Energy intensity changes as a proxy for energy savings

Research as part of the Odyssee/MURE project

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Content

- Why use intensities as proxy for savings?
- Comparison of intensities and savings
- Fit per sector (The Netherlands)
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- Overview of suitable intensities as proxy for savings
- Conclusions

Savings from energy indicators

ECN

Odyssee project on energy indicators:

- Calculation of total savings in end-use sectors (from 1990 on, all EU countries)
- Total = autonomous and policy derived savings
- Indicators per targeted energy use (average gas use per dwelling or energy use per ton of steel)
- Set of indicators > aggregated ODEX > savings per sector/national
- Deliverables: total saving figures up to Year-2

Sectoral intensities

ECN

Intensity = energy consumption per driver-unit

Examples driver-units:
- Households: number of people or households
- Industry: Value added (VA) or production (PV)
- Services: value added (VA) or employees
- Transport: GDP, activity (pkm/tkm) or equivalent car
- National: GDP or capita

Example of sectoral intensities: industry ▰ ECN
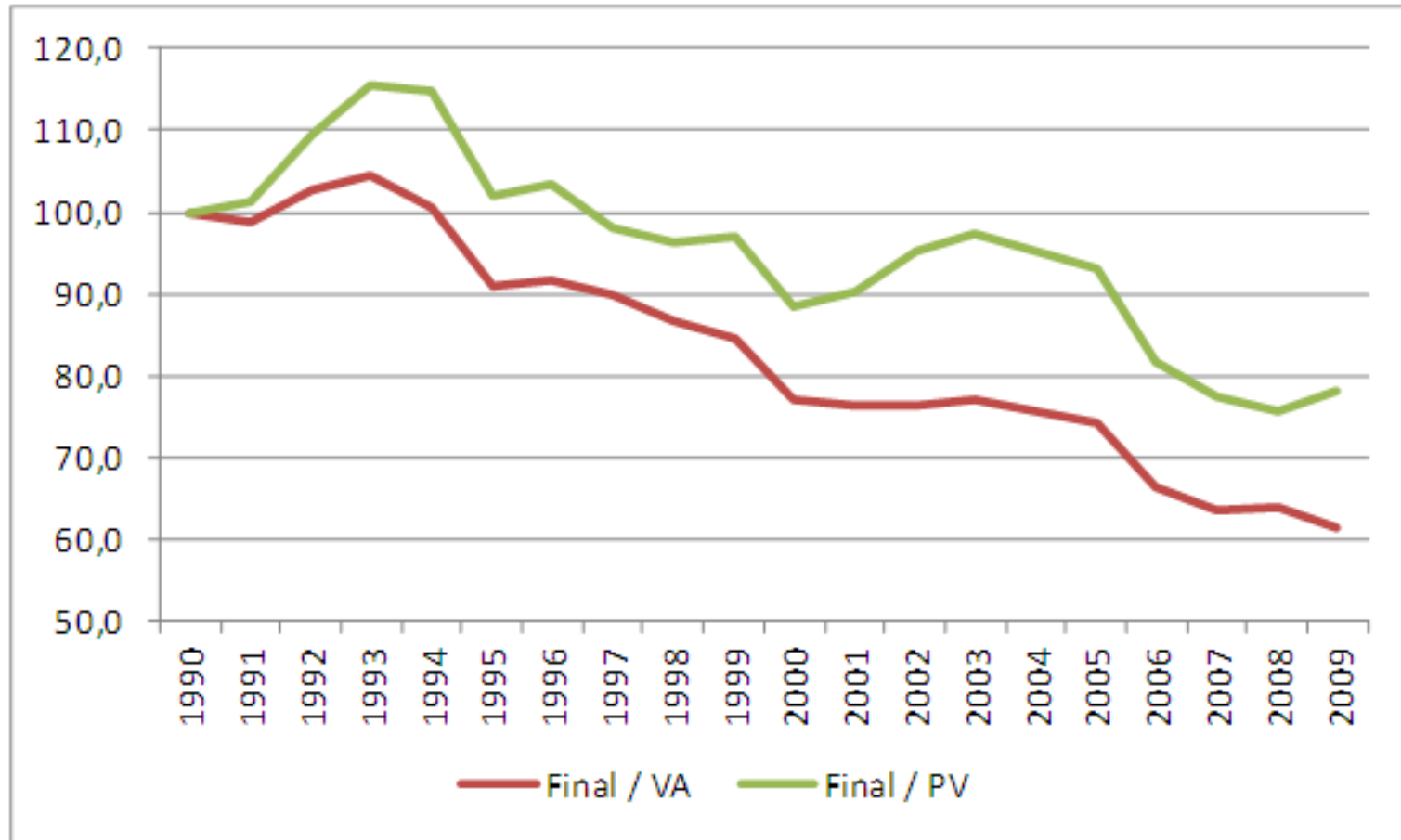
Sectoral intensities and savings

Advantages of using sectoral intensities:

- Data for driver-units readily available, compared to detailed savings indicators (from Odyssee database)
- Comparison possible with aggregated ODEX-savings per sector

Assumption:

- Logical relation with savings: more savings > lower intensity
- Year-to-year change for intensity > proxy for savings

Comparison

Comparison of intensities and savings

ECN

For Households, Industry, Transport and National:

- Yearly savings represented by ODEX indices sector/national

- Various intensities calculated per sector/national

- Year-to-year changes for intensity and ODEX compared > changes in same direction > fit !

- Number of yearly fits (for 1991-2009) > quality of intensity as proxy for development of savings

Example: savings / intensity Households ECN
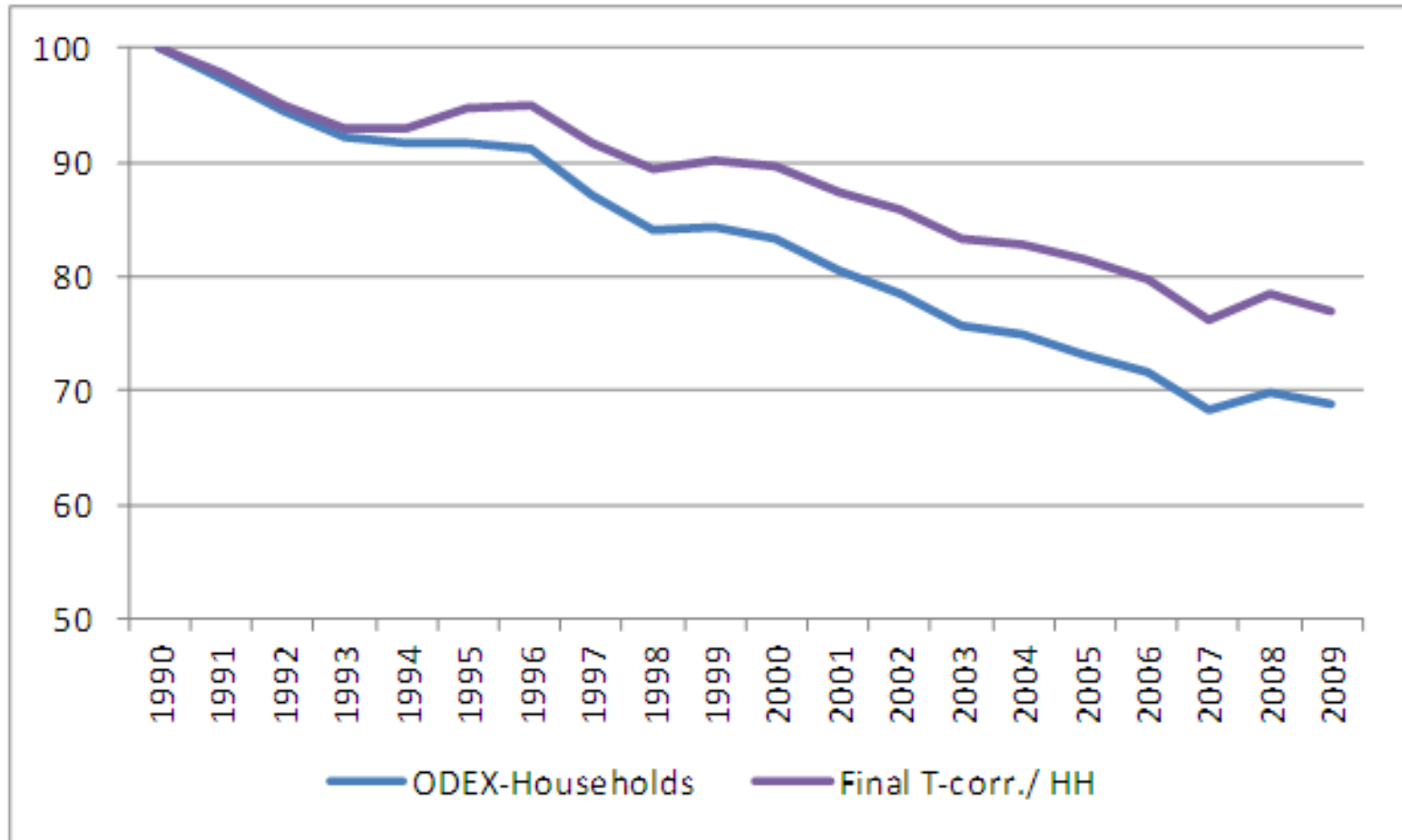
Fit for NL

Fit of intensities and savings Households ECN

	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09
Intensities																			
Capita	x	x	x				x	x	x	x	x	x	x	x	x	x	x	x	x
Household	x	x	x				x	x	x	x	x	x	x	x	x	x	x	x	x

Fit of intensities and savings Industry   ECN

	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09
Intensities																			
PV	x	x	x	x	x	x	x		x	x	x	x		x	x	x	x	x	x
VA		x	x	x	x	x	x			x		x		x	x	x	x		

Fit of intensities and savings Transport ECN

	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09
Intensities																			
GDP				x	x	x	x	x	x	x	x	x							
Trsp-activ.				x	x	x	x	x				x	x	x	x	x	x	x	
Equiv.car	x	x	x		x		x	x	x	x	x		x	x	x	x			x

Fit for other countries

Comparison for selected countries

Countries:

- Germany
- France
- Netherlands

Comparison for chosen standard intensity:

- Households: energy consumption per household
- Industry: energy consumption per unit of production volume (PV)
- Transport: energy use per unit of transport performance (person-km/tonne-km)
- National: energy consumption per Euro of GDP

Fit of intensities and savings Germany

	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09
National	x	x		x		x	x	x	x	x		x	x	x	x	x	x	x	-
Households	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x
Industry	x	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x	-
Transport			x	x			x	x		x	x	x	x	x	x	x	x	x	

Fit of intensities and savings France

	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09
National				x	x		x	x	x	x	x		x	x	x	x	x		-
Households	x	x	x	x	x	x	x	x		x		x	x	x	x	x	x	x	
Industry			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Transport	x		x	x	x	x	x	x	x	x			x	x		x	x	x	

Overall scores for intensities

Scores on fit for sectors and countries

	France	Germany	The Netherlands
National level (GDP)	67%	89%	74%
Households (HH)	68%	95%	84%
Industry (PV)	84%	89%	89%
Transport (activities)	74%	72%	63%

Acceptable alternative intensities

	France	Germany	The Netherlands
(standard intensities)			
National level (GDP)	x	Capita	x
Households (HH)	Capita	Capita	Capita
Industry (PV)	VA	VA	VA?
Transport (activities)	GDP	GDP / Equiv.car	Equiv.car

Quantification of fit

Quantification method

NO regression analysis

Calculation of ratio between change in ODEX and intensity change

Only ratios or year-to-year changes with fit

Average ratio used to calculate estimated savings from known intensity change (for most recent years)

Conclusions on the use of intensities

Standard intensities can be used for estimating recent savings in all sectors/countries

For households and transport the score is sometimes <80%, at national level the score is often <80%

Alternative intensities to be applied (score > 66%):

– For Households per capita energy consumption

– For Transport sometimes GDP, sometimes equivalent car

– For Industry VA in most cases

– At national level no useful alternative (per capita)

Dank voor uw aandacht

Deze presentatie werd samengesteld in nauwe samenwerking met:

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