



Built environment facing climate change

REHVA 13th HVAC World Congress
26 - 29 May, Bucharest, Romania



Energy in Buildings in Europe: An Overview



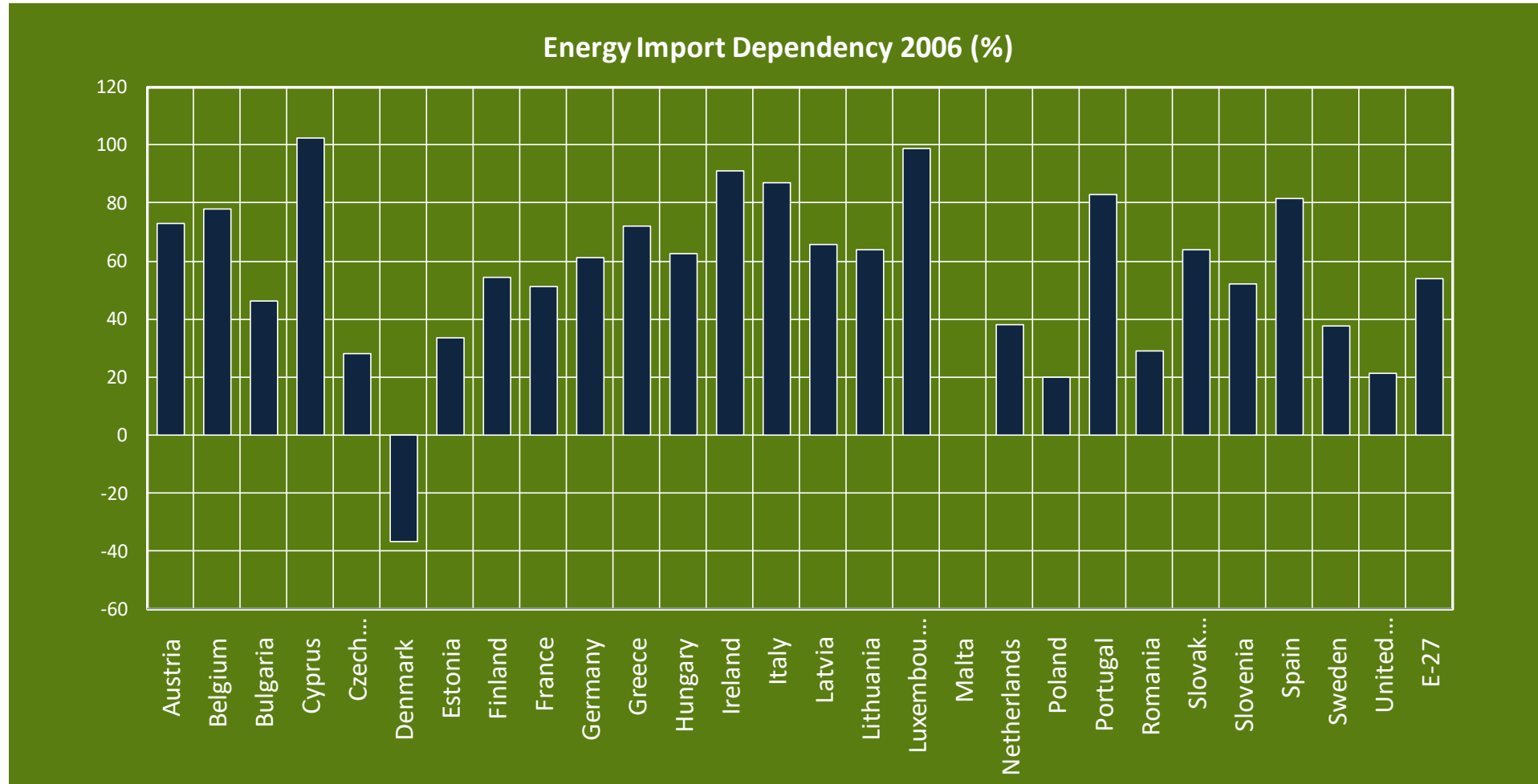
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Vice-President of REHVA, Chair of Education and Training Committee
University of Coimbra, Portugal

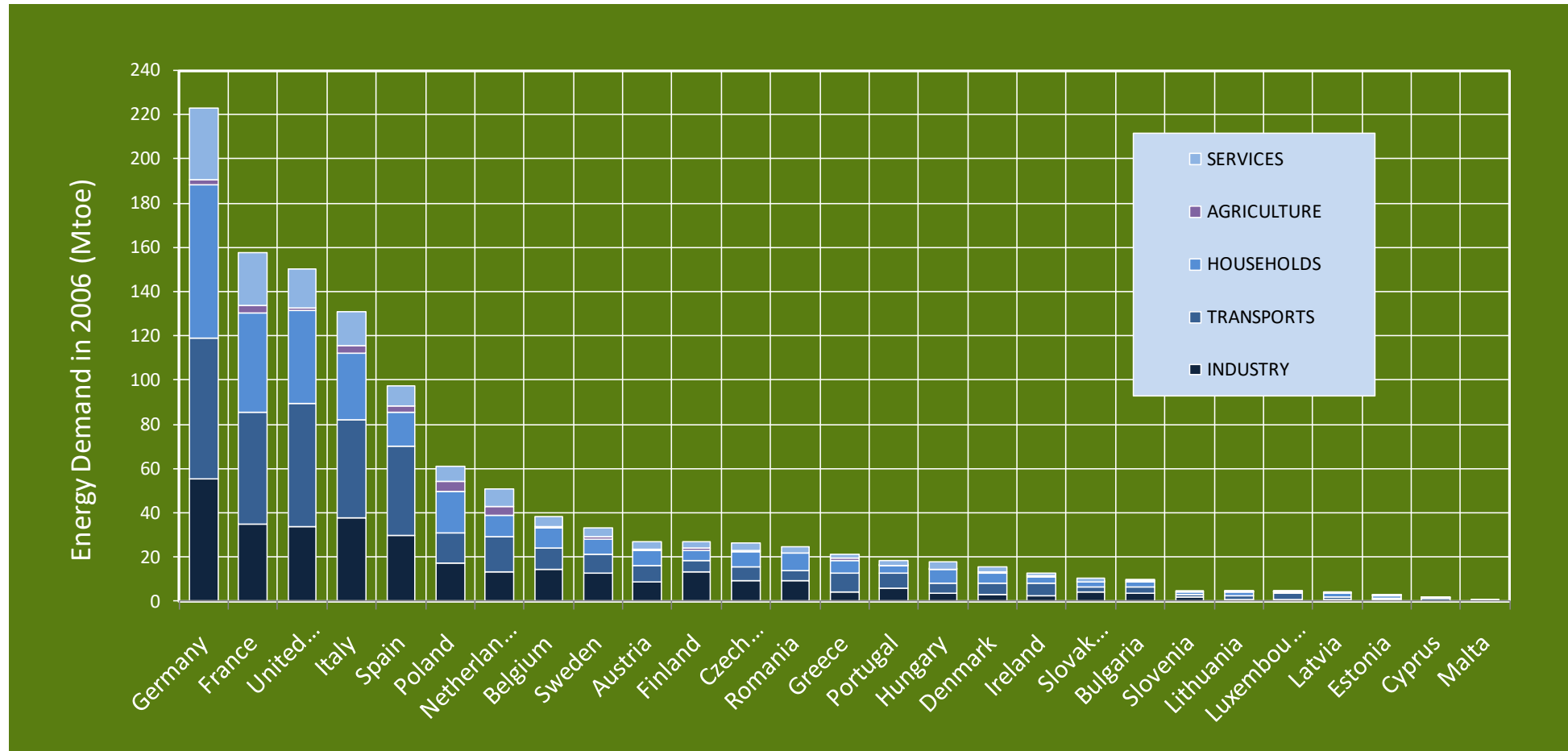
Presentation Outline

- European Energy Market Analysis
- Time Evolution of the Concentration of a Pollutant
- Step Change Input Based Methods
- Periodic Input Based Methods
- Conclusions

European Energy Market Analysis

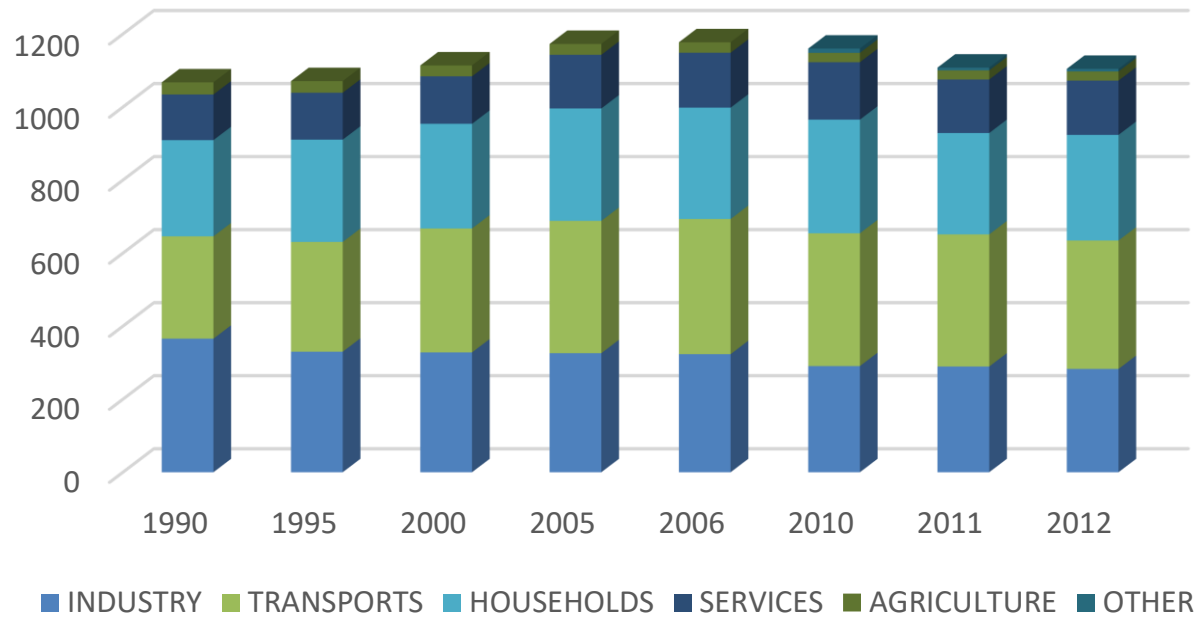


European Energy Market Analysis

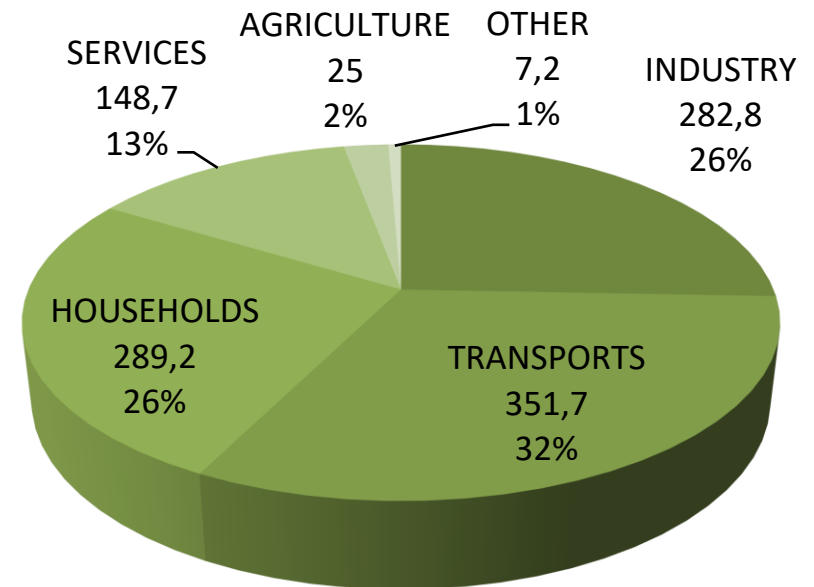


European Energy Market Analysis

EU Energy Demand (Mtoe)

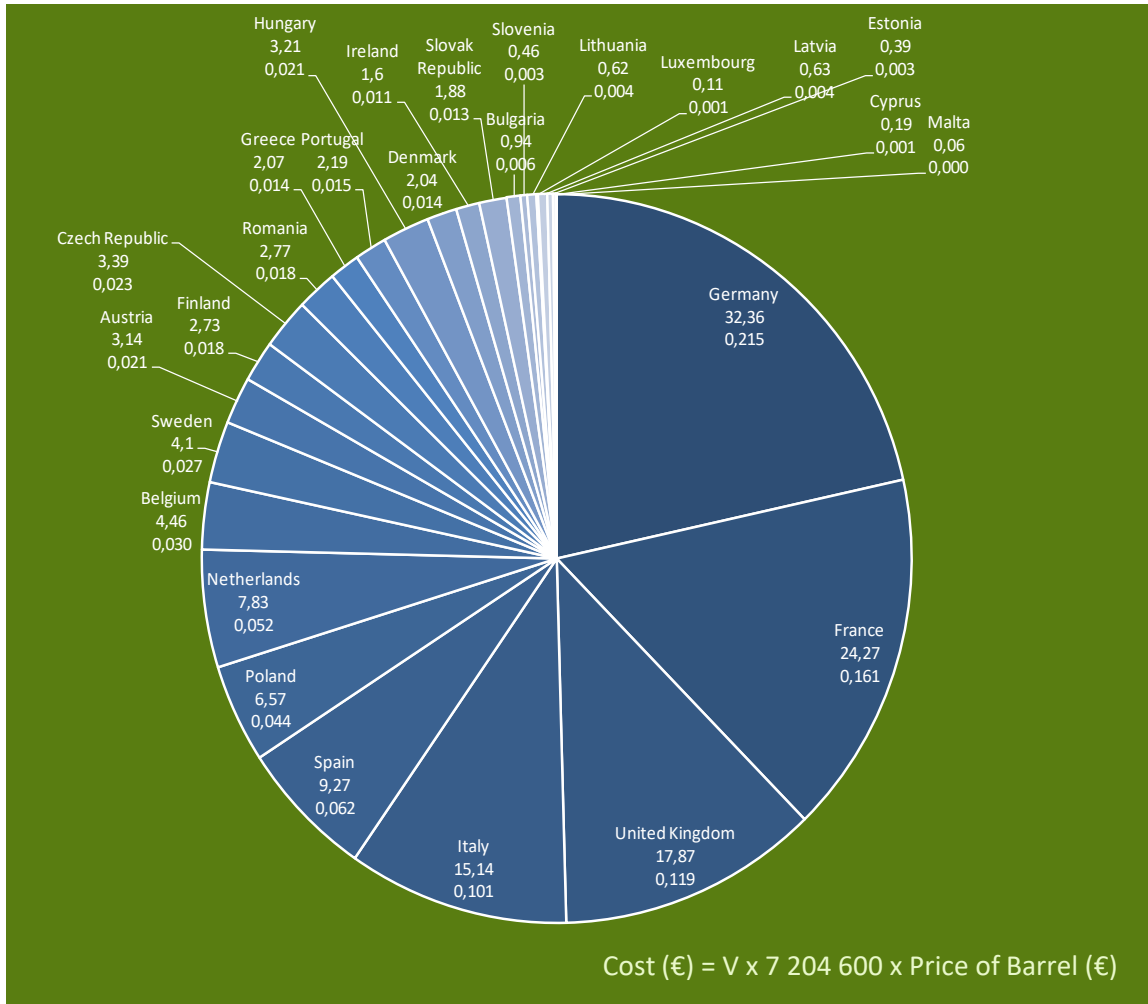


EU 28 Energy Demand 2012 (Mtoe & %)

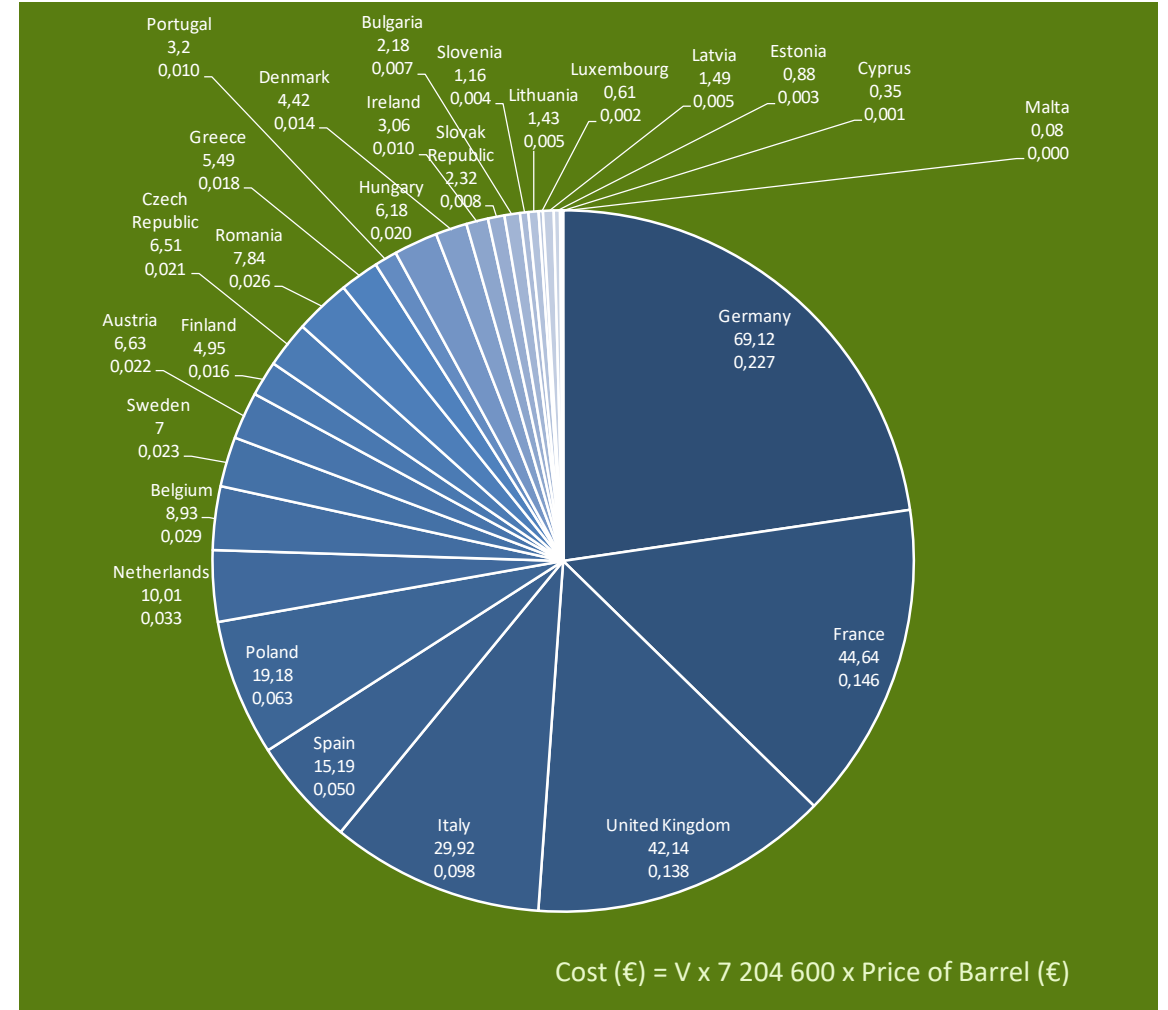


European Energy Market Analysis

Energy Demand in Service Buildings (Mtoe & %)

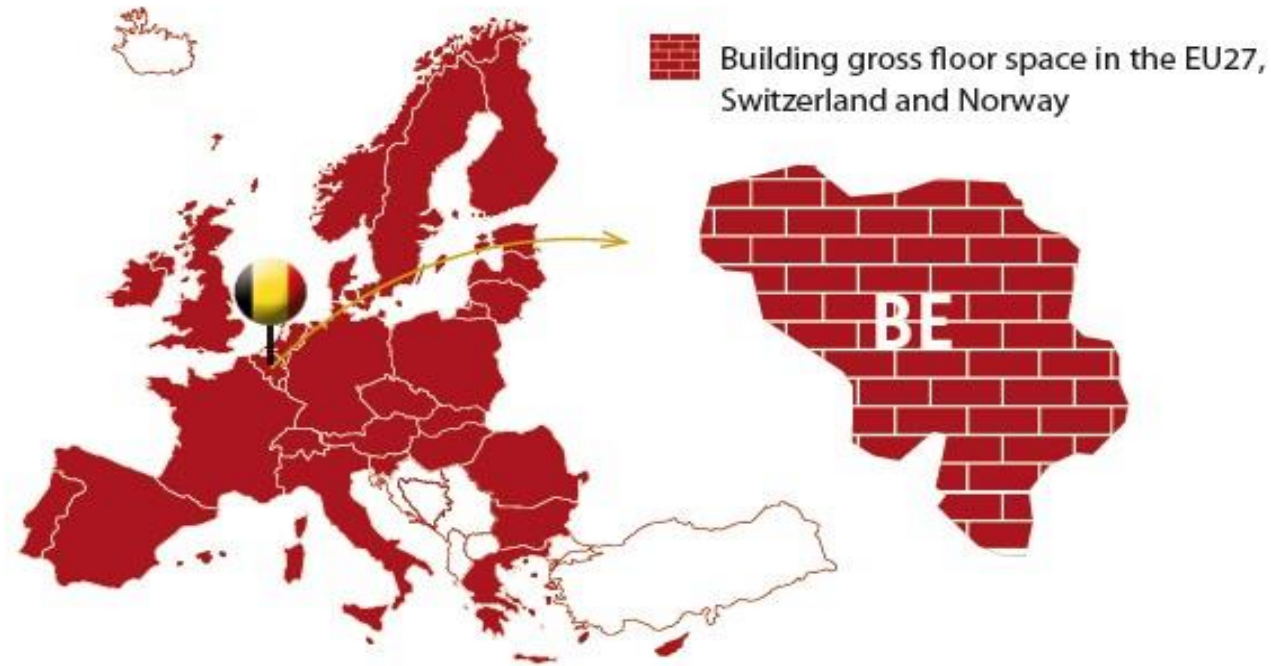


Energy Demand in Households (Mtoe & %)



Buildings in Europe

Sources: Population figures: World Bank, Eurostat. Floor spaces: EU27 - BPIE survey 2011, US - Annual Energy Outlook 2011 with projections to 2035 (US Energy Information Administration), China - Energy Efficiency in Buildings, Facts & Trends (WBCSD)



| | Population (2010) | Land area (km ²) | Building Floor Space |
|-------|-------------------|------------------------------|---------------------------|
| EU27 | 501 million | 4,324,782 | 24 billion m ² |
| US | 309 million | 9,826,675 | 25 billion m ² |
| China | 1338 million | 9,598,080 | 35 billion m ² |

47 m²/person

81 m²/person

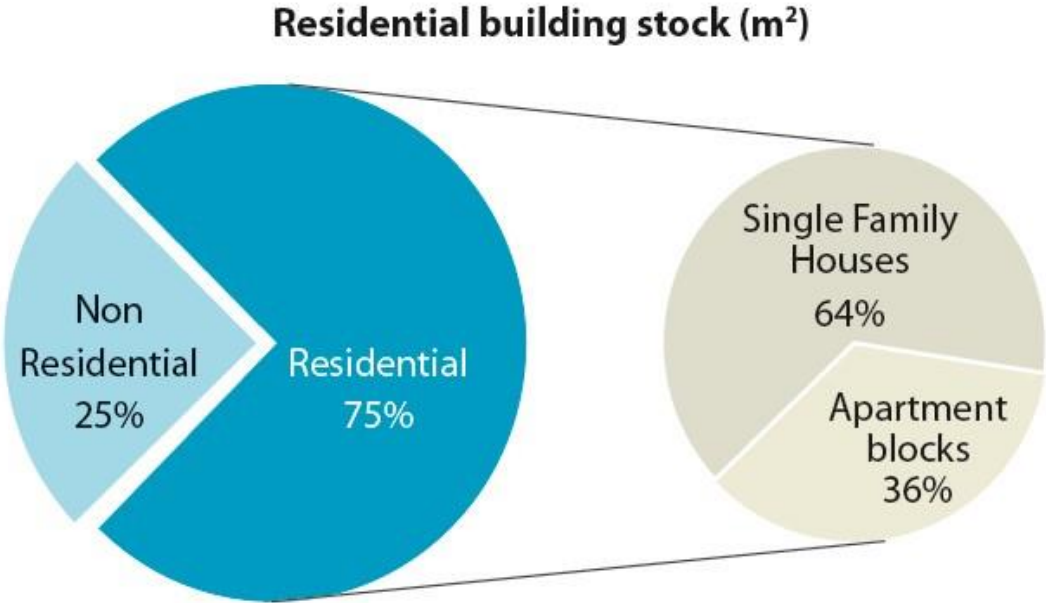
26 m²/person

The size of building stock in Europe (*adapted from M. Economidou et al (2011)*)

Buildings in Europe

European buildings at a glance

Source: BPIE survey



Non-residential building stock (m²)

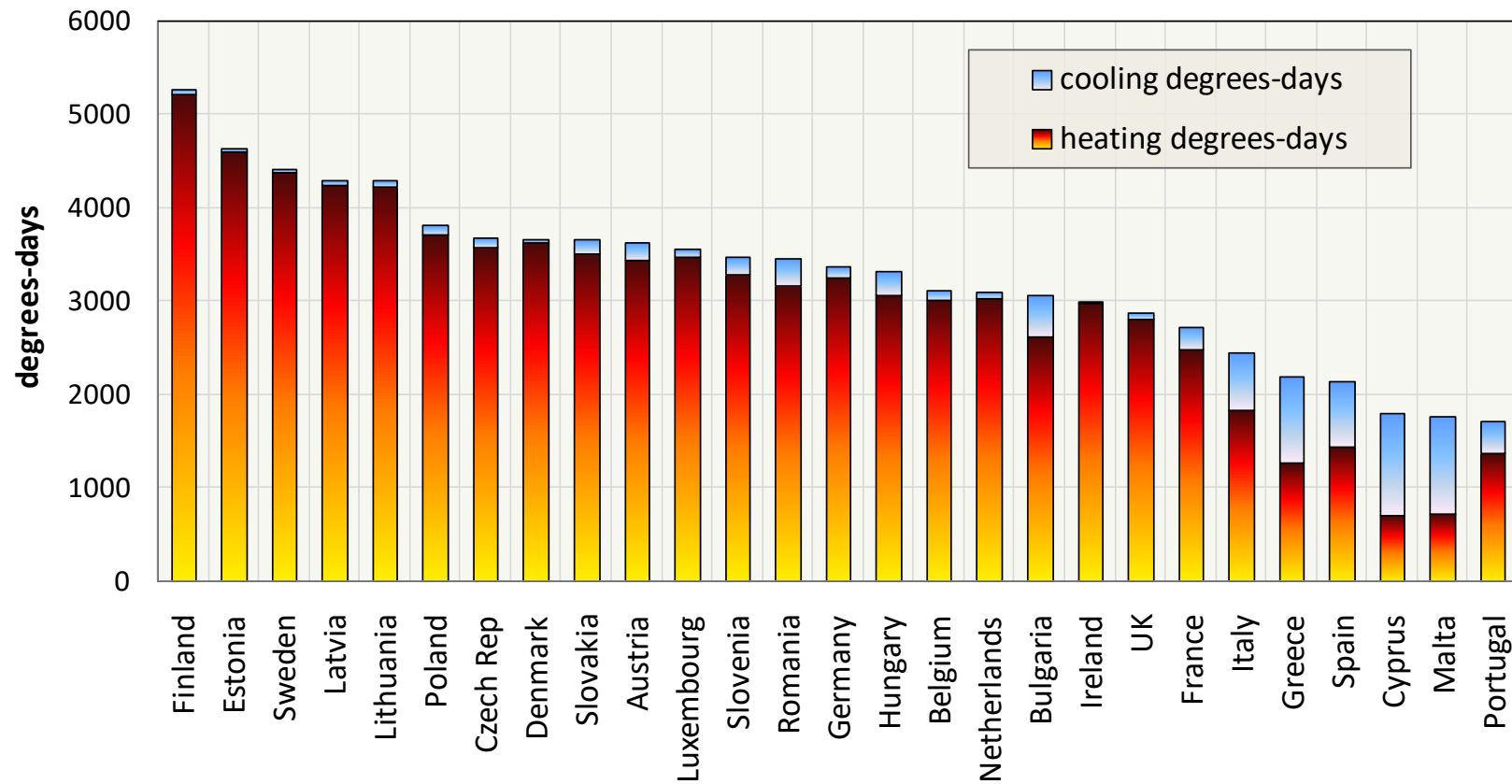


¹ The European countries have been divided based on climatic, building typology and market similarities into three regions

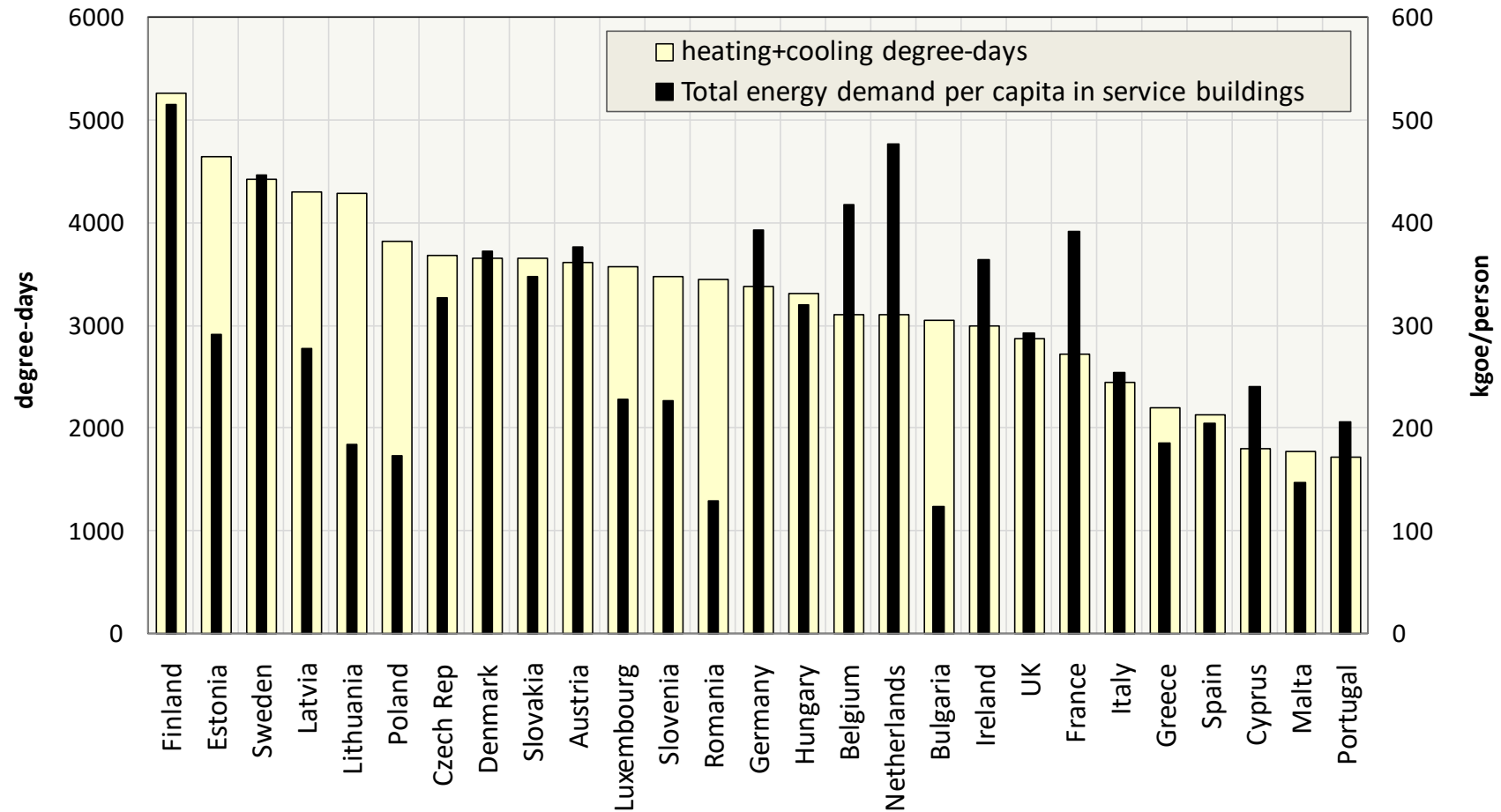
Climate Zones



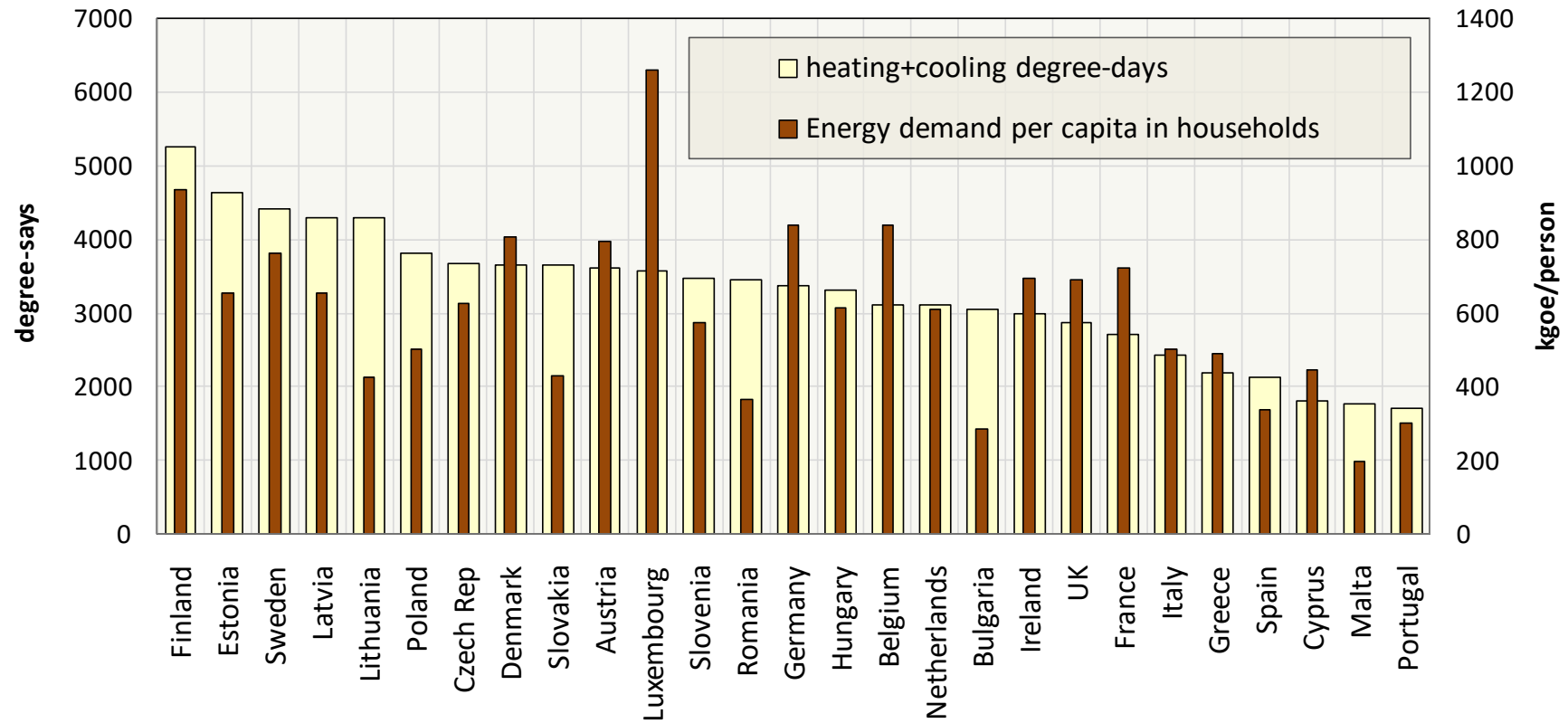
Heating and Cooling Degrees Days



Energy Demand vs H+C DD (Service Bldgs)



Energy Demand vs H+C DD (Households)



Questions

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Thank you very much
非常感谢你