

# Buildings and climate change ..and energy security

Czech case study



Quality buildings for the 21st century .....

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**Buildings**<sup>21</sup>

# Buildings: A very large asset

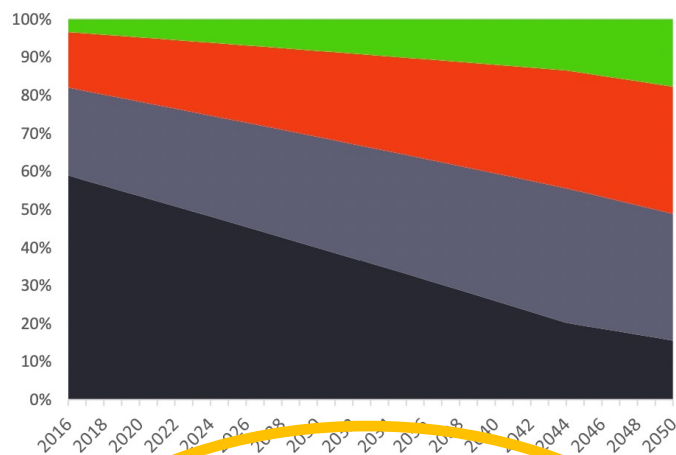
- Czechia: 10.7 mil. inhabitant country
- cca 2.4 mil. buildings:
  - 1.6 mil. detached residential houses with 1.9 mil. flats
  - 210 t. multi-apartment buildings with 2.6 mil. flats
  - 120 t. public buildings (less accurate data available)
  - 500 t. industrial+commercial buildings (even less accurate data available)
- altogether cca 600 mil. m<sup>2</sup> of floor area
  - all data: Long Term Building Renovation Strategy by Chance for Buildings for Ministry of Industry and Trade
  - as of 2016, data for 2021 will be available in 2023
- market value cca 1800 bn. euro!
  - 8 times annual GDP of cca 220 bn. euro

# Buildings: A source of emissions

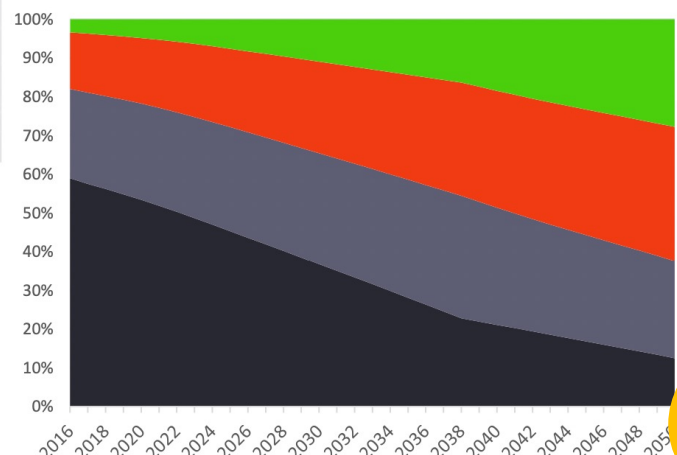
- 35 % of Czech carbon emissions come from operation of buildings
- additional 5-7 % are emissions from construction/demolition
  - this will get more important when buildings get more energy efficient
- potential for savings from operation of buildings at least 85 % from building renovation=energy efficiency+local renewables measures
  - climate neutrality possible by cleaning up electricity and district heating energy mix
- but: increase in combined rate&depth of renovations by factor of 3 is needed
- for that: we need to make 60,000 individual investment decision/y right

# Scenarios for building renovation (EE+RES)

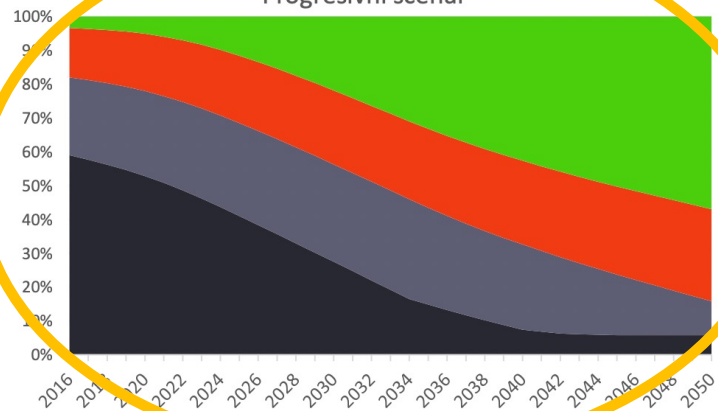
Základní scénář



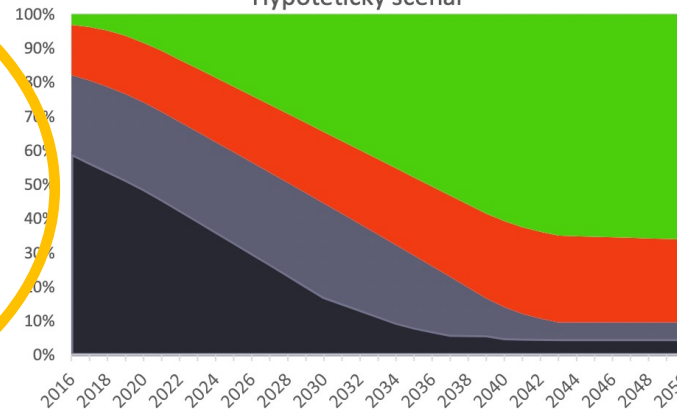
Reálný scénář dle MPO



Progresivní scénář



Hypotetický scénář



■ podlahová plocha nezrenovovaných budov [mil. m<sup>2</sup>]  
■ podlahová plocha středně zrenovovaných [mil. m<sup>2</sup>]

■ podlahová plocha mělce zrenovovaných [mil. m<sup>2</sup>]  
■ podlahová plocha důkladně zrenovovaných [mil. m<sup>2</sup>]

- share of non-/shallow-/medium-/deep renovated floor area of buildings
- at least "progressive" scenario needed to achieve 2030 targets and 2050 climate neutrality

# Adaptation to climate change impacts

- building level: measures are similar for mitigation and adaptation
  - quality design, well insulated envelope, efficient heating, local renewables
  - outer shading (passive, active.. natural: broad-leaf trees), efficient cooling
  - vegetation roofs, facades, trees around the building
  - rain-water utilization and water recycling (greywater)
  - ventilation for fresh air, keeping healthy inner environment
- urban planning to avoid city heat islands and for sustainable transportation
- landscape (not to forget, out of scope of this presentation)

# Real estate market implications

- quality buildings are at the same time mitigating climate and energy security risks and are more resilient to them
- they also come with lower energy bills and higher working productivity (esp. in services)
- quality buildings are and will continue to be valued higher on the market
- for residential buildings, an evidence shows 3-5 % price difference for one energy class, Energy Performance Certificates not perfect but good indication
  - market functions well if there is enough information on quality of traded goods
- for larger buildings, EPCs accompanied by environmental certification and life-cycle global warming potential figures play the role
  - higher asset value, quicker to rent, with higher premium

(macro: building renovation programmes are an economic engine, mainly for SMEs)

# Example: Large office buildings (new)



photos: Adapterra Awards

# Example: Renovation of single family house





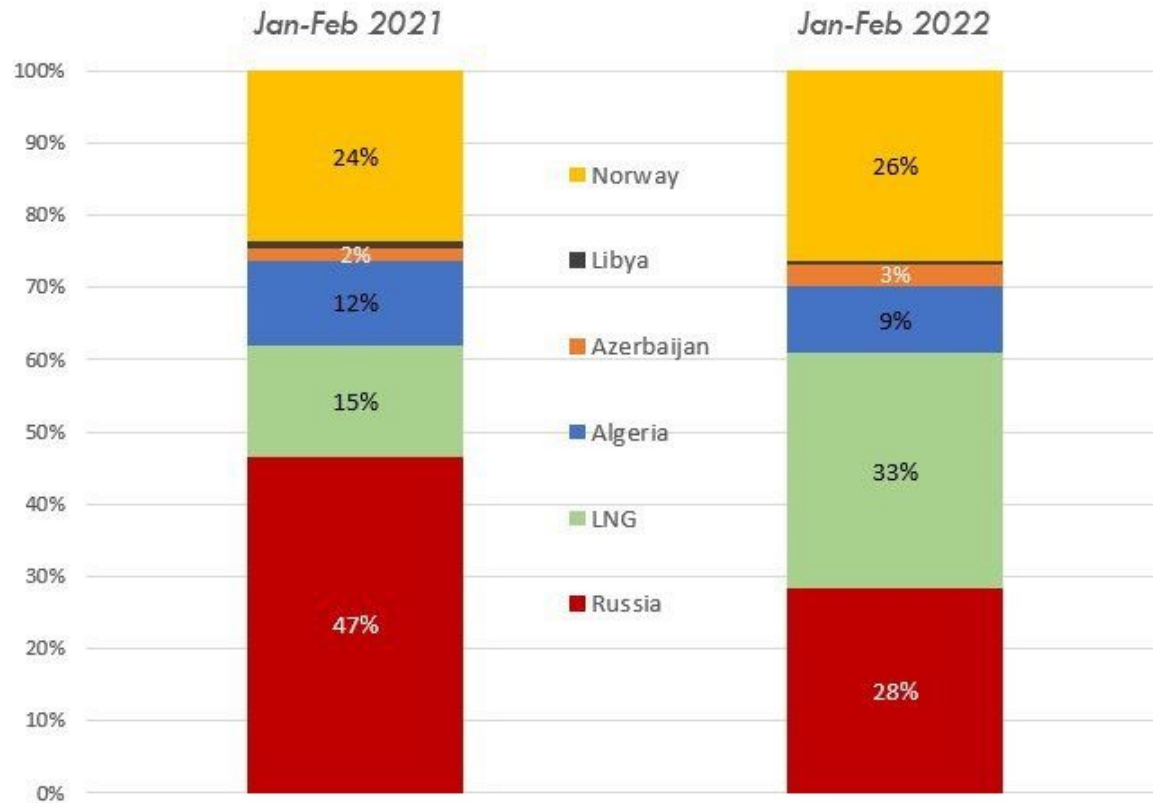
# Energy security: Russian invasion to Ukraine

- energy security a top political priority, doesn't equal to energy sovereignty but quick decrease in dependance on Russian fossil fuels is a must
- Czechia: consumption of gas cca 8.5 bn. m<sup>3</sup>/y
  - significant share (>2/3<sup>rd</sup>s) from Russia
  - EU wide a share of Russian gas is reported at 42 %
- short term measures until the next winter (building sector important):
  - efficient heating regulation+eventually lower space heating temperatures, lowering demand in industry, can bring 20 % of gas savings, diversification+LNG to do the rest
- mid-term by 2030 (building sector very crucial):
  - we can get 1.8 bn. m<sup>3</sup> from building renovation (EE+RES), ie. 1/3<sup>rd</sup> of Russian imports
  - for further savings: swift replacement for heat pumps, transformation of legacy district heating systems, more biomethane (green hydrogen not for buildings)

# Diversification of gas imports has started



Russia' share in EU gas imports decreased in 2022, replaced by LNG



Source: Bruegel based on ENTSO-G

# Thank you for your attention

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