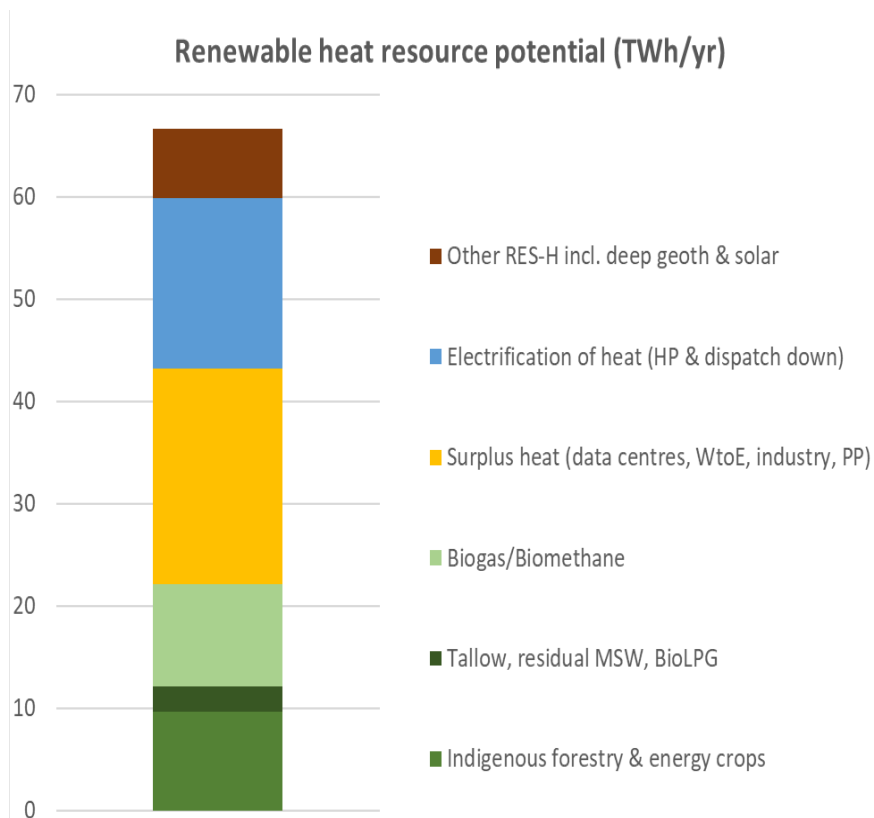
- Mobilising the resource and supply chain
- Established in 2009
- Managed and Administered by IrBEA
- Certifies suppliers of:
 - Woodchip
 - Wood pellets
 - Firewood
 - Wood briquettes
- All fuels certified for compliance with ISO 17225
- SSRH and Solid Fuel Regulation compliance
- Adding additional sustainable criteria certification in line with the European Renewable Energy Directive
- www.wfqa.org

-  **Woodchip**
-  **Firewood**
-  **Wood Pellets**
-  **Briquettes**



Ireland RES - Heat Resources – 40by30 Report

Ireland has enough RES-H resources to meet 100% of our future heat demand



Bioenergy ready to do the heavy lifting (40by30)

- **Solid Biomass**
- **Readily available resources for 2030:**
 - Forestry and wood processing residues: 3.3 million m³ or 6.3 TWh/yr
 - Post-Consumer Recovered Wood: 0.4 TWh/yr
- **Aggressive afforestation programme can yield:**
 - By 2030: short-rotation coppice (SRC): 68,000 ha = 2.9 TWh/yr
 - By 2035: SRC + short-rotation forestry: 150,000 ha = 6.7 TWh/yr
- **Renewable Gas**
- **Biogas available resources for 2030:**
 - Slurry and manures: 0.7 to 1.4 TWh/yr
 - Segregated food waste: 0.6 TWh/yr
 - Grass silage: 3.4 to 8 TWh/yr
- **Other Res-Gas resources available:**
 - Residual municipal solid waste: 1.1 TWh/yr
 - Tallow: 0.8 TWh/yr



Solid Biomass Supply Chain Capacity

- Supply chain infrastructure and equipment – chipping, transport
- An established supply chain of biomass technology providers in Ireland and across Europe to supply technology
- Biomass system designer capacity in Ireland
- Biomass system installer capacity in Ireland



Solid Biomass Case Studies

Danone

4MW Biomass
Steam boiler
Worlds First Certified
Carbon Neutral plant



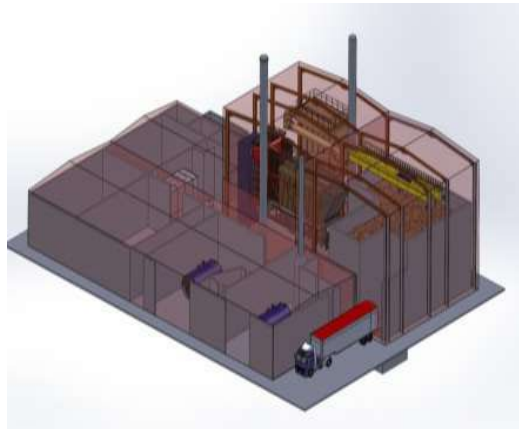
Astellas Pharma, Killorglin

1.8MW Biomass Steam Generator

- 30% Energy cost savings
- Saving circa €300,000 per annum
- Payback in 7 years at todays oil prices

Aurivo

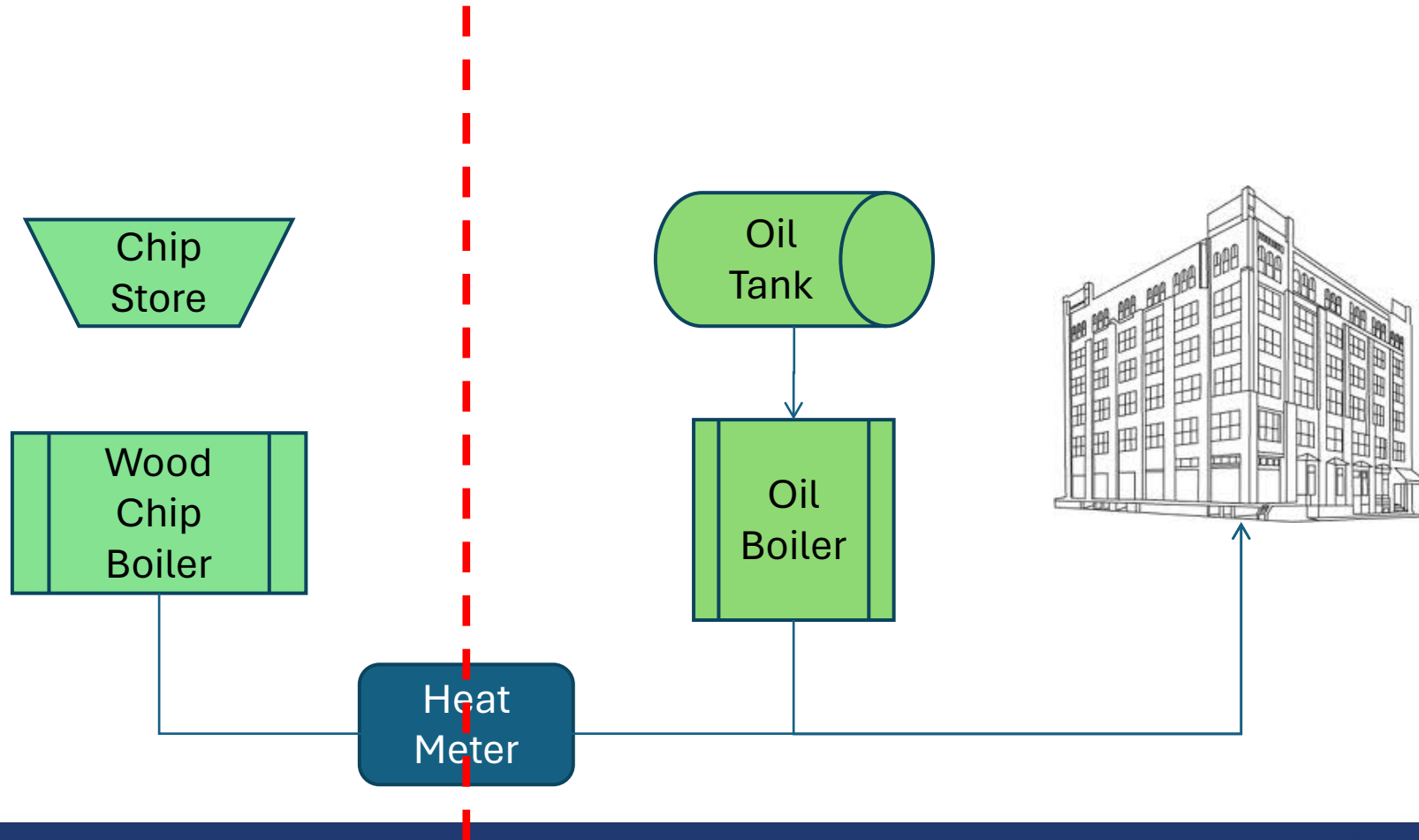
10MW Biomass
Steam boiler
Dairy Processing



Laois Sawmills (Green Wood Pellets)

8MW biomass furnace
40,000t wood pellet production

Contractual Arrangements - ESCO Model - Energy Supply Contracts



Advantages of Solid Biomass



Provide high grade heat at lower cost compared to other fuel options



24/7 supply, not reliant on variables



Renewable and Sustainable (RED Directive)



Indigenous & secure supply of fuel



Long track record

What is required to mobilise solid biomass to drive Industry Pathways to Net Zero

- Recognition and promotion at all levels (political, departmental, agencies) that biomass is a significant part of the solution for industrial decarbonisation
- Stronger focus on the need for a broad range of technology options for industrial decarbonisation and the role of biomass recognised through inclusion in Government policy documents
- Enhanced focus through the SSRH to attract larger industrial users
- Additional payment tier (6) in the SSRH to attract industrial users
- State aid approval to allow the ETS sector benefit