4th CEWEP CONGRESS

WASTE-TO-ENERGY IN SUSTAINABLE WASTE AND ENERGY POLICY

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THE POTENTIAL FOR COOLING

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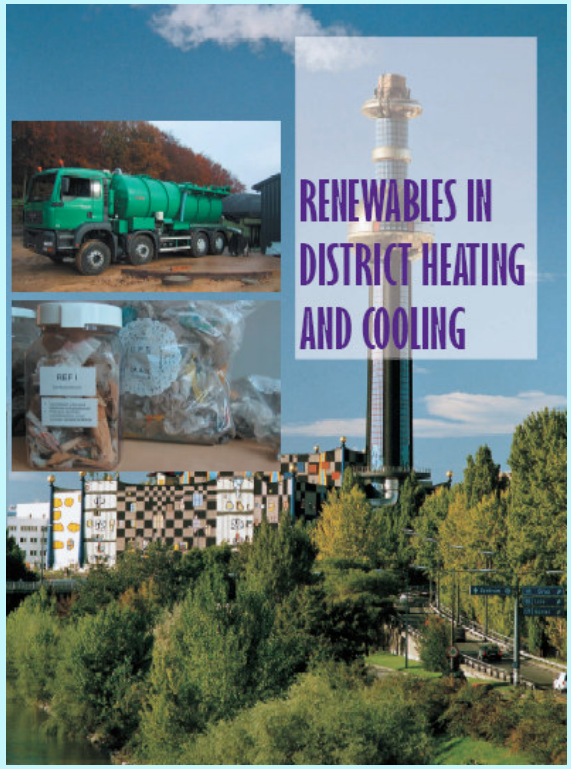
a2a
energie in comune

EUROHEAT & POWER

- 32 countries
- 24 national associations:
  - Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Italy, *Japan,* Lithuania, *Latvia,* Norway, *Poland*, Romania, *Russia*, Sweden, Switzerland, Slovenia, Slovakia, The Netherlands, UK
- Utilities
- Suppliers of Equipment and Services



ECOHEATCOOL STUDY
DHC opportunities - Horizon 2020

Doubling the sales of district heat (2003, EU-32) while increasing the shares of recycled heat and renewables would:

- **Reduce primary energy consumption by 2.1 EJ/a or 50.7 Mtoe**
  (- 2.6% of 81.1 EJ/a)
  (Primary energy consumption of Sweden)

- **Reduce import dependency by 4.5 EJ/a**
  (- 14% of 32 EJ/a)

- **Reduce CO2 emissions by 400 Mt/a**
  (- 9.3% of 4330 Mt/a)

ECOHEATCOOL STUDY (work packages 2, 5)

COOLING OBJECTIVES

- Assessment of the cold market - demands
- Common method for assessing the efficiency of CHP/DHC in a system approach
- Possibilities for more District Cooling
- Recommendations to policymakers

ECOHEATCOOL STUDY (work packages 2, 5)

BENEFITS FROM DISTRICT COOLING

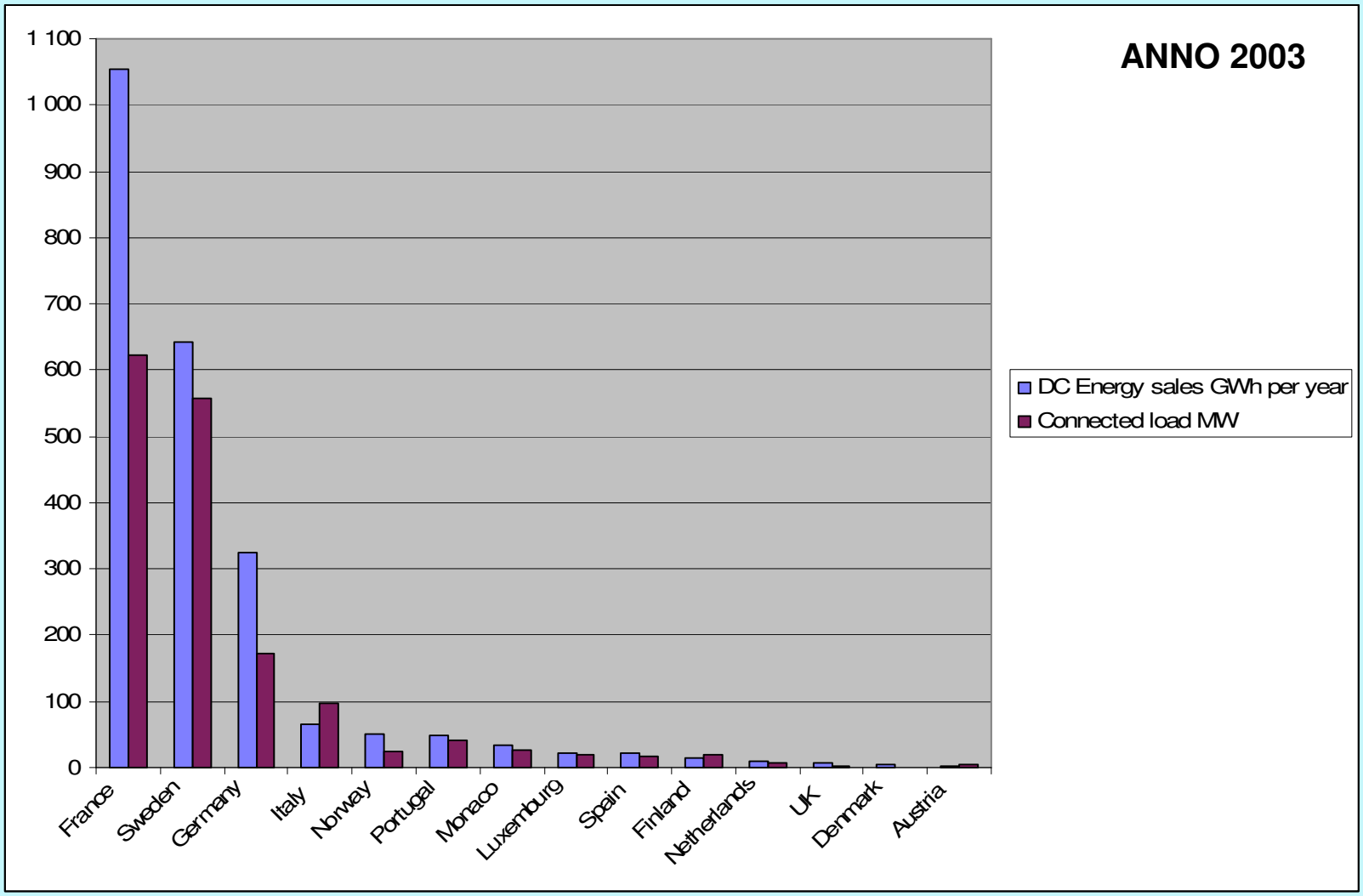
With a 25% market share (out of 660 TWhc) by 2015:

- **5 times higher energy efficiency than the conventional air conditioned equipments**
- **Reduction of annual electricity consumption by 50 to 60 TWhe**
- **40 to 60 million tons of annual CO2 savings (15% of EU's Kyoto commitment)**
- **Reduced investments in electricity capacity by 30 billion €**

EU OBJECTIVES – HORIZON 2020

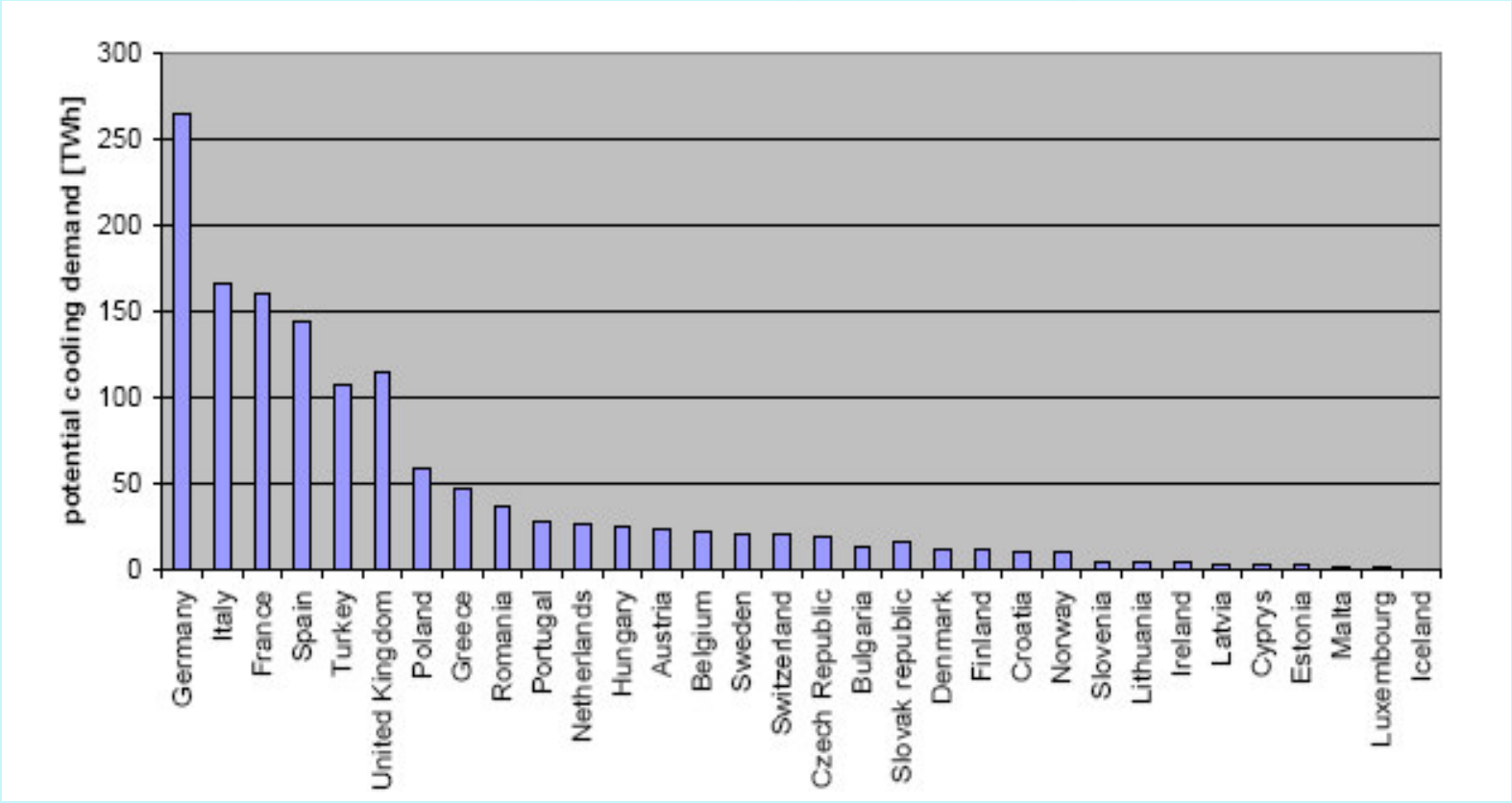
- Reduce CO2 by at least 20% (possibly 30%)
- Reduce primary energy consumption by 20%
- Increase renewables to 20%

SHARE OF DC IN THE MARKET



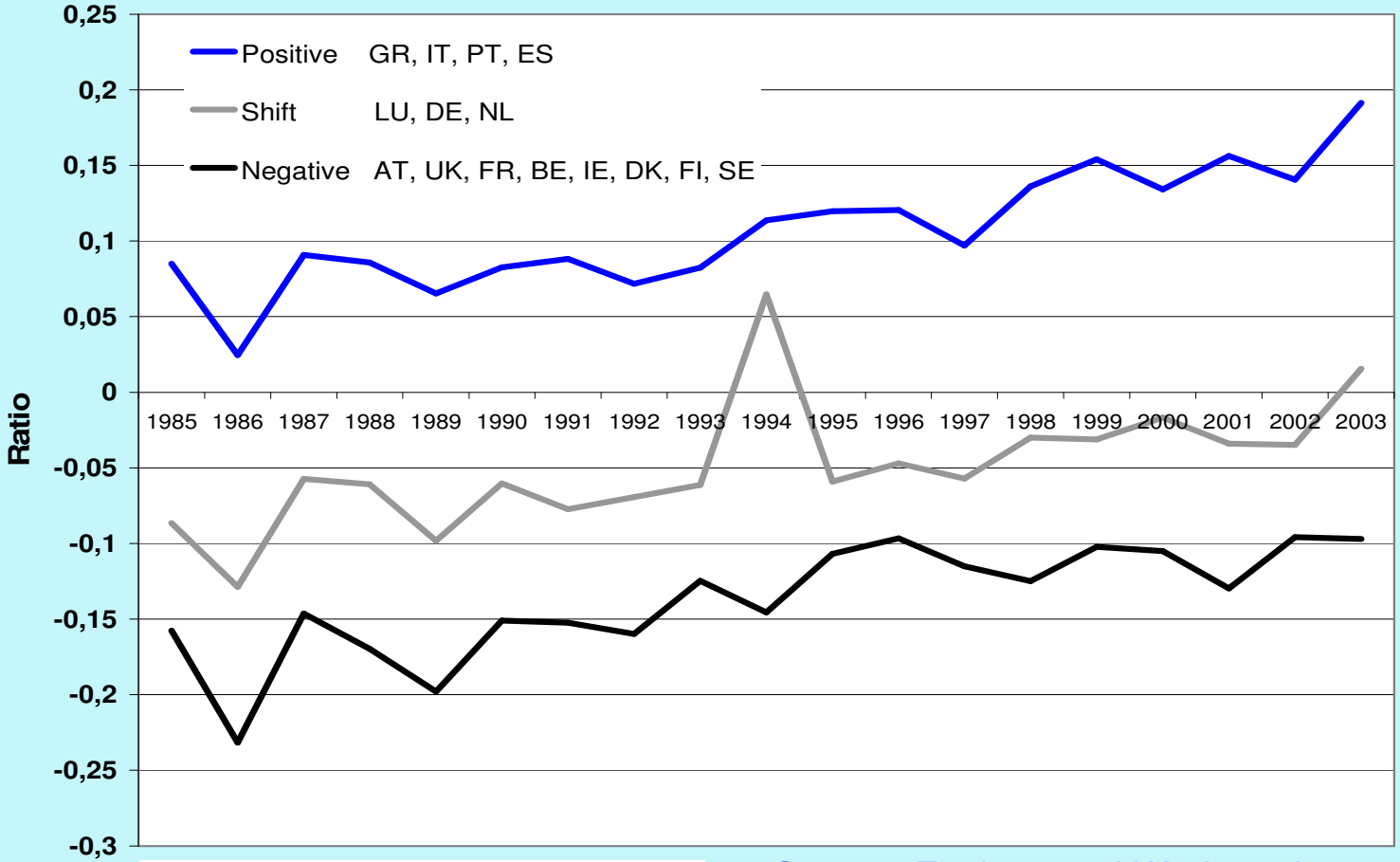
Source: Ecoheatcool Work package 2

POTENTIAL COOLING DEMAND IN EUROPE



Source: Ecoheatcool Work package 2

INCREASED ELECTRICITY PRODUCTION FOR COOLING DEMAND

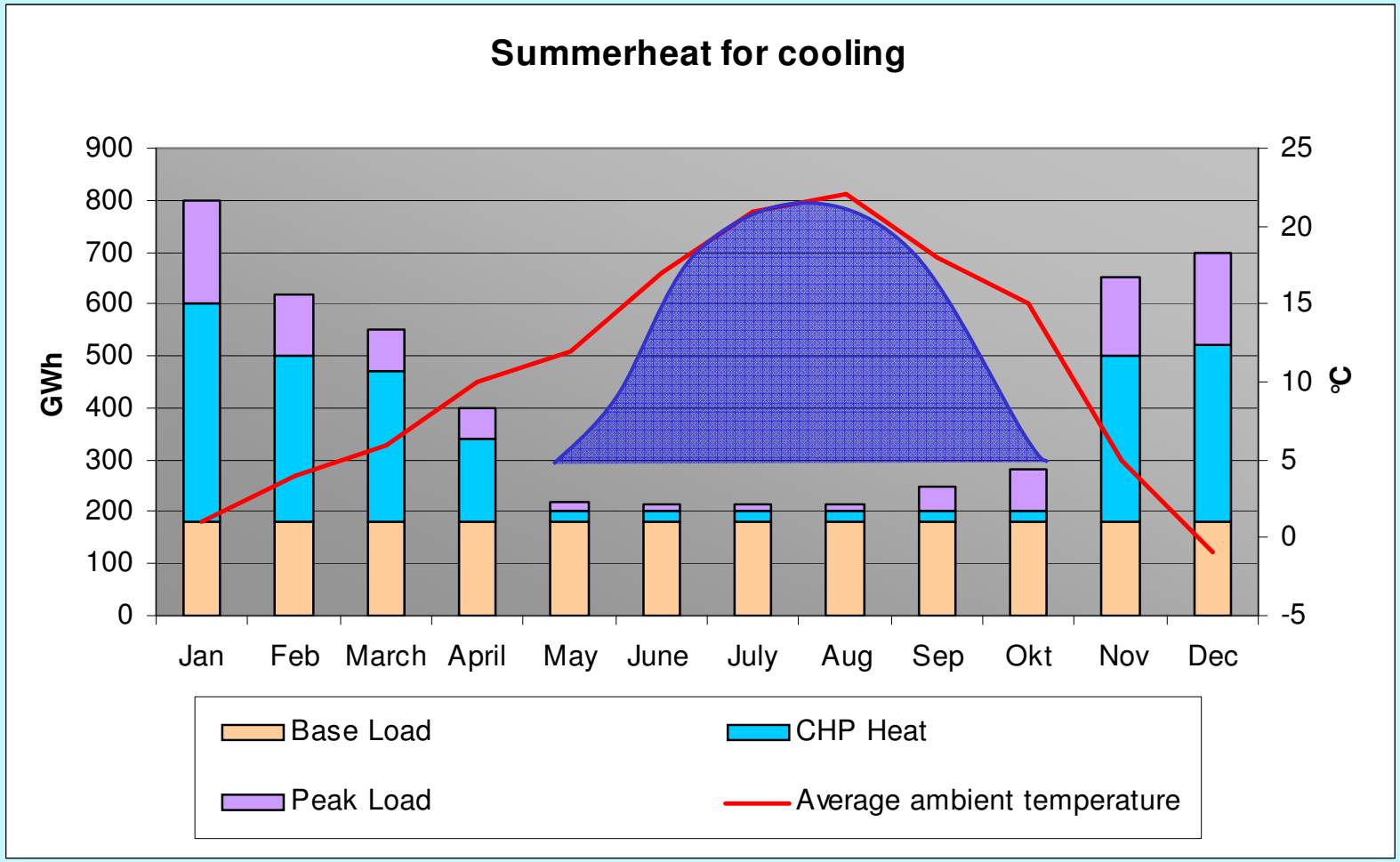


$$\text{Ratio} = \frac{(\text{demand July}) - (\text{demand April})}{\text{annual average demand}}$$

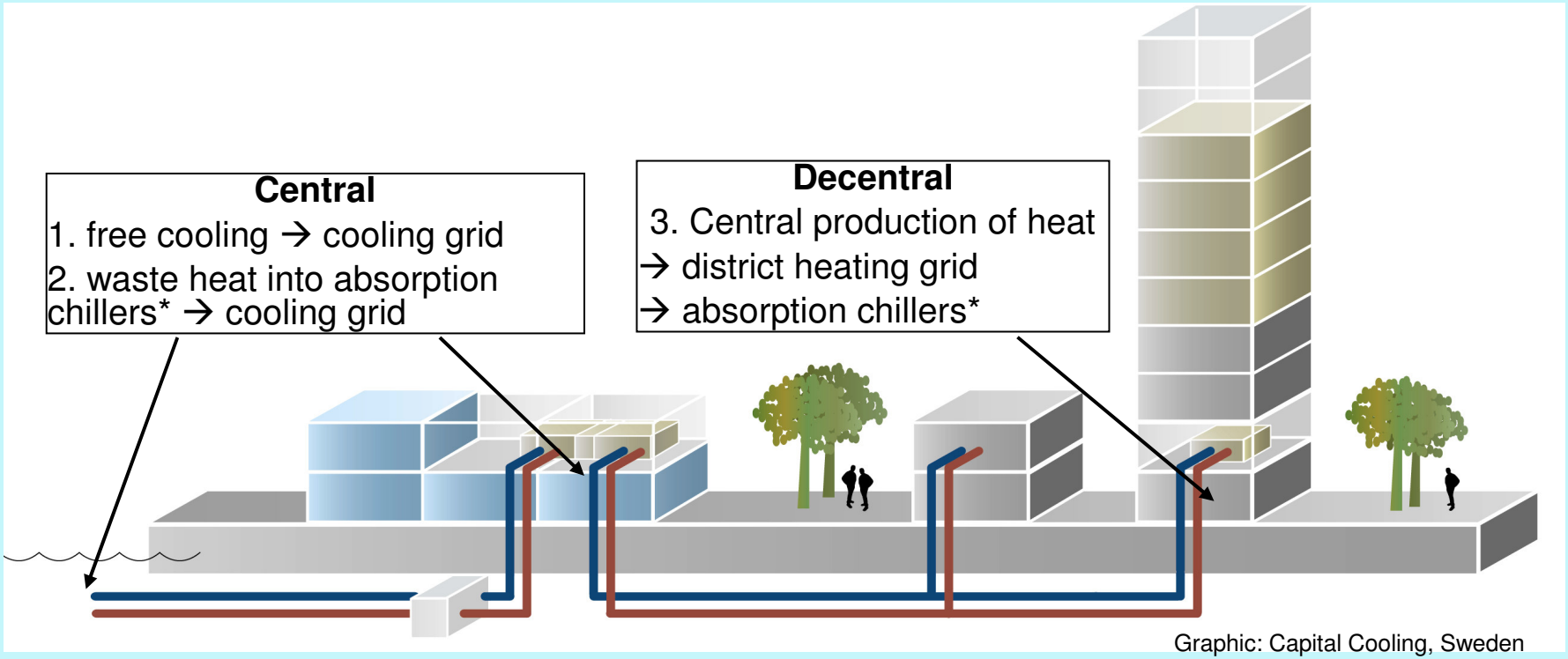
Source: Ecoheatcool Work package 2

PROJECT IDEA

(Summerheat study: www.eu-summerheat.net)



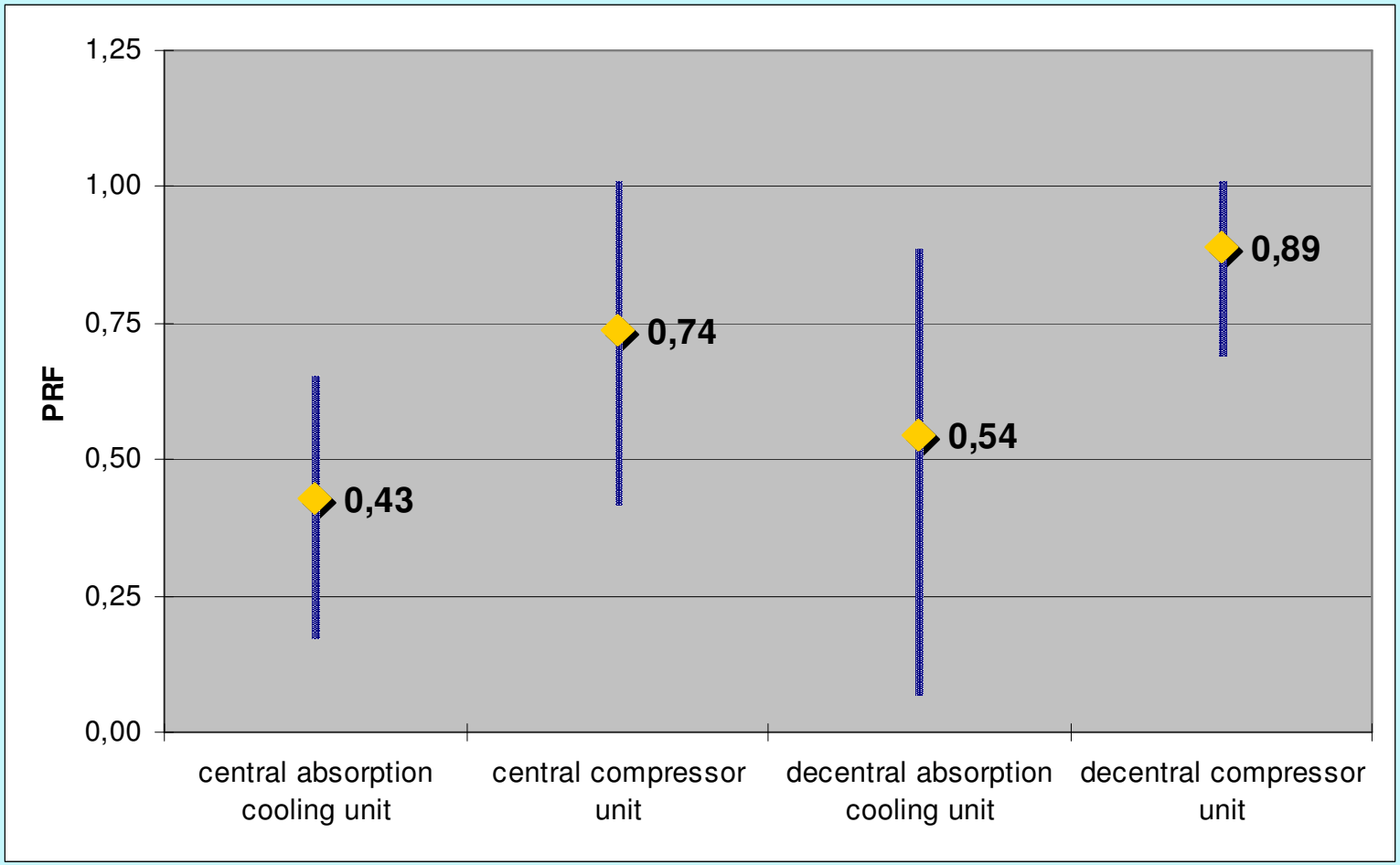
TECHNOLOGY COVERAGE



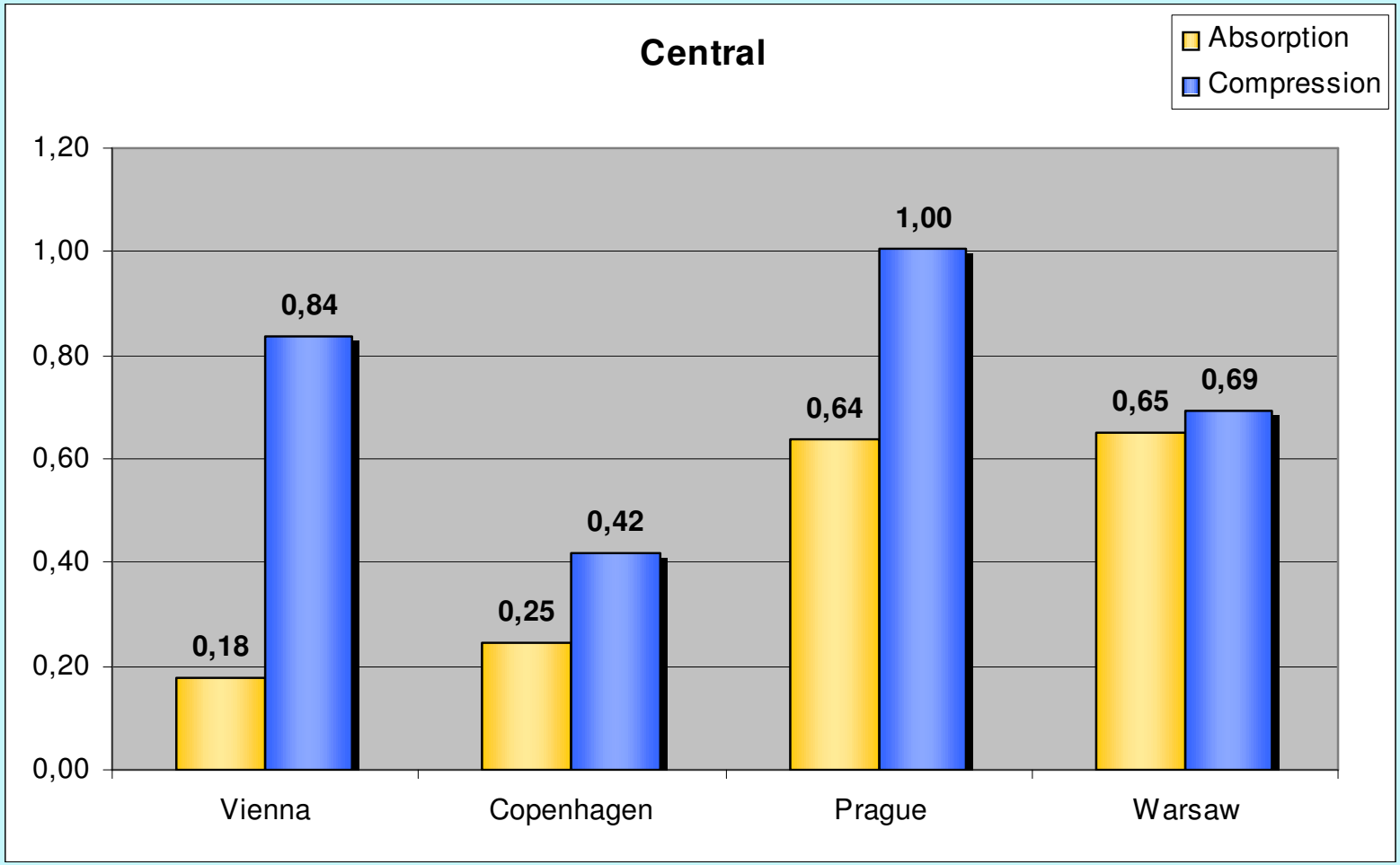
Graphic: Capital Cooling, Sweden

* Single-effect Lithium Bromide Absorption chillers

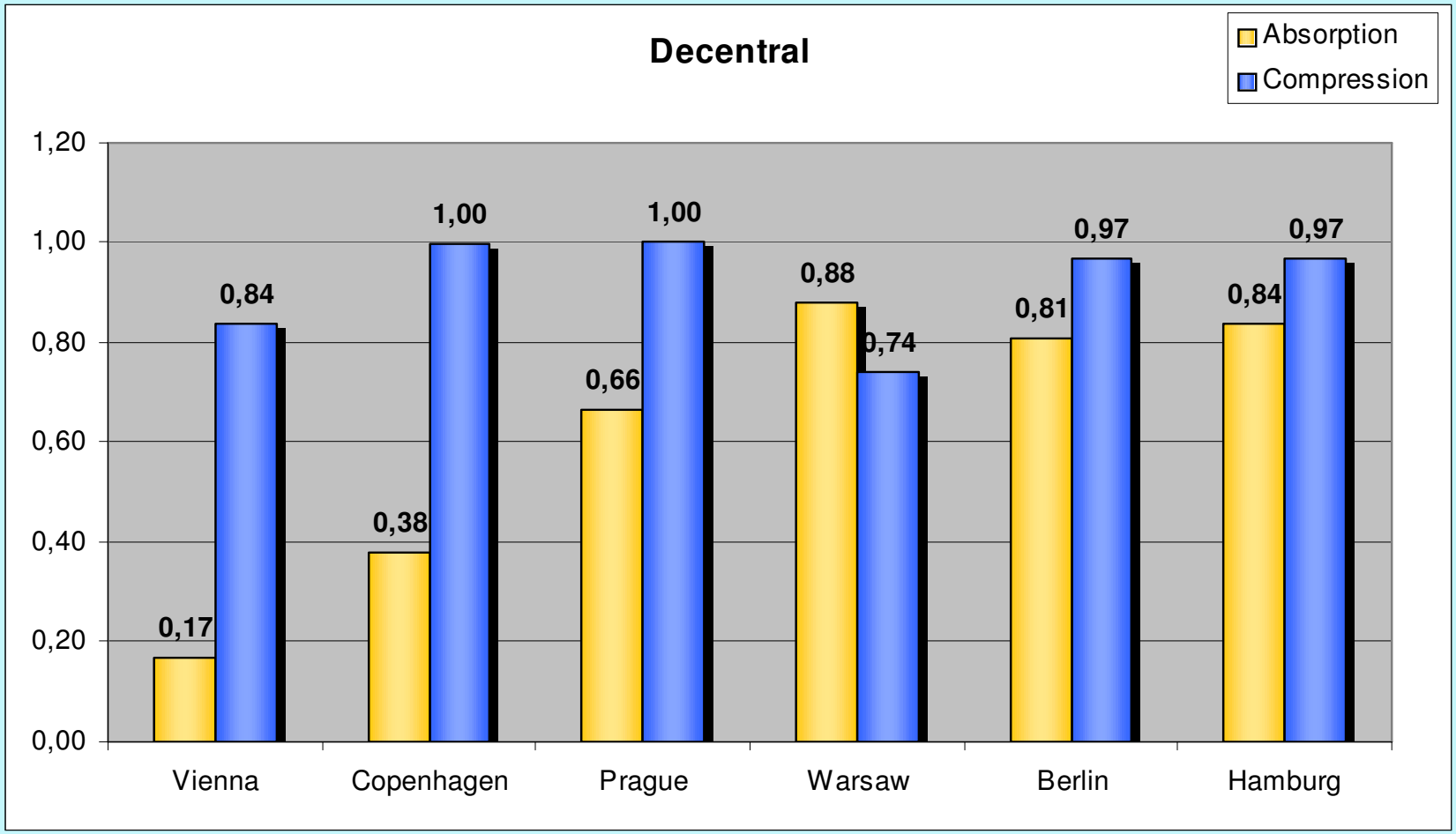
PRIMARY RESOURCE FACTORS



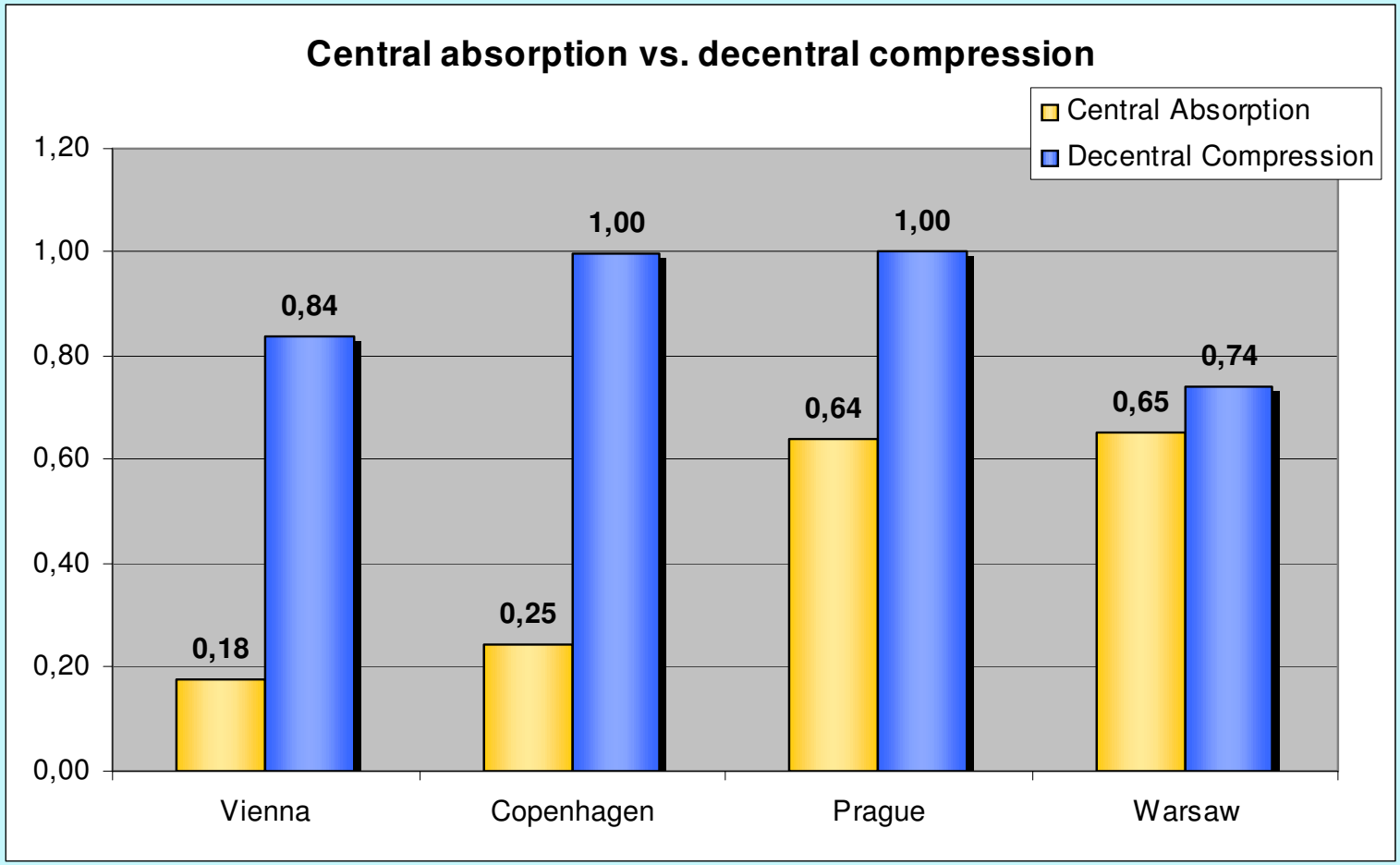
PRIMARY RESOURCE FACTORS



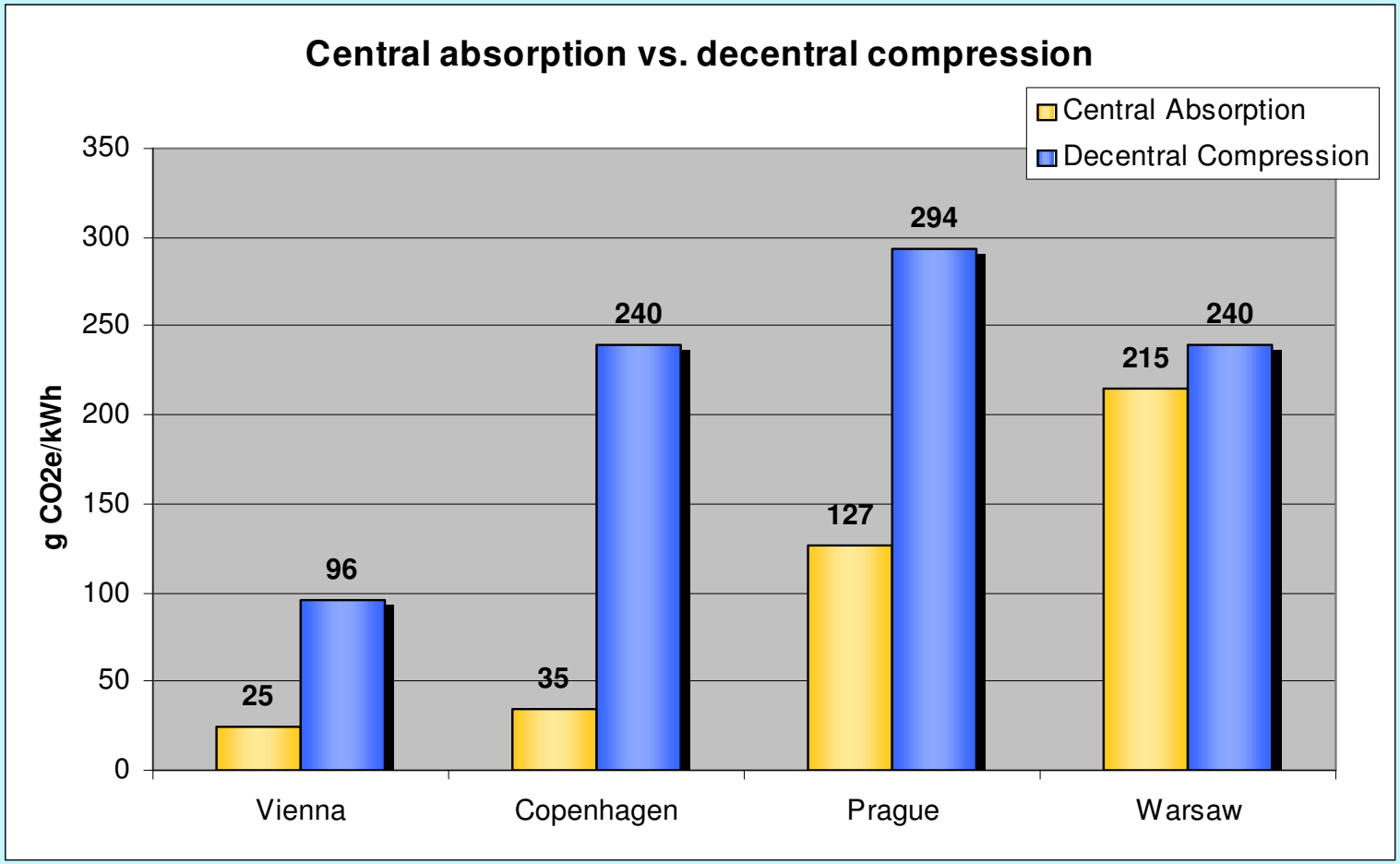
PRIMARY RESOURCE FACTORS



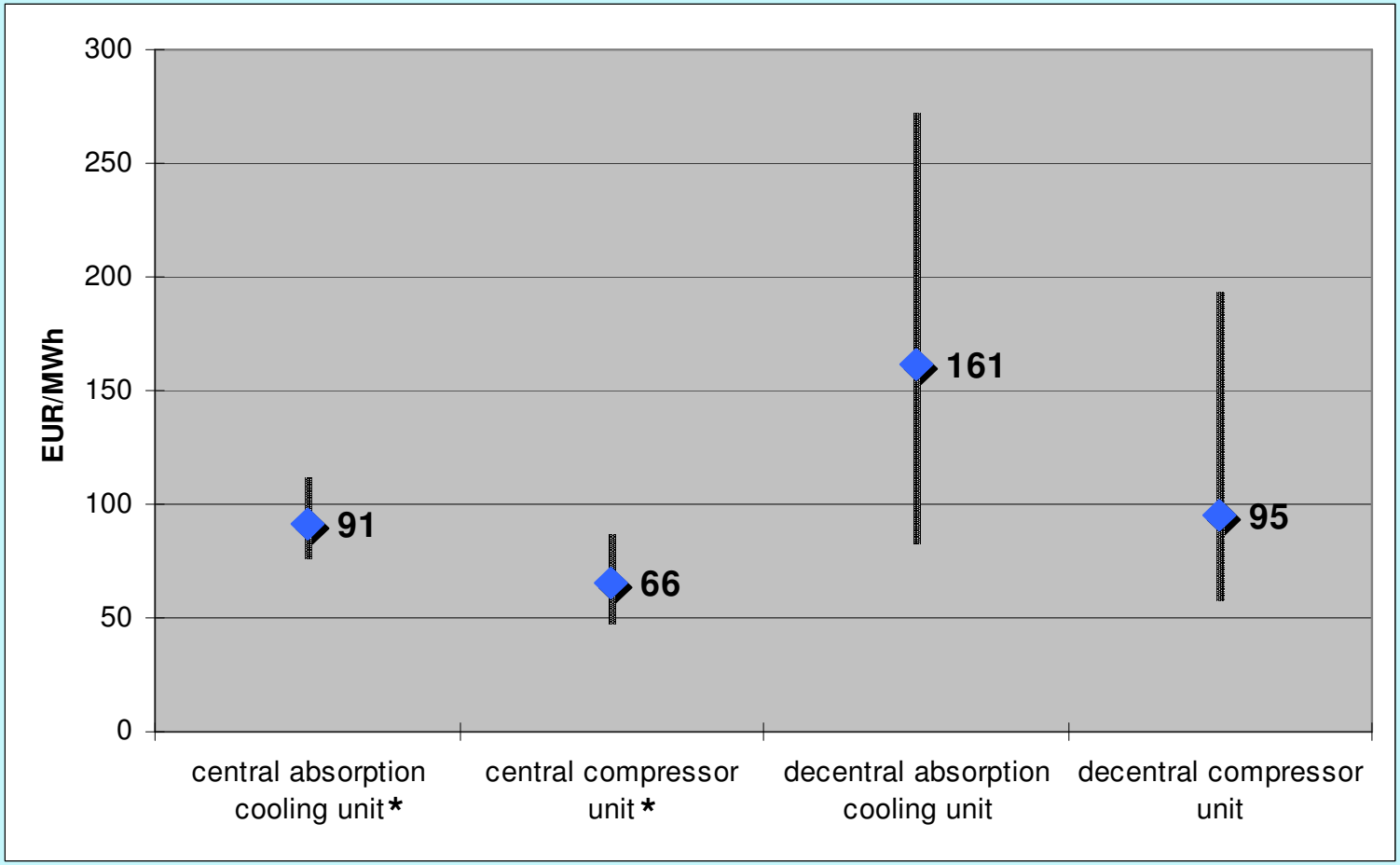
PRIMARY RESOURCE FACTORS



g $CO2_e$ / kWh


Central absorption vs. decentral compression
Central Absorption
Decentral Compression
g CO2e/kWh
350
300
250
200
150
100
50
0
25
96
35
240
127
294
215
240
Vienna
Copenhagen
Prague
Warsaw

PRODUCTION COSTS



* excluding network construction costs

CHALLENGES FOR DC

- **DC using waste heat *saves primary energy* but has to compete with compression chillers which have:**
  - **lower cold production costs**
  - **no additional network construction costs in decentral applications**

- **DC in general has:**
  - **long amortisation rates**
  - **low IRR**

BENEFITS FOR CUSTOMERS AND CITIES

For the city:

- **Less Electrical consumption (-30%)**
- **Less frigorific gases leakage (-25%)**
- **Less Total Equivalent Warming Impact (-30%)**
- **Less Water consumption (-65%)**
- **No local temperature increase (‘heat island’)**

BENEFITS FOR CUSTOMERS

- No performance degradation
- No on-site machinery
- All operations outsourced to specialists
- Reliable supply
- Possibility to increase easily the installed power
- Reduce noise for customers and neighbors
- Reduce the electrical consumption of the building
- Enhanced aesthetics - especially on historical buildings