How to decarbonise heating in Vienna by 2040

Jürgen Czernohorszky, Vienna Executive City Councillor for Climate, Environment, Democracy and Personnel
Michael Strebl, CEO Wien Energie
The mean temperature in Vienna is now more than 2°C above the long-term average.
The Viennese Climate Roadmap foresees no more than 60 Mn t CO$_2$ emission to 2040.
We are working on a detailed plan to decarbonize the building sector

Targeted path for greenhouse gas emissions of buildings until 2040

- Greenhouse gas emissions in Mio. Tons CO₂-equivalent
- Final energy consumption in TWh

- Climate-friendly energy
- Oil and coal
- Gas

- 2005: 2.0
- 2010: 1.8
- 2015: 1.6
- 2020: 1.4
- 2025: 1.2
- 2030: 1.0
- 2035: 0.8
- 2040: 0.0

- 2005: 20
- 2010: 18
- 2015: 16
- 2020: 14
- 2025: 12
- 2030: 10
- 2035: 8
- 2040: 6
Our decarbonisation study shows that demand for useful energy decreases while natural gas is displaced.

„Climate neutrality 2040“: Useful energy demand for heating [GWh]
(Values rounded to 100 GWh, sums above the rounded values do not always correspond to the rounded sum values)

- Population growth leads to increased demand
- The renovation rate and climate effects more than offset population growth
- Accordingly, useful energy demand for heating decreases by 18% by 2040
District heating is essential for achieving decarbonisation

„Climate neutrality 2040“: Generation of district heating [GWh]
(Values rounded to 50 GWh, sums above the rounded values do not always correspond to the rounded sum values)

- Generation increases by 18% by 2040
- In 2040, 56% of heat demand is covered by district heating
- Geothermal energy and large-scale heat pumps generate 55% of district heating by 2040
Recent price volatility emphasises the need to improve resilience via decarbonisation

- **Rising demand meets reduced supply**
- **Post-COVID economy** leads to higher demand for gas
- **Decreased supply**:
  - Non-commissioning of Nord Stream 2
  - Shortage of LNG gas (liquefied natural gas)
- **Gas storage** filled below average for the time of year
- **Russian invasion of Ukraine**:
  - High political uncertainty
  - Risk of a possible gas supply stop
  - Demand to be paid in rubles
- **Panic buying of market participants**

**Natural Gas Market Prices (CEGH)**

<table>
<thead>
<tr>
<th>EUR/MWh</th>
<th>Spot Markt (Day-Ahead)*</th>
<th>Future Market (Front Month)*</th>
<th>Future Market (Front Year)*</th>
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<td>Jan 2020</td>
<td>Begin COVID-19 crisis</td>
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* PEGAS and EEX, daily average

Source: Reuters; Visualization: Wien Energie EWS
The Green New Deal for the City of the Future brings the different elements together
SMART Block Geblergasse – a successful pilot project for renewable heating
Under the Vienna Photovoltaic Program 800 MW will be installed by 2030
Energy recovery turned Vienna‘s wastewater treatment plant energy positive
Wien Energie invests more than a billion Euros in CO₂ neutrality

Past income and investment 2017-2022 (Mio. Euros)

- Investment: 1,279
- Net income: 880

Future investment to 2027 (billion Euros)

- 334 Mio. Renewable Energy
- 625 Mio. Heating transition
- 250 Mio. Digitalisation, innovation, e-mobility and cooling
- 90 Mio. Security of supply
Wien Energie is taking action for achieving zero emissions by 2040

- Large-scale heat pump waste water treatment plant Simmering
- Industrial waste heat from Manner waffle production
- Ground survey and test wells for deep geothermal energy
- First hydrogen test in the operation of Donaustadt gas turbine
Wien Energie is going to present a city benchmarking study

- Overview of the current state of play in terms of climate action
- Exchange of best practice example
- Foster collaboration among European cities
Clean heating to the rescue

3rd DecarbCities Conference, Vienna

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Clean heating and Russian gas
SORRY NO GAS
Replacement options for Russian gas imports in IEA 10-point plan

Options to cut Russian gas imports to EU this year

- Replace Russian gas with gas from other countries
- More wind and solar
- Max generation from existing low-carbon generation
- Speed up heat pump deployment
- Energy efficiency
- Turn down thermostats
- Replace Russian gas with gas from other countries

Source: RAP analysis based on IEA 2022
Replacement options for Russian gas imports in RePower Europe

Source: RAP analysis based on EC 2022
Energy efficiency can cut Russian gas by 17% by 2025
Electrification can cut Russian gas by another 23% by 2025

Clean solutions can replace 66% of Russian gas imports by 2025

Russian gas imports cut by 101 billion cubic meters through implementation of Fit for 55 plus additional clean energy measures

Sources: Analysis by Bellona, E3G, Ember and Regulatory Assistance Project (RAP) • EU Fit for 55 plan - MIX scenario
Economics have changed
Starting point is challenging

Source: RAP forthcoming
Gas prices up ~5x compared to pre-pandemic levels

Source: Trading Economics
Oil prices up ~2x compared to pre-pandemic levels

Source: EIA 2022
Economics fundamentally changed

Example: UK, total cost of ownership

Assumptions: Heat demand: 10,204 kWh; Cost gas: 7.37p/kWh; Cost electricity: 28.34p/kWh; Gas standing charge: £0.27/day; CAPEX heat pump: £10.5k, incl. VAT, £10k, with BUS grant £5k; CAPEX gas boiler: £2.7k; Lifetime heat pump: 20 years; Lifetime gas boiler: 15 years

Source: RAP analysis
What next?
Key measures

• Stop funding new fossil fuel heating systems and redirect to clean heating now
• Stop installing fossil heating in new buildings now and in all buildings as soon as possible

• Bring forward minimum energy performance standards in EPBD
• Require worst buildings to be upgraded (F&G) earlier
• Introduce target for D&E rated buildings

• Commit significant funding at EU and national level for energy efficiency and electrification
• Reform taxes and levies on energy
Example: EPBD current proposals

Energy savings in oil and gas consumption by 2030 after renovation of the F and G classes buildings to E level (in TWh)

Before renovation Class F/G
- Gas: 696 TWh (69.6 bcm gas)
- Oil: 189 TWh (18.9 bn litres oil)

After renovation Class E
- Gas: 482 TWh (48.2 bcm gas)
- Oil: 129 TWh (12.9 bn litres oil)

Energy savings: -214 TWh (-21.4 bcm gas), -60 TWh (-6.0 bn litres oil)

Source: Guidehouse 2022
What if we increased ambition?

Energy savings in oil and gas consumption by 2030 after renovation of the F and G classes buildings to B/C level (in TWh)

Source: Guidehouse 2022
“We bought this really expensive car.” “Oh great, very nice car!”

“We got a new luxury kitchen.” “I like your marble worktop.”

“We got our home insulated.” “What’s the payback on that?”

9:05 PM · May 2, 2022 · Twitter for iPhone
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org
DecarbCities conference
Session "Solutions to decarbonise multi-family buildings: let’s do it!"

CENTRALIZING OF INDIVIDUAL GAS FLOOR HEATERS
SOZIALBAU AG is the biggest non-for-profit housing association in Austria.

- 120,000 inhabitants (about 7% of Vienna) in
- 53,000 dwellings
- 6,000 of which are still heated with individual gas floor heaters (about 400,000 in Vienna!)
Photo 1: central heating in the attic
Photo 2: gas connection pipes for the individual flats
"Combined Gas Heater"

"Collective heater"

In the dwelling
The **installation costs** are about €3,300,- and €5,200,- are financed – as for the replacement of the individual heating in the flats (about €5,000,-) – with the savings from the property.

The **heating costs**, that means the costs for energy are invoiced separately to our tenants acc. to the Heating Costs Ordinance ((HeizKG §2 Z 9+10) by means of a heating cost metering system.

*As a bulk energy buyer we can charge our purchase prices to our customers*
communication with our tenants

Machen Sie mit!

- Sie profitieren Sie und Ihre Umwelt von der Gemeinschaftstherme:
  - Mehr Abhängigkeiten
  - Mehr Lebensqualität
  - Weniger Energieverbrauch

Dazu profitieren Sie und unsere Umwelt!

Dürfen wir vorstellen?
Das ist Ihre Gemeinschaftstherme

Sie befindet sich auf dem Dachboden Ihres Wohnhauses und bringt Ihnen viele Vorteile. Ihre Wohnung wird an die Gemeinschaftstherme (Sozialbau) angeschlossen. Die Leitungen werden durch eine Kamera verlegt, und so Ihre Wohnung mit dem flexiblen Vorteil der Gemeinschaftstherme verbunden. Ihre Sterntherme wird dabei erstellt und für die Thermoregelung einrichtung gegen einen Elektroakustiker getauscht.

Die Vorteile:

- Weniger Abhängigkeiten: Ihre Wohnung wird von ihrem Gemeinschaftstherme verbrauch.
- Mehr Abhängigkeiten: Ihre Wohnung wird von ihrer Gemeinschaftstherme verbrauch.
- Weniger Energieverbrauch: Ihre Wohnung wird von Ihrer Gemeinschaftstherme verbrauch.

günstiger, sicherer, umweltfreundlicher

Jetzt anschließen! Auf www.bewohner.at

So einfach geht's:
1. Erstellung einer Gemeinschaftstherme an elektrischen
2. Verbindung der Therme direkt in Ihre Wohnung
3. Tägliche Einzeltage der Gast-Wohnung in Ihrer Wohnung
4. Montage der elektrischen Gemeinschaftstherme in Ihrer Wohnung

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energie

gemeinsam

Termin vereinbaren auf www.bewohner.at und anschließen!
communication with our tenants

„video-teaser“...
thank you for your attention