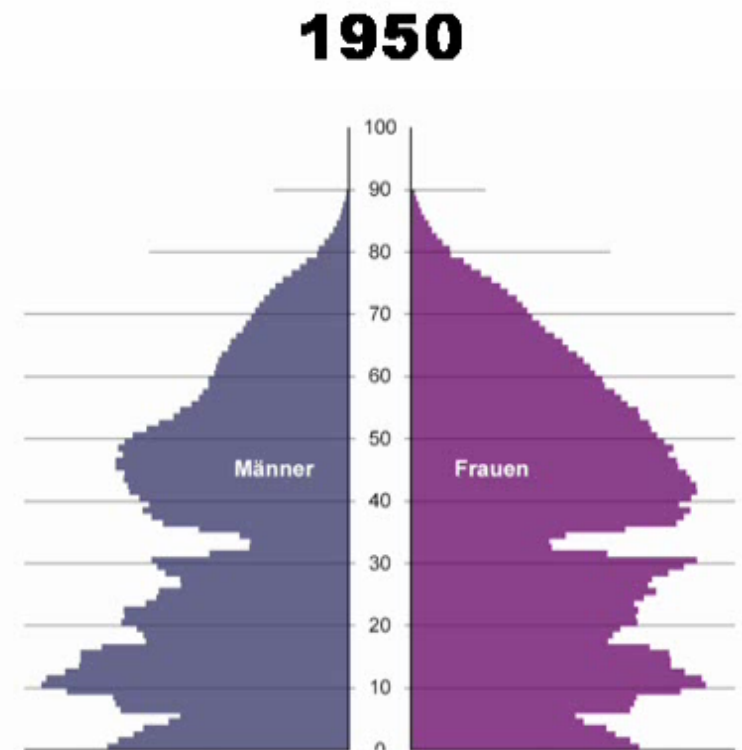# The effect of age on residential energy demand

Matthias Deutsch (Prognos AG), Philip Timpe (Dortmund University of Technology)
eceee 2013 Summer Study, Belambra Presqu'île de Giens
7 June 2013

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- Long term investments in energy infrastructure

- Technical infrastructure is capital-intensive and lack flexibility

- Particularly determined by demographic and socio-economic developments

- In the past, energy infrastructure was planned for a growing population

- Corresponding to most EU Member States demographic change brings out a shrinking and ageing population

1950

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Shrinking population

- 30% of the overall energy consumption is on the residential sector

- Decline in population will influence residential energy demand

- Decline in population = Shrinking number of energy consumers

Demographic ageing

- Households are an inhomogeneous group and differ during their lifecycle regarding socio-demographic issues

- The consumer behaviour of different age groups varies during their life cycle

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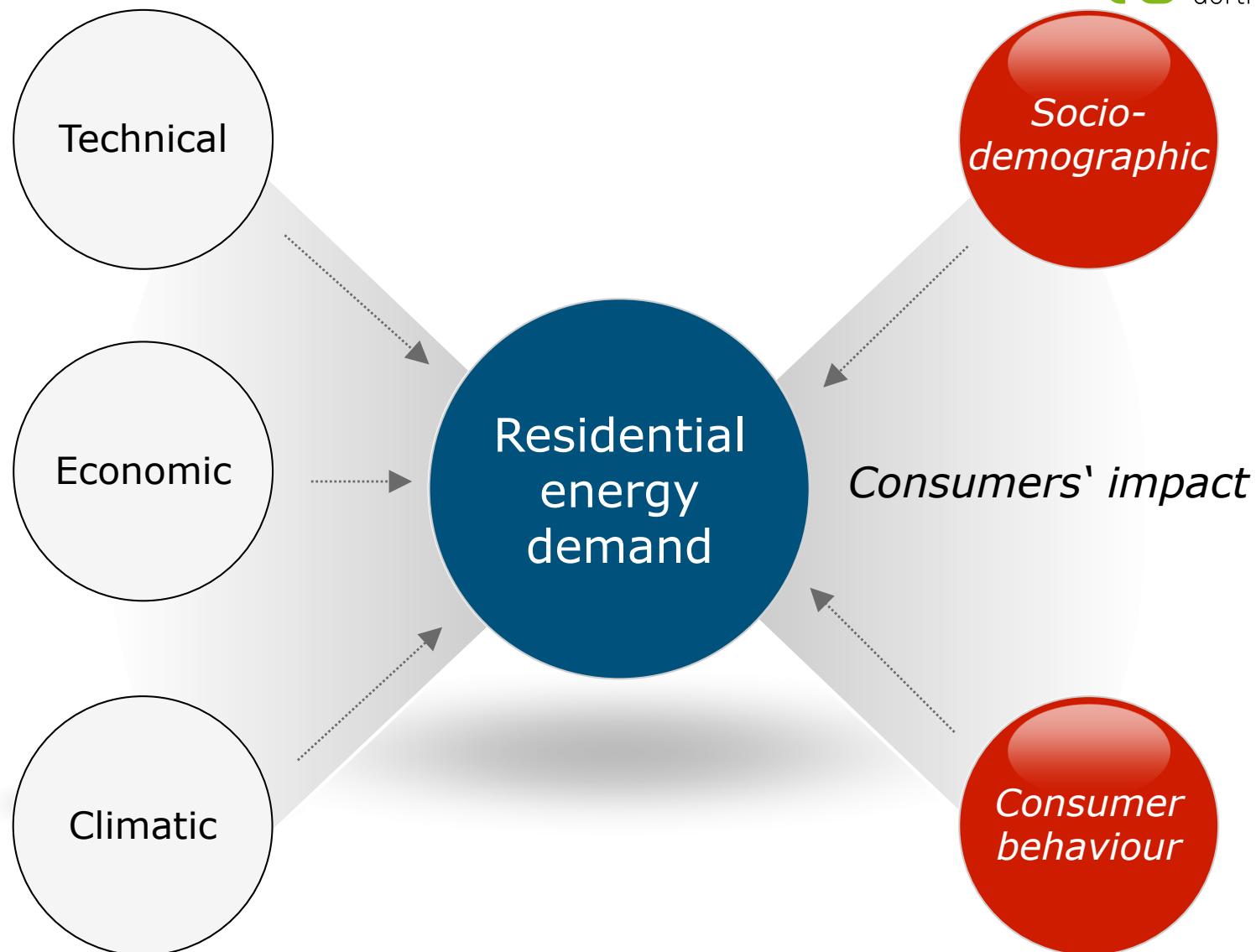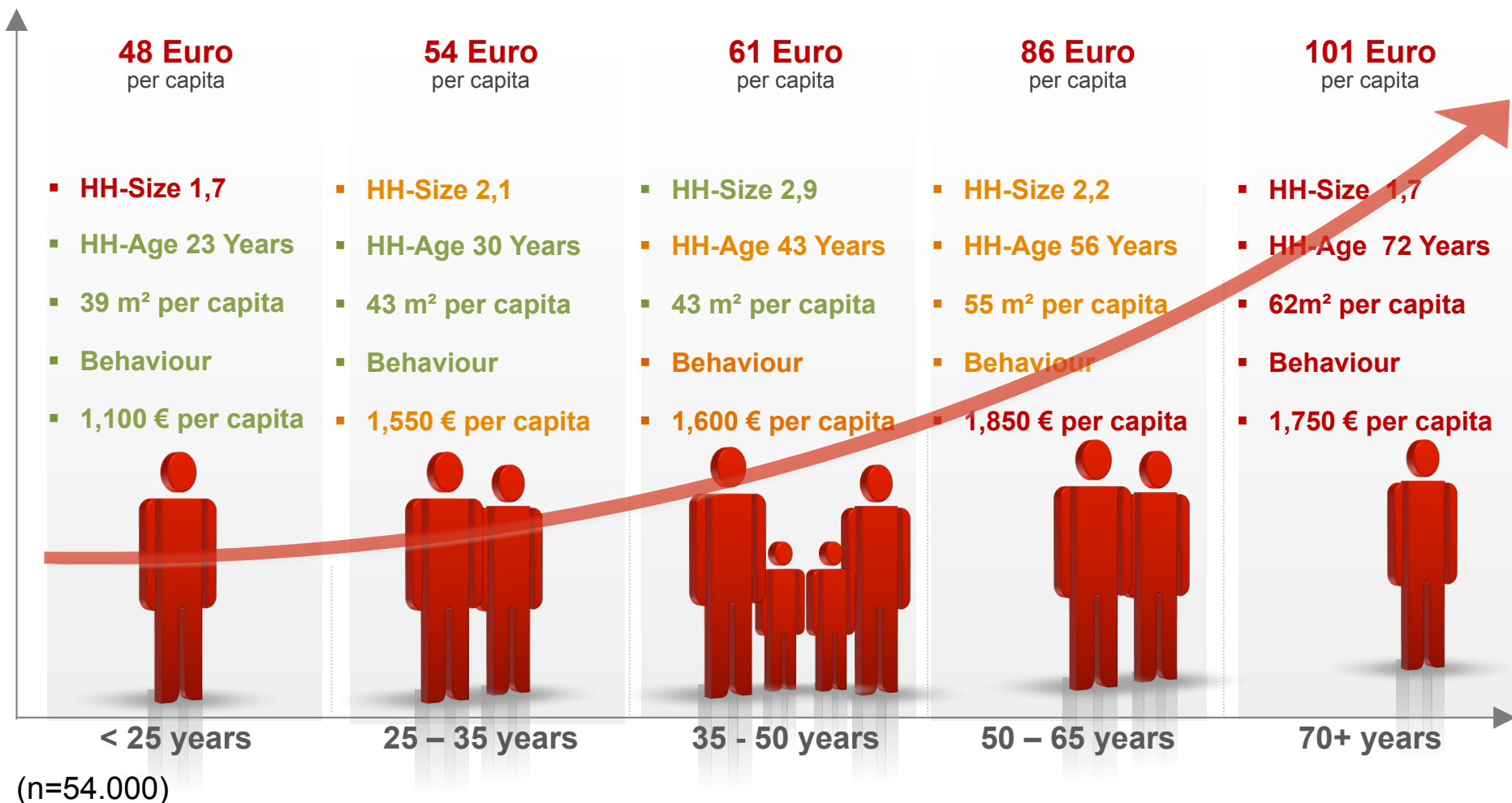
„Do households with younger members demand more or less energy than those consisting of older members?"

Source: Oldify, available for iPhone

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Technical

Economic

Climatic

Residential energy demand

Socio-demographic

Consumer behaviour

Consumers' impact

Summary

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48 Euro per capita	54 Euro per capita	61 Euro per capita	86 Euro per capita	101 Euro per capita
▪ HH-Size 1,7	▪ HH-Size 2,1	▪ HH-Size 2,9	▪ HH-Size 2,2	▪ HH-Size 1,7
▪ HH-Age 23 Years	▪ HH-Age 30 Years	▪ HH-Age 43 Years	▪ HH-Age 56 Years	▪ HH-Age 72 Years
▪ 39 m² per capita	▪ 43 m² per capita	▪ 43 m² per capita	▪ 55 m² per capita	▪ 62m² per capita
▪ Behaviour	▪ Behaviour	▪ Behaviour	▪ Behaviour	▪ Behaviour
▪ 1,100 € per capita	▪ 1,550 € per capita	▪ 1,600 € per capita	▪ 1,850 € per capita	▪ 1,750 € per capita
< 25 years	25 – 35 years	35 - 50 years	50 – 65 years	70+ years

(n=54.000)

Influence on residential energy demand: ■ **Pull-factor** ■ **average** ■ **Push-factor**

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Data sources

- Energy consumption: housing companies and municipal public utilities

- Housing characteristics: housing companies and private owners

- Socio-demographics: registration offices

The challenge

- Registers contain: a person's name, address, move-in date, spouse, children etc.

- But they do **not** contain: the exact apartment within a multi-family house in which an individual resides
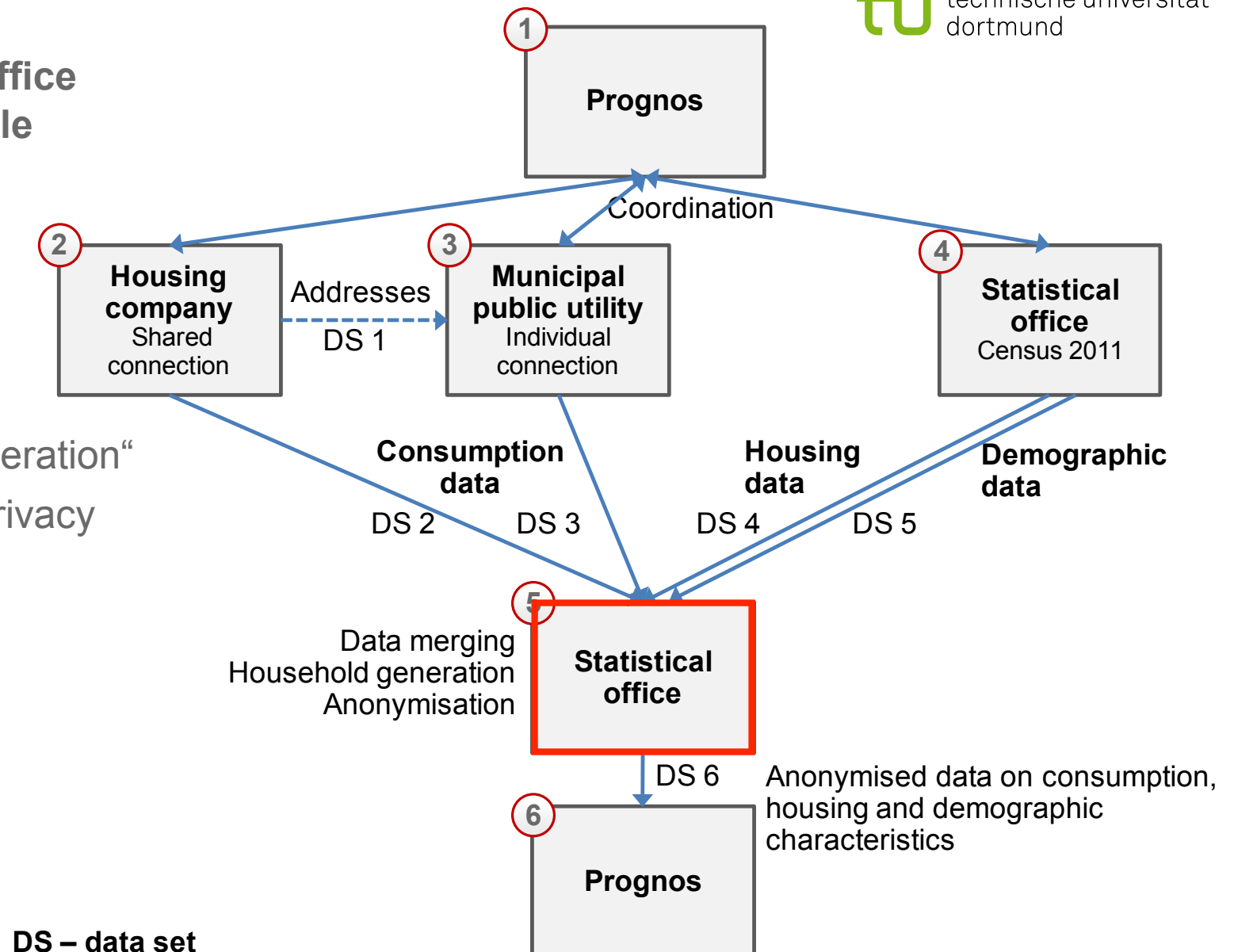

Source: :adapted from www.zensus2011.de

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The statistical office plays a major role

- It contributes census data
- It applies its procedure for „household generation"
- It guarantees privacy protection

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Coordination

② **Housing company**
Shared connection

Addresses
DS 1

③ **Municipal public utility**
Individual connection

④ **Statistical office**
Census 2011

Consumption data

Housing data

Demographic data

DS 2   DS 3   DS 4   DS 5

Data merging
Household generation
Anonymisation

⑤ **Statistical office**

DS 6   Anonymised data on consumption, housing and demographic characteristics

⑥ **Prognos**

DS – data set

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Demography matters for infrastructure planning

- EU median age is projected to rise from 41 years (2009) to 48 years (2060)

Analyzing households may be difficult

- Key challenge in Germany: registration offices cannot deliver complete data on households that live together in the same apartment

Statistical offices can be more than mere data providers

- They have superior abilities for data handling and – at the same time – can guarantee privacy protection at the highest level possible.

Thank you very much for your attention!

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Interactions between energy consumption and demographic change
(available in German: „*Wechselwirkungen von Energieverbrauch und demografischem Wandel*")

http://www.ub.tu-dortmund.de/katalog/titel/1356116

WECHSELWIRKUNGEN VON ENERGIEVERBRAUCH UND DEMOGRAFISCHEM WANDEL

EINE RÄUMLICH DIFFERENZIERTE BEWERTUNG SOZIO-DEMOGRAFISCHER EINFLUSSGRÖSSEN AUF DIE ZUKÜNFTIGEN ENERGIEAUSGABEN DER PRIVATEN HAUSHALTE IN DEN STADT- UND LANDKREISEN

GUTACHTERINNEN

UNIV.-PROF. DR. HANS-PETER TIETZ
FACHGEBIET VER- UND ENTSORGUNGSSYSTEME

DR. ANDREA RÜDIGER
FACHGEBIET STADT- UND REGIONALPLANUNG

VERFASSER

PHILIP TIMPE
MÄRZ 2012