ECN

Energy research Centre of the Netherlands

Towards a better explanation of electricity savings in households

P. Vethman (ECN)

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Energy using products (EuP) policy

Need for monitoring & evaluation of policy impacts

Important issue: improve understanding of electricity savings

ECN: energy research for policy analysis and support

Introduction

ECN research on energy using products:

Energy modelling: e.g. decomposition analysis (Boonekamp, 2005)

National: e.g. Protocol Monitoring Energy savings (PME)

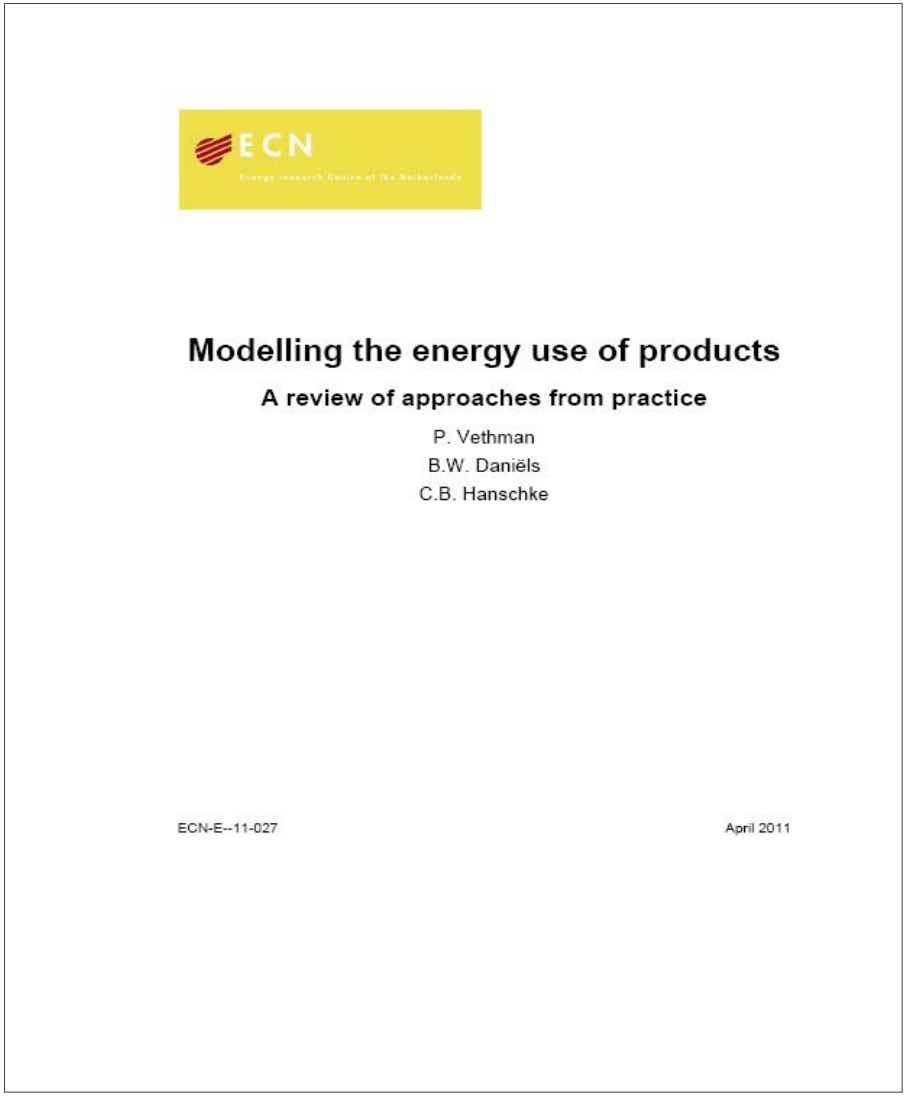
International: e.g. IEE Odyssee research project

Introduction

Review study:

'Modelling the energy use of products' (2011)

- Forthcoming -

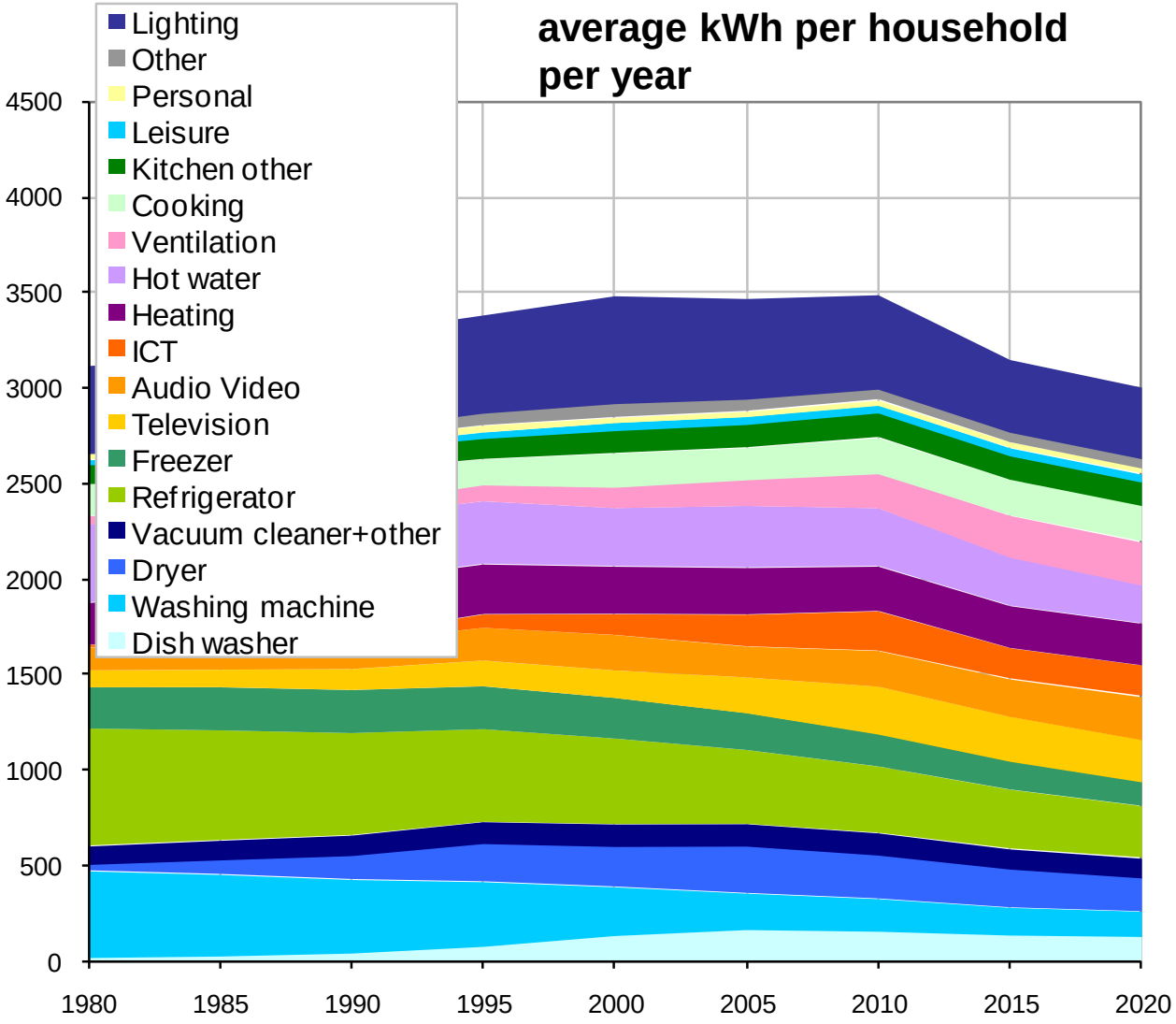


Electricity savings in households: NL example

Modelling approach used in NL: EVA model

Model name	**EVA: "ElektriciteitsVerbruik Apparaten"**
Model owner	**Energy research Centre of the Netherlands (ECN)**
Main clients	**Government (national, foreign, EU)**
General description	**Bottom up-, technology based-, stock-, accounting-model Very detailed: 172 appliances in 19 product groups Ex ante and ex post evaluation Part of modelling system (other ECN models)**
Main inputs	**Stock (sales, lifespan), usage rates, energy consumption per label type, specific factors**
Main outputs	**Electricity consumption, savings and potential Decomposition analysis Five scenarios**
Validation	**Calibration on historical data to achieve fit Consistency checks**

Electricity savings in households: NL example



Electricity consumption

Electricity savings in households: NL example

Yearly final electricity use (PJe/yr)

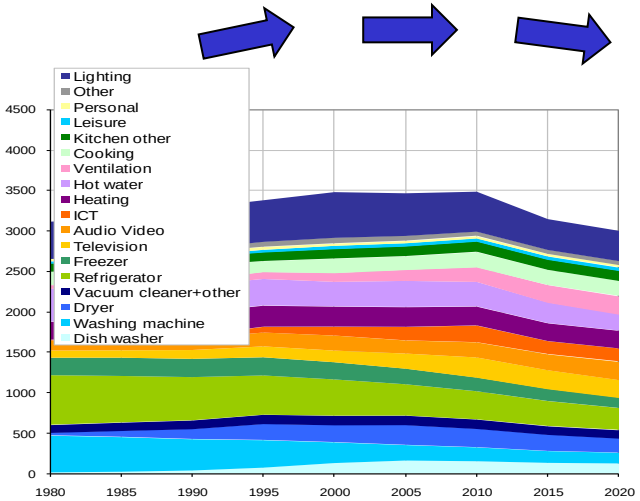
Year	Consumption *Bau*	Consumption *Mer/Lbl*	Policy savings	Policy savings %	*Additional potential*	*Additional potential %*
2010	87	87				
2015	91	83	8	9%	*15*	*16%*
2020	95	84	11	11%	*23*	*24%*

Electricity savings & potential

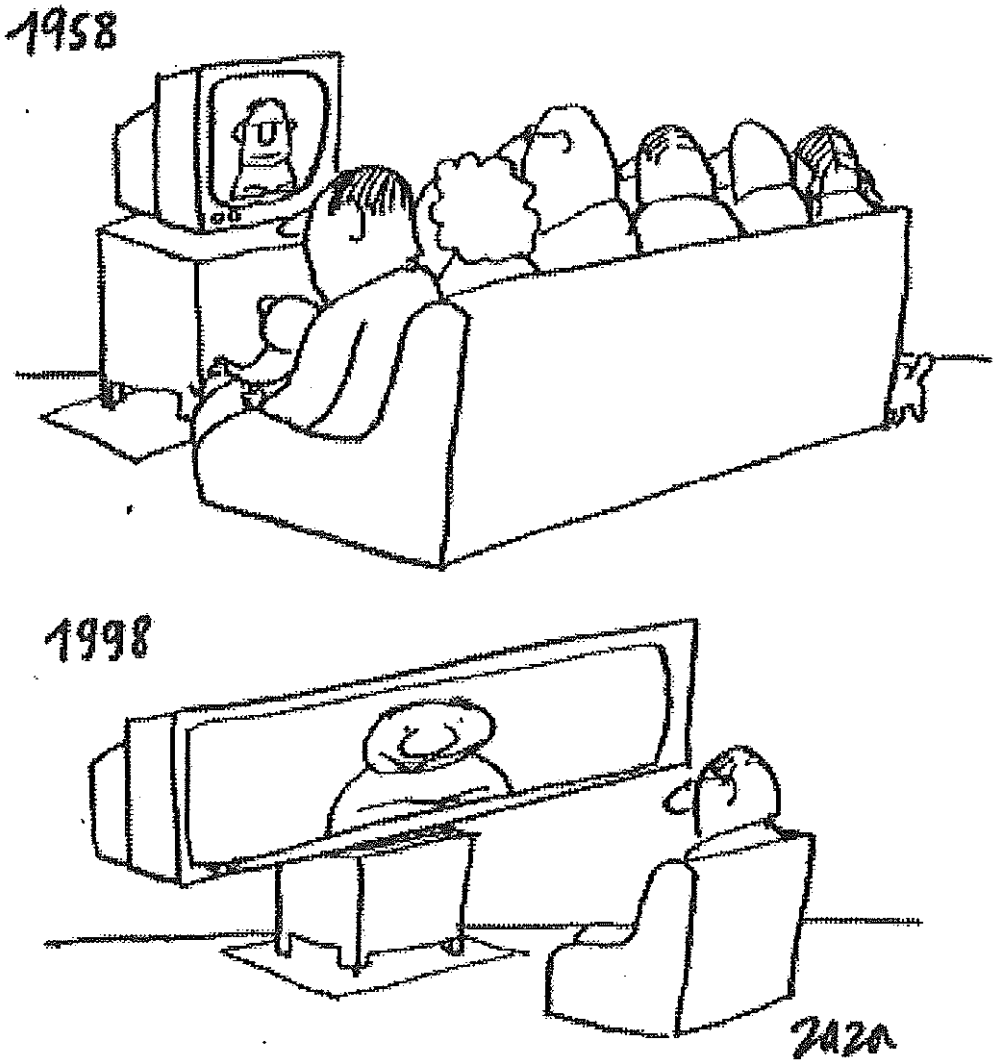
- around 1/3 of total potential to be realised by policy
- main impact from Eco-design (standards):
  on dish washer, washing machine, refrigerator, freezer, set-top box, lighting, television, standby use

Understanding electricity savings

Trend consumption:
clear



Drivers and actual savings:
less clear



Understanding electricity savings

1) Bottom up modelling

Literature and empirical findings:

Several modelling approaches and methods to evaluate savings

Bottom up modelling approach suitable for EuP policy analysis

- modelling individual products fits policy questions on product level
- strengths: detail, comprehensible
- limitations: data needs, explanation of economy and behaviour

Understanding electricity savings

2) Decomposition analysis

Change in electricity consumption over time:

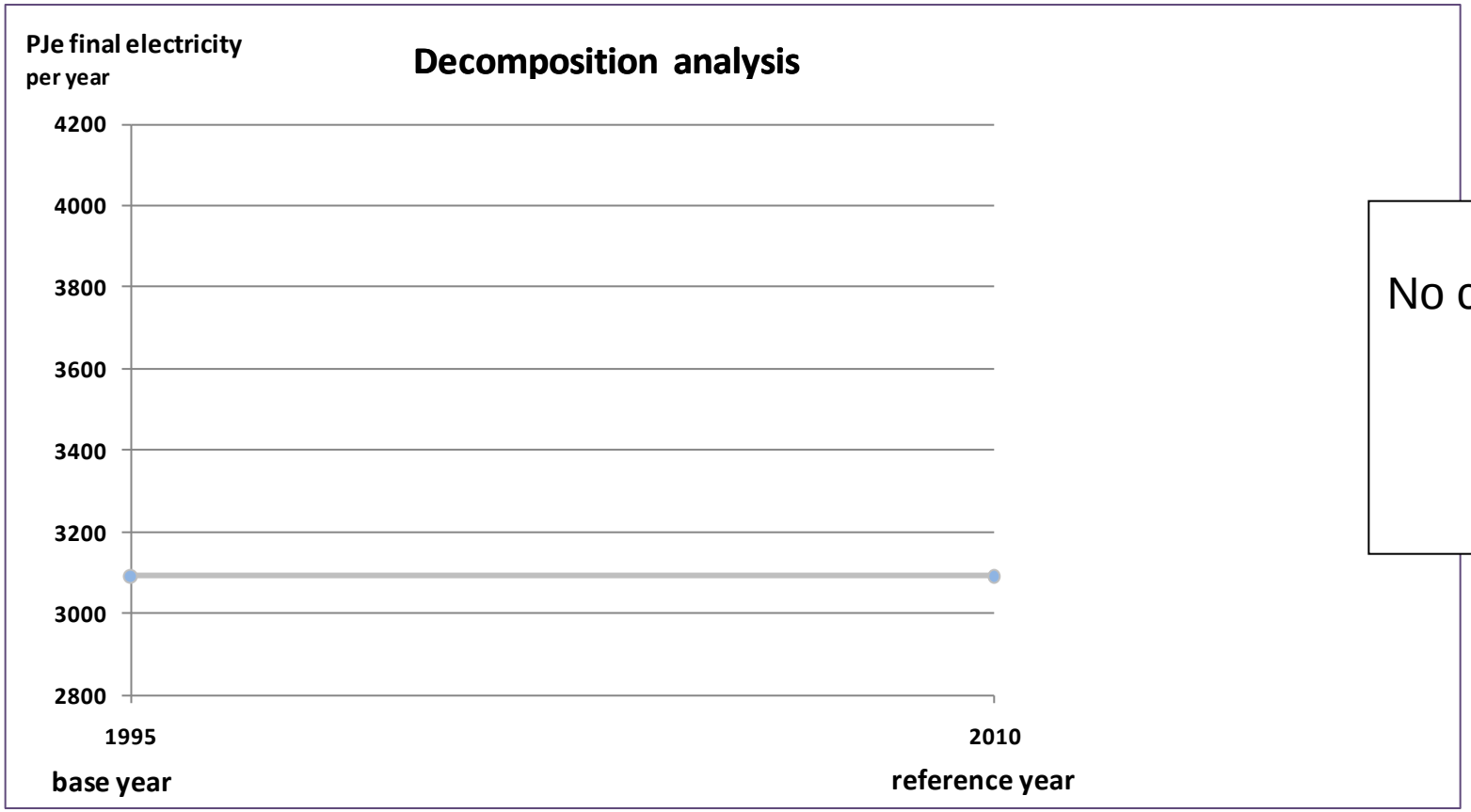
main components → *stock x usage x technical performance* (Δ)

Decomposition of the change in electricity consumption:

to quantify the contribution of components (“drivers”)

Understanding electricity savings

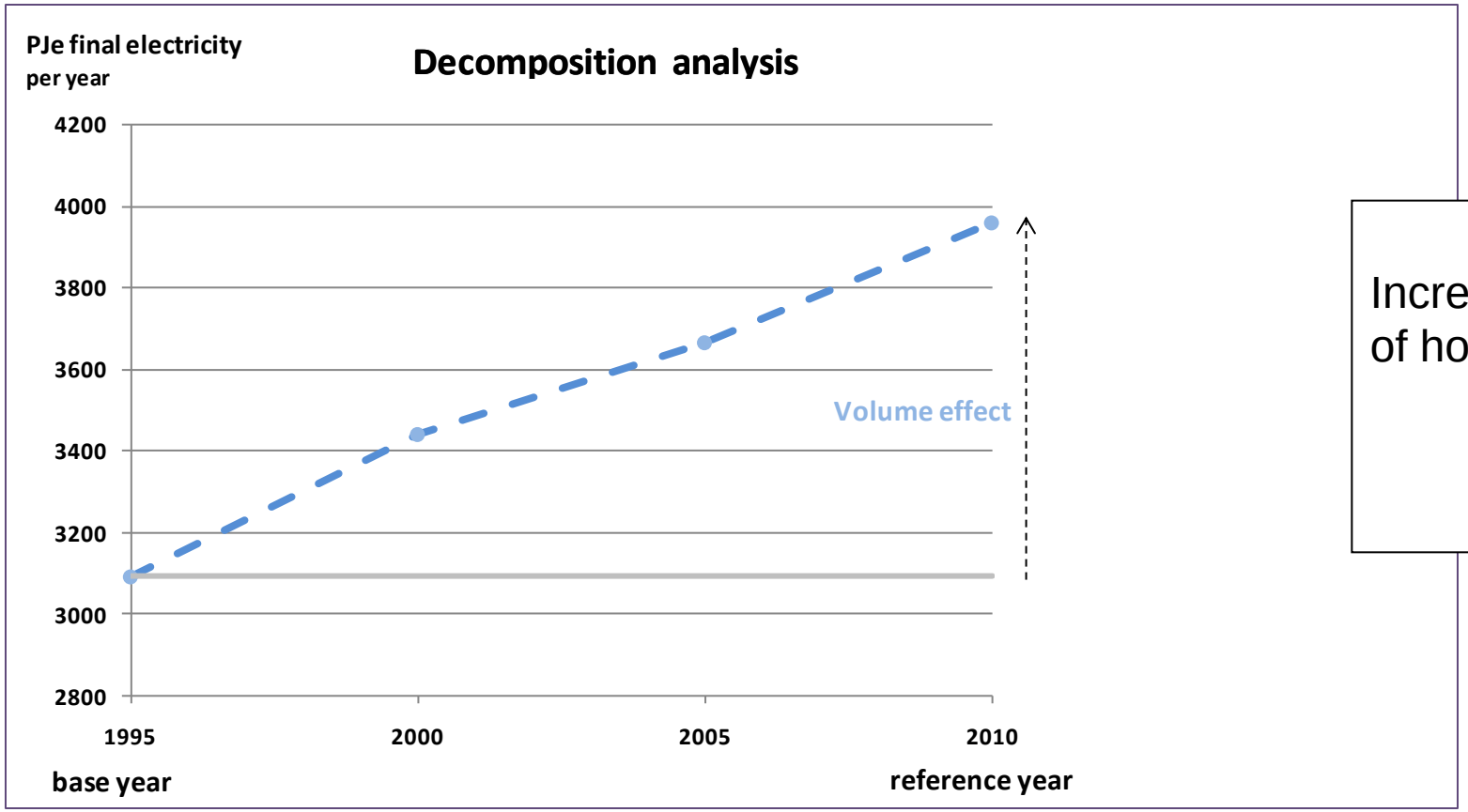
2) Decomposition analysis (ECN)



No change

Understanding electricity savings

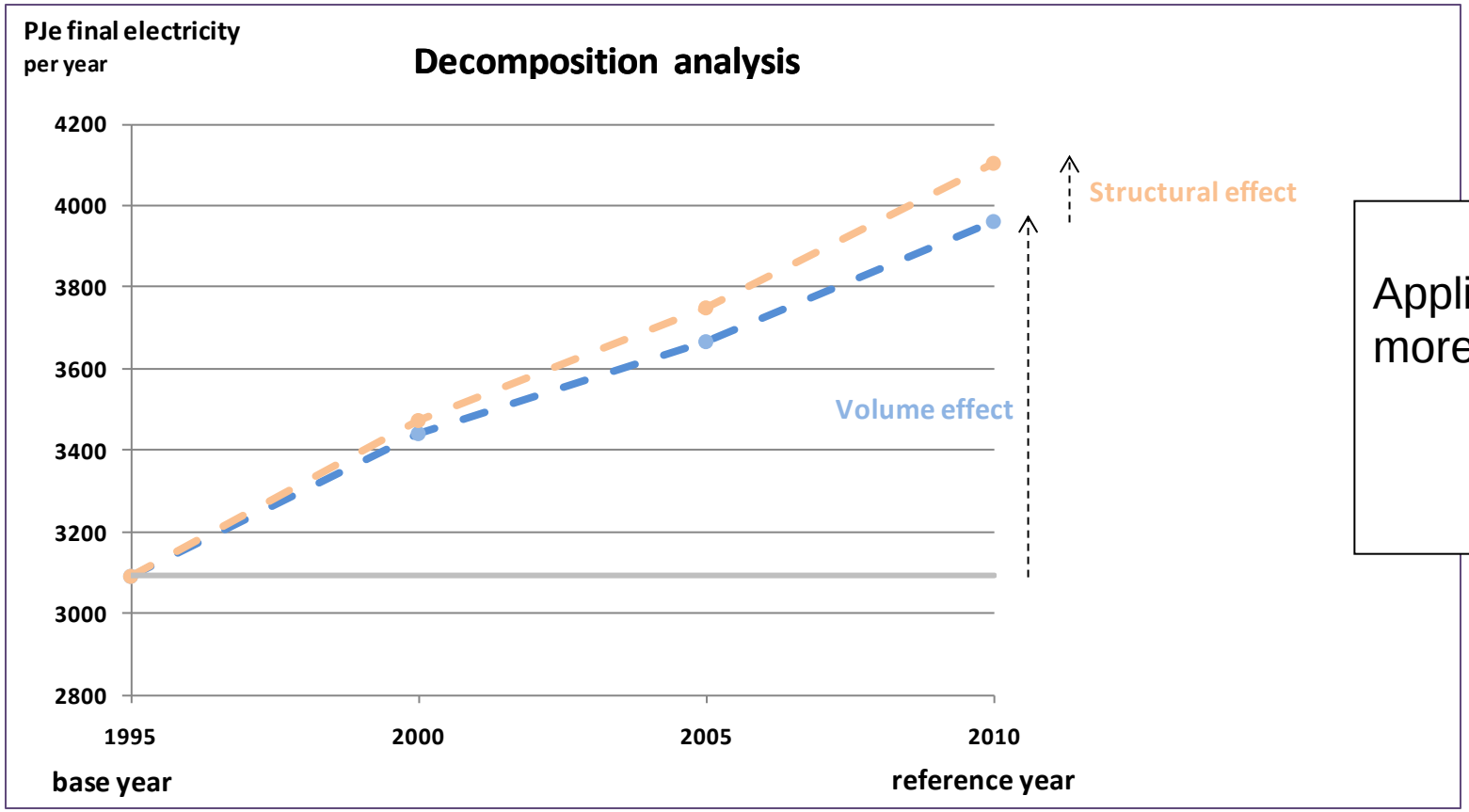
2) Decomposition analysis (ECN)



Increase of # of households

Understanding electricity savings

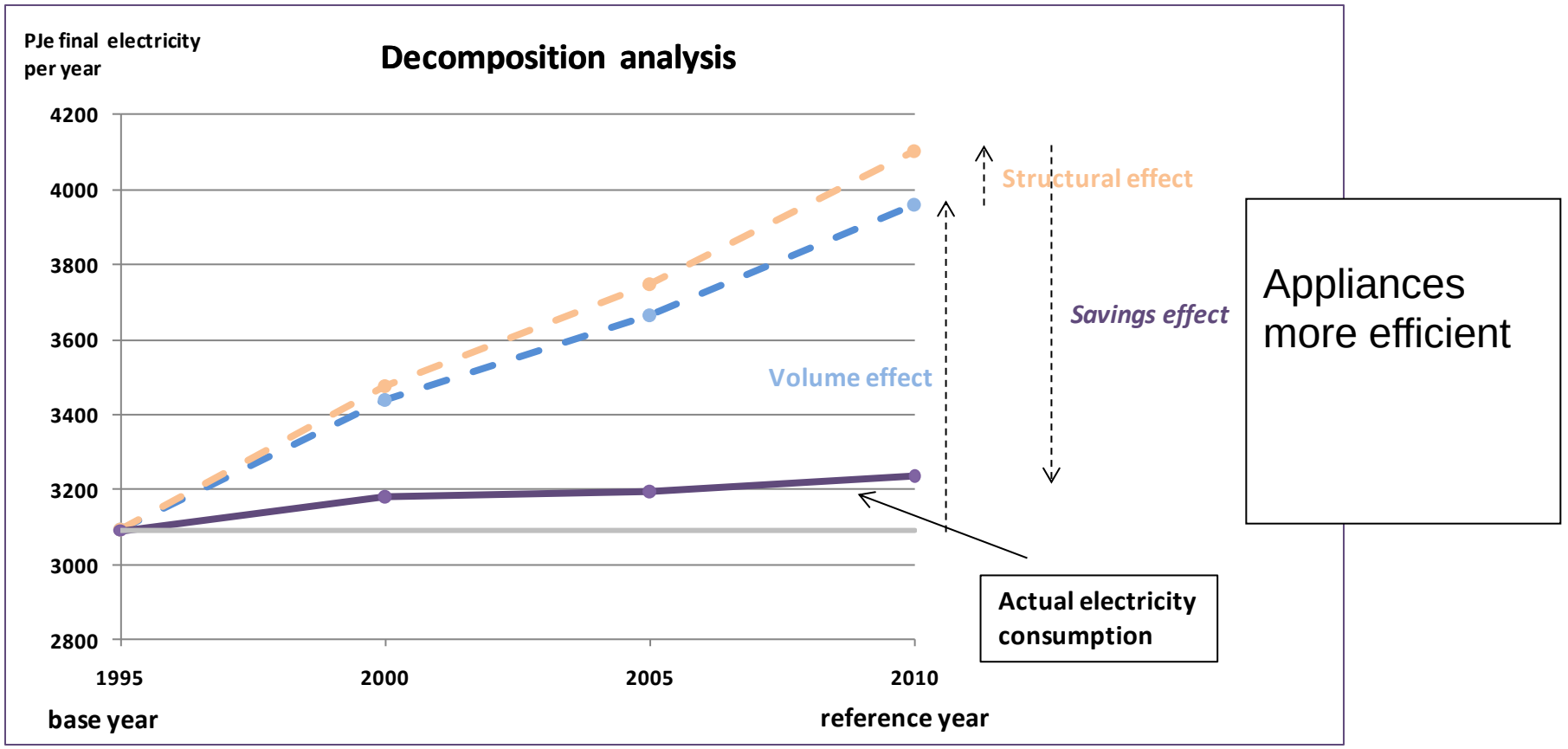
2) Decomposition analysis (ECN)



Appliances more used

Understanding electricity savings

2) Decomposition analysis (ECN)



Typical output: volume + structure + savings effects

Understanding electricity savings

2) Decomposition analysis

- shows where savings come from (usually technical efficiency)
- doesn't explain *why* savings arise (e.g. cause of technical efficiency)
- applied in ex-ante and (particularly) ex-post evaluations

Understanding electricity savings

3) Findings from modelling approaches across the world…

Savings evaluation by decomposition analysis: not common practice

Limited attention for ex post evaluation (e.g. past policies)

Common data problems:

- data is lacking or difficult to obtain
- lack of actual data: e.g. billing/metering data, measurements, audits
- selective, actual data can also be valuable

Conclusions

Way forward for a better understanding of electricity savings:

1) Bottom up modelling is suitable approach

2) Account for demography, economy, behaviour (link with 1)

3) Use better savings evaluation methods: e.g. decomposition analysis

4) Use better data sources: e.g. measurements, surveys

International coordination of practices, methods, data collection?

✓ Network of experts from ECN study

THANK YOU FOR YOUR ATTENTION !

Questions?