

# Speeding up the urban energy transition

## Reasons, challenges and solutions in the Dutch housing stock

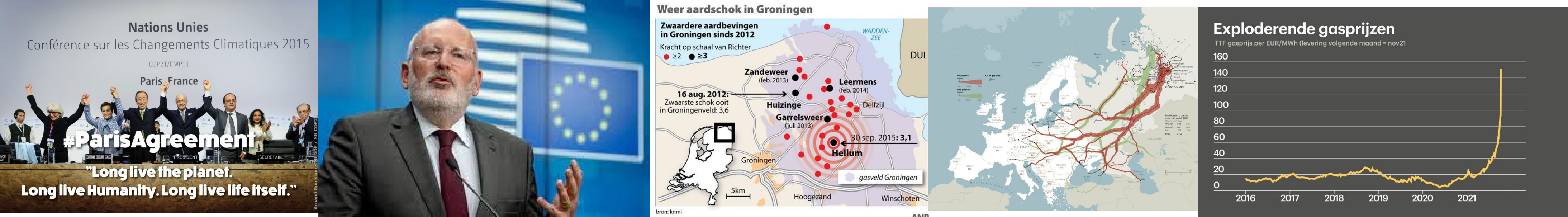
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### INTRODUCTION

The IPCC reports show with an increasing urgency that there is no time to lose in reducing CO<sub>2</sub> emissions to avoid severe climate change. In 2050 CO<sub>2</sub> emissions should be virtually zero and, according to the EU, by 2030 we should have already achieved a reduction of 55% compared to 1990. The built environment is responsible for about 40% of energy consumption, so a major energy transition must take place there. In the Netherlands and other countries with a comparable climate, most energy is needed to heat buildings. The energy transition in buildings will consist of a combination of reducing the energy demand (e.g. through insulation) and the use of sustainable energy instead of fossil fuels. 70% of the building stock of 2050 is already there. This stock needs to be renovated to a high level. In the Netherlands, this means that approximately 7 million homes and other buildings need to be renovated. That's about 200,000 a day! This is a huge task with many challenges and barriers

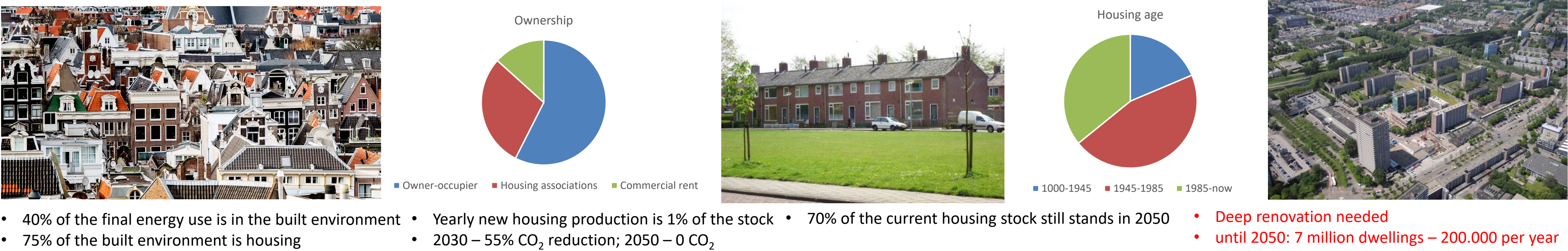


### REASONS



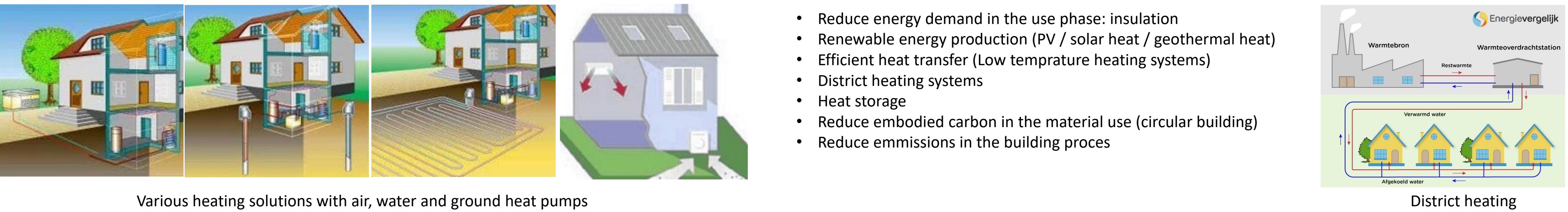
- 2015 COP 21 Paris < 1,5 degrees
- EU: 2030: 55% Carbon reduction  
2050: nearly zero carbon  
Green Deal, Renovation Wave. nZEB
- NL: natural gas resources cause earth quakes. Government terminates exploitation
- Ukraine war revises vision on availability of coal, oil and gas
- Steep rising energy prizes

### EXISTING HOUSING STOCK IN NL



- 40% of the final energy use is in the built environment
- 75% of the built environment is housing
- Yearly new housing production is 1% of the stock
- 2030 – 55% CO<sub>2</sub> reduction; 2050 – 0 CO<sub>2</sub>
- 70% of the current housing stock still stands in 2050
- Deep renovation needed
- until 2050: 7 million dwellings – 200.000 per year

### SOLUTIONS

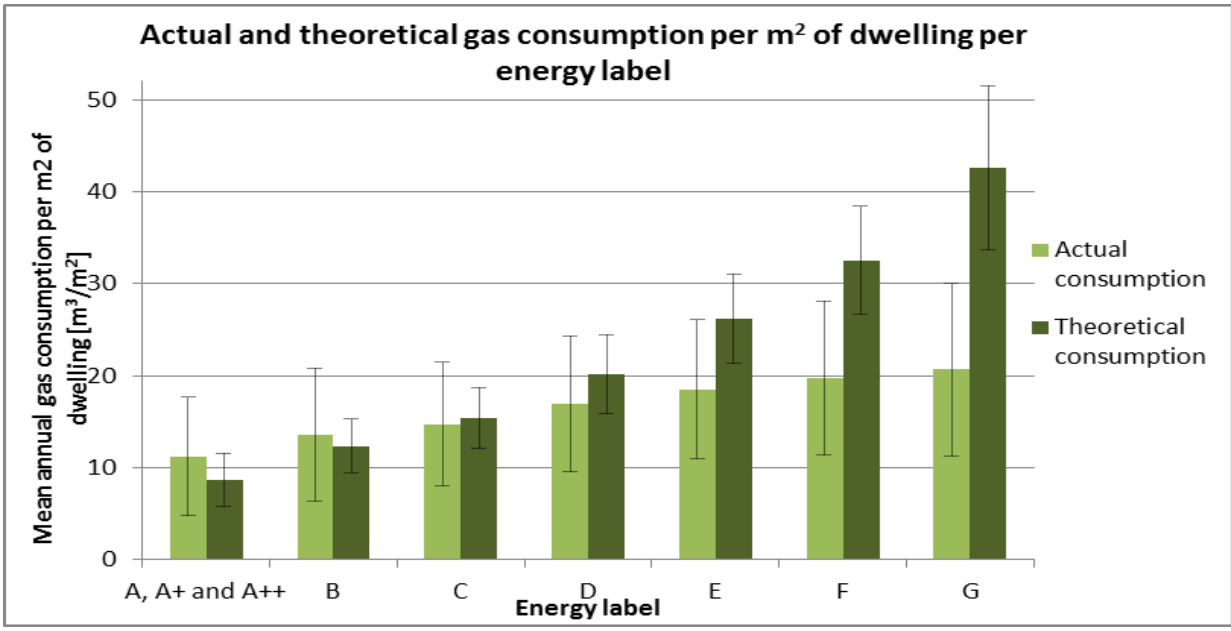


Various heating solutions with air, water and ground heat pumps

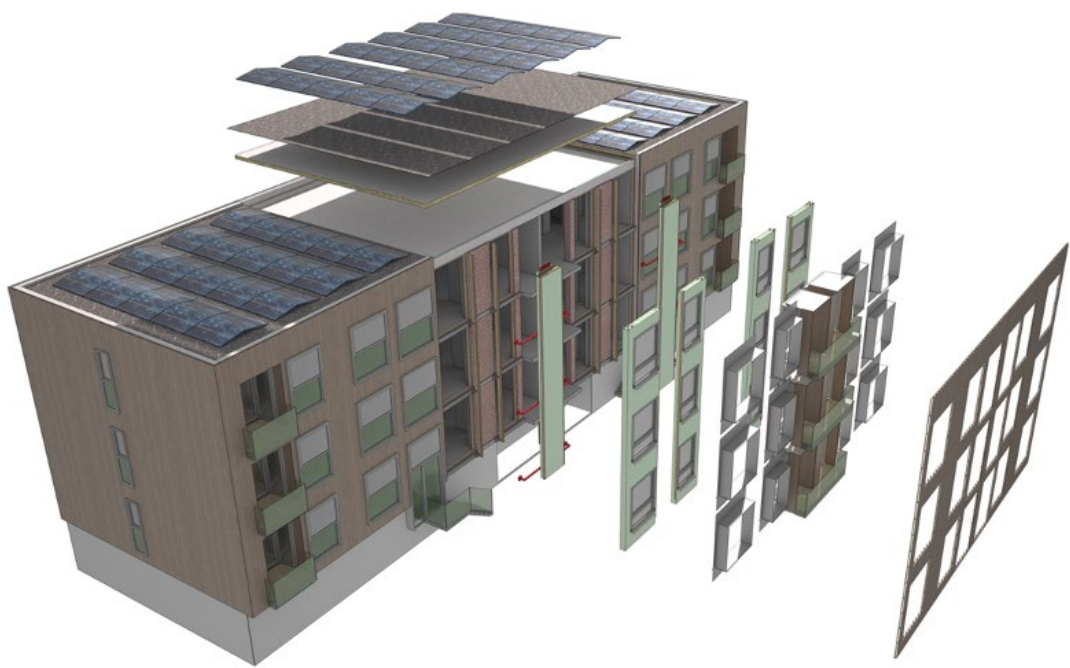
District heating

### CHALLENGES

- What are the effective, efficient and feasible renovation and heating solutions for each building?
- How can costs be reduced and financed for all building owners?
- How to make all building owners participate?
- How to operationalise enough capacity in the construction sector?
- Industrialisation is essential: prefab, automated production



- Insight in occupant behaviour, preferences and comfort is essential



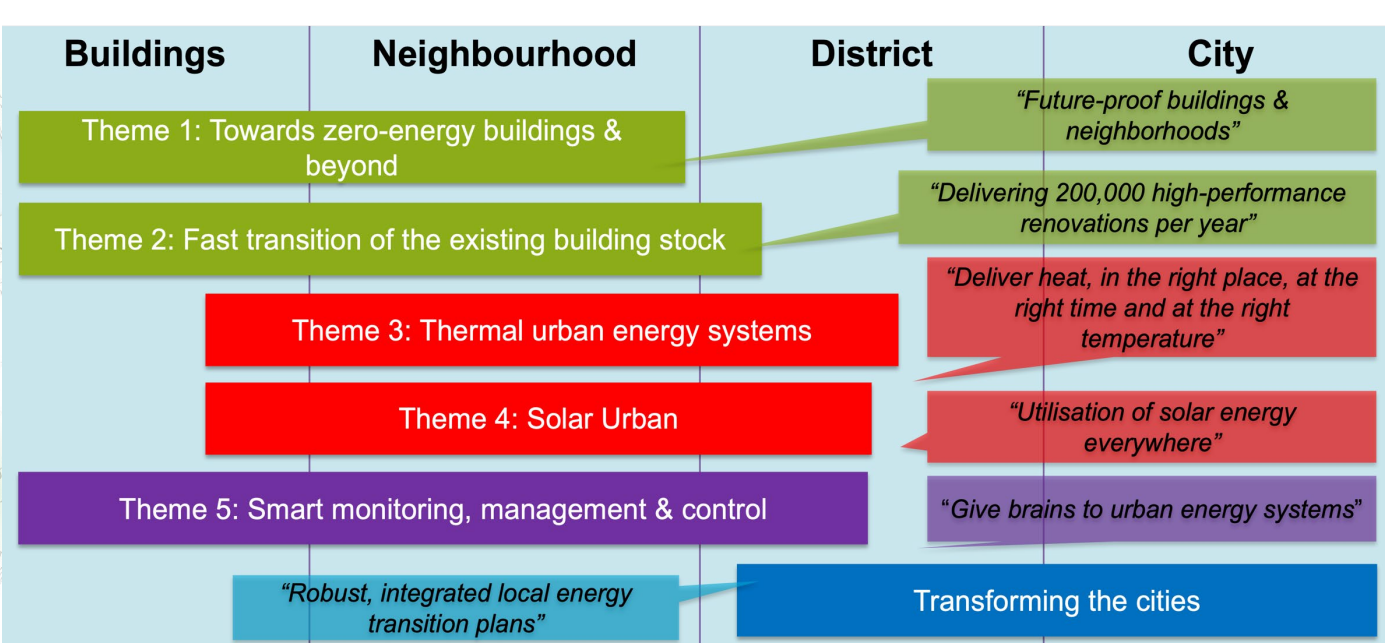
### TUDELFT



### The Green Village



### Urban Energy Institute



### SBE'2

