

October 2024

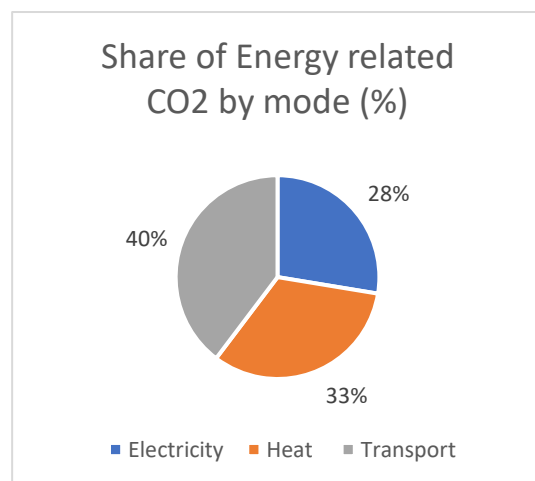
## Main Policy Barriers for Electrification



### Introduction

Ireland Electrified is an industry body representing electric heat, both industrial and domestic, as well as electric transport. We aim to help grow electrification to fulfil its immense potential in Ireland. To aid this transition and sustain its growth in Ireland a specific policy framework is required. Currently we are continuing to develop and be world leaders in renewable energy, particularly from wind. This will continue to expand and with the electrification of heat and transport this means an increased utilisation of our renewable energy being generated.

Growing electrification is not simply new demand but can benefit the electricity sector broadly. For example the ‘dispatch-down’ of renewable energy generation is difficult to avoid on a small island such as Ireland, and it means we are wasting renewable electricity already being produced.<sup>1</sup> This ‘dispatch-down’ refers to the amount of renewable energy that is available but cannot be used by the system.<sup>2</sup> Measures need to be developed to address this lost energy and electrification can aid in helping to use this electricity that is already going to waste, utilising the existing grid and helping with curtailment and constraints. This means cleaner heat and transport, reduced imports of fossil fuels and greater security of energy supply for the Island of Ireland using our own indigenous renewable energy. Ultimately heat and transport are very reliant on imported fossil fuels. Ireland currently spends more than €1 million an hour importing fossil fuels according to UCC.<sup>3</sup> This means monies leaving the economy. Electrifying more directly displaces fossil fuels and retains more energy spending in our own economy. Policy barriers exist which are slowing the decarbonisation of Irish energy,



<sup>1</sup> Identifying the relative and combined impact and importance of a range of curtailment mitigation options on high RES-E systems in 2030 & 2040 Paul Blount\* &^^, James G. Carton\*\*, Conor Forde\*\* & \* & ^, Peter Lynn^, Rory Mullan^ \*ABO-Wind, \*\*Dublin City University, ^Mullan Grid Consulting, ^^Coillte.

<sup>2</sup> Annual Renewable Energy Constraint and Curtailment Report 2021 August 2022

<sup>3</sup> <https://www.ucc.ie/en/eri/news/how-should-ireland-go-about-protecting-its-energy-supplies.html>

# ireland electrified

especially heat and transport, some of which we outline in this paper. These sectors of heat and transport also form part of the States renewable energy obligations.

Despite Ireland's abundance (and often over supply) of renewable electricity our level of renewable heat is the worst in the EU and the fourth lowest EU state in terms of renewable transport. So the heat and transport sectors continue to underperform on our move away from fossil fuels.

On 2022 emissions figures we see they mostly emanated from sectors that can largely electrify. See above figures and below also from the SEAI<sup>4</sup>:

- |  |
|--|
| <ul style="list-style-type: none"><li>• <b>Transport</b> was at 40%</li></ul>                      |
| <ul style="list-style-type: none"><li>• <b>Heat</b> was 33% of energy related emissions.</li></ul> |

The electrification of heat and transport means lowering emissions, means a more secure energy supply and offers an economical alternative to fossil fuels for Irish industry, homes and transport. The curtailment and constraints of renewable generation results in the wastage of indigenous electricity already procured by the Irish citizens. Electrification means much of this can be employed to help power homes, industry and transport.

There are Climate Action Plan targets for renewable heat across homes and industry, and for transport electrification;

## **CAP Targets Heat:**

- Industrial heat 50-55% carbon neutral 2025. 70-75% carbon neutral by 2030
- Flexible Demand targets - 15-20% electricity system demand flexible by 2025, 20-30% by 2030
- Implementation of Decarbonisation Roadmap for Industrial Heat.
- 170,000 new dwellings using heat pumps by 2025, and 280,000 by 2030  
45,000 existing dwellings using heat pumps by 2025, and 400,000 by 2030.

## **CAP Targets Transport:**

- 175,000 passenger EVs by 2025
- 20,000 commercial vans
- 700 low-emission HGV
- 300 EV buses in PSO bus fleet expansion of electrified rail services

<sup>4</sup> <https://www.seai.ie/data-and-insights/seai-statistics/key-statistics/co2/#:~:text=We%20can%20also%20look%20at,responsible%20for%20the%20remaining%2027.6%2>

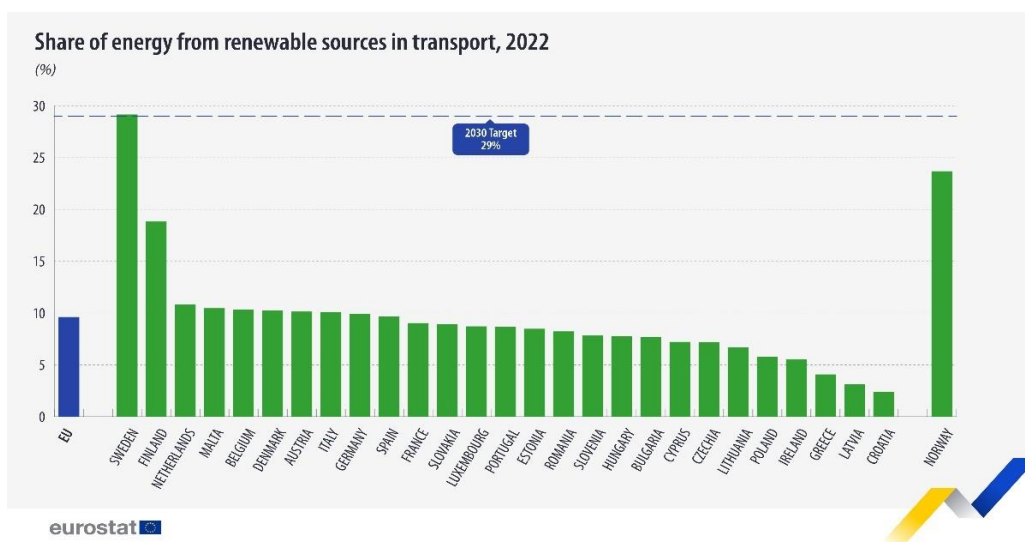
# ireland electrified

In addition to these CAP targets there are also targets on the electricity sector to integrate more wind and solar generation while minimising wastage. The System Operators and Regulators are tasked with providing the flexible demand needed to facilitate more wind and solar.

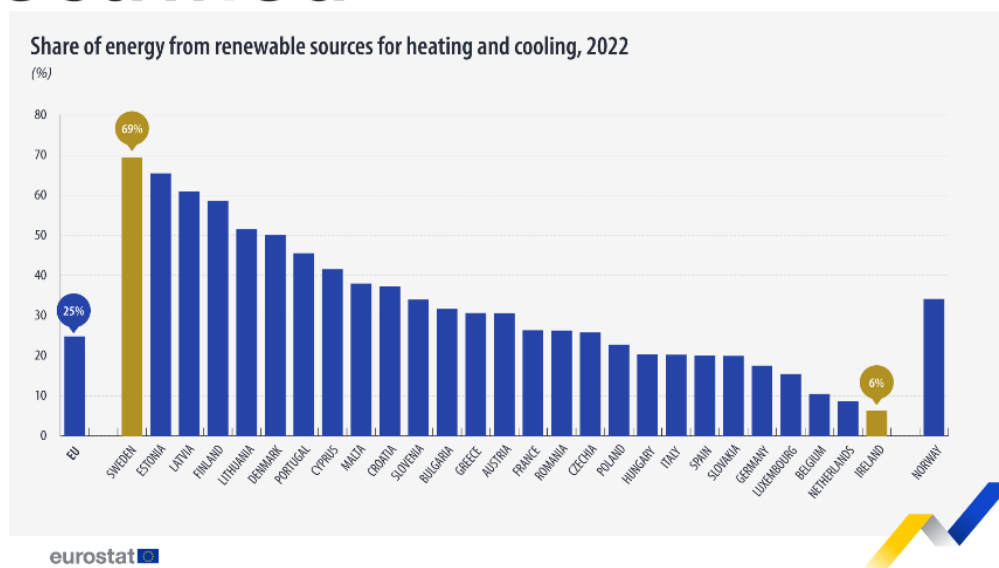
Ireland Electrified know that electrification of existing fossil fuel energy will provide a great deal of the these needed services, while cost effectively utilising more of our renewable generation.

There are also EU wide emissions reduction targets to consider. Under the Regulation on the Governance of the Energy Union and Climate Action, the EU has adopted integrated rules to ensure planning, monitoring and reporting of progress towards its 2030 climate and energy targets and its international commitments under the Paris Agreement.

Our homes and commercial premises, much of Irish industry, and much of transport can make the switch to the electrification, creating more sustainable home heating, sustainable industrial processes and sustainable transport. The electrification of the industrial heat sector alone will provide broad gains to Irish industry as well as the economy, society and the energy sector as a whole. *Below EU figures for renewable heat and transport.*



# ireland electrified



## Electrification Potential

Existing, mature electrification of heat technologies, can provide low, medium and high grade heat up to 280°C. With the switch to electrification for Irish industry this lowers emissions, increases energy efficiency and provides a more secure energy source for business in Ireland. With domestic vehicles, light commercial, bus and rail electrification this offers technology that can immediately displace fossil fuels which are largely imported and are having a devastating environmental and direct human health impact. Electrified heat and transport can be coupled with our growing indigenous electricity generation, as we highlight, to deliver lower fuel cost than the current fossil fuels. The potential in electrification across heat and transport is immense and offers wide benefits.

There are targets set in the Climate Action Plan CAP in terms of creating 80% renewable energy, dispatch down of renewables below 7%, and 20-30% of flexible demand by 2030.<sup>5</sup> These can be aided with developing electrification. Home and business heat, the industrial application of electric heat and wide scale electric transport results in greater utilisation of indigenous renewable energy. Using electrification means utilising both our existing electricity grid better and using the electricity that can be generated on the island of Ireland better.

Flexibility as mentioned can be provided through electrification of heat and transport. 'Demand Turn Up'<sup>6</sup> was a British balancing service incentivising increased demand during periods of over generation and 'Project Shift' in Britain for example explored different market mechanisms to facilitate smart charging in a way that moved EV demand away from peak.

<sup>5</sup> <https://www.gov.ie/pdf/?file=https://assets.gov.ie/296414/7a06bae1-4c1c-4cdc-ac36-978e3119362e.pdf#page=null>

<sup>6</sup>

<https://www.nationalgrid.com/sites/default/files/documents/Demand%20Turn%20Up%20FAQs%20v3%20%282%29.pdf>

# ireland electrified

Across all market mechanisms trialled, smart charging successfully shifted EV charging away from the evening peak period.<sup>7</sup> It is important therefore to note that growing electrification is more than growing new demand, it has much broader gains right across the economy and for the consumer. Removing regulatory barriers makes electrification more attractive and enables this flexibility.<sup>8</sup>

The electricity market should recognise the significance of electrification. Currently the software of the Transmission System Operator's (TSO) (Eirgrid and SONI) cannot issue signals to a flexible consumer of electricity. They can only issue dispatch instructions to generation units to generate more or less power. A consumer who can displace fossil fuels otherwise wasted renewable electricity is excluded from the market. This is despite "non-discriminatory market access" being legally binding under Article 1 of the Electricity market code<sup>9</sup>. ESB Networks National Network, Local Connections (NNLC) programme with the goal of facilitating greater demand flexibility on the electricity system, is primarily focused on procuring capacity in specific locations which have a generation deficiency. Signalling for 'Green Soak' of wasted renewable electricity is yet to be addressed. Both TSO barriers and DSO barriers can be removed quickly and at almost zero cost if policy direction is made more transparent.

## **Electrification of Heat and Transport – Technologies and Supports**

Electrification is a sustainable, efficient and an economic means of creating heat and powering transport and is proven to be a particularly effective means of decarbonising heat and transport globally.

There are various technologies available across electrification such as: heat pumps, electric-boilers, thermal storage, EV's, vehicle to grid technologies and each of these should be treated on their merits in terms of policy approach. We will need both different technology types and different forms of energy to displace the substantial amount of fossil fuels that are currently imported into Ireland.

Many market mechanisms and grants are developed to help Ireland reduce our fossil fuel usage, improve our energy security of supply and comply with legally binding carbon emission targets. Unfortunately many of these specify technologies and can have stringent qualification limitations that only one technology need apply. To best support our legally binding 2030 carbon ceiling, consideration could be given to the cost of carbon abatement in Euro per tonne CO<sub>2</sub> displaced and speed of delivery.

The electrification of heat offers a sustainable alternative for Irish industry for example. And electrification will prove to be one of the most economic and practical ways to meet Ireland's

---

<sup>7</sup> Project Shift Final Report May 2022:

[https://d1oyzg0jo3ox9g.cloudfront.net/app/uploads/2023/10/UKPN\\_Project-Shift\\_2022\\_Web-PDF-v2.pdf](https://d1oyzg0jo3ox9g.cloudfront.net/app/uploads/2023/10/UKPN_Project-Shift_2022_Web-PDF-v2.pdf)

<sup>8</sup> Power-2-Heat: Gas savings and emissions reduction in industry, Agora Industry, Version: 1.0, November 2022

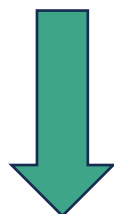
<sup>9</sup> Electricity Market 2019/943 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0943>

# ireland electrified

decarbonisation targets.<sup>10</sup> There is a broad range of electrification technologies available for heating purposes as we note, and these are already used in a range of settings.<sup>11</sup> Electrification further provides broader economic opportunities. This is across the electricity sector gains, job creation in society, and displacing imported fossil fuels on the island of Ireland.

The European Green Deal has as a pillar of energy system integration. This results in the operating of the energy system ‘as a whole’, across multiple energy carriers. Sector integration means linking the various energy carriers such as electricity, with heat. Linking sectors will allow the optimisation of the energy system as a whole rather than decarbonising and making separate efficiency gains in each sector independently.<sup>12</sup> Seeing electrification in the context of the wider energy sector and economy means we can utilise its full potential.

Ireland has been excellent at developing renewable electricity, particularly through onshore wind. This has occurred through specific policy changes in the sector to encourage growth. This renewable electricity adds to the Irish economy in such areas as enhancing security of energy supply. Ireland has however been poor at developing renewable heat and transport. We continue to import much of our fuel for these sectors, including for industrial heat, and much of Irish industry has an alternative available, to adopt the proven technology in electric heat as currently used across the EU. Addressing some of the policy barriers and developing a new regulatory framework concentrating specifically on electrification measures will encourage growth in the sector as policy changes have done for indigenous renewable electricity generation. Electrification should be supported by strong government actions and state agency commitments to decarbonise the Irish economy through specific policy changes in electrification.



<sup>10</sup> <https://www.esbnetworks.ie/who-we-are/electrification-of-heat-and-transport/electrification-of-heat-and-transport#:~:text=The%20electrification%20of%20heat%20and%20transport%20uses%20clean%20electricity%20to,to%20meet%20Ireland's%20decarbonisation%20targets.>

<sup>11</sup> [https://cdn.esb.ie/media/docs/default-source/leading-lights/industrial-heat-pumps-insights-paper.pdf?sfvrsn=270c3311\\_7](https://cdn.esb.ie/media/docs/default-source/leading-lights/industrial-heat-pumps-insights-paper.pdf?sfvrsn=270c3311_7)

<sup>12</sup> Powering a climate-neutral economy: An EU Strategy for Energy System Integration.

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0299&from=EN>

Policies Barriers

1. Electricity Pricing Structure
2. Connections Policy
3. Grid Investment
4. Education

ireland  
electrified



## **1. A Dynamic electricity Pricing Structure**

There are certain renewable heat technologies that receive on-going tariff supports to give stability to pricing. This is not provided to electrification. Addressing the cost of electricity will be an important policy change to aid in the move from fossil fuels to renewable heat and transport. Reforming the electricity pricing structure should be conducted in the context of the financial savings to the grid and other savings from increased electrification. The current pass-through costs methodology on electricity discourages flexible consumption, and it can exasperate wastage of renewable electricity generation. We can reform certain historical pass-through costs in electricity that can reward dynamic usage for example that benefits the end user, benefits the grid, and benefits electricity generation and supply.

The wholesale market gives a very efficient price signal. In hours of high delivery of renewable electricity, the market price tends towards zero cost. This real time price signal is the cornerstone of European efficient market design. It can facilitate the electrification of heat and transport at lower cost than fossil fuel incumbents. Due to Irelands abundance of renewable electricity our citizens and businesses have the potential to lead the way for European decarbonisation. The first policy step should be to electrify our domestic energy needs using mature and existing technology.

Ireland has no history of encouraging active participation of electricity consumers. Our legacy charging structures have assumed that generation assets modulate to match consumption. To accommodate renewable electricity generation, we now need consumers to modulate consumption to match the variable nature of wind and solar patters.

Policy must deliver dynamic charging mechanisms which support the consumption of electricity in hours of high renewables on the grid. The abundance of renewable electricity can then be used to displace fossil fuel in the heat and transport sector.

*Examples of possible reforms:*

### **Imperfections and Capacity Charges**

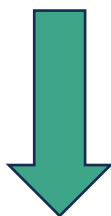
These are electricity costs set by SEMO every year and form a substantial part of the end user bill. These charges do not take any account of the flexible nature of electrification or how it can benefit the overall grid and help deal with excess renewable electricity generation. Electrification can provide much needed flexibility and this is further enhanced via technologies such as electric boilers, thermal storage or Vehicle to Grid, and this can be reflected in the electricity pricing structure reforms. Restructuring the application of imperfections and capacity charges to be lowered for the electric heat or transport user, acknowledges the advantages it provides for System Operators.

## Other Use of System Charges

CAP aims to ensure 20-30% of system demand is flexible by 2030.<sup>13</sup> . If this is to be achieved there must be rewards to the application of flexibility for demand users for example and recognising that the switch to the electrification is not simply adding to demand but can provide wide improvements to the electricity market. Other use of system charges such as Tariffs under DUoS and TUoS could further be reformed to encourage electrification. The CRU is currently conducting a major review of the Tariff structure (the first in decades) consideration here should be afforded to how tariff reform can encourage low carbon electrification.

There should be a focus on charging methodology to support the transition to cleaner electrification and all its benefits. Support also flexible consumers who are willing to adjust consumption based on the availability of indigenous zero carbon renewable power. There has been limited analyses of how reform of electricity pricing can benefit both the demand users and the grid operators.

**Responsible body for policy change: SEMO – CRU – ESBN – Eirgrid**



## 2. Connections Policy

The connections timeframes for the new electrification of heat and transport to the grid must be addressed. Considering the CAP targets to 2025 and 2030, more rapid and efficient connections will be an important policy change to help toward achieving these objectives. Current connections times could be a number of years and so clean electric heat and transport will compete with a fossil fuel alternative, which may be able to provide quicker connections. At a European level there has been a call to prioritise grid connection for heat electrification to avoid delaying projects.<sup>14</sup> We must ensure that the dynamic potential of electrification across the various heat technology types, and across electric transport are used to shape grid

<sup>13</sup> file:///C:/Users/CathalMurphy/Downloads/203558\_f06a924b-4773-4829-ba59-b0feec978e40.pdf

<sup>14</sup> <https://www.ehpa.org/wp-content/uploads/2024/02/20240215-EHPA-Manifesto-2024.pdf>

# ireland electrified

investment planning. Timeframes should be substantially reduced to connect to the grid, to ensure that the advantages of electrification are harnessed quickly.

Alongside connection times, providing flexibility in connections to the grid gives system operators gains. Electrification can allow shifting demand to cheaper periods<sup>15</sup>, and a flexible coupling of power and heat sectors can contribute to both renewable energy integration and decarbonising.<sup>16</sup> With this, electrification technologies could significantly lower the costs for integrating renewables and reduce carbon emission.<sup>17</sup> As of yet there is no policy in place with the CRU, or the DSO in terms of connections for industrial users of electrification to acknowledge their dynamic applications for the grid.

Flexibility on both the demand and the supply side offers huge potential to further enhance the efficient use of existing grid infrastructure by shifting demand to periods with more capacity and reducing supply during congested periods. This way electrification can help maximise the potential for renewables deployment. Dynamic non-firm connection agreements and dynamic time of use tariffs are among the most promising demand-response solutions in the short and medium term.<sup>18</sup>

The ERSI have stated that *“Heat pumps in conjunction with thermal energy storage provide system wide flexibility services such as load shifting, peak shaving, and demand side management, thereby ensuring increased utilisation of excess renewable energy during off-peak periods.”*<sup>19</sup> The current policy on grid connections is framed without regard to the dynamic application of heat and transport electrification across different technology types. A more flexible approach could be developed by system Operators in regard to MIC connections to help accommodate greater electrification. Electrification can help, and not hinder management of the grid. ‘Flexible’ grid connections, mirroring non-firm connections for generators, could be provided at minimal/no cost and accelerate access to the grid for large energy users.

**Responsible body for policy change: ESNB - CRU**



<sup>15</sup> Grid-edge technology - Exploring the flexibility potential of a heat pump and thermal energy storage system Christoph Schellenberg<sup>1,\*</sup>, Laurentiu Dimache<sup>1</sup>, and John Lohan<sup>1</sup> <sup>1</sup>Galway-Mayo Institute of Technology, Department of Mechanical and Industrial Engineering, Galway, Ireland.

[https://www.e3s-conferences.org/articles/e3sconf/pdf/2019/37/e3sconf\\_clima2019\\_06002.pdf](https://www.e3s-conferences.org/articles/e3sconf/pdf/2019/37/e3sconf_clima2019_06002.pdf)

<sup>16</sup> Power-to-heat for renewable energy integration: A review of technologies, modeling approaches, and flexibility potentials Andreas Bloessa,<sup>b</sup> Wolf-Peter Schillb, Alexander Zerrahn Applied Energy, 2018.

<https://d-nb.info/1221668390/34>

<sup>17</sup> Benefits of flexibility from smart electrified transportation and heating in the future UK electricity system

<sup>18</sup> [How flexibilities can help make Europe’s grid fit for net zero \(agora-energiewende.org\)](https://www.agora-energiewende.org/en/publications/how-flexibilities-can-help-make-europes-grid-fit-for-net-zero)

<sup>19</sup> ERSI Working Paper No. 627 June 2019

### **3. Grid Infrastructure: Transmission and Distribution**

To fulfil the immense potential and see the expansion of electrification across domestic and industrial heat, across EV's and public transport, the electricity infrastructure must see further investment. In 2021 a study published on the distribution grid investment needed to power the energy transition, found that grid investments needs to increase by 50-70% in the 2020s compared to the last decade. With the Irish analyses, they estimated a €6.9 billion investment

is required. See below the Ireland breakdown in the report <sup>20</sup>. Further investment is likewise required across the transmission system. Markets must upgrade and expand their transmission infrastructure to support a smooth transition to renewable energy.<sup>21</sup> High increases in demand growth could be referenced as the driver for investment. Increased electric heat and transport means increased demand and is required if we are to achieve a net-zero future and this will require grid investment.<sup>22</sup>

The electricity grid of the near future will be more and more the conduit for our home heating, for industrial heat in Irish Industry and a key infrastructure to power our transport sector. Investment must be conducted in this remit and the electricity grid infrastructure must be seen in this expanded economically vital role. Investment then in the electricity grid should be prioritised considering its intrinsic link to greater security of supply, to an improved environment, job creation and to economic growth. This broad policy effect should be considered in developing our electricity infrastructure. Grid infrastructure needs to be seen as critical infrastructure and given priority policy consideration. In terms of planning regulations these need to be reform to reduce times urgently for consents. It must be considered that large scale electrification projects on the higher voltage network would deliver quicker decarbonisation. This could be seen as an early win as it will naturally be more

---

<sup>20</sup> <https://www.eurelectric.org/connecting-the-dots>

<sup>21</sup> [https://www.ey.com/en\\_ie/recai/how-transmission-investment-could-unlock-global-growth-in-renewables](https://www.ey.com/en_ie/recai/how-transmission-investment-could-unlock-global-growth-in-renewables)

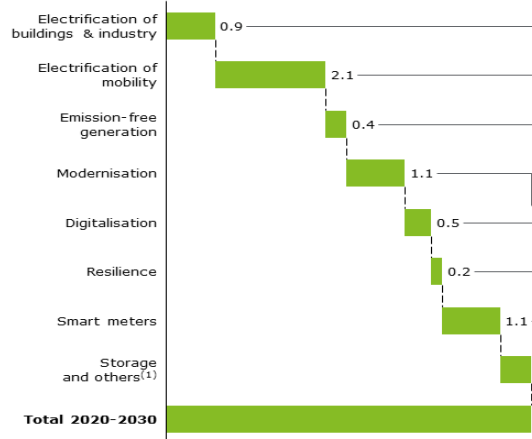
<sup>22</sup> <https://www.marei.ie/wp-content/uploads/2021/03/Our-Climate-Neutral-Future-Zero-by-50-Skillnet-Report-March-2021-Final-2.pdf>

gradual in upgrading all system down to the domestic voltage level.

## Investments per country - Ireland



**Overall investments in power distribution grids**  
(nominal €bn; 2020-30)



### Key insights

- It includes **600,000 domestic heat pumps** (200,000 new build & 400,000 existing buildings) and **25,000 installed in commercial buildings**
- Large proportion of residential charging points due to **rural spread of customers** resulting in **high investments to reinforce LV grid** in particular
- Part of the grid connections is **built and financed by renewable developers**, limiting the DSO investment needs to integrate renewable generation
- High investments due to the **age and loading** of the grid and its **architecture** (long radial feeders covering long distances)
- **Automation improvement in substations** and implementation of **automation/digitalisation in secondary substations** (MV/LV); digital assets for **grid management** (e.g. SCADA)
- Relatively **benign climate** and few extreme weather events, resilience plan is focused on flood protection
- Program for **full deployment of smart meters** (current deployment is ~4%)

(1) Investments in storage are expected to be 0€.  
Source: DSOs and national associations; Monitor Deloitte

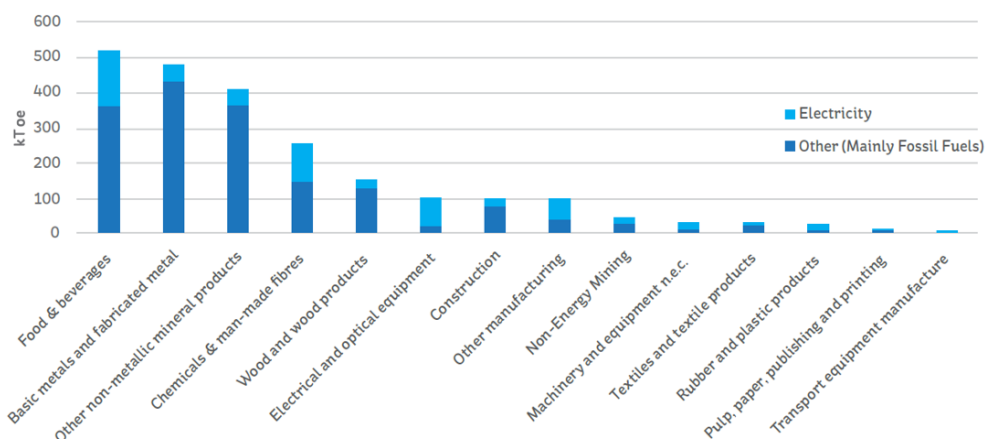
**Responsible body for policy change: ESNB - EirGrid**



## 4. Education on Electrification

For homes, industry and the transport sectors to make the move from fossil fuels to the more secure low carbon electric alternative there must be greater knowledge available on the electrification technology that is advanced and ready to use to help decarbonise the Irish economy. Much of the technology used in electrification has been in place and well established across the EU for decades. As the rest of the EU continues to expand its electrification, Ireland continues to have the lowest level of renewable heat across the EU and fourth lowest in renewable transport. Much of Irish industry for example can make the switch from fossil fuels but may not be fully aware of the technology now available and its broad advantages.

Industrial Final Energy Demand by Application



It is important that sectors are aware of the ready to use technology to help decarbonise through electric heat and transport. Alongside this, further upskilling in the area is important, so that this technology can be fully utilised over the coming decade and beyond. Shortages in the trained professional installers could set back targets on decarbonisation, which is a concern mirrored in other countries.<sup>23</sup> So effective upskilling will be a factor in electrification growth.<sup>24</sup> Alongside homeowners being given more knowledge of the heat and transport electrification options, increasing the knowledge and the training needs for future electrification is required too for industrial users of heat electrification and for fleets electrifying transport.

**Responsible body for policy change: Department of Enterprise, Trade & Employment - Enterprise Ireland – IDA – SEAI – ETB – SOLAS - Green Tech Skillnet**

## Conclusion

The main stakeholders in the energy sector such as EirGrid, ESBN, DECC have been successful in delivering Ireland's renewable projects, which makes us an EU leader in onshore wind. We can leverage this success in developing the electrification of heat and transport. Policy should recognise the broad technologies available across electrification, such as heat pumps, electric boilers, heat storage, EVs, electric commercial fleets, public transport and vehicle to grid technologies. Renewable electricity will be Ireland's least cost renewable heat and transport provider and can be delivered quicker to better aid our carbon ceilings. Policy should seek the

<sup>23</sup> <https://www.eceee.org/all-news/news/uk-shortage-of-trained-heat-pump-installers-could-set-back-net-zero/>

<sup>24</sup> <https://www.seai.ie/publications/Heat-Pump-Adoption.-Maximising-Savings..pdf>

# ireland electrified

lowest cost of carbon abatement and policy specific targets should be scored on Eur/ CO2 abated.

Electrification across heat and transport offers wide rewards for Irish homes, businesses, the electricity sector, and the economy as a whole. There has been a lack of a specific policy framework that will help aid the transition to cleaner electrification and to help sustain its growth right across the Irish economy. Removing the policy barriers currently in place will help companies make the move from fossil fuels. This in turn will allow for the broad advantages of electrification to be embraced with increased security of supply, cleaner heat and transport for the environment, lower emissions, improved grid management and greater utilisation of renewable electricity: all gained through greater electrification with the right policies in place.

