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Impact assessment of the Energy Efficiency Directive 2018 in Iceland

Implications of EED implementation in Iceland and pursued derogations

Implement Consulting Group • March 2024

Iceland accepts the full Energy Efficiency Directive 2018 with derogation for Article 7, Article 5, and Article 9 due to disproportionality or cost-inefficiency, as well as derogations from articles related to natural gas consumption

SUMMARY

After having carefully considered and analysed the implications of adopting the Energy Efficiency Directive 2018, Iceland stands ready to adopt the directive subject to certain adaptations. Iceland is in a very different situation than the rest of the EU/EEA with a completely different energy system and geopolitical implications. This implies that many of the benefits accruing from energy efficiency in the EU will not accrue in Iceland, and that the directive is less suited in Iceland.

Our analysis suggests that articles 7, 5 and 9 should be candidates for adaptations, as they are not well suited in the Icelandic context and will lead to disproportionate and cost-inefficient outcomes. The results of our analyses are substantiated in the report, with the following highlights:

Article 7: Energy savings obligation

- Iceland seeks to reduce the energy savings obligation of 0.8% per year. The Icelandic conditions are less favourable than Malta and Cyprus (who has been allocated a 0.24% obligation), hence Iceland aims for a 0.15% obligation. The reasons are:
- 88% of primary energy in Iceland is renewable. Iceland has a disproportionately high share of energy intensive industry already covered by the EU ETS, giving a savings obligation per capita 330% higher than the average EU27. Cost and price of heat and electricity is substantially lower than in the EU implying much fewer cost optimal savings. Energy consumption does not pose any geopolitical risks as the vast majority is sourced from Icelandic natural resources.

Article 5: Energy savings in public buildings

- Iceland seeks full derogation from article 5, as it builds on Iceland's current derogations from the EPBD and would add a disproportionate administrative burden
- The derogation from the EPBD was granted based on 1: Limited scope for improving the performance of the recent and uniform building stock, 2: 90% of the buildings are heated with cheap and carbon-free geothermal energy. 99% of total heat consumption is from renewable sources thereby being *zero-emission*.
- Iceland's heat price is about 78% lower than in the EU, which makes very few measures cost-efficient. Consequently, the administrative burdens associated with the various requirements of article 5 are deemed to economically outweigh the very few benefits

Article 9: Smart metering

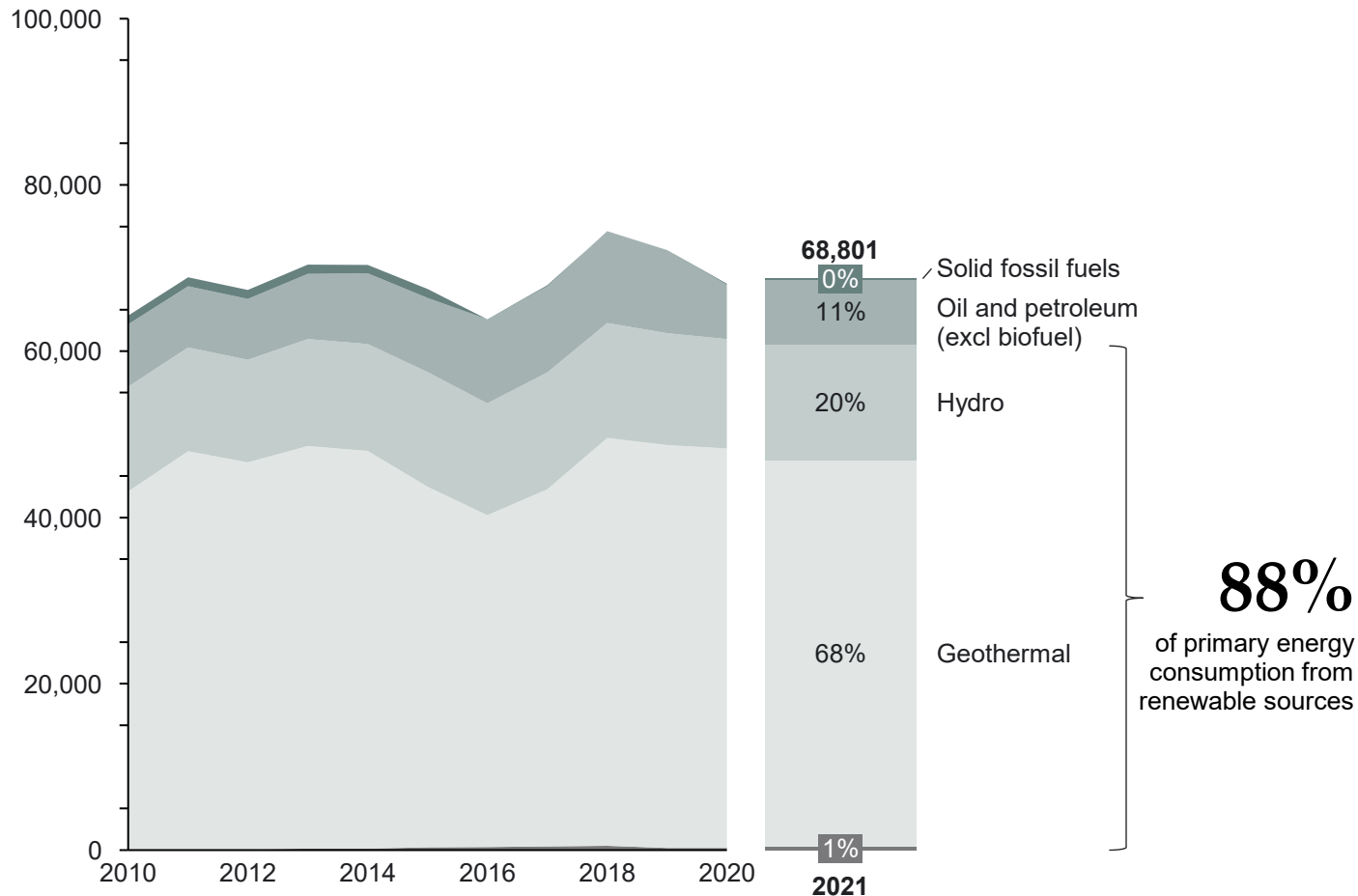
- Iceland seeks derogation from parts of article 9 due to incompatibility with the Icelandic infrastructure system and very low cost-effectiveness.
- 9a/9c: Multiple small district heating systems provide for small communities. Adhering to 9a and 9c will be very cost-ineffective
- 9a: Seeking to change the wording "actual energy" to "equivalent energy" due to the specificities of the Icelandic district heating system
- 9b: Individual metering or smart thermometers in Icelandic multi-apartment buildings would lead to much higher net lifetimes costs.
- 9: Iceland has no natural gas system, hence seeking derogation from everything related to natural gas

Background on Iceland's energy system and composition

Iceland's energy supply is almost fully renewable. 88% of its total **primary** energy supply comes from geothermal (68%) and hydro (20%)

Iceland's primary energy consumption by source

GWh

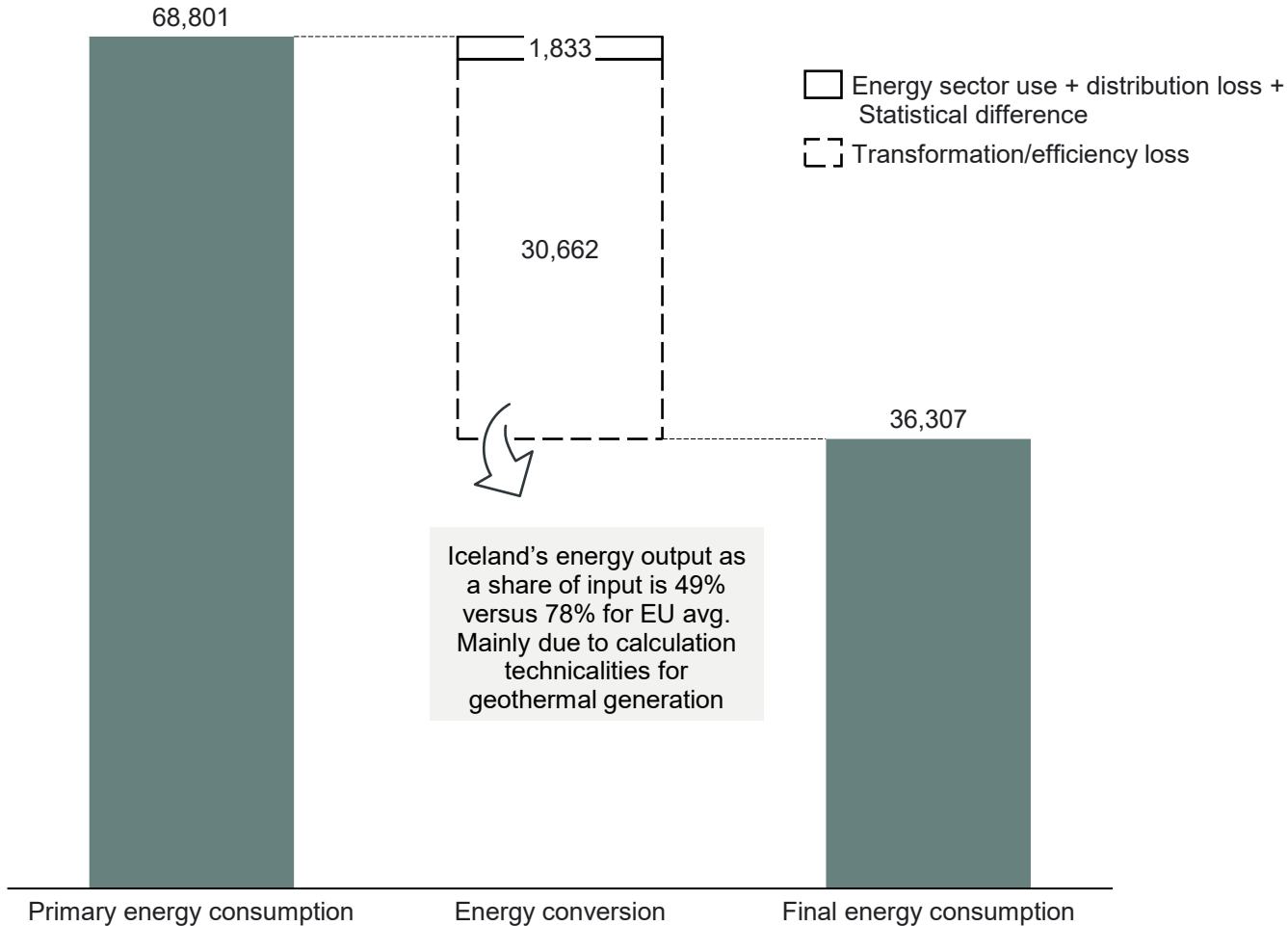


- Iceland's total energy of 68.8TWh in 2021 comes primarily from geothermal (68%) and hydro power (20%).
- Around 2/3 of geothermal energy is used in heat and the rest as electricity. Due to the large transformation loss associated with electricity production from geothermal energy the final energy consumption from geothermal is only around 45% of total.
- Hydro generates the majority of electricity (~2/3).
- Fossil fuels are primarily (89%) used in transportation (incl. international aviation) and fishing.

Iceland has a high primary energy consumption relative to final energy consumption due to technicalities around geothermal generation

Breakdown of Icelandic energy consumption by use 2021

GWh

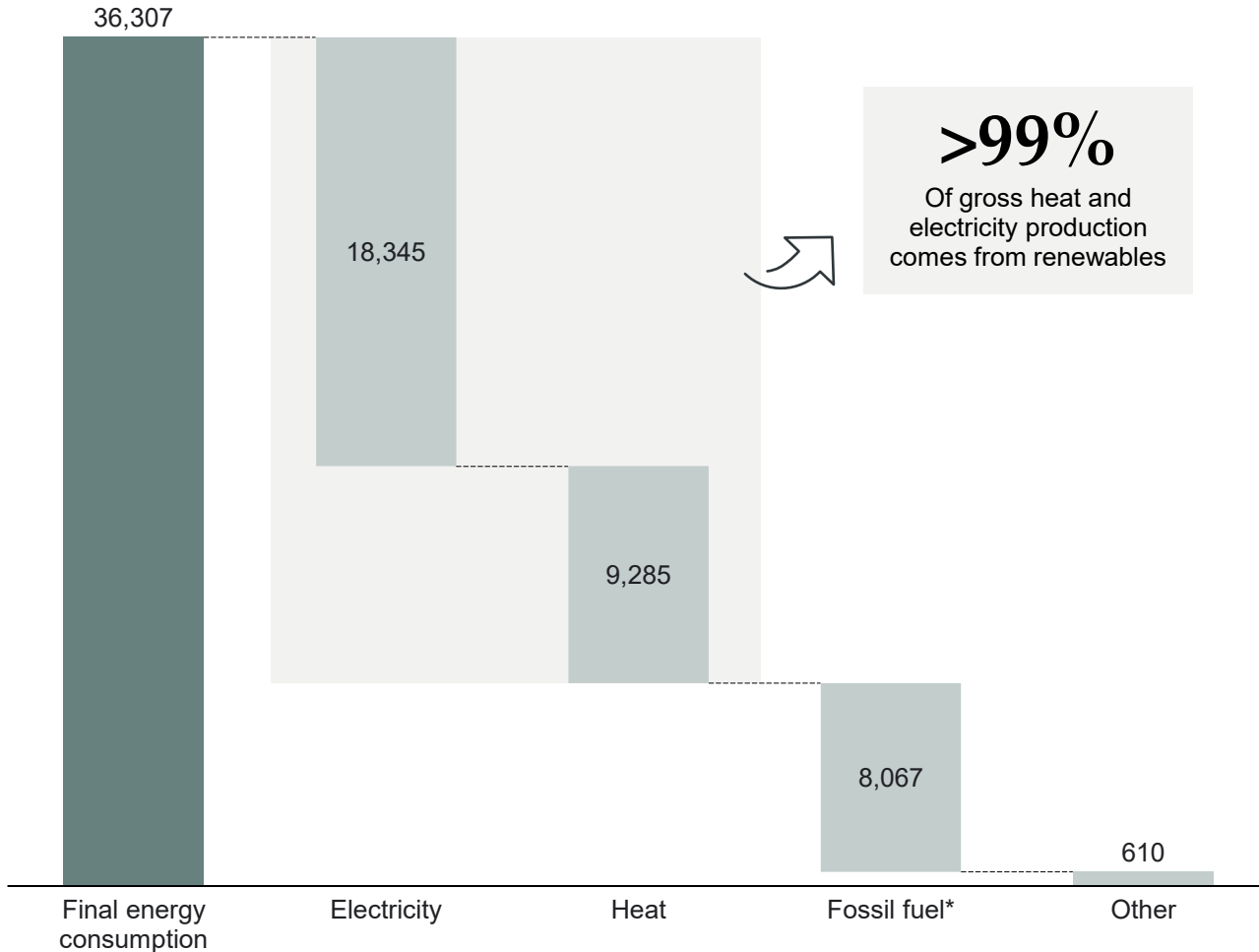


- In 2021 Iceland had a primary energy consumption of 68,801GWh. Primary energy consumption is:
 - *Gross available energy* (Primary energy production + Recovered & recycled products + Net energy imports + Change in stock) - *International maritime bunkers - Non-energy use*
- Final energy consumption is equal to primary energy consumption after accounting for transformation and distribution, i.e.:
 - *Primary energy consumption + Net transformation output* (output – input) – *energy used in the energy sector – distribution loss*
- In 2021 Iceland had a final energy consumption of 36,307GWh

In Icelandic statistics, final energy consumption is grouped untraditionally, mixing energy source and activity, due to the unique Icelandic energy infrastructure where renewables provide close to 100% of both heat and electricity

Breakdown of Icelandic energy consumption by use 2021

GWh



• Final consumption is usually split by sector (industry, household, transport etc.), but in this report we consider energy by energy source instead. We do this as Iceland do not produce combined forecasts for total primary and final energy consumption but instead produce individual forecasts for:

- Electricity and fossil fuels
- Geothermal production (for heating)

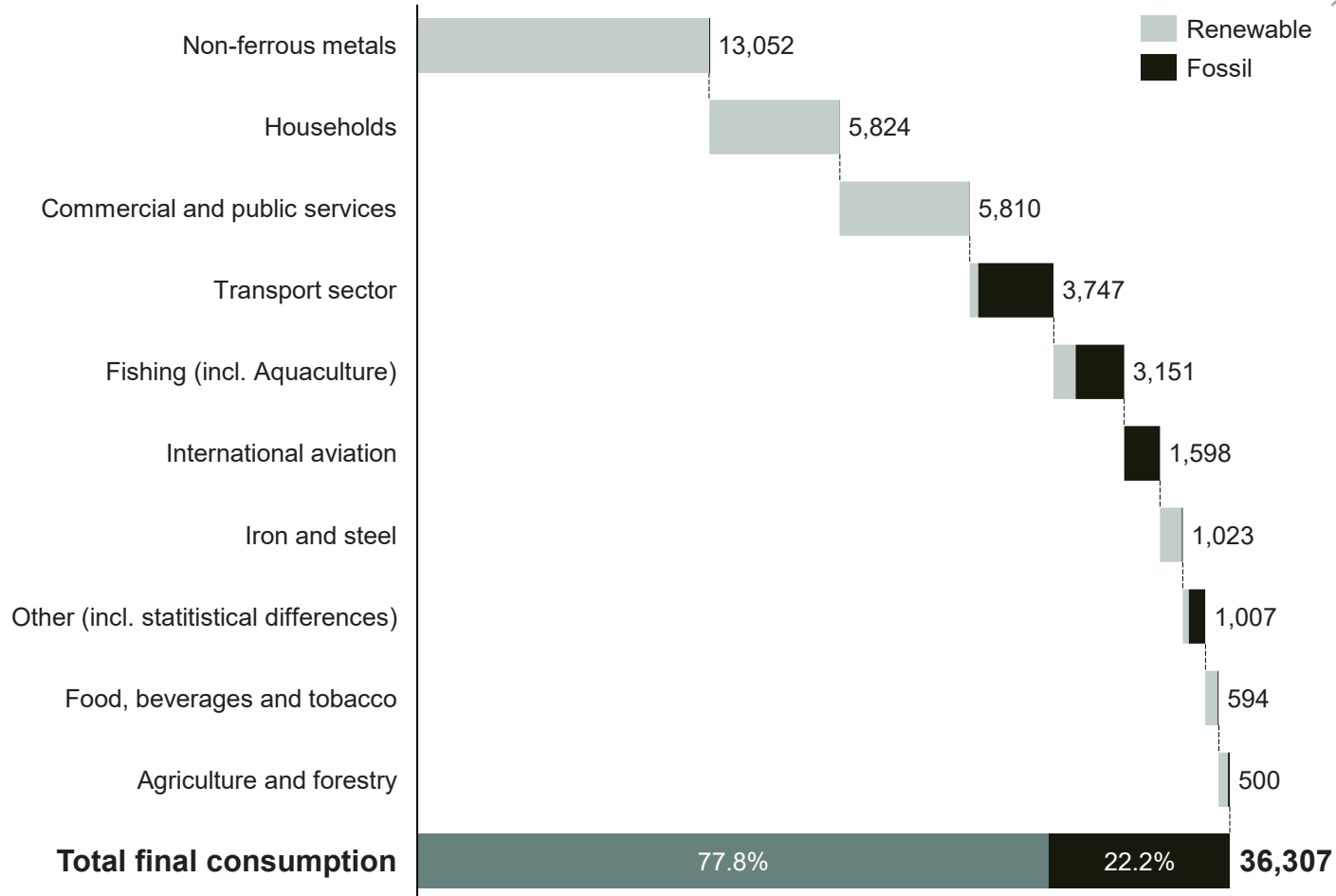
And it is therefore natural to make the equivalent split in the impact assessment to allow for calculation of the savings potentials based on the internal data of e.g. Orkustofnun.

- Drawing this line only makes sense in an Icelandic context due to the tiny overlap between e.g. fossil fuels used for electricity production or heating. E.g., gross heat and electricity from fossil fuels was around 6GWh in 2021 or 0.02% overlap.
- Combining the Icelandic projections sums to a total consumption in 2021 of 37.003GWh. This is 102% of the actual final energy consumption as reported to Eurostat in 2021. The deviation is explained by small overlaps but serves as a good approximation given the data availability.

78% Iceland's **final** energy consumption is made up by renewables. Fossil fuels are almost exclusively used in transportation and for fishing vessels and processing

Iceland's consumption of final energy 2021

GWh

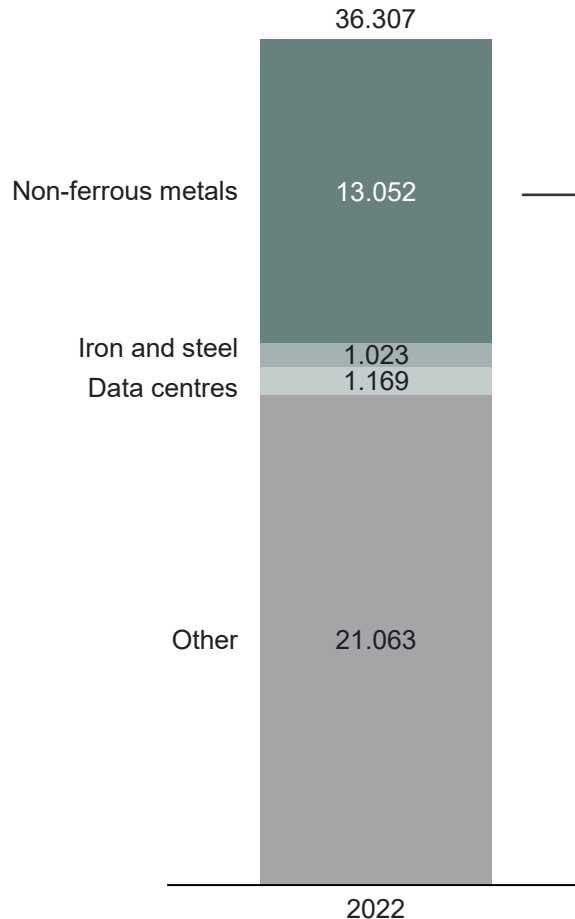


- Iceland's largest energy consuming sectors, non-ferrous metals, households, and the commercial and public service sector, are all almost running on 100% renewable energy.
- Iceland a final consumption in 2021 of 8,067GWh of fossil fuels which are predominantly consumed within three main sectors:
 - Domestic transport accounting for 42%
 - Fishing accounting for 27%
 - International aviation accounting for 20%

Iceland has a disproportionally high energy consumption per capita given its heavy presence of electricity intensive industry such as aluminium and ferro-silicon.

Iceland's consumption of final energy 2021

GWh



Three aluminium smelters are consuming 64% of Iceland's electricity or a 36% of Iceland's total energy consumption.



45%

Industry's share of final energy consumption in Iceland



26%

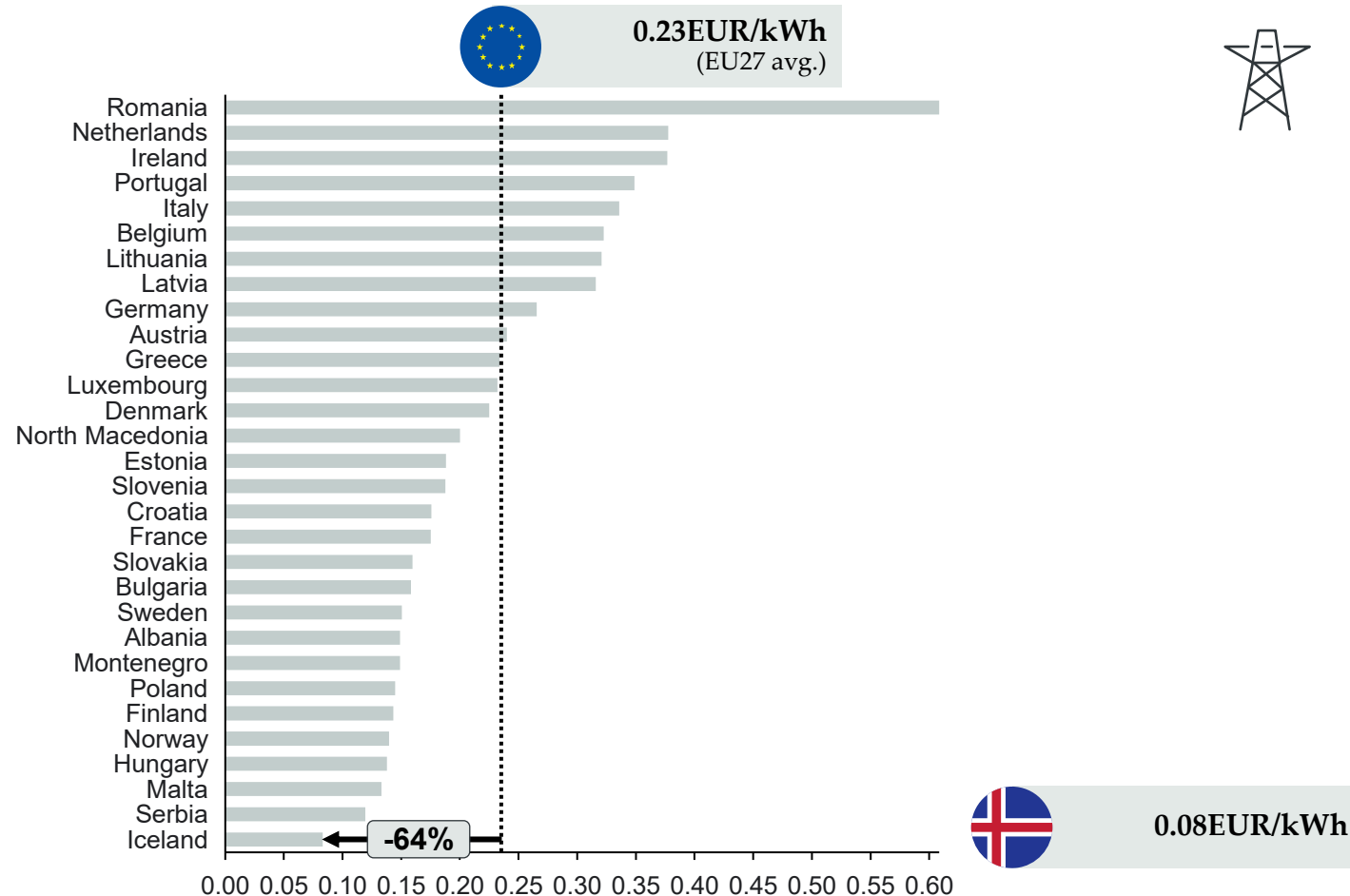
Industry's share of final energy in EU27

- In total the industry sector accounted for 45% of Iceland's final energy consumption versus only 26% for the EU27.
- Iceland's largest energy consuming sectors, non-ferrous metals (basically only consisting of three large aluminium smelters).

Icelandic PPP-adjusted electricity prices are the lowest in EU and 64% lower than the average EU Member State due to a unique situation of non-exportable low cost renewable energy

Average electricity price for household 2023H1 (excl. taxes and levies)

EUR/kWh, PPP-adjusted

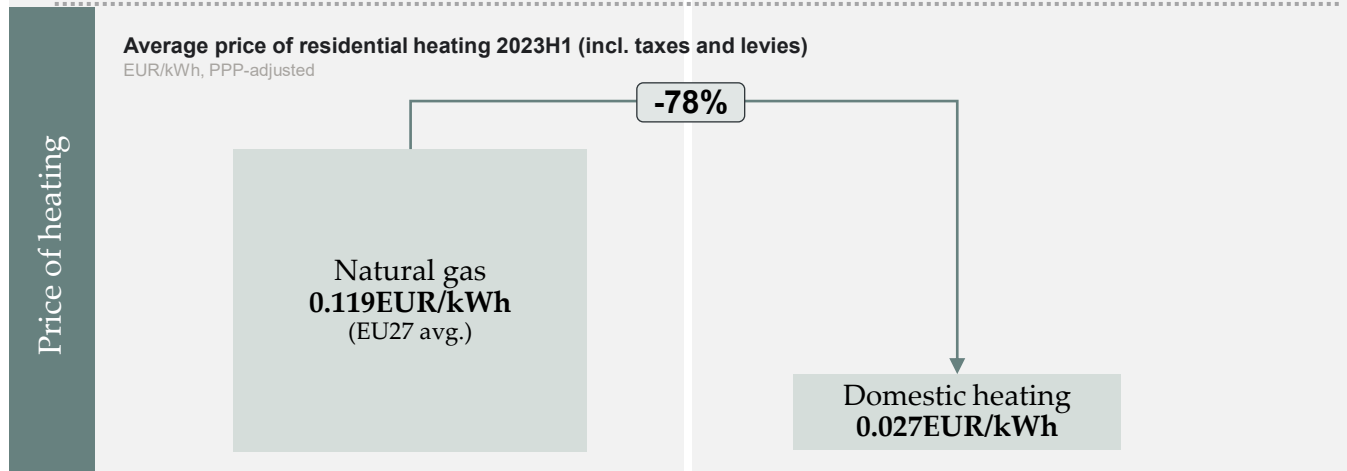
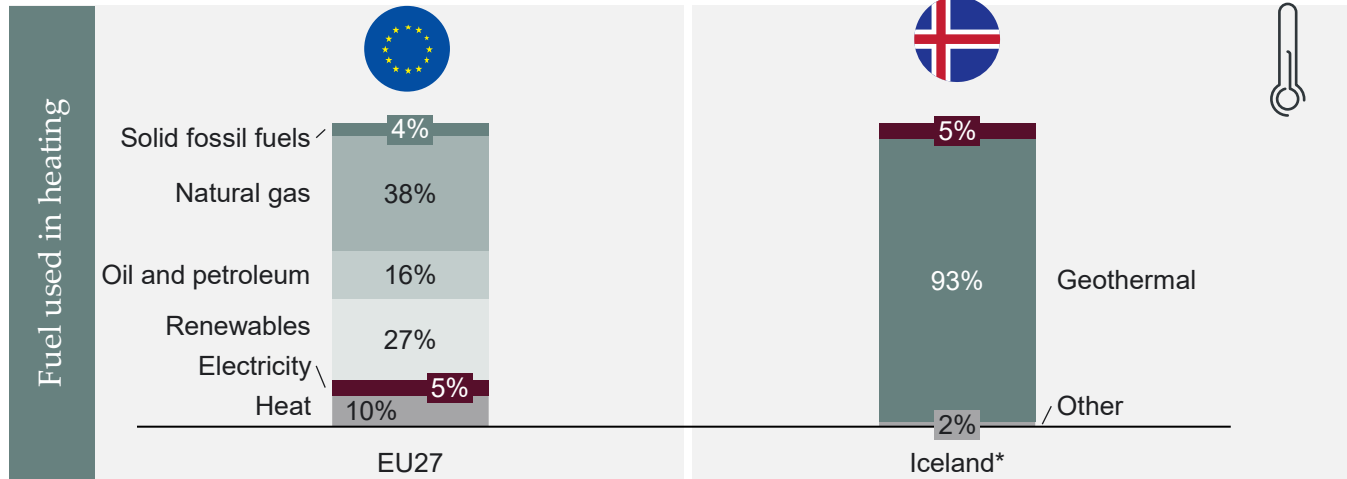


- Iceland has a lower price of electricity (excl. taxes and PPP-adjusted) than any EU country at 0.08EUR/kWh
- This makes Iceland's electricity price 64% lower than EU average. Apart from generally low prices the prices are also very stable/has little volatility relative to the fluctuating prices experienced in EU since 2021
- The low price of electricity means that Iceland has fewer attractive electricity savings options available due to the low cost-efficiency break-even point

Iceland's PPP-adjusted price of heating is 78% lower than the average price of natural gas – Europe's primary fuel used for heating

Share of fuels in the final energy consumption for space heating in the residential sector, 2020

%



- Heating prices are not directly published and available for comparison across EU Member States due to the vastly different ways of providing space heating across Members.
- The majority (38%) of space heating in the EU is done using natural gas
- In Iceland the primary heating source is geothermal energy accounting for ~93% of consumption
- Comparing the price of heating for these heating sources (excl. taxes and PPP-adjusted) the price in Iceland is about 78% lower than natural gas pr. kWh relative to the EU27 average.

Article 7 – Energy savings obligation

Iceland seeks a derogation from Article 7, preceded by Malta and Cyprus. The energy saving rationale in Iceland is less clear than in Malta and Cyprus, hence Iceland is aiming for a 0.15% savings obligation (compared to 0.24%)

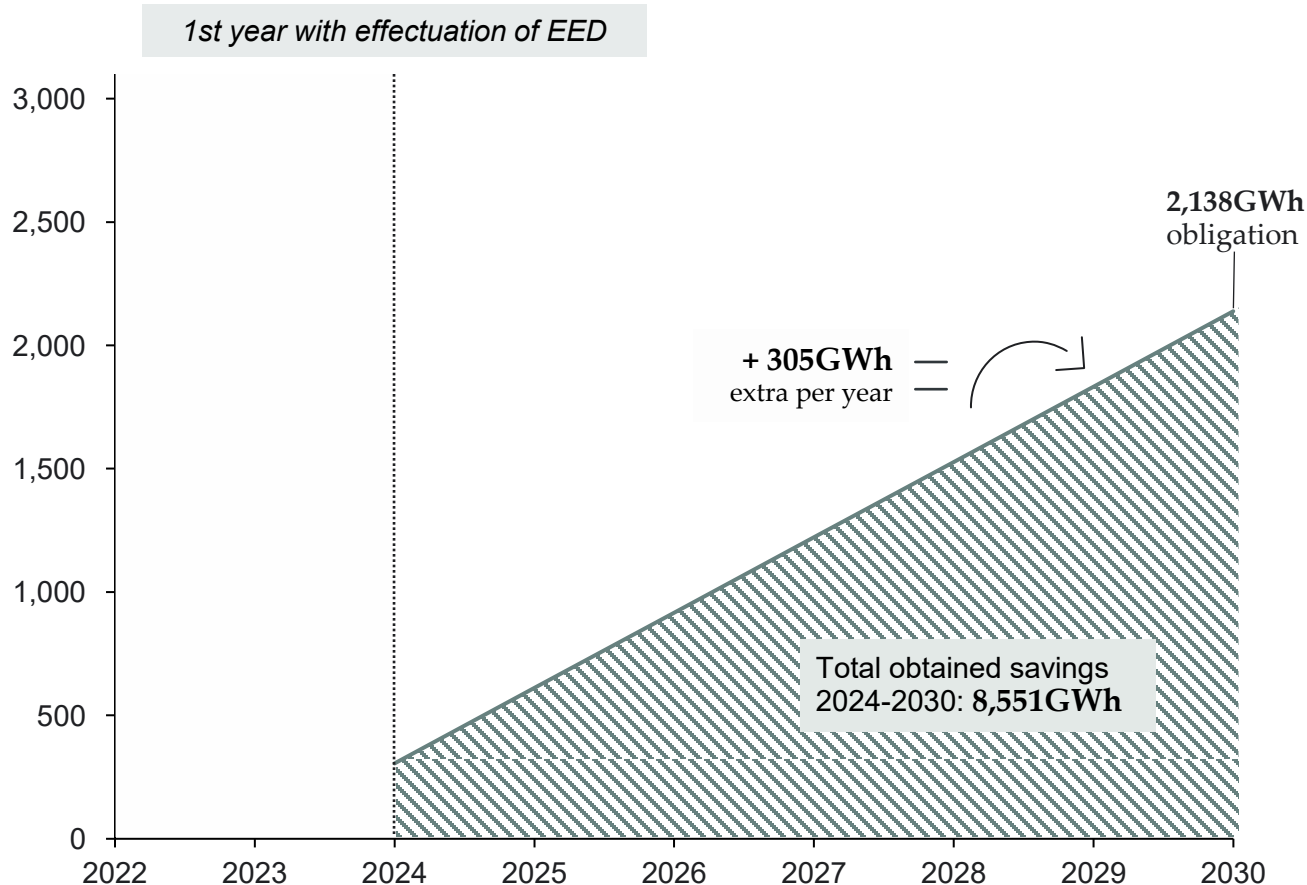
Arguments for Iceland's derogation from Article 7 of EED 2018

Arguments for Cyprus' and Malta's 0.24% derogation (2018/2002 recital 13)	Arguments for Iceland's 0.1% derogation from Art. 7
Small isolated island	☒
Small size of petroleum distribution companies	☒
No natural gas network	☒
Single electricity distributor	☐
No district heating or cooling systems	☐
Further arguments	Most of Iceland's primary energy (88%) is from renewable sources
	Iceland has a disproportionately high share of energy intensive industry already covered by the EU ETS thereby already facing strong incentives for energy efficiency. If Iceland faced the full obligation, it would per capita be disproportionately higher than EU27 avg. (+330%)
	Iceland's low cost of energy implies that much fewer energy efficiency measures will be cost-optimal compared to EU countries.
	Iceland's energy consumption does not pose a geopolitical risk
	Iceland has already implemented several measures including transitioned a substantial share of personal road transport (1 st in EU on share of fleet on alternative fuels and 2 nd on share of new registrations)

- Iceland is sharing many of the arguments presented for the 0.24% derogation of Cyprus and Malta for Article 7 (instead of 0.8%)
- Additionally, Iceland has a number of further reasons which calls for a lower obligation. Iceland is of the opinion that an obligation of 0.15% is relevant, fair and suitable given its special circumstances much different from the rest of the EU (see page 26 for elaboration on the exact number).

The Energy Savings Obligation is calculated as a cumulative obligation. Under a full obligation, it equals a yearly saving obligation of 2.138 GWh by 2030 giving rise to total cumulative savings of 8,550 GWh from 2024-2030.

Iceland's cumulative new energy savings obligation
GWh

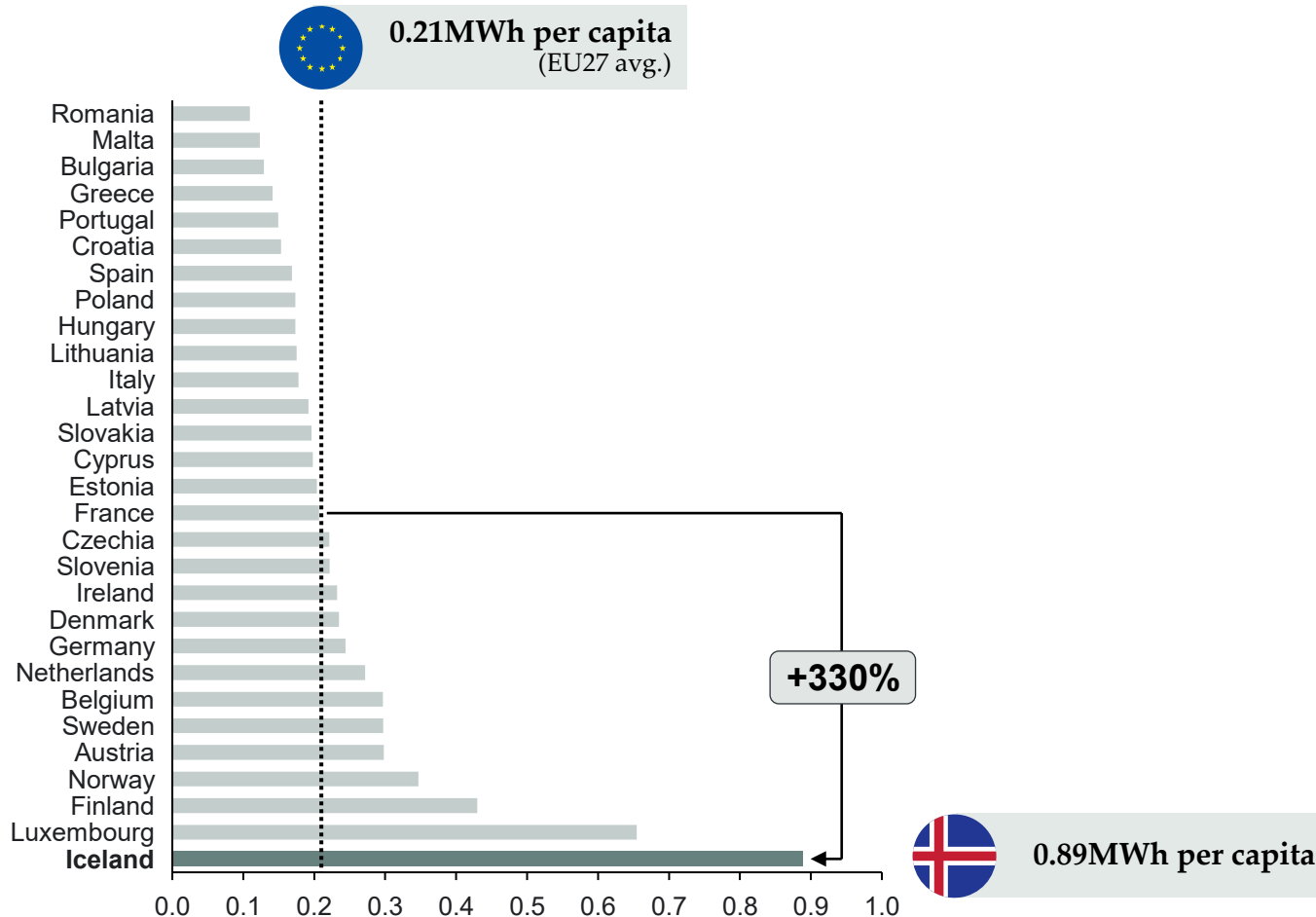


- The annual increase in the energy savings obligation until 2030 is equivalent to 305GWh =
 - Average final energy consumption from 2016-18 (38,176GWh)
 - The yearly reduction obligation (0.8%)
- By 2030 Iceland is obligated to save 2.138GWh per year or 5.6% of the 2016-2018 average consumption.
- Over the period 2024-30 Iceland will have to save a total of 8,551GWh.

A full Article 7 obligation would require Iceland to save 330% more per capita than the average EU27 Member State due to Iceland's disproportionately large energy intensive industry

Yearly additional energy efficiency obligation per head (based on 2016-18 consumption)

MWh per capita

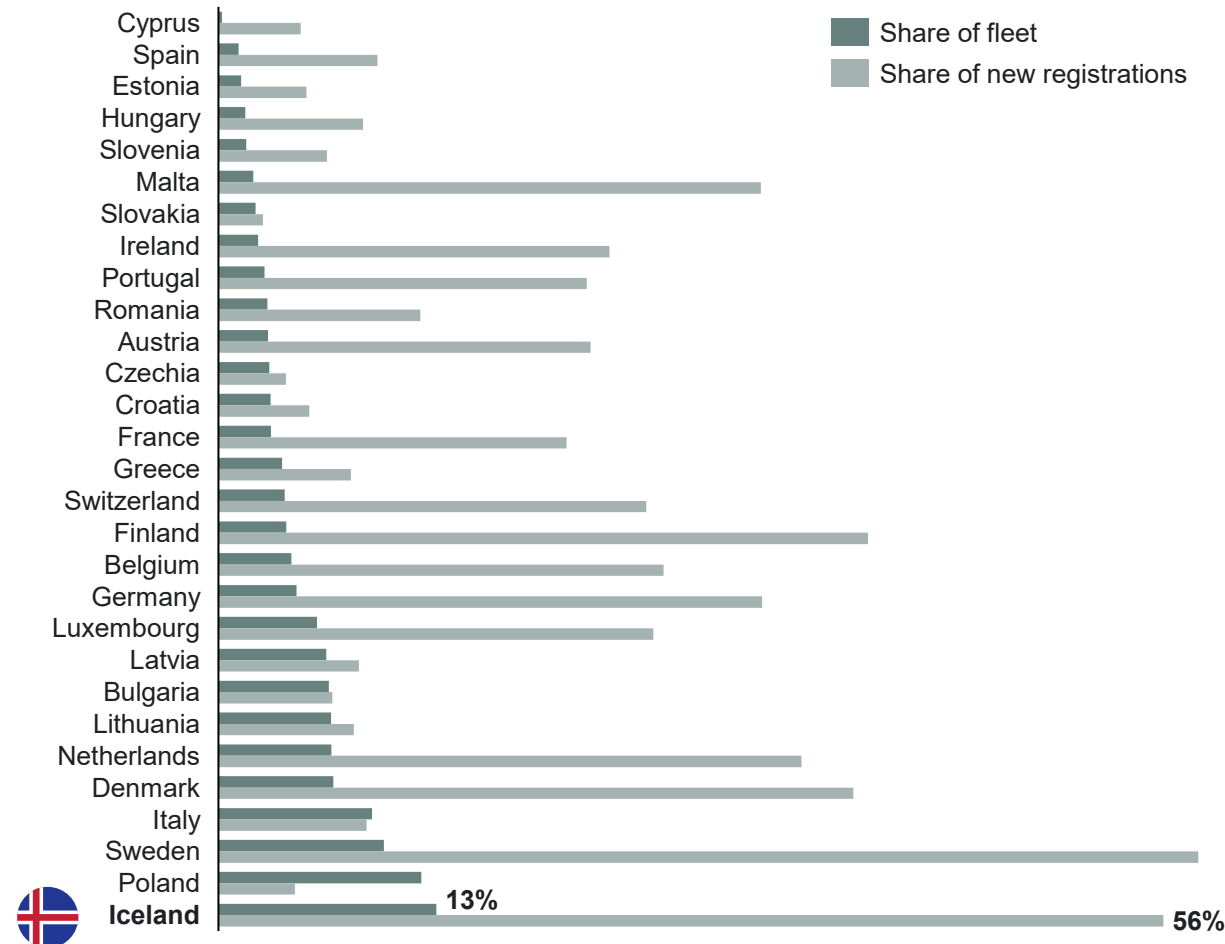


- Iceland's abundance of cheap clean energy has attracted energy intensive user to Iceland e.g. aluminium smelter and data centres leading to a very high energy consumption per inhabitant relative to other EU countries even though these heavy users are operating at EU-baseline (output per energy)
- Under Article 7 EU countries are required to save 0.8% additionally per year of their final energy consumption
- For Iceland however, heavy industry pumps up the consumption baseline meaning that Iceland would be forced to save 330%/proportionally more per year per head than the average EU country regardless of the availability of savings options
- This is particularly relevant, as the energy intensive industry is already part of the EU ETS and heavily exposed to international competition. Consequently, it can be expected that this part of the consumption is already facing a strong incentive to be energy efficient. And that other sectors such as households and service sectors will therefore need to face a disproportionately high savings requirement

Iceland is leading the alternative fuel transition relative to Member States with the largest fleet share (13%) and second in share of new registrations (56%)

Alternative fuel passenger vehicles in 2022

%



- Iceland is already leading the alternative fuel (primarily electrical and plug-in-hybrid) transition relative to most European countries with the largest fleet share (13%) and the second highest share among new registrations (56%).



Iceland's low cost of energy implies that much fewer energy efficiency measures will be cost-efficient compared to EU countries.

Estimation strategy for energy saving potentials and cost-effectiveness calculations

In the following, we will present facts and evidence about the Icelandic potential for energy efficiency as well as energy prices and costs.

While energy prices are well understood, evidence on technical energy efficiency potentials and the costs of these are less described. And so, there exists limited research and studies on this in Iceland (besides a recent study taking a first step into understanding the efficiency potential within *electricity* consumption)

Based on these limitations, we have collected available information as well as supplemented with specific calculations and analyses. Based on this we are able to cover potentials within electricity, residential heating, and personal transport



Data sources and estimation strategy

Category	Certainty of energy reduction potential	Certainty of cost-effectiveness	Remarks
Electricity (incl. all sectors using electricity including industry, households, transport, agriculture etc)	Medium – good	None-Low The study does not identify costs explicitly	The reduction potential is a combination of a technical potential and a cost-effective potential. The study excludes purely technical reduction potentials that have been deemed completely unfeasible. The potentials covered are however not necessarily cost-efficient
Heat (only residential heating)	Medium Extrapolates the technical potentials of the residential building stock in Norway	Medium – good Assumes that the cost of renovation measures are similar in Norway and Iceland	The technical potential extrapolation is based on a per capita adjustment of the identified potential in Norway
Personal transport	Medium Calculates the energy savings in going from conventional ICE-cars to electric vehicles	Medium	Based on projections from Orkusþá Orkustofnunar (Icelandic Energy Agency)

Categories not covered:

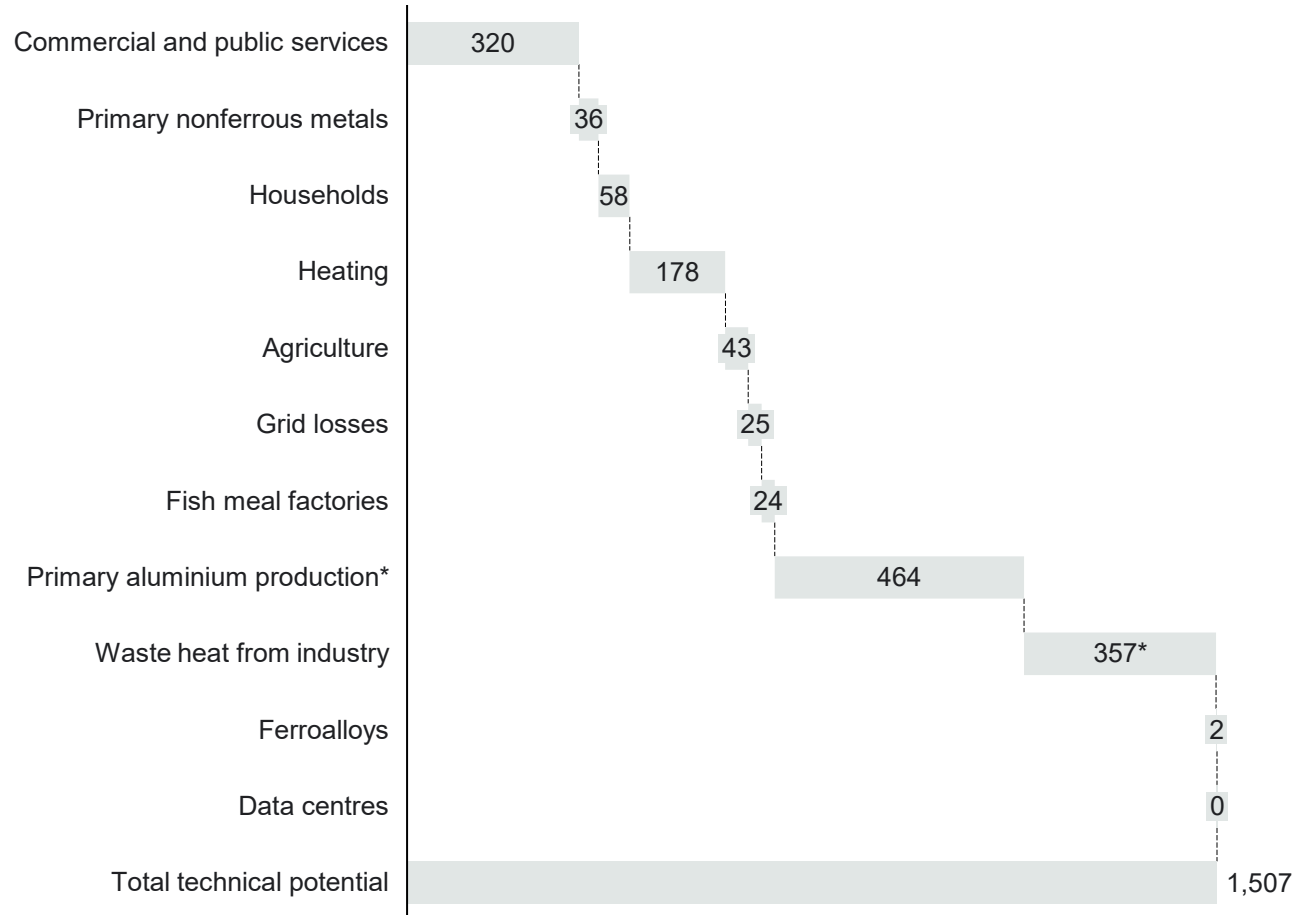
- Heating for non-residential buildings
- The transport sector except personal transportation
- Other activities using fossil sources (constituting only 8% of total final energy consumption) including primarily fishing vessels and some fish meal factories

Technical potential

For electricity (50% of final consumption), a full study of the energy savings potential suggest a total technical potential of 1.5TWh

Savings potential in Icelandic electricity use from the study 'No Wasted Energy'

GWh

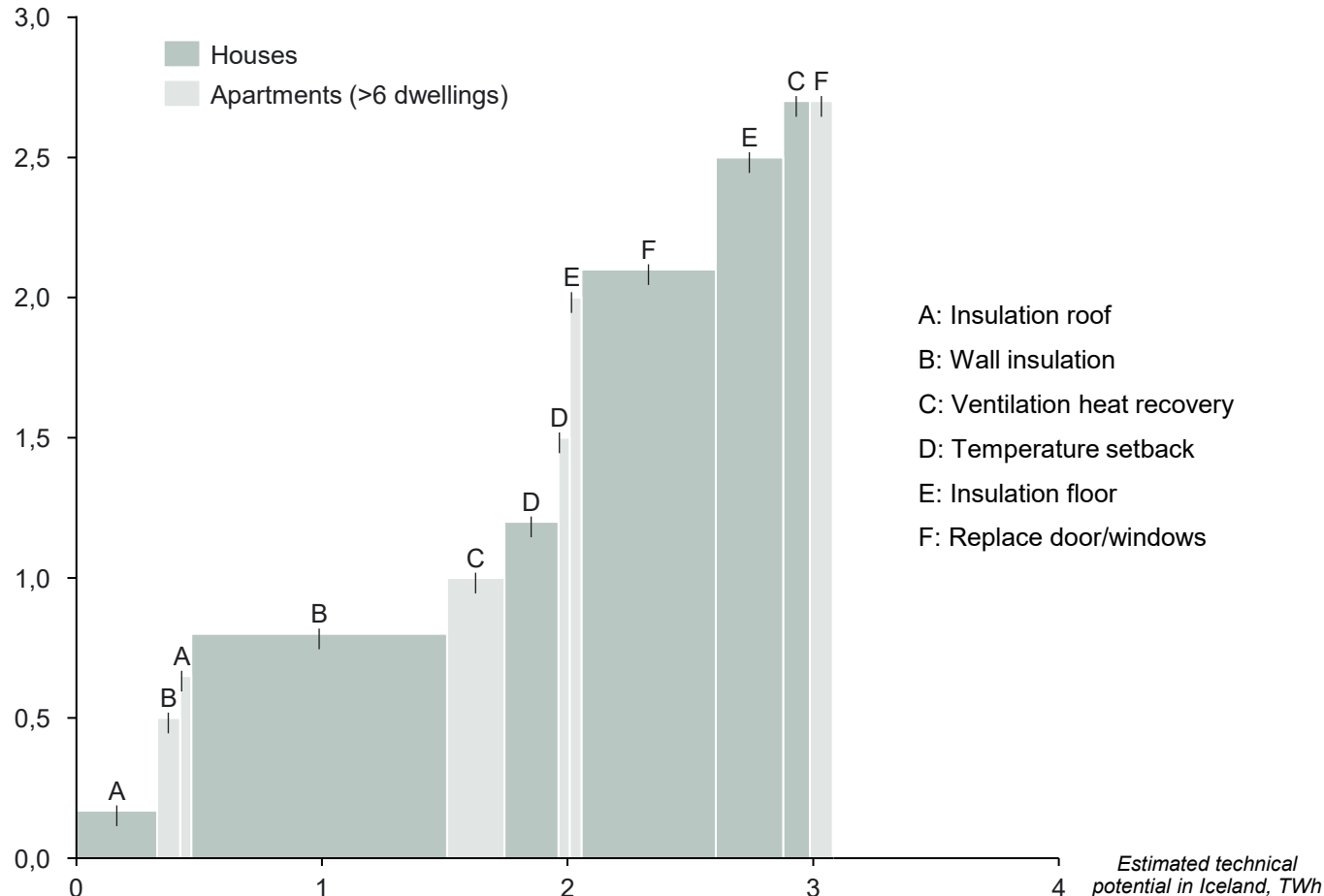


- Total identified technical savings potential of 1.507 GWh correspond to approximately 8% of the total electricity consumption in 2021.
- The study excludes purely technical reduction potentials that have been deemed completely unfeasible for technical realization within a time frame of ~10 years.

For residential buildings, our simple estimation suggest a full technical energy savings potential of 3,1 TWh which should be interpreted as an optimistic estimate

Estimated levelised cost of energy (LCOE) for residential energy efficiency initiatives (excl. taxes)

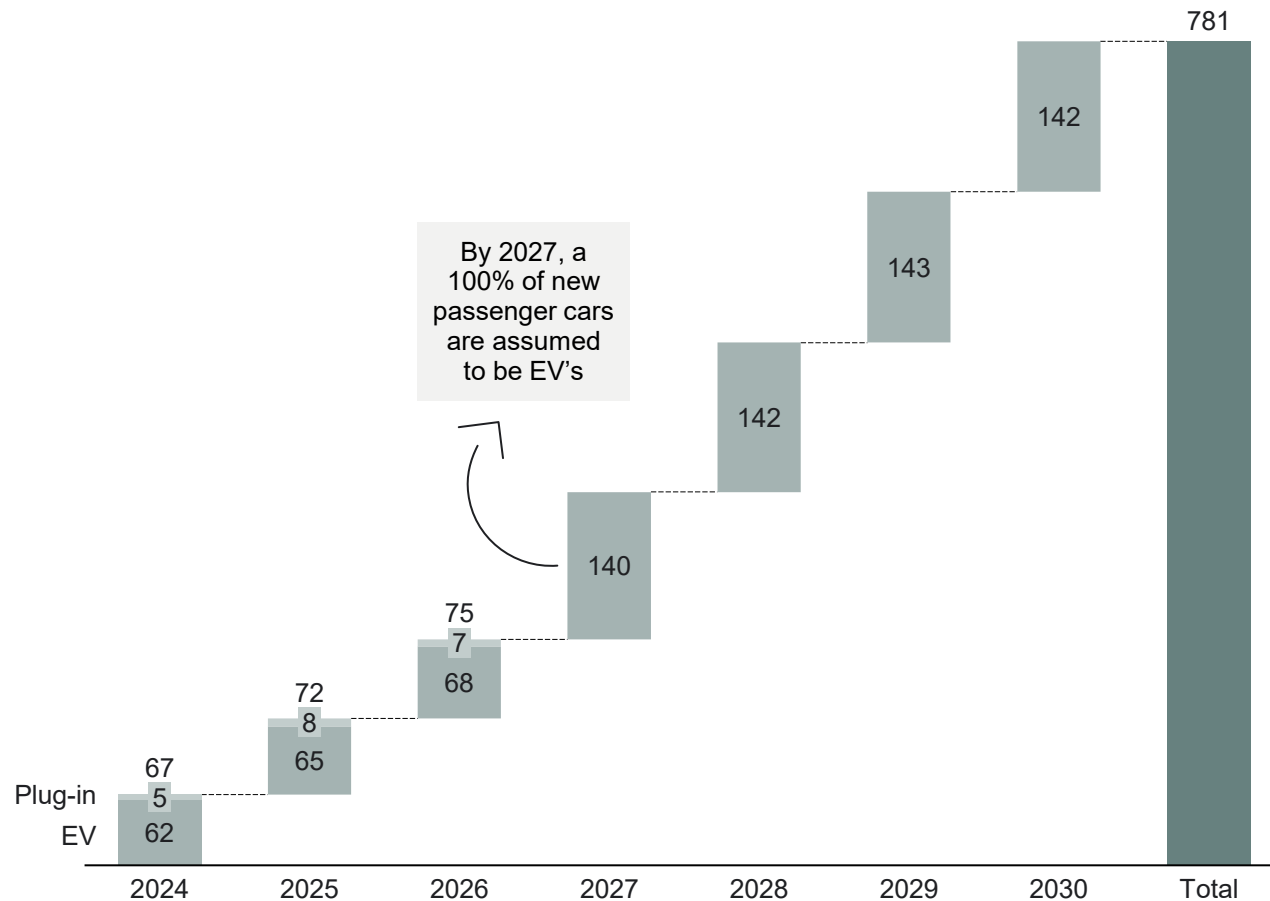
NOK (2020-prices) per kWh



- Our estimate of technical efficiency potential in Iceland is based on a study from Norway (*NVE 2022: Underlag for langsiktig strategi for energieffektivisering ved renovering av bygninger*).
- This study finds that 62% of the total heating related energy consumption in residential buildings could technically (not economically) be reduced through different renovation and improvement efforts. The study further breaks down this potential into specific measures and lists both technical potential and costs of the measures.
- Translating this directly to Iceland, it would imply that 65% of total heating related energy consumption in residential buildings could *technically* be reduced by measures. The difference between 65% and 62% is that Iceland has a larger share of the population living in apartment buildings than in Norway, which translates into a higher technical potential.
- **65% of total heating related energy consumption in residential buildings correspond to 3.1TWh.**

For personal transportation, our calculations suggest a full technical energy savings potential of 781GWh per year by 2030

Additional yearly technical energy savings potential from passenger vehicles (M1) in Iceland
GWh



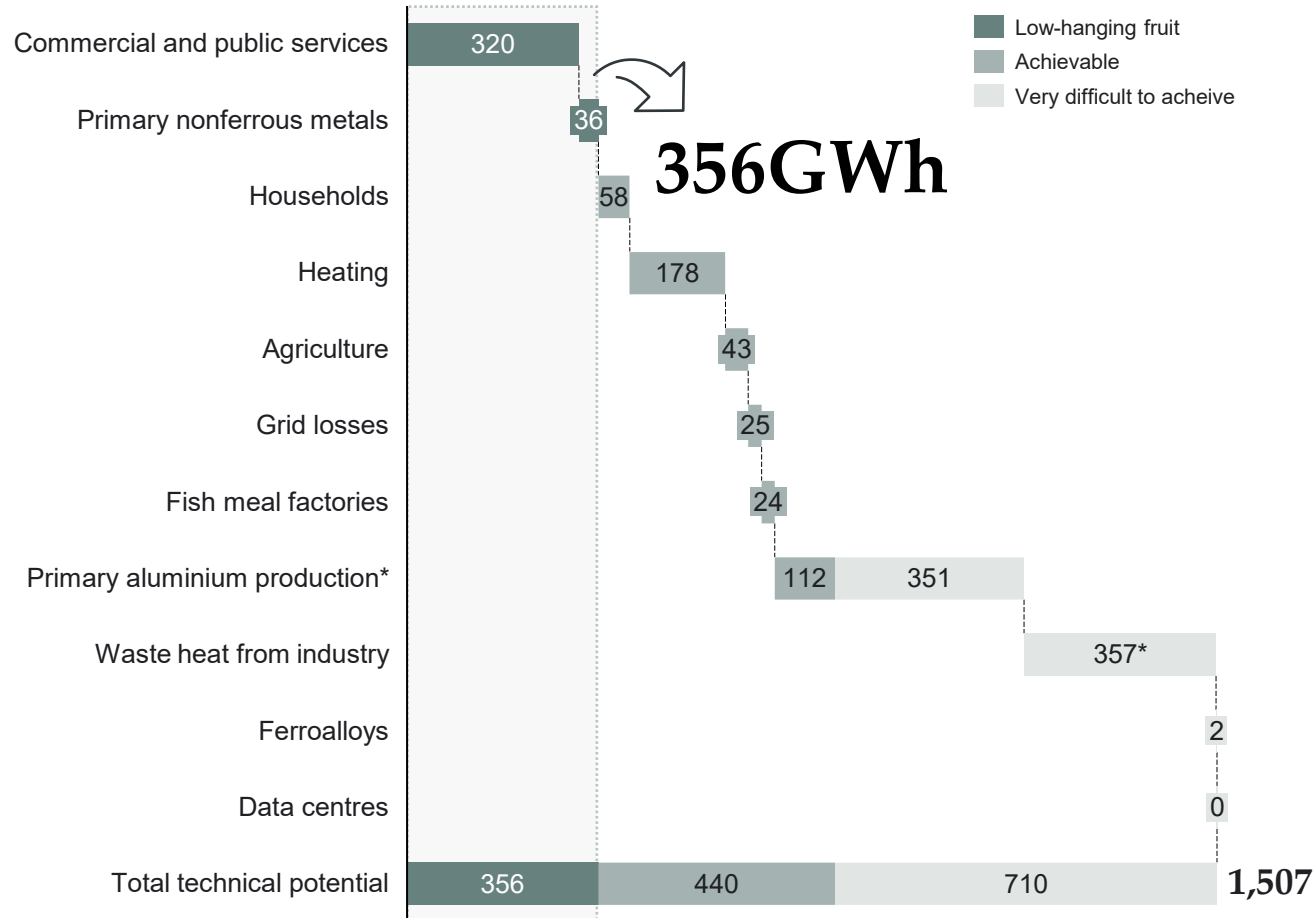
- Our estimate of technical efficiency potential in Iceland is based on the "High" i.e. optimistic scenario from the latest energy forecast from Orkustofnun. The high scenario assumes:
 - 6-8% of the personal car fleet is replaced each year
 - 1.8% avg. yearly growth rate in the personal car fleet between 2024-30
 - 100% of newly registered M1 will be EV's by 2027
- Assuming unchanged yearly kilometres driven per car of 14,644km, and a saving equivalent to 0.5kWh per km (0.25kWh for Plug-in), the transformation has a **potential to reduce the energy consumption by 781GWh per year in 2030.**
- In the high scenario 53% of the M1 fleet will be non-fossil by 2030.

Cost-efficiency considerations

356GWh of the savings potential in electricity might be considered cost-efficient, but this is likely optimistic

Savings potential in Icelandic electricity use from the study 'No Wasted Energy'

GWh

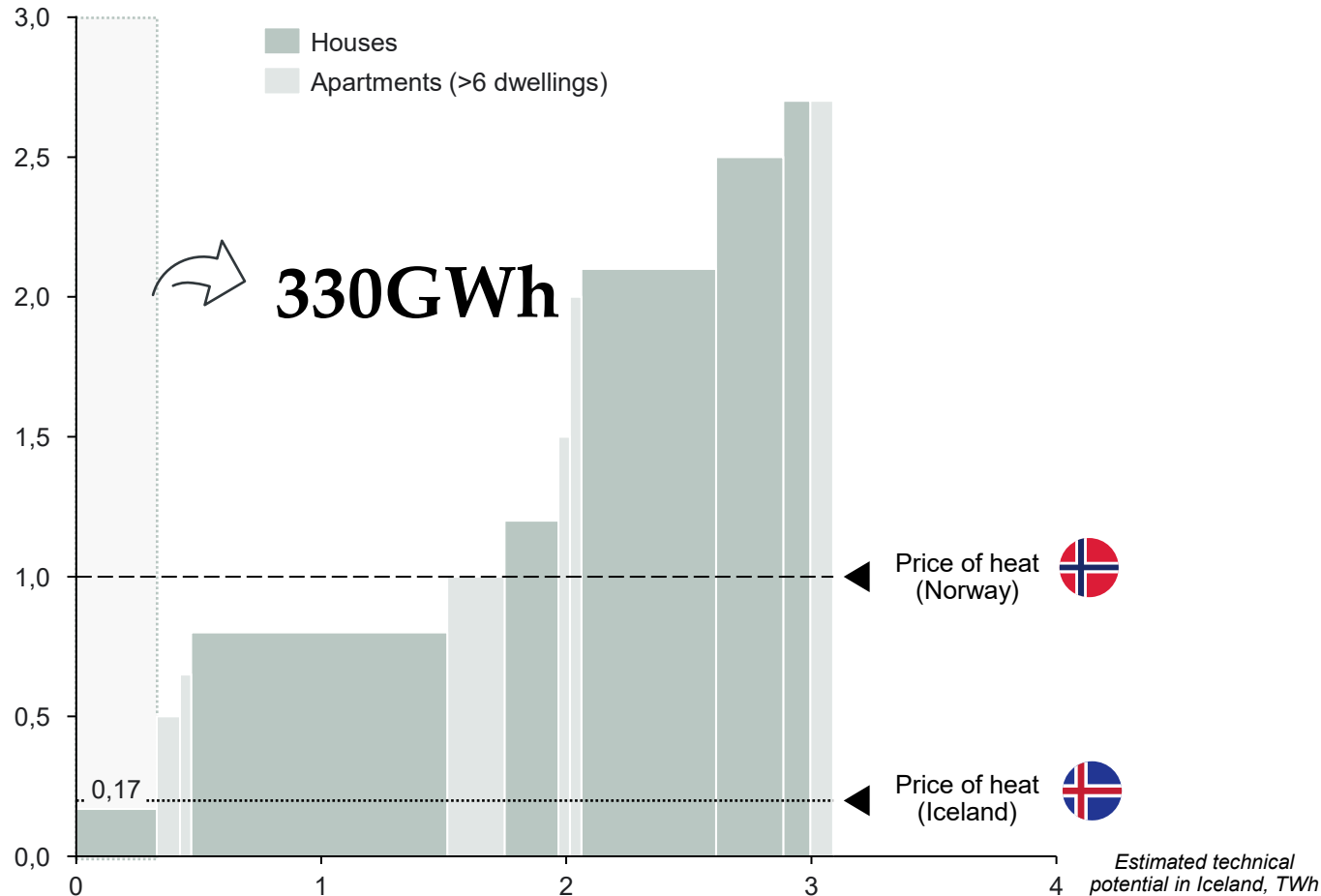


- The study did not as such estimate the specific costs for each category. It did however propose three different categories labelling the likelihood of realising these potentials: Low-hanging fruit, achievable and very difficult to achieve.
- For this purpose, we interpret the “low-hanging fruit”-category as being cost efficient.
- We understand that this interpretation is not correct, as the original study did not estimate costs. Instead, the assessment was made from a broader implementation perspective.
- Consequently, we should treat the potential of 365GWh as a high (and most likely unrealistic) estimate of the cost-effective potential within the electricity sector.

In residential heating, 330GWh is considered cost-efficient given the low cost of heat in Iceland

Estimated levelised cost of energy (LCOE) for residential energy efficiency initiatives (excl. taxes)

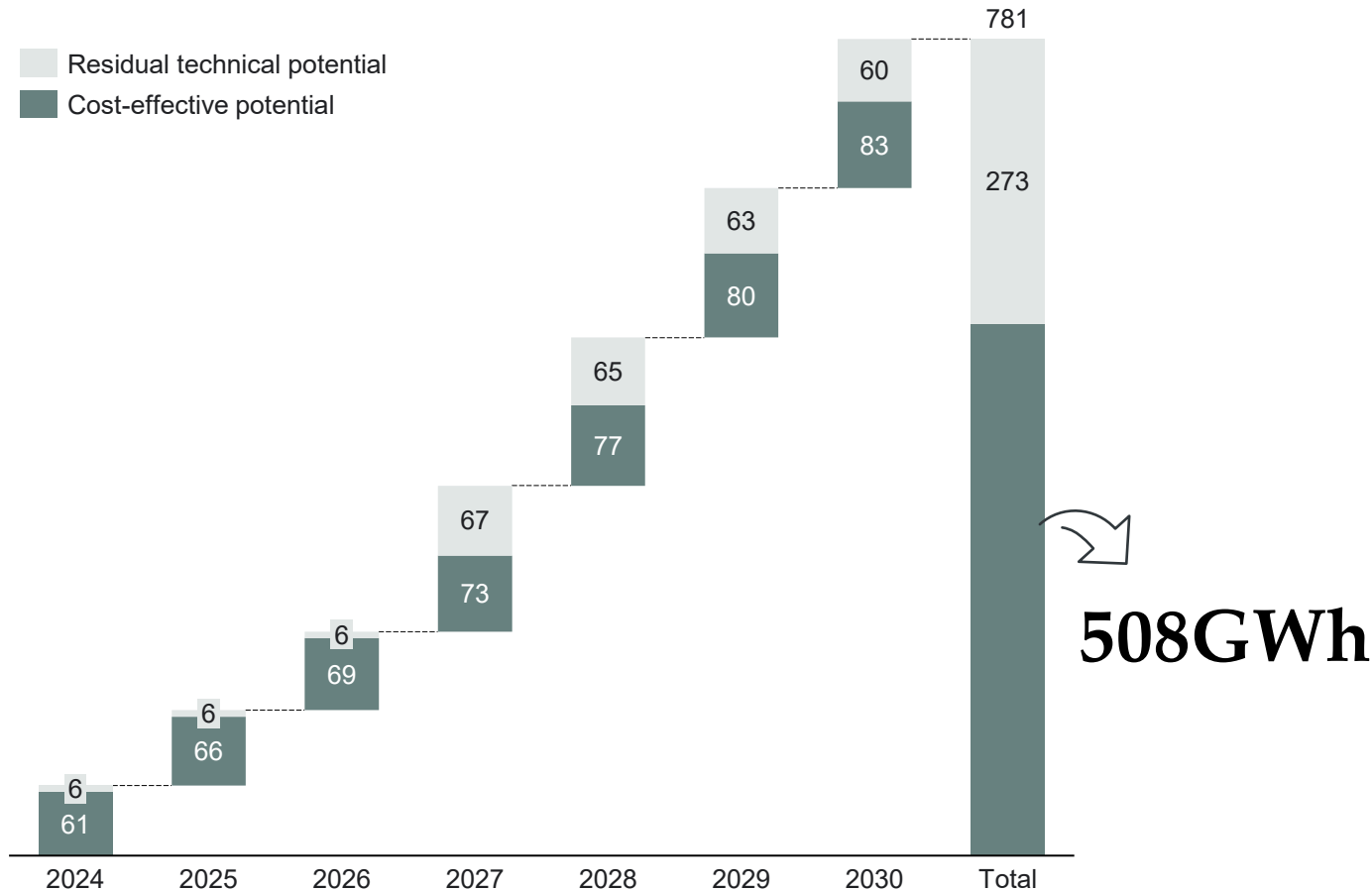
NOK (2020-prices) per kWh



- Taking the Icelandic price of heat and applying that to the extrapolated renovation measures from the Norwegian study, we find that a very low share of the identified measures would be cost-efficient. With the Icelandic heat price of about 0.209NOK/kWh, **only roof insulation in residential houses is considered to be cost-efficient with an estimated potential of ~330GWh.**
- The price of heating in Iceland in 2023 has been calculated by accounting for price differences in heating between Iceland and Norway (PPP-adjusting) as well as development in the general Norwegian price level since 2020.
- The 330GWh are assumed to be captured linearly over 50 years based on the assumptions from the Norwegian analysis. In the analysis the cost-effectiveness of roof insulation hinges on the coincidence of its natural replacement cycle/when the roof is already slated for a 'change of roofing'. It With a >50-year lifetime and assuming a uniform rate of roof replacement in Iceland it means that it would take 50 years to reap the full 330GWh potential.

For personal transport, 508GWh is considered cost-efficient given Iceland's high taxation of fossil transport

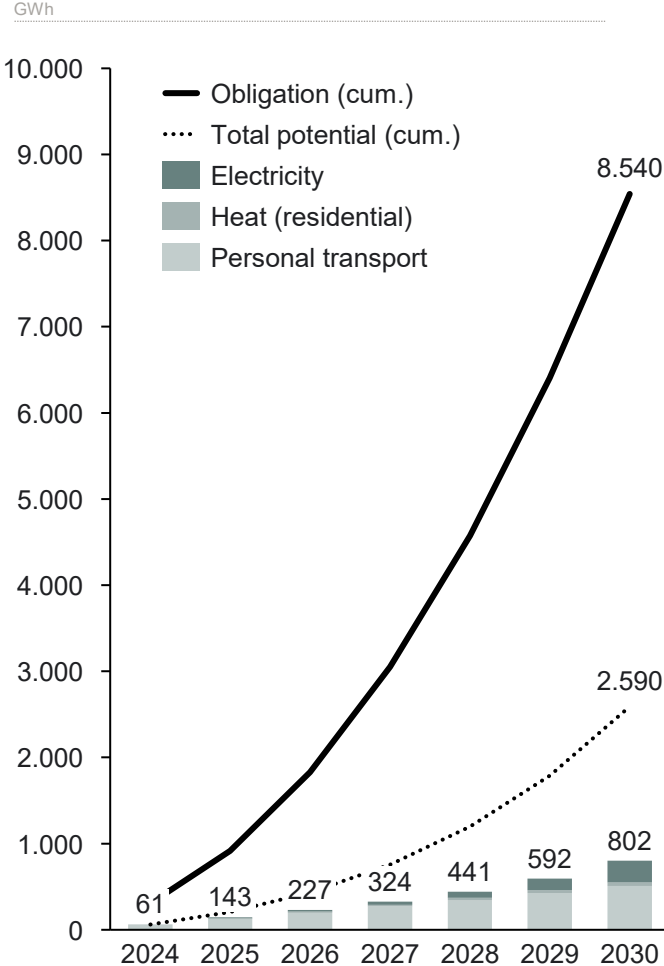
Additional energy savings from passenger vehicles (M1) in Iceland
GWh



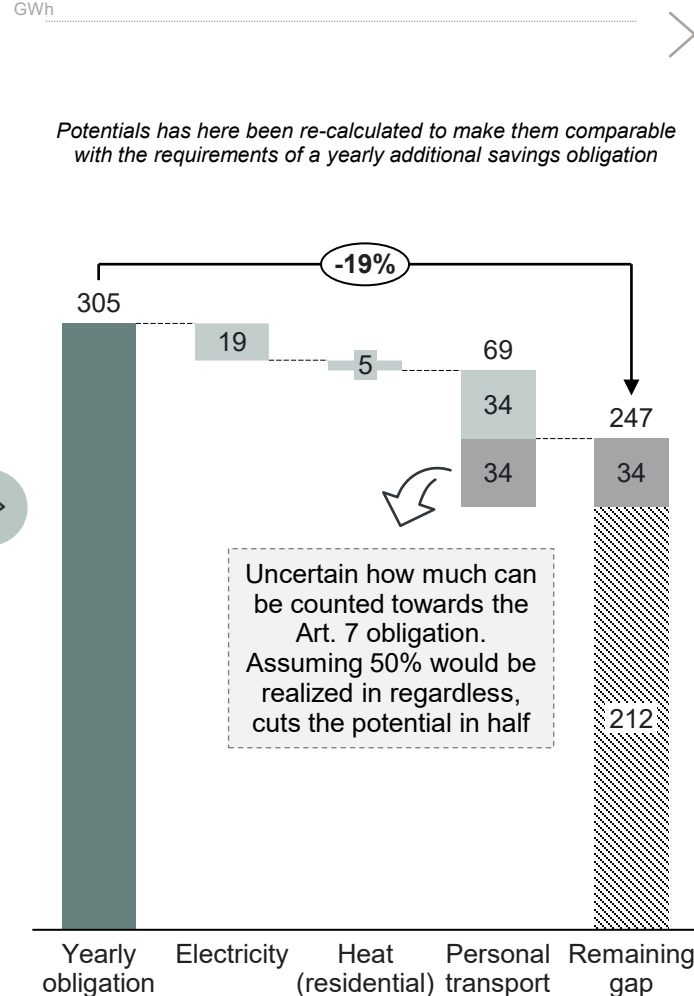
- A total of 781GWh by 2030 is identified as the technical potential/the high scenario. However, not all those savings are cost-effective. With the current transportation policies in Iceland, the expectation is that **508GWh of the technical potential will be reached is cost-effective by 2030** – given is current high tax on fossil transport. This will bring the share of alternative fuel cars to 42% of the M1 fleet.
- Not all 508GWh can be expected to be count towards the savings obligation in article 7 though. Part of this development is likely due to measures or business-as-usual not eligible for meeting the requirements of the obligation.
- It is difficult to say exactly how much of this potential that could be counted towards the obligation; assuming 50% means that 254 GWh would be eligible.
- Iceland has ambitious national policies for personal transportation with an annual owner fee, import fees, and fuel and CO2 taxes. E.g. the combined fuel and CO2 tax in 2024 for diesel excl. taxes is 0.63EUR/l (88.85 ISK/l) vs. 0.33EUR/l required by EU minimum standards.

The cost-efficient potentials identified in Iceland would only be able to achieve 19%-30% of the full obligation imposed by Article 7. Consequently, full obligation would be disproportionate and very costly for Iceland

Roll-out of cost-effective energy savings measures



Summary of yearly cost-efficient Icelandic energy saving potentials towards 2030



- In a scenario where the EED is implemented with effectuation in 2024 Iceland will have to save 305GWh of new and additional energy savings per year until 2030.
- To make the estimated cost-efficient potentials comparable with the savings obligation stipulated in Article 7, an implementation profile has been used for each of the three savings potentials:
 - *Electricity*: Potential assessed to be realisable within 6-8 years. Savings are therefore linearly phased in over 7 years.
 - *Heating (residential)*: Phased in with the replacement of roofs, which is expected to have 50-year lifetime
 - *Personal transport*: Follows the forecasted profile from Orkustofnun
- With these implementation profiles, Iceland would be able to meet between 19-30% of the yearly obligation
- **19% of the yearly obligation of 0.8% is equivalent to 0,15% per year, which consequently is the obligation Iceland is seeking**

Article 5 – Energy efficiency in public buildings

Iceland seeks full derogation from Article 5 as it builds on Iceland's current derogation of EPBD 2002 and 2010 and the disproportionate administrative burden

Arguments for Iceland's derogation from Article 5 of EED 2018

Arguments for Icelandic derogation from Art. 5

The EED 2018 is an amendment of Directive 2002/91/EC on the energy performance of buildings (EPBD1) and Directive 2010/31/EU on the energy performance in buildings (EPBD2). Neither Directive applies to Iceland by virtue of EEA Joint Committee No 37/2004 of 24 April 2004 and No 135/2022 of 29 April 2022, as it was recognised that Iceland has limited potential to improve the building stock.



Administrative burden of adhering to Article 5 is likely to economically outweigh the renovation benefits given the few available cost-efficient heat renovation options in Iceland



The heating of the Icelandic building stock is already >99% fossil-free, bringing Iceland on the frontier to reach the updated EU 2050 target of zero-emission buildings (ZEB)



Iceland is in parallel working actively towards modernising their public buildings through; reviewing the general building code, setting certifications targets for larger public project (>3.4 million EUR) administered by The Government Property Agency, and having energy efficiency as one of five pillars in Iceland's long-term energy policy incl. initiatives such as grants for heat pumps and installation of smart controls in buildings



- Article 5 of the EED 2018 builds on the (minimum) energy efficiency standard set out in Directive 2002/91/EC on the energy performance of buildings (EPBD1) and Directive 2010/31/EU on the energy performance in buildings (EPBD2). Neither Directive applies to Iceland. Henceforth, Iceland should also have derogation from Article 5.
- Further, Iceland's (public) building stock is already living up to the overall aim of the Article:
 1. Cost-efficient energy efficiency/renovation level due to low price of heating
 2. The building stock is heated by 99% renewable energy

The existing derogation from EPBD acknowledged the limited scope for improvements in the Icelandic building stock as well as the high degree of carbon-free energy

Justification in the explanatory note which led to the final agreement on the full derogation from EPBD

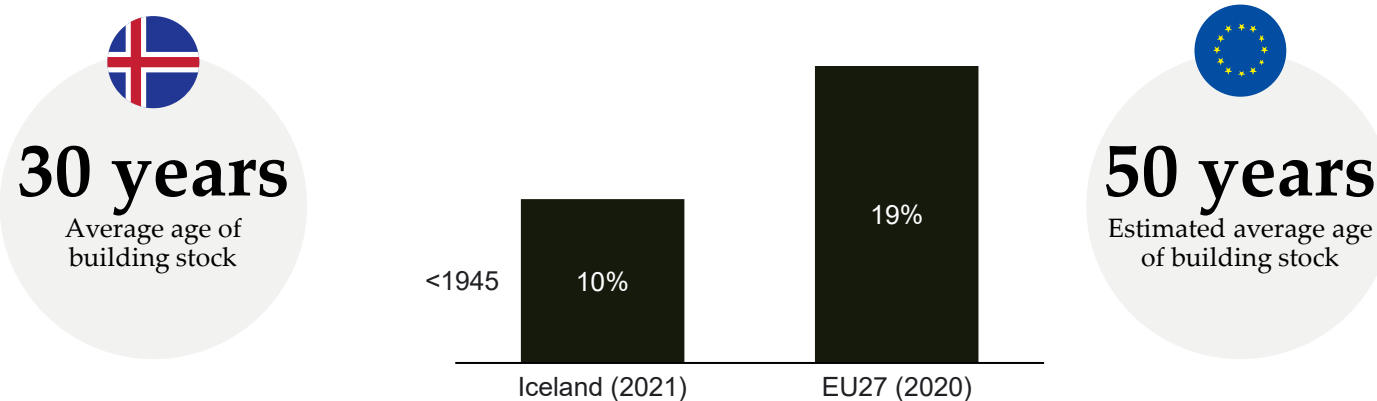
1. Derogation for Iceland

Justification

The total exemption requested is assessed following the approach that such exemptions are to be justified and specifically adapted to the particularities of the EFTA State(s) concerned.

On the basis of the information provided by Iceland during the bilateral dialogue, the European Commission has acknowledged the specificities of Iceland. In particular, with regard to the limited present scope for improvements in the performance of its relatively recent and uniform building stock, the fact that currently 90% of houses are heated through renewable geothermal district heating networks and its significantly cheaper electricity prices as compared to prices in EU Member States, which are factors pointing towards potentially comparable decarbonisation aims.

Share of residential building stock by age
Number of buildings



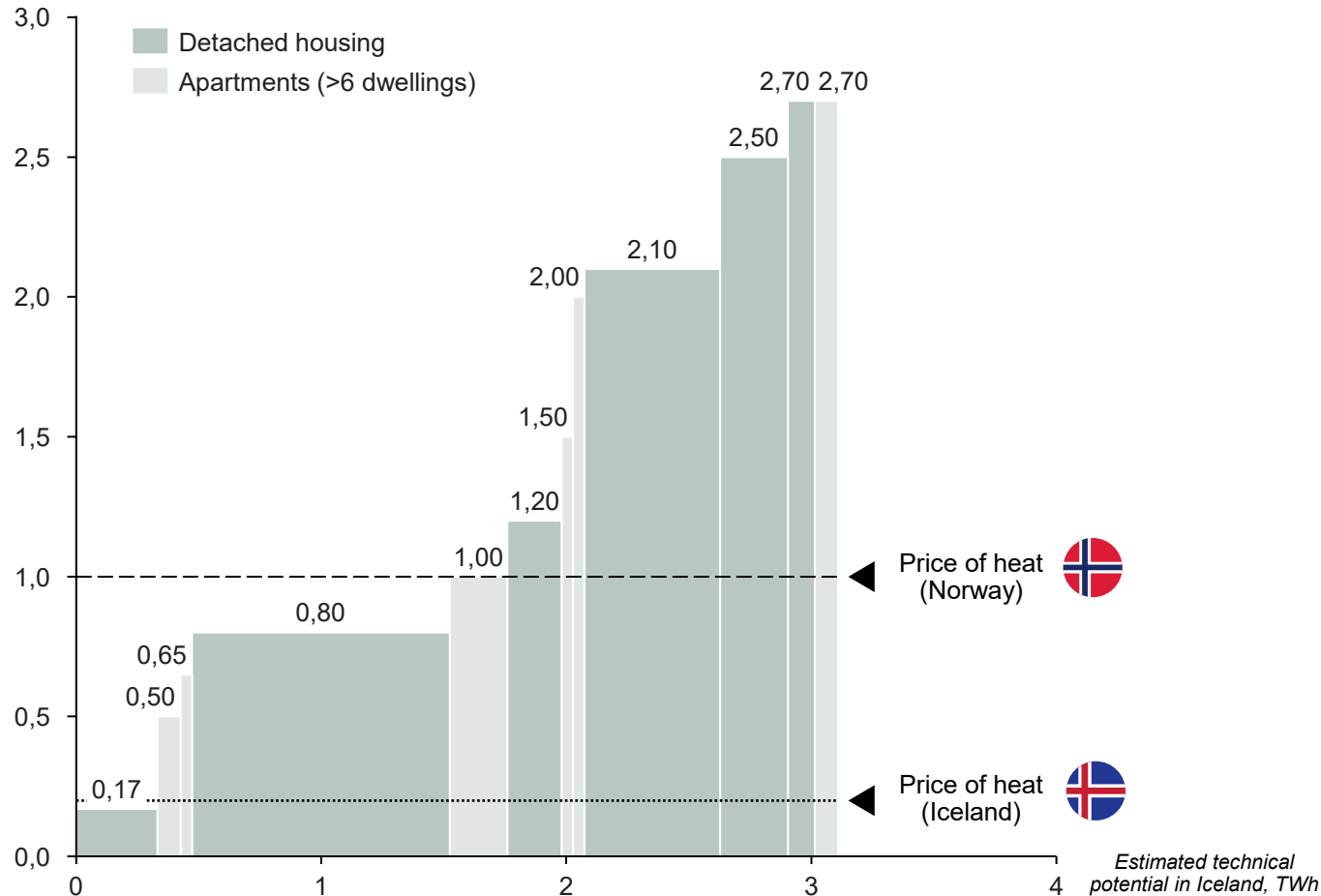
Source: Implement Consulting Group on European Commission and internal documents

- Iceland has a derogation from EPBD. The justification for the derogation of the EPBD's also apply for the derogation of Article 5:
- Iceland has limited scope for improving the performance of its buildings.
- Iceland has a relatively recent and uniform building stock with an average building age of 30 years relative to 50 years of EU27.
- 90% of the buildings are heated through cheap and carbon-free geothermal district heating.
- Further, Icelandic building regulation states maximum requirements on U-values of building components. Major refurbishment of buildings, and of building elements, must fulfil the same requirements as already defined for new buildings. Iceland current U-values standard has been the building code since 2007. These standards are comparable to e.g. Norway but are 30%-100% higher. Meanwhile price of heating is in Norway is around 500% higher than in Iceland.
- Finally, due to Iceland's fully domestic heating production and i.e. no import reliance, the saving is not subject to any geopolitical risk consideration.

As shown previously, evidence from Norway suggest that there is virtually no cost-efficient renovation potential in the (residential) building stock in Iceland

Estimated levelised cost of energy (LCOE) for residential energy efficiency initiatives (excl. taxes)

NOK (2020-prices) per kWh



- Based on the results from page 24, we found that the residential sector in Iceland has only a cost-effective potential of 330GWh or equivalent to around 20% of the identified potential in Norway (accounting for size of energy consumption).
- The primary driver for the low estimated potential in Iceland, is Iceland's low price of heating. This driver also applies for the public buildings.
- Based on this, we expect the renovation requirement under Article 5 to only apply to a small fraction of the Iceland's central government building stock as most building are already expected to be mostly cost-effectively heated today.

99% of energy used for residential buildings is carbon-free. The revised EPBD now speaks of zero-emission buildings instead of zero-energy buildings. Iceland's building stock is already fully zero-emission.



>99%

Renewable share in
Iceland's fuel mix used
for heating

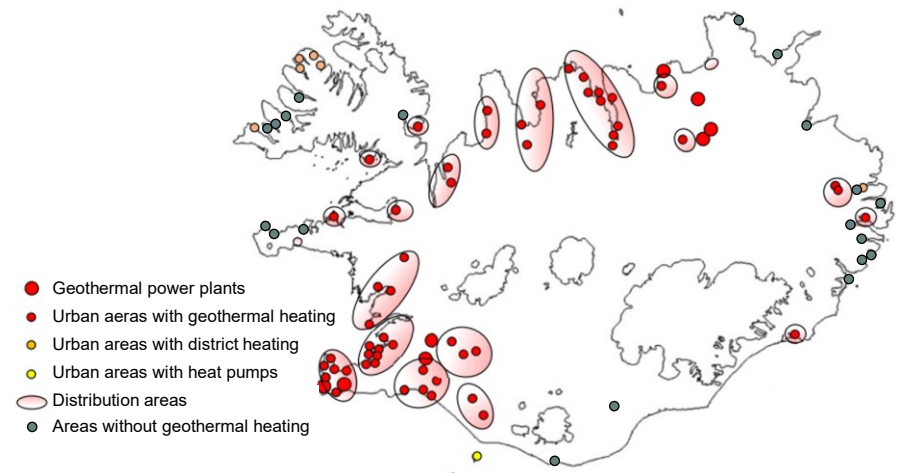


24%

Renewable share of EU's
space/water heating. 35%
of energy-related GHG
emissions comes from
buildings

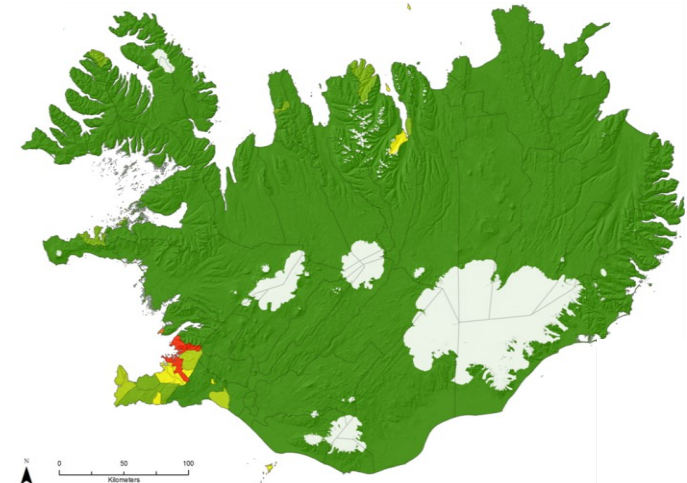
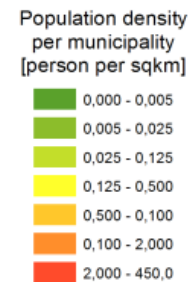
1.

Iceland has
widespread
coverage of
geothermal
heating



2.

All Iceland's
densely
populated
areas are in
geothermal
areas



Despite seeking a derogation, Iceland is already working actively towards modernising its public buildings incl. reforming the building code with respect to energy and certification of large public buildings

Current steps taking in Iceland towards modernising the public (and general) building stock

1

Long-term politic ambitions: Iceland has Energy Efficiency as one of the five key pillars in the long-term 2050 energy policy, *A Sustainable Energy Future - An Energy Policy to the year 2050*. Some of the concrete measures of the policy includes:

- Incentivising heat pumps through the Act on Subsidies for Central Heating Costs, where the state is allowed to participate with a one-off payment in the initial costs of environmentally friendly energy procurement. Heat pumps are also VAT exempted.
- Improved access to geothermal heating in rural areas currently using electricity

2

Reviewing the building regulation: Iceland is currently in early the process of reviewing the building regulation. As a part of updating the building code, there has been established a working group to discuss how energy performance and savings should be tackled in the reviewed code

3

Certifying government buildings: The Government Property Agency (FSRE) administrating most governmental buildings are already setting requirements for their building stock. FSRE has a policy objective that all buildings that are estimated 500 m.kr. (3.4 million EUR) or more will be certified with either BREEAM or Swan or will undertake sustainability measures without certification. 31 out of 130 ongoing development or construction projects at FSRE are undertaking sustainability measures such as BREEAM or the Nordic Swan. Additionally, 5 buildings have already been certified with BREEAM.

Article 9 – Smart metering

Iceland seeks derogation from part of Article 9 due to incompatibility with the Icelandic energy infrastructure system and very limited cost-effectiveness

Arguments for Iceland's derogation from Article 9 of EED 2018

	Derogation	Argument	Note
Derogation on 9a + 9c	Small district heating providers with fewer than X,000* end-user shall not comply with Article 9a and 9c	Iceland has multiple smaller district heating systems providing heat for smaller communities. Iceland seeks derogation from Article 9a for these small district heating providers both under a consideration of both technical complexity and cost-efficiency for the local communities	Arguments have been discussed and substantiated in prior dialogue with the European Commission
Art. 9a -Metering	'Equivalent energy consumption' shall replace the wording 'actual energy consumption' in Article 9a	Heat in Iceland is primarily billed per volumetric unit of supplied water. District heating infrastructure in Iceland is however "open loop", and district heating providers therefore have to assume a fixed return temperature. Users are thereby billed for the energy potential instead of actual energy consumed, incentivizing efficient use of heating. Icelandic billing method is therefore compatible with the objective of Article 9 under EED 2018, although with slightly different methodology	
Art. 9b -Submetering	Full derogation from Article 9b	It would not be cost-efficient to instal individual metres in Icelandic multi-apartment buildings. An initial cost-efficiency evaluation of smart thermometers in standard Icelandic multi-residential buildings suggest that the net lifetime savings would be 30%-140% higher/more expensive than a business-as-usual scenario.	

- Iceland seeks derogation of part of Article 9a and 9c and the whole of 9b
- Under an energy costumer and complexity consideration Iceland is seeking adaptation of 9a and 9c for small district heating providers with fewer than X,000* end-user
- Adaption of Article 9a to align with Iceland's heating infrastructure such that 'actual energy consumption' is replaced with ' equivalent energy consumption'
- Full derogation from Article 9b due to lack of cost-efficient potential of individual metering

Initial calculations suggest it would not be cost-efficient to implement individual metering acc. to Article 9b for Iceland due to the low price of heating

Initial calculation of cost-efficiency of installing individual metering in multi-apartment buildings in Iceland

Standard 100 m2 apartment:

- Avg. heat use of 220 kWh/m²
- Avg. heat price of 3.95 ISK/kWh (excl. fixed metre fee)

Yearly consumption for this standard household is **22MWh** at a total of **86,900ISK**.



Smart thermostat system:

- Price ~130,000ISK (uncertainty range of 95-160,000ISK)
- No system operation costs assumed
- Savings assumed to range between 10-15%
- Typical lifespan is assumed around 9.5 years

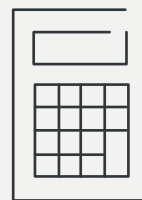
Yearly saving to range between 2.2-3.3MWh per year for 9.5 years with a lifetime savings cost of **4.15-7.66ISK/kWh**.



Discounted break-even point:

- 4% discounting rate

The lifetime savings cost are in 2023-price and should be compared to the future (discounted) price of heating i.e. also in 2023-prices. The average discounted price of heating over the 9.5 years is **3.23ISK/kWh**. Under the presented assumption for the smart thermostats the price of individual metering in multi-residential buildings is roughly 30% higher than the price of heating.



- The initial calculation suggest that the net heat saving cost of installing smart thermometers would be between 30%-140% higher than a business-as-usual scenario for a standard 100m2 apartment in Iceland.
- One key driver of the lagging societal business case is the low price of heating in Iceland almost 20% lower than the EU27 average on a PPP-adjusted basis (the referred EU27 heat price is proxied by the price of natural gas).