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DECARBONISATION OF THE HOUSEHOLD HEATING SECTOR IN THE VISEGRAD COUNTRIES

*The Visegrad Four countries' responses to
the energy crisis (V4ETTP)*

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14 of September, 2023

Agenda

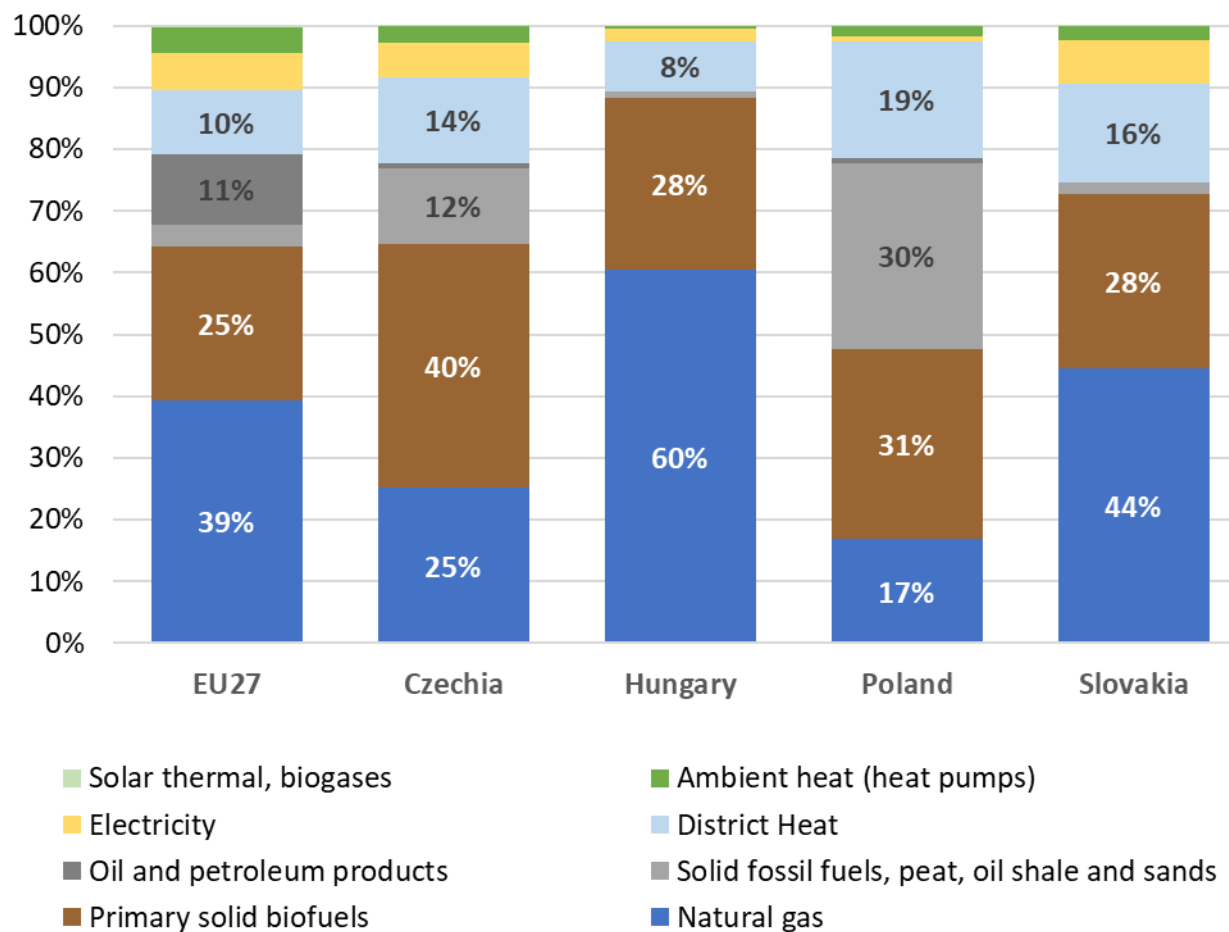


- The current situation of the residential heating sector in the V4 countries
 - State of play: Individual residential heating
 - State of play: District Heating
 - The impact of the Russian-Ukrainian war on the household heating sector
- Decarbonisation options
 - Individual heating
 - District heating
- Goals and measures of the V4 countries
- Policy recommendations

Individual residential heating: natural gas is still dominant

- Hungary and Slovakia mainly use gas: 60% and 44% which exceeds the EU average (39%).
- Use of biomass (fuelwood) for heating is widespread: In the case of Czechia (40%) and Poland (31%) the primary heating fuel are the primary solid biofuels (fuelwood).
- In Czechia and Poland, in addition to wood and natural gas, coal also plays a significant role.
- District heating is more widespread in the V4 than in the EU27: Compared to the EU27 average (10%), the share of district heating is high.

Energy consumption of household's space heating by type of fuel



Wasteful and polluting heating across V4

- GHG emission and energy consumption per household in V4 are higher than EU27 average
- Two underlying reasons for this:
 - General quality of the buildings
 - More GHG intense fuel mix
- Poland has the highest GHG emissions per household
- Czechia has the lowest GHG emission value per household



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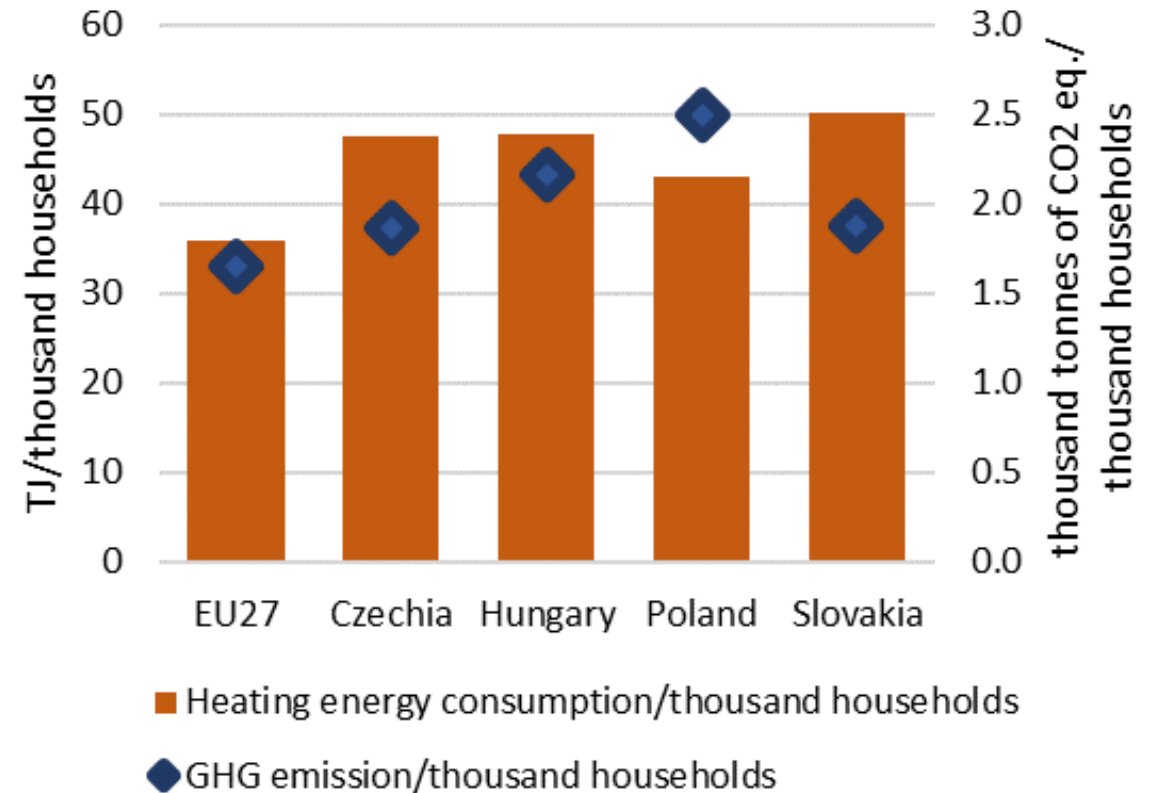


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Heating energy consumption and GHG emission per thousand household

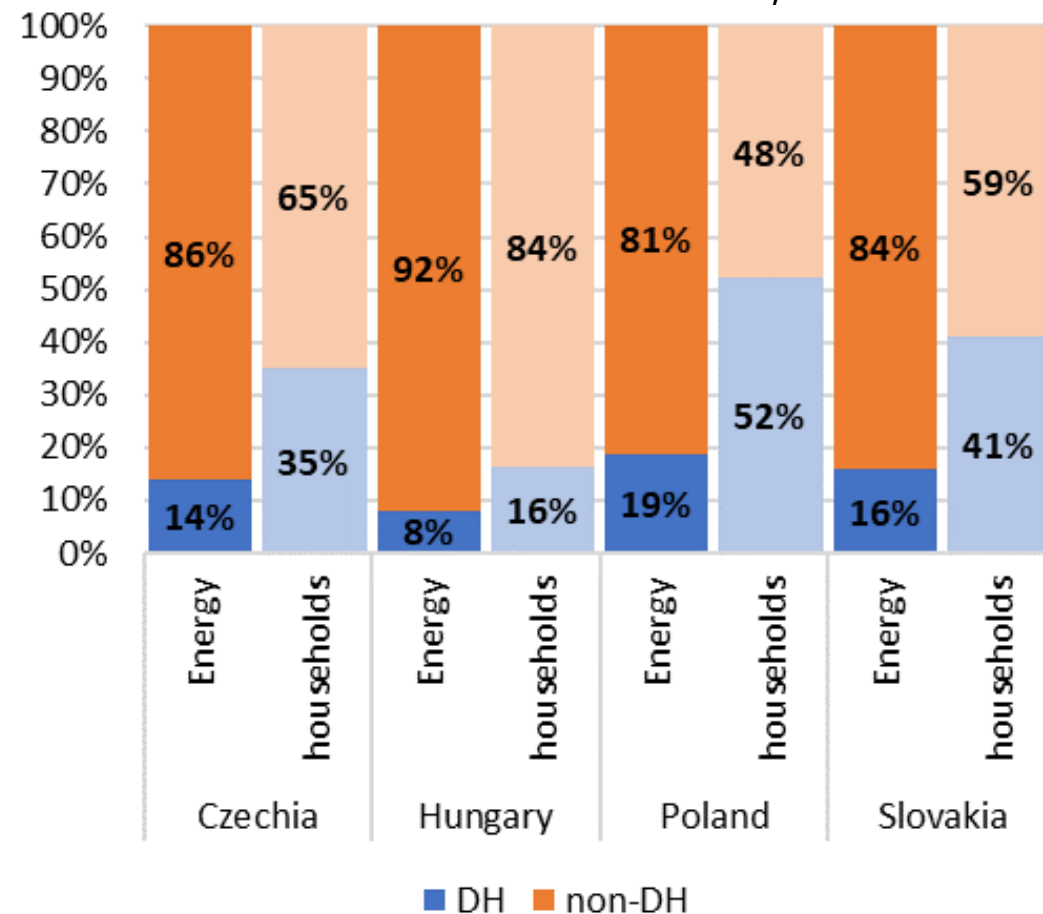


Source: Eurostat

District heating is a natural heritage

- District heating networks are widespread in urban areas of the V4. 52% of households are connected to district heating networks in Poland, 41% in Slovakia and 35% in Czechia.
- However, only 16% of Hungarian households are using district heating
- Within the final energy consumption, the share of district heating is much lower than the share of households using district heating. The reason for this is that the energy consumption of apartments connected to district heating is much lower due to their basic parameters.

Share of district heating in final energy consumption and number of households in the V4, 2021

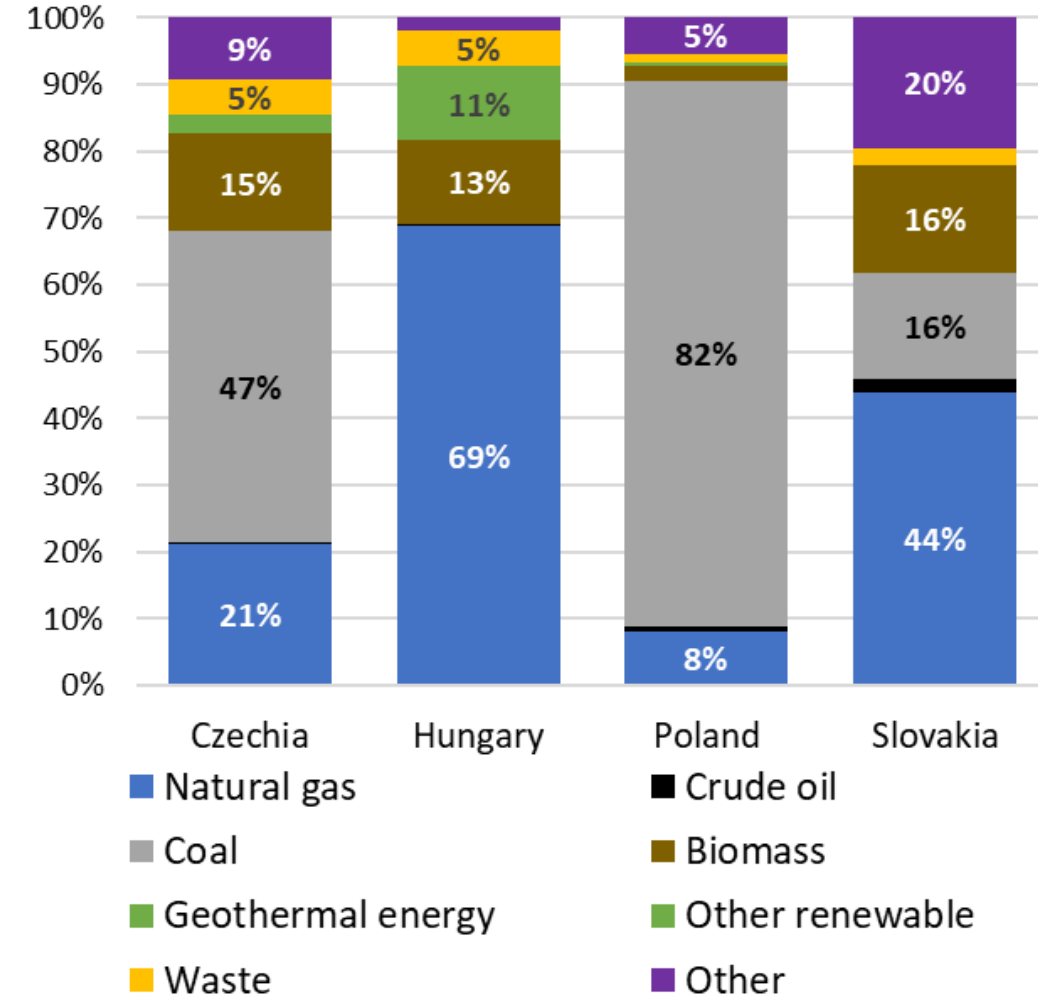


Source: Eurostat, Hungarian DH statistics

District Heating: largely based on fossil fuels

- Czechia and Poland use coal: In Poland, 82% of district heat is generated using local coal, the Czech DH sector has a more diverse fuel mix, but is still dominated by coal (47%),
- Slovakia relied mainly on natural gas (44%) while in Hungary, gas-based district heat generation is by far the dominant form of production (69%)
- Differences can also be observed in the use of renewable energy sources between individual countries. In Hungary, in addition to biomass, geothermal energy also plays a significant role (11%).
- District heating systems use a very low proportion of renewable heat in Poland.

Fuel mix of district heating in the V4, 2021



The impact of the Russian war in Ukraine on the household heating sector in V4

- In the case of the V4 countries it can be seen that residential gas consumption has decreased significantly compared to the average between 2019-2021, similar to the European Union average.
- By the first quarter of 2023, consumption had dropped by 13-23%.
- The decrease is primarily due to changed behavior of consumers driven by the price increase



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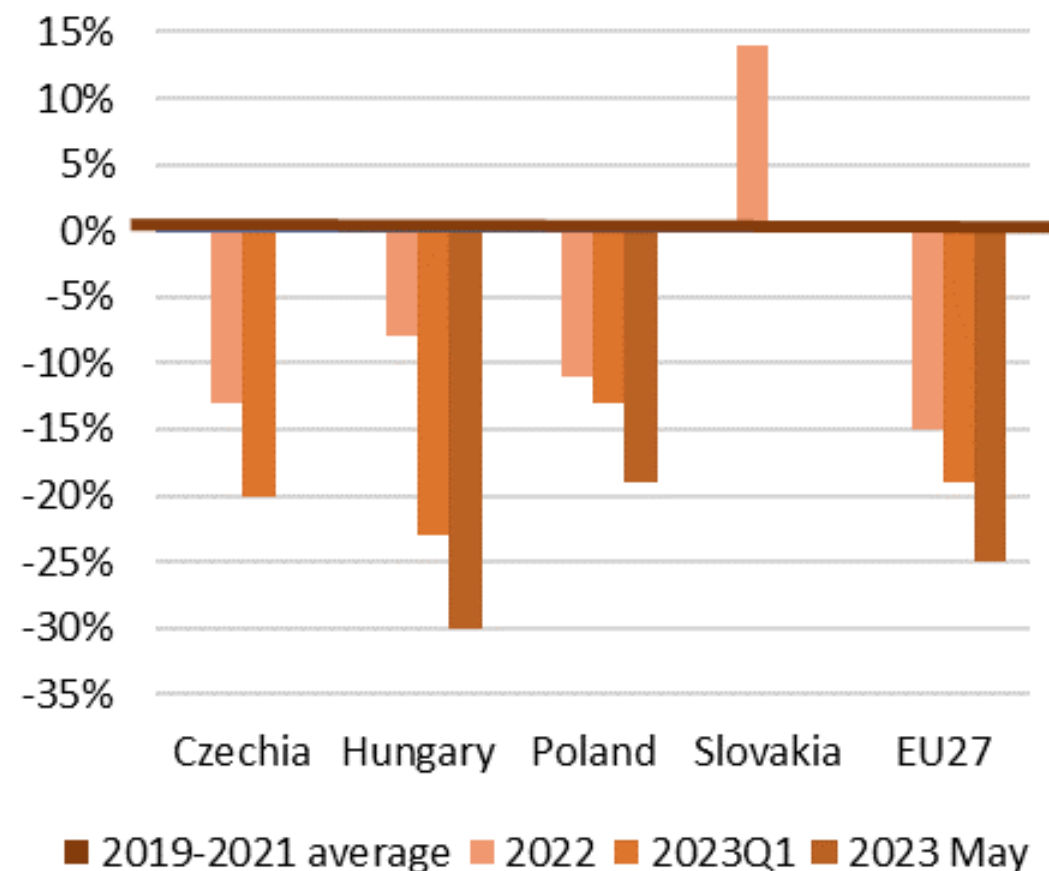


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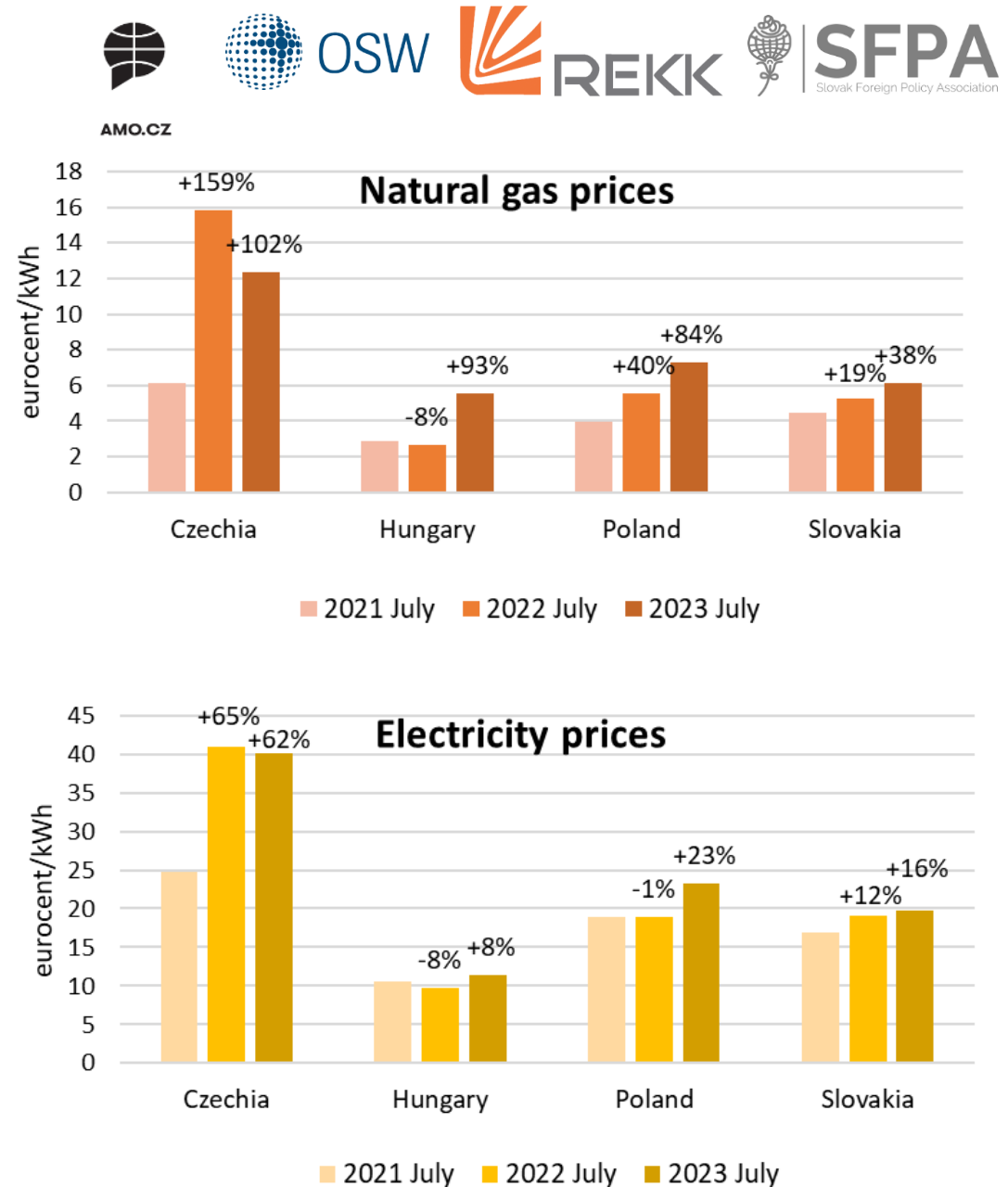
Natural Gas Demand in the household and industry sector vs 2019-21 Average



Source: Bruegel

Significant increase of gas and electricity retail prices in the last two years

- The impact of the war can also be traced in the rise in residential natural gas and electricity prices. Prices rose most drastically in Czechia, compared to July 2021, by 100% while electricity rose by more than 60%.
- Natural gas, prices have increased significantly also in Poland (+84%) and Slovakia (+38%) in the last two years,
- In the case of Hungary, this level of increase can be observed only in the case of natural gas.



Decarbonisation options



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Individual heating

Energy efficiency: in the case of three countries of the V4 (Czechia, Hungary, Poland) there is still significant energy saving and energy efficiency potential in the household heating sector: home renovation programs, various thermal insulation investments and development of the district heating system

Biomass: advantages: zero-emission, maturity of the technology, its accessibility, cheapness of the investment – but only for rural detached houses, local emission

Electrification: heat pumps or electric radiators –the key issue is efficiency; low-cost option with investment needs in electricity grid

District heating

Biomass: most popular, readily available renewable source in DH – but lot of concern over sustainability and carbon neutrality

Geothermal: significant, but underutilised potential - risky investment: expensive to build but cheap to run

Heat Pump: low uptake, but ideal for using ambient and waste heat sources and renewable electricity

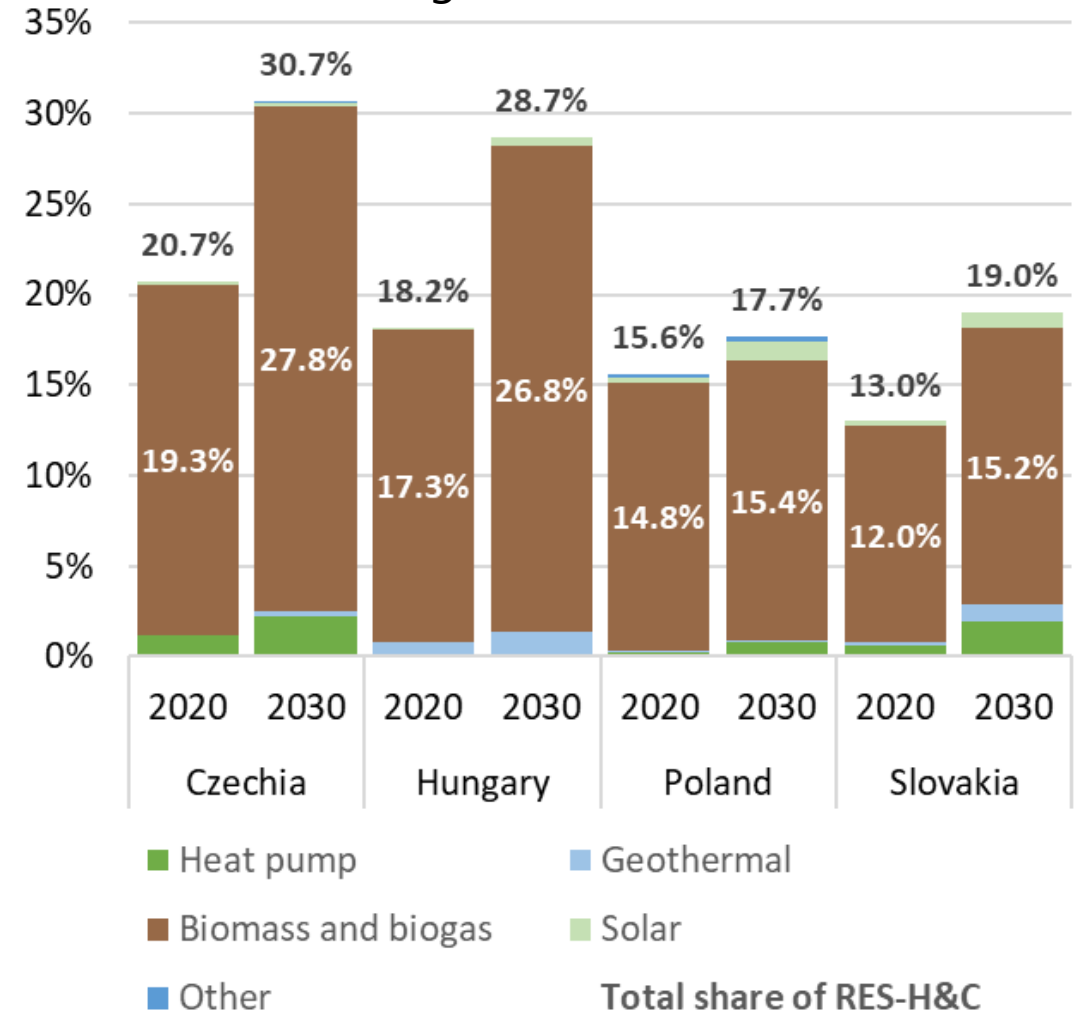
Solar: low uptake, seasonal, heat storage needed

Another possible way to decarbonize the sector is to increase the role of district heat.

Target numbers in the heating and cooling sector

- Comparing the National Energy and Climate Plans (NECPs), in terms of the total renewable share of the heating and cooling sector, the Czech (30,7%) and Hungarian (28,7%) targets are significantly higher than the Slovak and Polish ones (19,0%, 17,7%).
- More than 90% of the achievement of the renewable share comes from biomass, the share of other renewable energy sources is negligible even in 2030
- (Note: The revision of the NECPs is currently underway, we used their versions published in 2019)

Share of renewables in the heating and cooling sector in 2020 and 2030



Varying measures for the same challenge



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	Czechia	Hungary	Poland	Slovakia
Boiler replacement program	X	X	X	X
Promoting deep renovation	X		X	X
Convert DH coal to gas	X		X	X
Convert DH coal or gas to RES	X	X		
Increase the number of DH users: grid expansion			X	
Price regulation changes		X		

Source: MURE database, IEA factsheets, NECPs

General policy recommendations



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- Improving the energy efficiency of buildings through deep renovation is clearly the most effective way to decarbonise residential heating. The "efficiency first" principle needs to be put into practice.
- Household price regulation is a double-edged sword: It should be limited to consumers in need and gradually phased out
- Preventing disconnection and promoting network expansion of the district heating system should be seen as a prerequisite for further decarbonisation of heating.
- Heat pumps are seen as the first alternative for decarbonising individual heating, countries must create a supportive regulatory environment for the penetration of heat pumps.
- Switching to biomass is considered a viable option in many cases, particularly in district heating or houses in remote 'off-grid' areas where there are few other options for switching to low-carbon energy sources/heating technologies
- More elaborated and coherent heating strategy needed, preparation of building heating strategies is recommended



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THANK YOU FOR YOUR ATTENTION

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The study is to be published soon on REKK's website.



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BACKUP SLIDES

Measures: Czechia



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- The reduction of local emissions and air pollution is currently a key issue, which the government would like to reduce with various programs. One of the most important measures, the boiler replacement scheme, which has been operating since 2013.
 - In 2018, the program continued with a third phase, where the replacement of coal boilers with heat pumps, gas condensing boilers and biomass boilers could be subsidized. In parallel, the government is also reducing the number of outdated boilers with the help of regulations.
- The limited use of skilled professionals and supervisors is a key issue in the case of deep renovations. To promote deep renovations, the government included non-subsidy financial mechanisms, such as concessional loans and guarantees to the support schemes, and also plans to simplify the legal and administrative framework. Besides these measures the government also plans to launch an energy consultation program and information campaign.
- One of the main priority is to maintain/preserve the efficient district heating networks by converting coal based co-generation to gas, until other alternatives have proven their suitability to replace it.
 - A newly introduced programme offers direct grants for projects aimed at (i) modernizing existing coal-fired heat generation unit into one suitable for biomass combustion; and (ii) replacing existing units with a new one based on renewable energy sources or high-efficiency cogeneration based on waste to energy (waste incineration) or natural gas.
 - Grants are awarded on the basis of effectively incurred costs limited to the „funding gap” of the project (the extra cost of a green investment compared to the less green alternative).

Measures: Hungary



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- Several support programs were launched in Hungary in the last decade, within the framework of which households could receive support for investments in heating systems using renewable energy, solar and heat pumps, as well as for the use of geothermal energy under certain conditions.
- In the last decade, the subsidized natural gas price significantly influenced the household sector's gas consumption, due to which consumers did not reduce their consumption in the lack of price indication. However, from August 2022, a new universal service price regulation came into force, and as a result of the price increase, Hungarian household natural gas consumption started to fall significantly.
- In the field of district heating, the Green District Heat program is the key instrument to drive the -partial- replacement of natural gas in district heat generation. The program aims at converting DH systems over 100,000 GJ heat consumption to efficient DH systems by increasing the share of renewable and CHP to over 50%.
 - The majority of green district heating would be provided by geothermal resources and waste that is in line with the waste hierarchy.

Measures: Poland



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- The use of local coal resources causes local air pollution and results in health issues. Government programmes exist to replace solid-fuel boilers to more efficient gas fired ones. In the 2023 version of the scheme the support is offered also to replacing boilers with heat pumps, electric heating and for insulation of buildings.
 - It is important to mention that by simply switching from coal to gas, decarbonisation cannot be achieved, it would mean a significant decrease in the carbon footprint of the heating sector. (Moreover, changing heating systems are major investments for households and can easily create lock-in effects for 15-25 years.)
- The main objectives of Polish energy policy for the district heating sector are:
 - Connecting 1.5 million new households to district heating by 2030, to reach 70% of households to be connected in municipalities by 2030;
 - Increasing the use and efficiency of district heating and co-generation by replacing coal with renewable, waste and gas based co-generation;
 - And developing a nationwide heating map (showing the potential of district heating and co-generation) and activation of regions in the field of energy and heat planning.
- In parallel with grid expansion, Poland is focusing on replacing coal-fired heating plants with high-efficiency CHP plants using gas, renewable energy or waste, which will help improve air quality.

Measures: Slovakia



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- Family houses present also a significant part of residential dwellings, however, the first complex renovation programme dedicated to family houses has been launched within Recovery and Resilience Plan. Contrary to the previous subsidy programmes aimed, for example on heating device replacement, the current grant is conditional on making at least 30 per cent primary energy savings, including home insulation, replacement of windows, but also re-placement of heating source, green roofs, installation of shading technology and asbestos removal.
- One of the main objectives of the Slovak energy policy on the heat sector is to „develop efficient centralised heat supply system“ and to „support high-efficiency cogeneration of heat and electricity“. However, progress in the installation of high-efficiency cogeneration units has been far below expectations, so the government decided to introduce a new support scheme to promote the development of new high efficient cogeneration plants in the district heating systems and enable existing coal-based CHP installations to convert to the use of less polluting fuels, primarily natural gas.
 - The operational support is provided either in the form of a feed-in premium or a feed-in tariff, depending on the size of the installation.