Enterprise, Waste & Circular Economy

Q20: What measures can be taken to accelerate the uptake of carbon-neutral low temperature heating in manufacturing?

[redacted] University College Dublin:

Currently, of all the heat produced in Ireland, 33% of it is allocated to industrial heating (SEAI, 2021), with heating and cooling accounting for 50-90% of an individual processing plant's entire energy consumption (GEA, 2021). Reducing this carbon footprint can be accelerated through the introduction of incentives to encourage industrial heat pumps which can use a primary clean source of energy (e.g. geothermal) or capture waste heat from secondary processes such as refrigeration and waste-water disposal. Tax incentive aimed at corporate organisations, such as tax credits or deductions could be given for on-site use of renewable energy or renewable energy systems, particularly focusing on areas where there is a complete removal for the requirement for fossil fuels, for example using waste water or geothermal as the primary energy source for the industrial heat pump.

Q72: What other opportunities exist to support decarbonisation through the acceleration of a transition to the circular economy?

[redacted], University College Dublin:

In light of ambitious targets to electrify transportation, coupled with the continue developments of Ireland's growth in the electronics sector, recognition must be given to Ireland's, (and Europe's) dependence on foreign imports of critical metals, particularly rare earth elements, from outside the European Union. In line with The European Raw Materials Initiative (2008) and the Critical Raw Materials for Strategic Technologies and Sectors in the EU (2020), Ireland would be taking a proactive approach in enhancing its recycling capacity of critical and rare Earth metals, particularly through processing of modern electronic waste and rare earth magnets. This would contribute to Europe's goal of becoming 'metal independent' whilst placing Ireland at the forefront of this growing sector. This can be achieved through a number of steps:

1) Regulating the exportation of critical e-waste (electric batteries, smart devices, computers, etc.) to ensure critical metals remain within Ireland to be recycled.

2) Financing research and development into recycling and processing of critical e-waste (including rare Earth magnets). At present, there is no effective process to recycle and recover 100% of metals within rare Earth magnets, as such, continued emphasis should be placed in this field.

3) Producing critical component locally using recycled (and supplemented by imported) metals.

Electricity

Q18: What financial incentives are needed to increase renewable generation capacity?

a. To incentivise commercial scale production.

b. To incentivise microgeneration.

[redacted] University College Dublin:

Capacity would benefit from increased incentive aimed at improving access to capital, reducing upfront costs, and supporting market growth of variable renewable technologies. This can be partly achieved through tax measures:

1) Personal income tax incentives - Tax credits or deductions are given for purchasing and installing renewable systems and technologies;

2) Corporate tax incentives - Similar to above, tax credits or deductions are given for on-site use of renewable energy or renewable energy systems;

3) Property tax incentives – Incentives aimed at reducing the level of property tax associated with property improvements relative to renewable systems and technologies; and

4) value-added tax incentives – Reduced or removed VAT associated with purchasing of renewable systems or technologies at both personal and corporate level.

a) Production is stimulated by demand. Driving commercial demand for renewable energy through 1) customer incentives, 2) increased government purchasing of renewable systems and 3) funding allocated toward research and development within Ireland, would lead to a cycle of increased demand, improved technologies and decreasing costs. Resources for research and development should also be allocated toward energy storage so as to generate confidence from commercial producers. Furthermore, financial insurance schemes could be offered to mitigate risk during construction phases. This is particularly pertinent to geothermal energy operations which bear significant risk during the feasibility stage.

b) In addition to tax incentives mentioned above, capacity generation would benefit from parallel-running financial grants aimed at alleviating upfront costs. The biggest barrier to the current Micro-generation support scheme remains the upfront costs. Given an average upfront investment of €5-15000 for a residential photo-voltaic system, the maximum capital grant of €2400 currently offered under the Micro-generation support scheme is not sufficiently enticing to encourage majority adoption.

As an alternative, a policy of 'rent-to-own' could be proposed, under which renewable systems could be acquired and installed through a fixed term rental agreement through energy suppliers, similar to policies currently proposed in countries such as South Africa, with relative success. Such an agreement would encourage energy provider to adopt a proactive, individual-focused approach, whilst alleviating the upfront capital burden on customers and providing a long term customer asset.

Transport

Q44: What additional measures should be considered to improve the quality or attractiveness or active mobility solutions as an alternative to private car use (e.g. dedicated lanes, secure bike parking, rest areas).

[redacted] University College Dublin:

Incentivising active mobility.

Under the current CAP2021, the government of Ireland plans for 1 million electric vehicles by 2030 (a figure that would unrealistically require roughly 7-10% of the known global critical metals supply). Whilst this target is ambitious, it is presented as a standalone option without considering the potential for electric bicycles as a mode of transportation. Rather than increasing the number of e-vehicles on the road, focus should be placed on alternatives. Unlike electric vehicle purchases that can avail of up to €5000 grants, no grants exist for e-bikes in Ireland. Rapid progression towards decarbonising transportation must be wholistic to include incentives for e-bike adoption such as those present throughout most of Europe as a means to drive adoption and shift from a car-centric approach. The Austrian government for example offers e-bike purchasing grants of up to €1000 for individuals and 50% (up to a maximum of €2000) for business cargo e-bikes. Similarly, as part of their commitment to decarbonisation, the Government of France has drafted a bill to offer a €1500 scrappage grant where owners of older cars can trade their used vehicles for an e-bike.

Disincentivising the use of unnecessary vehicles.

In line with transitioning away from personal vehicles and towards public transport and active mobility, a case can be made to limit the use of sports utility vehicles (SUVs) in city centres. In addition to requiring significantly more critical metals to produce an electric SUV, compared to a standard light electric vehicle, studies have demonstrated that the risk of a fatal accident involving an SUV and a pedestrian is significantly higher than that with a standard light vehicle. Furthermore, there is significant observational evidence to suggest an increased risk behaviour in SUV drivers leading to higher road violations. The use of SUVs in high density population areas strongly contradicts the transition to an inclusive transportation system with active mobility infrastructure. A vehicle taxation based on weight could adequately discourage the growing trend of SUV purchases. Similar disincentives exist in France and Norway. Importantly, these taxes should link the weight of the vehicle to: 1) CO2 emissions for standard combustion engines; 2) Critical metals used (coupled with the CO2 emissions necessary during production) in electric SUVs; and 3) a balance between CO2 and critical metal use in the case of hybrid SUVs.

Built Environment

Q39: Further to those technologies identified in previous iterations of the Climate Action Plan, what other additional measures could be used to reach our emission reduction target in this sector?

[redacted] University College Dublin:

At present, low temperature heating and cooling is one of the biggest consumers of energy in Ireland. Whilst heat pump technology is acknowledged and being pursued, not enough emphasis is being placed on differentiating between various heat pump technologies. This lack of differentiation is best seen in SEAI purchasing grants, which provide a maximum value, irrespective of the heat pump purchased. Similarly, most building decarbonisation models focus on seasonal heat demand and neglect seasonal efficiency and wear-and-tear on heat pumps. This is a fundamental flaw in driving heat pump adoption and significantly hampers low temperature heating solutions. Compared to air-source heat pumps, ground source heat pumps have a constant year-round efficiency, a longer life-span and significantly contribute to cooling as well as heating, storing waste heat in the subsurface during summer months.

Emphasis should be placed on the benefits of various heat pump technologies and financial incentives should reflect these benefits, providing increased funding and improved public knowledge for the use of more efficient heat pump technologies. Furthermore, social acceptance is a key measure in accelerating the uptake of renewable heat. Similar to information campaigns driven against cigarettes in the 80s and 90s, a fact-based education campaign on the benefits of renewable heating and cooling would encourage adoption.

Q40: What specific measures would incentivise a greater rate of oil boiler replacement?

[redacted] University College Dublin:

Whilst the initiative to install 600000 heat pumps by 2030 in Ireland, under the 2021 Climate Action Plan, is progressively ambitious, succeeding in this ambition is dependent on customer adoption. The biggest barrier to this adoption is the upfront capital. The deterrent of a €5-15000 cost is not sufficiently balanced by the €4500 grant (for apartments) offered through the SEAI Heat Pump System Grant. Furthermore, under the aforementioned grant scheme, no financial distinction is made between air-source and ground source heat pump systems. Without any distinction, customers will likely opt for cheaper air-source pump systems, despite ground-source systems having a higher year-round energy efficiency and a longer life-span.

Proposing a 'rent-to-buy' scheme that runs concurrent to the present grants schemes could encourage rapid adoption of low temperature heating. This scheme could allow residents to acquire a heat pump system without the up-front burden of cost, similar to schemes proposed by heat pump installers in Germany.

In addition to positive incentives such as grants and tax rebates, symbiotic disincentives would rapidly accelerate the transition to low-temperature heating. A carbon-credit system for heat use could be granted to residential users with a maximum allowance for carbon emissions, similar to carbon budgets. Dwellings that exceed their allowance could be appropriately penalised, whilst those that under-utilised their credit through a switch to renewable heat systems, would have the option to sell their credits. This credit system, combined with tax rebates on carbon-reducing energy systems, would function in the same way that carbon budgets function for corporations, with the added benefit of allowing civil society to financially benefit (through tax credit, carbon-credit sales, and grants) from reduced carbon from heating.

Q41: What is the next step for geothermal energy application to the built environment?

[redacted], University College Dublin:

Currently there is no legislation governing the licencing, regulation, production/extraction and sale of geothermal energy. Whilst the significant effort being undertaken by DECC to secure Ireland's legislative foothold in the geothermal industry is acknowledged, the present lack of specific policies governing the industry remains the biggest barrier. This creates ambiguity in ownership and unnecessary administrative delays, extending to both the deep and the shallow geothermal application.

Furthermore, the application of shallow geothermal energy should be accelerated to ease the burden of fossil fuels in heating. As of 2016 (according to 2016 census data), around 73% of all residential dwelling in the Republic of Ireland are located outside of major gas infrastructure (i.e. city centres). These residences rely almost entirely on peat and oil for heating purposes, both of which are rapidly becoming obsolete in Irish legislation. The transition to renewable heat system is fundamental in ensuring heat security, however, administrative delays (mentioned above) related to installations and usage of shallow geothermal heat systems can lead to an overall reluctance to switch to geothermal energy as a renewable heat option. As such, the 'next step' is to implement user-friendly policies and legislation to encourage rapid investment from interested parties. Importantly, residential shallow-geothermal applications should be made easy, without the need to extensive licenses and administration.

Q92: Have you identified any research and innovation gaps which need to be addressed? If so, how can these gaps best be addressed?

[redacted] University College Dublin:

Ireland's ambition to become a global leader in renewable energy, as well as a net-neutral carbon emitter by 2050, is coupled with initiatives to increase e-vehicle usage, renewable heat and renewable electricity. But this is overshadowed by an inherent dependence on imports of rare Earth and other critical metals from foreign sources, including China, who currently provides 90% of the worlds rare Earth metals. The gap between Ireland's desire to grow its renewable sector and

Ireland's ability to provide the necessary materials presents a significant supply risk. As such, increased financing for research and innovation towards recycling of critical metals from e-waste and rare Earth metals would enforce Ireland's commitment towards renewable growth and enhance metal security.