Gas Infrastructure Europe

2022 CEE & SEE Decarbonisation Report

2022 CEE & SEE Decarbonisation Report – General Overview

Special Focus: The role of gas in the Energy Transition

- The report outlines **the Status of the Energy Transition in Central-Eastern and South-Eastern Europe (CEE/SEE)**
- Published on 16 November 2022 in cooperation with Deloitte
- The report covers all 14 Member States (Austria, Bulgaria, Croatia, Czech Republic, Cyprus, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia)
- The report is divided into two main parts:
  - Regional Analysis (including a sector analysis)
  - Country Analysis (individual country sheets)

Why do we focus on the CEE & SEE region?

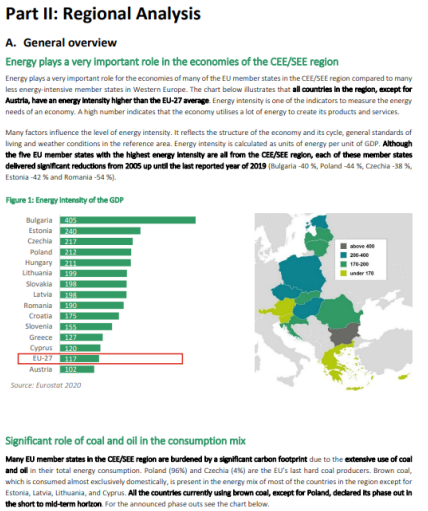
- Limited coverage compared to Western Europe
- High share of energy intensive economies
- Significant role of coal and oil in the consumption mix
- Dependency on imports from Russia

2022 CEE & SEE Decarbonisation Report – General Overview

Special Focus: The role of gas in the Energy Transition

The report presents in easy-to-read format:

- A comparative analysis of the national energy markets in the region
- The key energy market figures of each of the 14 member states
- The current emissions and emissions target figures
- The main decarbonisation challenges and strategies
- Examples of cross border and national decarbonisation projects


Part II: Regional Analysis

A. General overview

Energy plays a very important role in the economies of the CEE/SEE region

Energy plays a very important role for the economies of many of the EU member states in the CEE/SEE region compared to many less energy-intensive member states in Western Europe. The chart below illustrates that **all countries in the region, except for Austria, have an energy intensity higher than the EU-27 average**. Energy intensity is one of the indicators to measure the energy needs of an economy. A high number indicates that the economy utilises a lot of energy to create its products and services.

Many factors influence the level of energy intensity. It reflects the structure of the economy and its cycle, general standards of living and weather conditions in the reference area. Energy intensity is calculated as units of energy per unit of GDP. **Although the five EU member states with the highest energy intensity are all from the CEE/SEE region, each of these member states delivered significant reductions from 2005 up until the last reported year of 2019** (Bulgaria -40 %, Poland -44 %, Czechia -38 %, Estonia -42 % and Romania -54 %).

Figure 1: Energy intensity of the GDP

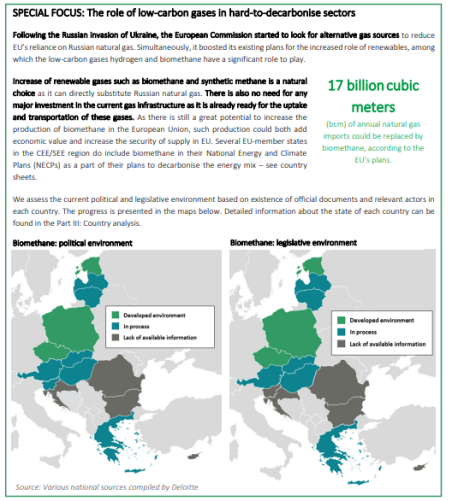
Bulgaria 406
Estonia 240
Czechia 217
Poland 212
Hungary 211
Lithuania 199
Slovakia 198
Latvia 198
Romania 190
Croatia 125
Slovenia 155
Greece 127
Cyprus 110
EU-27 117
Austria 102

Source: Eurostat 2020

above 400
200-400
170-200
under 170

Significant role of coal and oil in the consumption mix

Many EU member states in the CEE/SEE region are burdened by a significant carbon footprint due to the **extensive use of coal and oil** in their total energy consumption. Poland (96%) and Czechia (4%) are the EU's last hard coal producers. Brown coal, which is consumed almost exclusively domestically, is present in the energy mix of most of the countries in the region except for Estonia, Latvia, Lithuania, and Cyprus. **All the countries currently using brown coal, except for Poland, declared its phase out in the short to mid-term horizon**. For the announced phase outs see the chart below.


SPECIAL FOCUS: The role of low-carbon gases in hard-to-decarbonise sectors

Following the Russian invasion of Ukraine, the European Commission started to look for alternative gas sources to reduce EU's reliance on Russian natural gas. Simultaneously, it boosted its existing plans for the increased role of renewables, among which the low-carbon gases hydrogen and biomethane have a significant role to play.

Increase of renewable gases such as biomethane and synthetic methane is a natural choice as it can directly substitute Russian natural gas. **There is also no need for any major investment in the current gas infrastructure as it is already ready for the uptake and transportation of these gases.** As there is still a great potential to increase the production of biomethane in the European Union, such production could both add economic value and increase the security of supply in EU. Several EU-member states in the CEE/SEE region do include biomethane in their National Energy and Climate Plans (NECPs) as a part of their plans to decarbonise the energy mix – see country sheets.

17 billion cubic meters

(bcm) of annual natural gas imports could be replaced by biomethane, according to the EU's plans.

We assess the current political and legislative environment based on existence of official documents and relevant actors in each country. The progress is presented in the maps below. Detailed information about the state of each country can be found in the Part III: Country analysis.

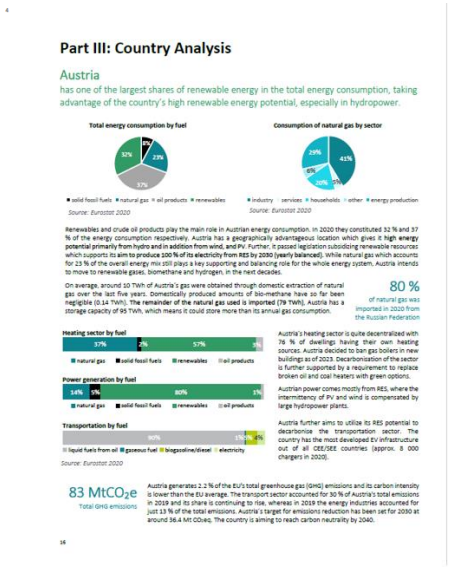
Biomethane: political environment

Biomethane: legislative environment

Developed environment
In process
Lack of available information

Source: Various national sources compiled by Deloitte

Special perspective - the role of gases (natural gas, hydrogen and biomethane) in the energy transition in the CEE/SEE region


Part III: Country Analysis

Austria

has one of the largest shares of renewable energy in the total energy consumption, taking advantage of the country's high renewable energy potential, especially in hydropower.

Total energy consumption by fuel

Consumption of natural gas by sector

Source: Eurostat 2020

Renewables and crude oil products play the main role in Austrian energy consumption. In 2020 they constituted 32 % and 37 % of the energy consumption respectively. Austria has a geographically advantageous location which gives it high energy potential primarily from hydro and in addition from wind, and PV. Further, it passed legislation subsidizing renewable resources which supports its aim to produce 100 % of its electricity from RES by 2030 (yearly balanced). While natural gas which accounts for 23 % of the overall energy mix still plays a key supporting and balancing role for the whole energy system. Austria intends to move to renewable gases, biomethane and hydrogen, in the next decades.

On average, around 10 TWh of Austria's gas were obtained through domestic extraction of natural gas over the last five years. Domestically produced amounts of bio-methane have so far been negligible (0.14 TWh). The remainder of the natural gas used is imported (79 TWh). Austria has a storage capacity of 95 TWh, which means it could store more than its annual gas consumption.

80 %

of natural gas was imported in 2020 from the Russian Federation

Heating sector by fuel

Power generation by fuel

Transportation by fuel

Austria's heating sector is quite decentralized with 76 % of dwellings having their own heating sources. Austria decided to ban gas boilers in new buildings as of 2023. Decarbonisation of the sector is further supported by a requirement to replace broken oil and coal heaters with green options.

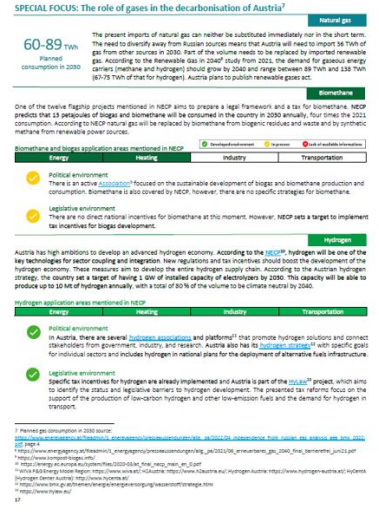
Austrian power comes mostly from RES, where the intermittency of PV and wind is compensated by large hydropower plants.

Austria further aims to utilize its RES potential to decarbonise the transportation sector. The country has the most developed EV infrastructure out of all CEE/SEE countries (approx. 8 000 chargers in 2020).

83 $MtCO_2e$

Total GHG emissions

Austria generates 2.2 % of the EU's total greenhouse gas (GHG) emissions and its carbon intensity is lower than the EU average. The transport sector accounted for 30 % of Austria's total emissions in 2019 and its share is continuing to rise, whereas in 2019 the energy industries accounted for just 13 % of the total emissions. Austria's target for emissions reduction has been set for 2030 at around 36.4 Mt CO_2eq. The country is aiming to reach carbon neutrality by 2040.


SPECIAL FOCUS: The role of gases in the decarbonisation of Austria

Natural gas

60-89 TWh

Planned consumption in 2050

The present imports of natural gas can neither be substituted immediately nor in the short term. The need to diversify away from Russian sources means that Austria will need to import 56 TWh of gas from other sources in 2030. Part of the volume needs to be replaced by imported renewable gas. According to the Renewable Gas in 2040[6] study from 2021, the demand for gaseous energy carriers (methane and hydrogen) should grow by 2040 and range between 88 TWh and 138 TWh (67-75 TWh of that for hydrogen). Austria plans to publish renewable gases act.

Biomethane

One of the twelve flagship projects mentioned in NECP aims to prepare a legal framework and a tax for biomethane. NECP predicts that 13 petajoules of biogas and biomethane will be consumed in the country in 2050 annually, four times the 2021 consumption. According to NECP natural gas will be replaced by biomethane from biogenic residues and waste and by synthetic methane from renewable power sources.

Biomethane and biogas application areas mentioned in NECP

Energy	Heating	Industry	Transportation

Political environment

There is an active Association[5] focused on the sustainable development of biogas and biomethane production and consumption. Biomethane is also covered by NECP, however, there are no specific strategies for biomethane.

Legislative environment

There are no direct national incentives for biomethane at this moment. However, NECP sets a target to implement tax incentives for biogas development.

Hydrogen

Austria has high ambitions to develop an advanced hydrogen economy. According to the NECP[8], hydrogen will be one of the key technologies for sector coupling and integration. New regulations and tax incentives should boost the development of the hydrogen economy. These measures aim to develop the entire hydrogen supply chain. According to the Austrian hydrogen strategy, the country set a target of having 1 GW of installed capacity of electrolyzers by 2030. This capacity will be able to produce up to 10 Mt of hydrogen annually, with a total of 80 % of the volume to be climate neutral by 2040.

Hydrogen application areas mentioned in NECP

Energy	Heating	Industry	Transportation

Political environment

In Austria, there are several hydrogen associations and platforms[11] that promote hydrogen solutions and connect stakeholders from government, industry, and research. Austria also has its hydrogen strategy[12] with specific goals for individual sectors and includes hydrogen in national plans for the deployment of alternative fuels infrastructure.

Legislative environment

Specific tax incentives for hydrogen are already implemented and Austria is part of the HyLAW[13] project, which aims to identify the status and legislative barriers to hydrogen development. The presented tax reforms focus on the support of the production of low-carbon hydrogen and other low-emission fuels and the demand for hydrogen in transport.

Use the QR code to access the report or follow this link

SCAN

2022 CEE & SEE Decarbonisation Report – Regional Analysis

Energy plays a very important role in the region

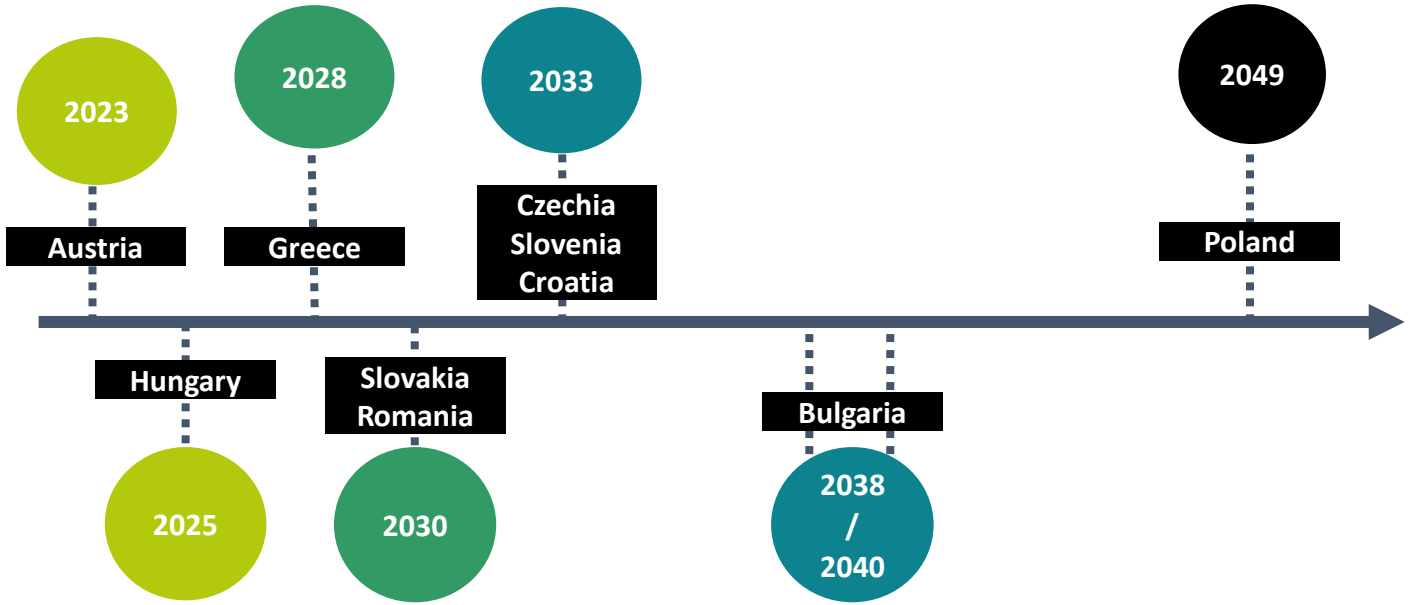
- Energy plays a very important role in CEE & SEE economies due to **high energy intensity of the GDP**
- Apart from Austria all CEE & SEE countries have an energy intensity above EU average
- **Extensive use of coal and oil** in energy consumption
- Poland and Czech Republic - hard coal producers
- Significant energy efficiency improvement (2005 - 2019) in 5 most energy intensive economies:
  - Bulgaria - 40 %
  - Poland - 44 %
  - Czechia - 38 %
  - Estonia - 42 %
  - Romania - 54 %

2022 CEE & SEE Decarbonisation Report – Regional Analysis

Focus on coal phase-out and coal-to-gas transition

- All countries, except for Poland, declared its phase out of brown coal in the short to mid-term

Coal phase out timeline:



- Many countries plan a transition from coal to gas in the mid-term to meet the coal phase-out deadline
- However, since February 2022, the majority of the countries operating or presently retiring coal power plants has opted for their reopening in the light of possible Russian gas cut-off and increased gas prices
- Security of Supply concerns due to high dependency on Russian natural gas and oil

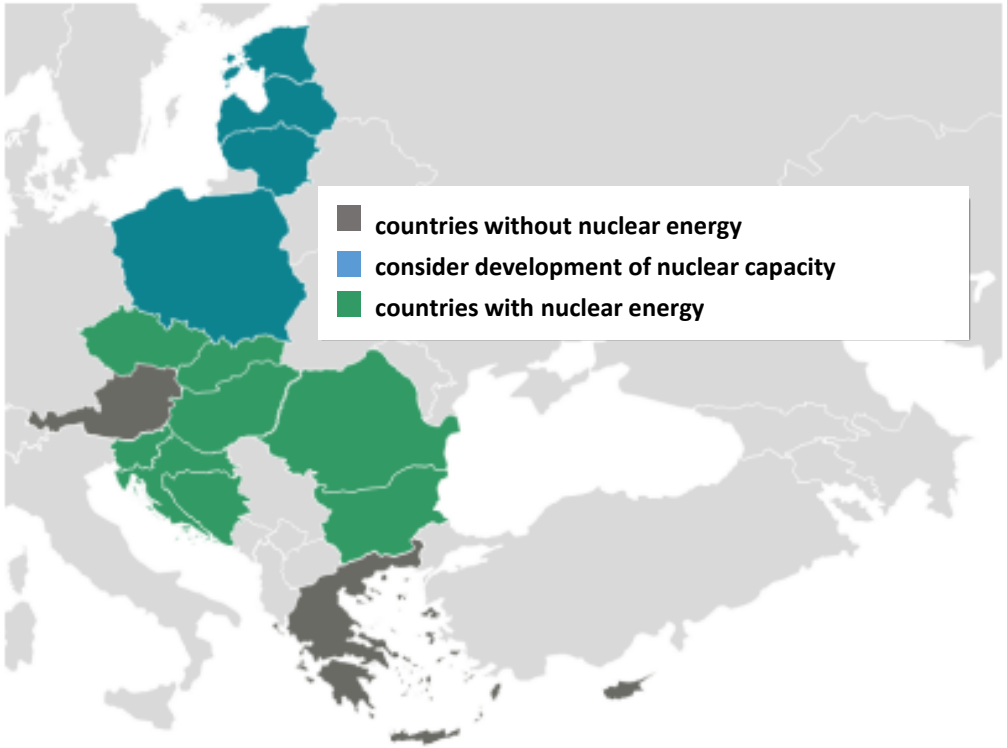
2022 CEE & SEE Decarbonisation Report - Sector analysis

Nuclear power to decarbonise power generation

Decarbonisation is happening in POWER GENERATION

- The most noticeable decarbonisation progress
- Targeted **share of RES** in power generation became even more ambitious in reaction to Russia's aggression in Ukraine
- However, the share of solid fossil fuels in power generation remains above EU average
- **Nuclear power production** plays an important role in the CEE/SEE region – to both decarbonize the economy and strengthen energy security
- Poland, Lithuania, Latvia and Estonia plan or consider development of nuclear capacity in the future
- Need of **coal phase-out** in the electricity sector

The role of nuclear power in the CEE/SEE region



2022 CEE & SEE Decarbonisation Report - Sector analysis

Decarbonisation of Industry & transportation is the biggest challenge

ENERGY INDUSTRIES and TRANSPORT generate the most emissions

- Decarbonisation in transportation has just started
- In industry - **costly process** of reimagining production processes and redesigning existing sites with rebuilds and retrofits, making CEE/SEE economies more vulnerable when implementing structural changes

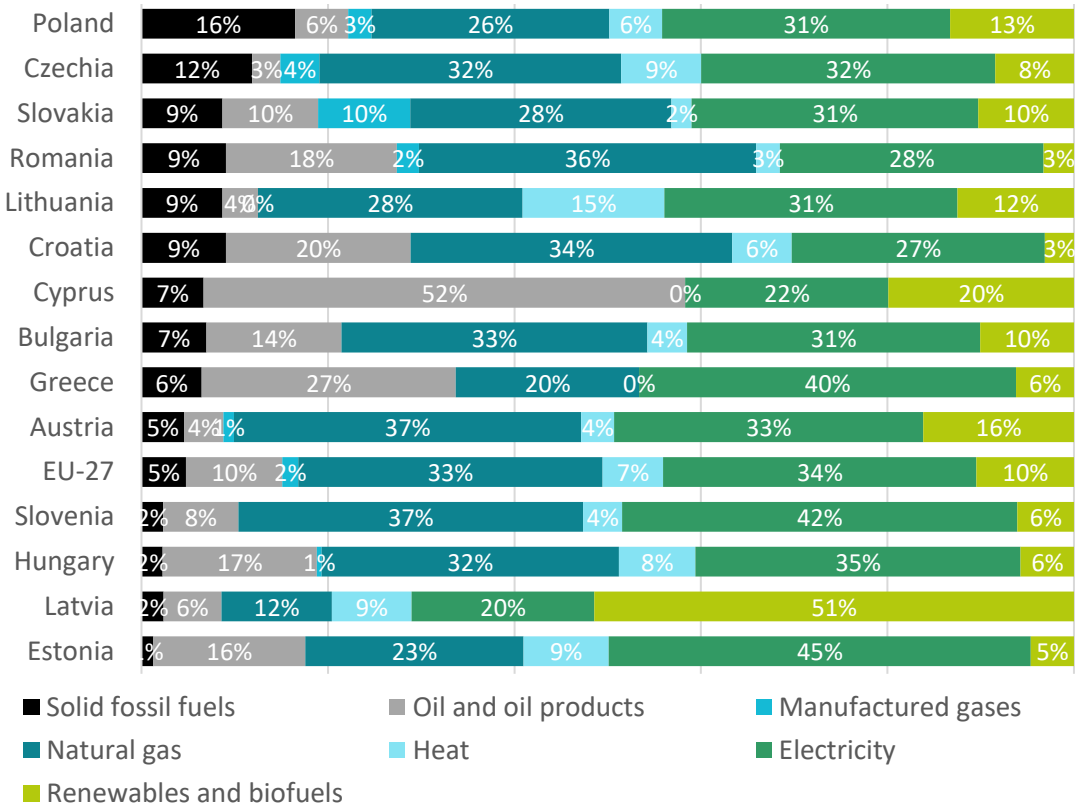
Progress in the HEATING AND COOLING SECTOR

- Dependency on coal in heating sector

Decarbonisation of SERVICES

- Focus on energy efficiency measures and targeting emission sources, mainly buildings

Final energy consumption in the industry by type of fuel



2022 CEE & SEE Decarbonisation Report

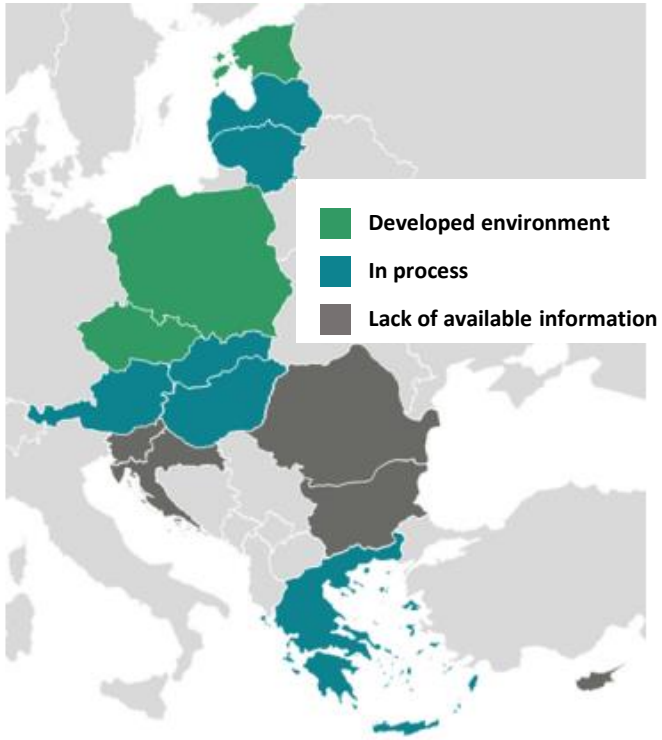
Biomethane production is a part of the region's NECPs

BIOMETHANE

- Current **gas infrastructure is ready**
- No need for any major investment
- **Direct substitution of natural gas**
- Increase the security of supply
- Great potential to increase the production of biomethane
- Several countries include biomethane in their NECPs as a part to decarbonise the energy mix

Biomethane: political environment

Biomethane: legislative environment



Source: Various national sources compiled by Deloitte

- Different levels of **legislative & regulatory environment development for biomethane** in respective CEE&SEE countries – in country reports

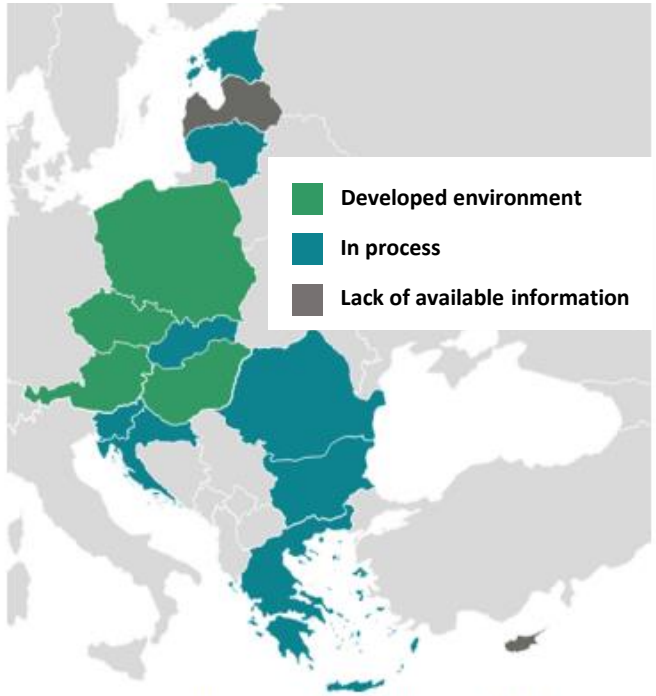
2022 CEE & SEE Decarbonisation Report

Hydrogen can replace natural gas, coal and oil in the region

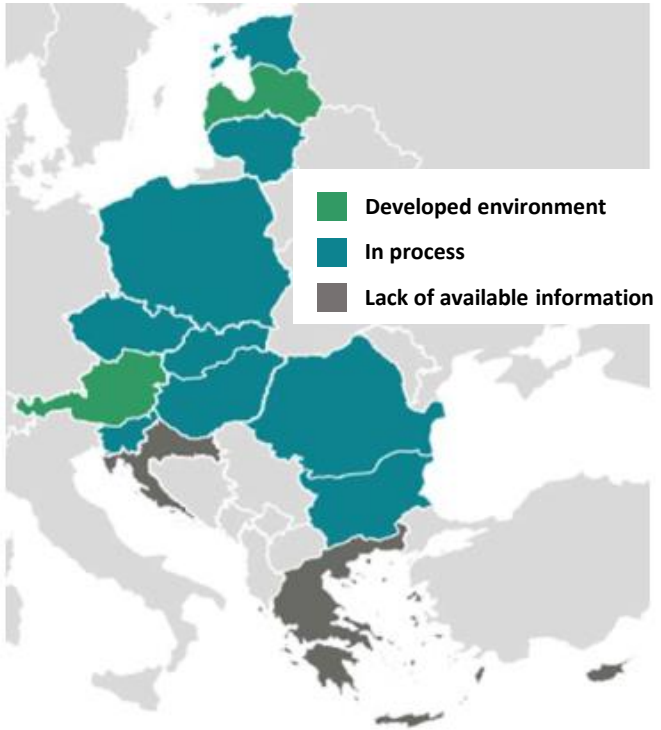
HYDROGEN

- **Substitute for natural gas, coal and oil in hard-to-abate sectors**
- **Ukraine** as one of the key sources of imported green hydrogen
- **Need to build up an entirely new value chain** from production via transportation to the consumer on an industrial scale
- Need for consistent **political and regulatory framework** and incentives to invest in the necessary technologies and systems

Hydrogen: political environment



Hydrogen: legislative environment



Source: Various national sources compiled by Deloitte

- Different levels of **legislative & regulatory environment development for hydrogen** in respective CEE&SEE countries – in country reports

Gas Infrastructure Europe

BACK-UP: Projects

2022 CEE & SEE Decarbonisation Report - Projects

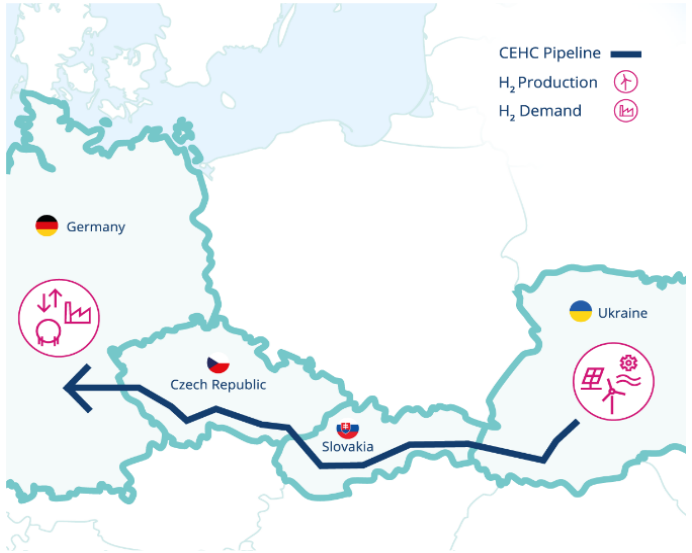
Ukrainian Hydrogen Corridor

H2EU + STORE PROJECT

- **H2EU+Store** - integrated project looking at the **entire value chain** from production, transport and storage and including the consumer market
- Import of green hydrogen from prospective countries for large scale H2 production (such as Ukraine) to Austria and Germany
- Participating companies: RAG, Eco-Optima, Bayerngas, bayernets, OGE, GCA, EUSTREAM, NAFTA, GTSOU, SSO of Ukraine, MND

CENTRAL EUROPEAN HYDROGEN CORRIDOR (CEHC)

- **CEHC** – a corridor for the transportation of hydrogen from Ukraine to Germany mainly based on **repurposed existing gas infrastructure**, combined with **compressor stations**
- Hydrogen import "highway" from Ukraine via Slovakia and the Czech Republic to large H2 demand areas in Germany and the EU
- Partners: EUSTREAM, GTSOU, NET4GAS and OGE



2022 CEE & SEE Decarbonisation Report - Projects

Local Projects

High Pressure pipeline to West Macedonia – New built H2 infrastructure - GREECE

- extension of the existing NGTS via a new pipeline branch up to the region of West Macedonia.
- 157 km high pressure pipeline designed for blends with biomethane and hydrogen up to 100%

Aquamarine - Integrated H2 project (production, transport, use) - HUNGARY

- implementation of an electrolysis system with approx. 2,5 MW total performance and the corresponding hydrogen gas preparatory technology at the Kardoskut UGS site

Damasławek Hydrogen Storage - enabling the storage of pure hydrogen - POLAND

- construction of an UGS facility for pure H2 (2 caverns with the capacity of approx. 40 mcm each) and H2-ready caverns for CH4 that may be converted to H2 (up to 36 caverns with the capacity of approx. 40 mcm each)

H2I Transmission - Retrofitting/repurposing existing infrastructure - SLOVAKIA

- repurposing of one of existing natural gas transmission lines, enabling transport of hydrogen with daily transport capacity of hydrogen 120 GWh/d.
- integral part of 2 multilateral projects in the region - CEHC project and H2Store project

Project SLOP2G - Integrated Power-to-Gas project - SLOVENIA

- power and gas sector coupling implementation of an efficient way of storing renewable electricity surpluses in natural gas transmission system
- integration of first green hydrogen and renewable gases production facilities in Slovenian natural gas system