

## 6. Examples of top down methods: Modal shift for transport of goods

evaluate  
energy savings<sup>EU</sup>

**ADEME**

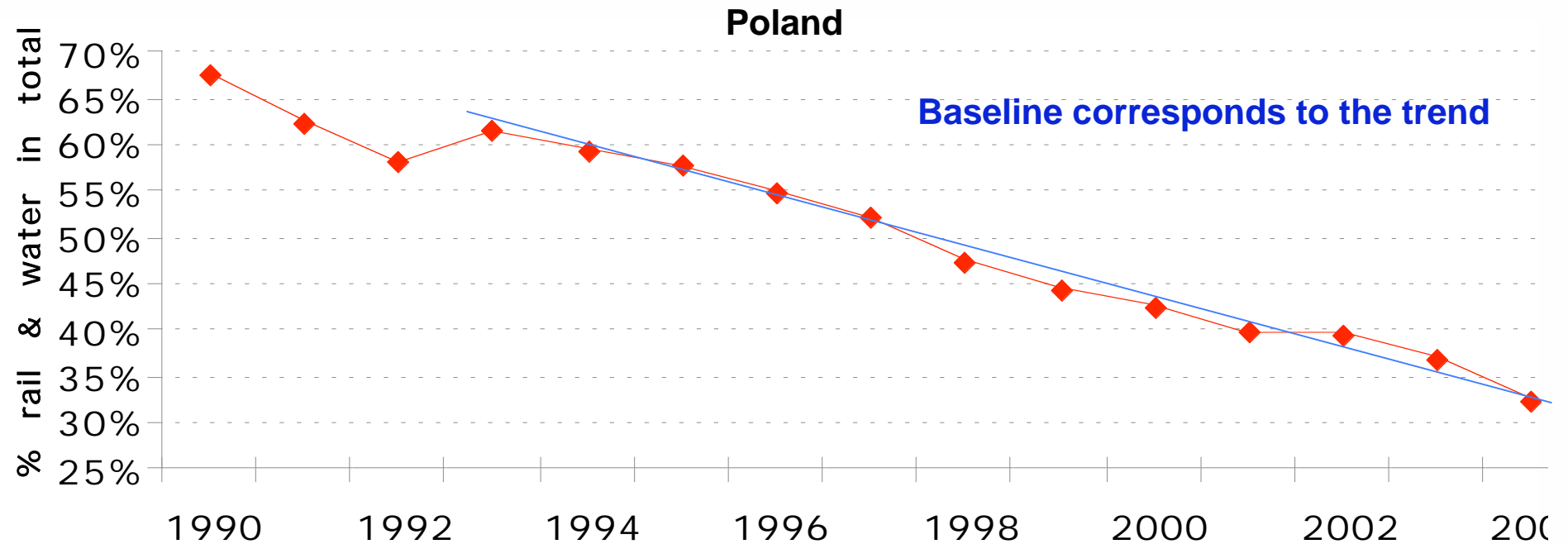


## Top-down estimation of energy savings for modal shift

- Indicator used to measure energy savings: share of rail and water (non road transport).
  - Change in modal shift can be generally explained by the following variables:
    - Autonomous trend
    - Cost difference by mode
    - Facilitating measures to promote modal shift (After / before 1995)
    - Other transport measures (relative investment in road/rail/water infrastructure)
- } **Defines the baseline**
- In practice, taking into account the data usually available, modal shift in the absence of policy measures (baseline) can be modelled with two main variables :
    - Time to capture the autonomous trend
    - Average diesel price, as a proxy to measure change in relative costs
  - Different situations among EU countries as to the trend in the share of rail and water transport for goods (see following typical cases)

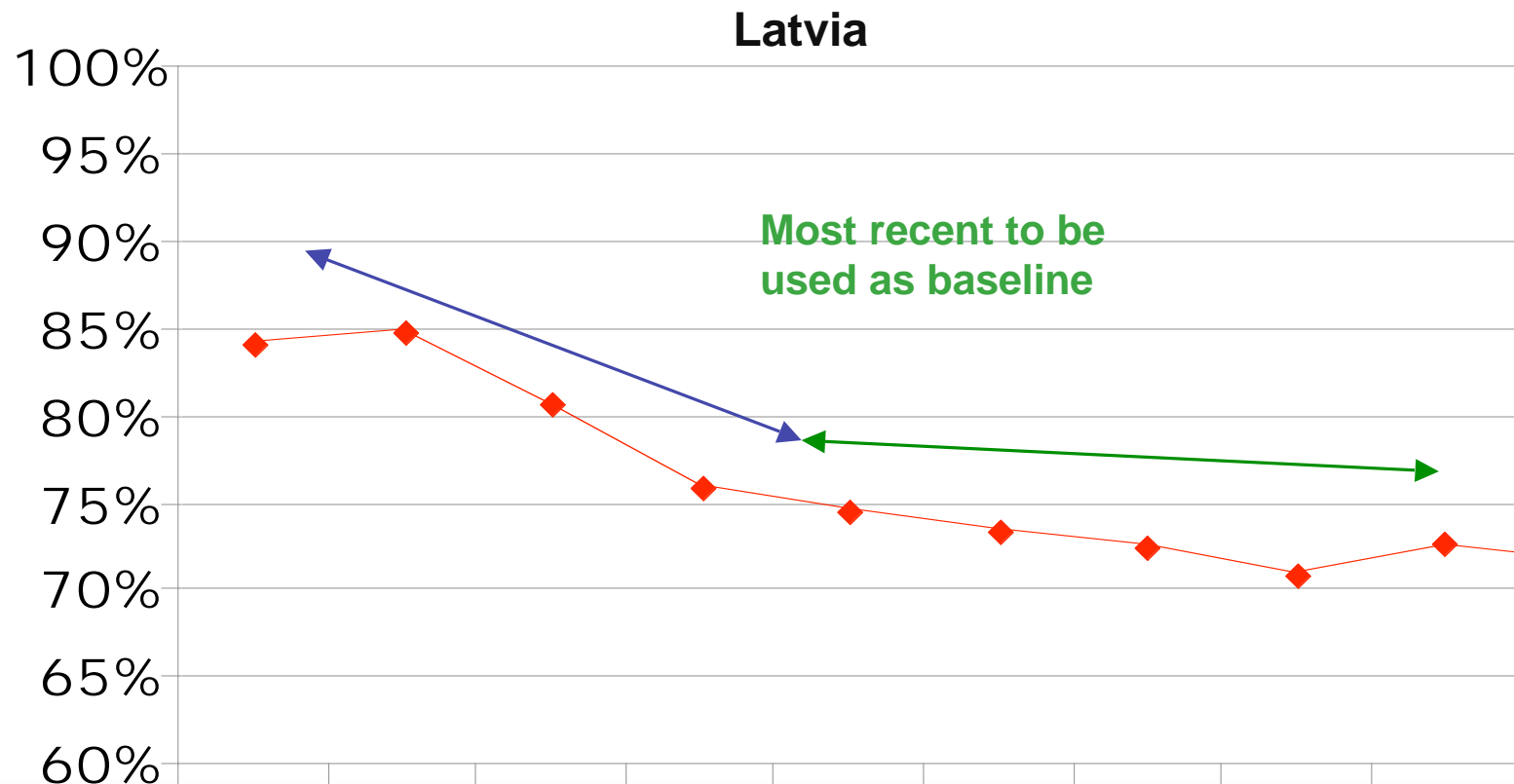
# Case of a regular market share reduction for rail and water transport

## Share of railways and inland waterway in transport of goods (%)



# Case of a slow down of the market share of rail & water

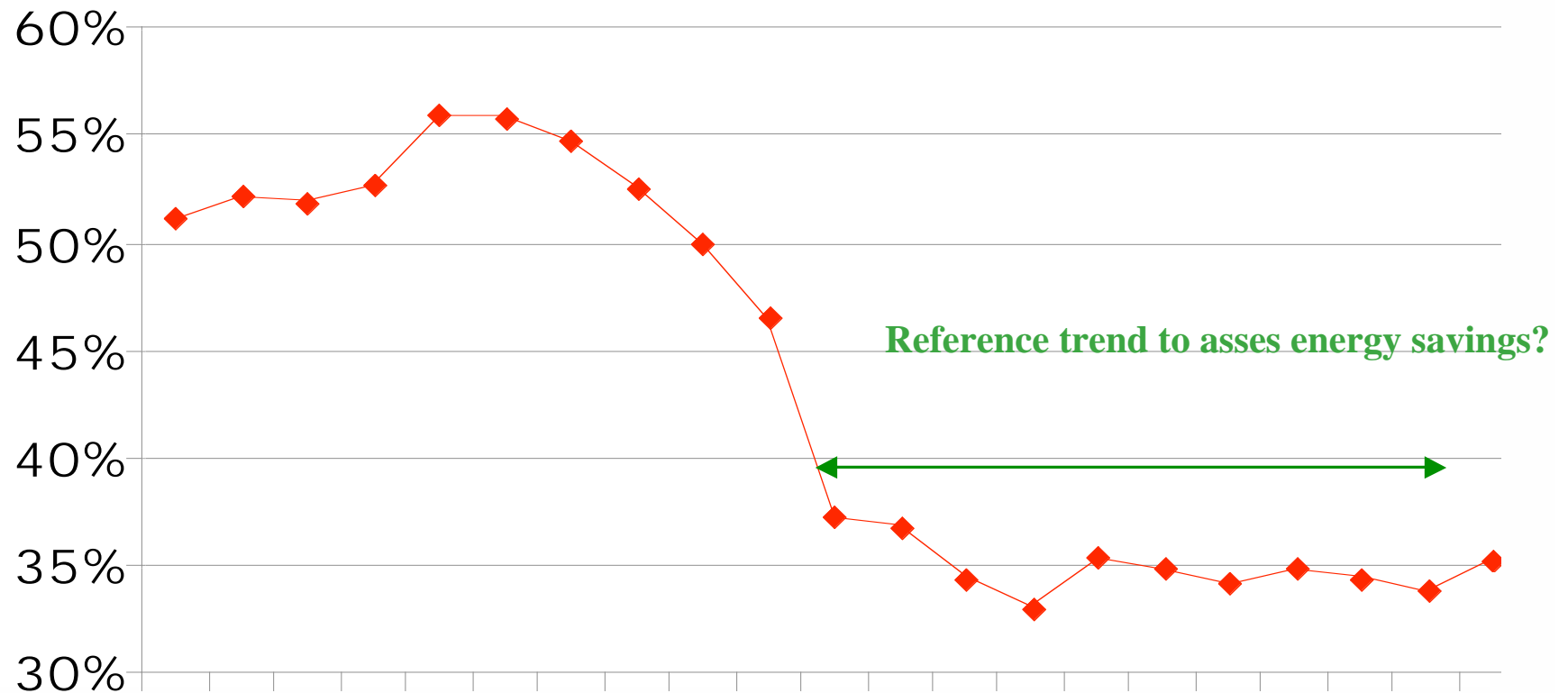
Share of railways and inland waterway in transport of goods (%)



# Case of a stabilisation of the market share share of rail & water

Share of railways and inland waterway in transport of goods (%)

Austria

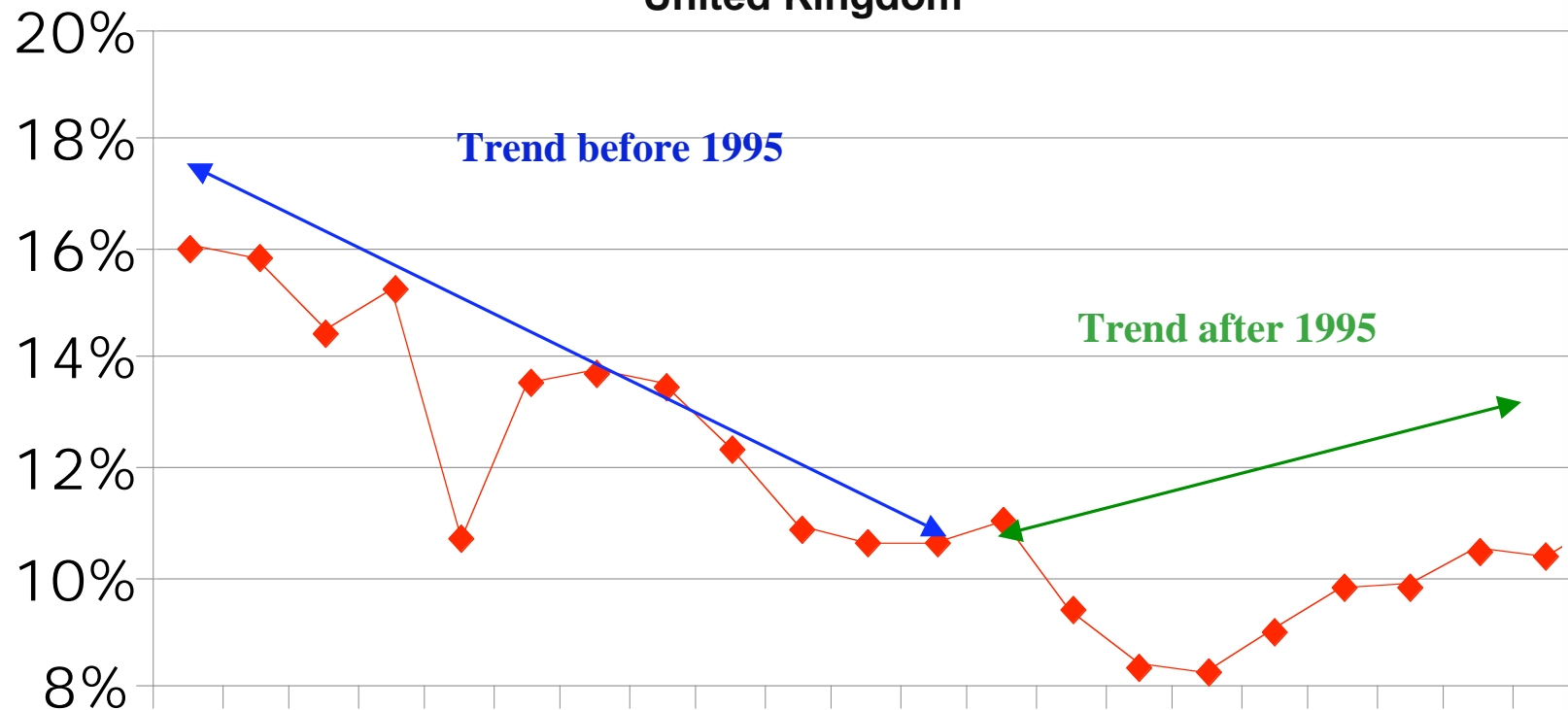


## Case of an increase of the market share of rail & water

- Why this trend inflexion? No link to price as same price increase in the other countries. No specific measure. What trend to take to assess savings?

### Share of railways and inland waterway in transport of goods (%)

#### United Kingdom



# Modelling of the baseline modal shift for transport of goods

- Modelling of the share of non road traffic through regression analysis with two variables:
  - Time to capture an autonomous trend
  - Average diesel price used to capture price differential

$$\text{Ln (WRS)} = T \times t + A \times \text{Ln (P)} + K$$

- ✓ T: trend
- ✓ A: price elasticity (>0 )
- ✓ P: diesel price

- Price elasticity calculated from regression not significant for most countries (e.g. <0 despite an important increase of diesel prices)
- It is proposed to use an **exogenous** and **asymetric** price elasticity, with a lag of 3 years to well capture the impact of price :
  - ✓ 0.46 if prices increase (EU average between 2001 and 2005)
  - ✓ and 0 if prices decrease

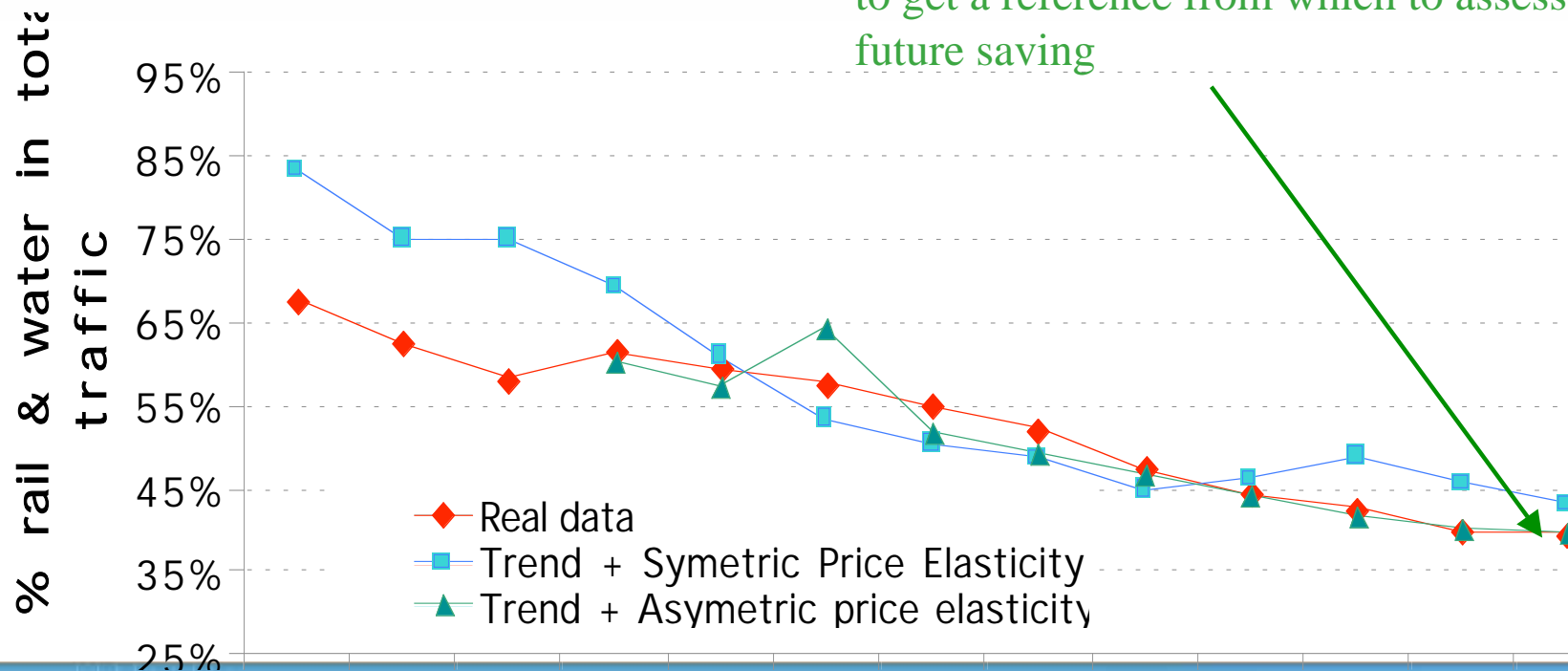
# Modelling of baseline modal share Poland

➤ **Asymmetric final regression :**

$$\ln(\text{WRS}) = -0.05 \times t + 0.46 \times \ln(P_{-3}) + 0.3 \text{ if prices increase}$$

$$\ln(\text{WRS}) = -0.05 \times t - 0.3 \text{ if prices decrease}$$

No energy saving in the past →  
adjustment of a trend and price effect  
to get a reference from which to assess  
future saving

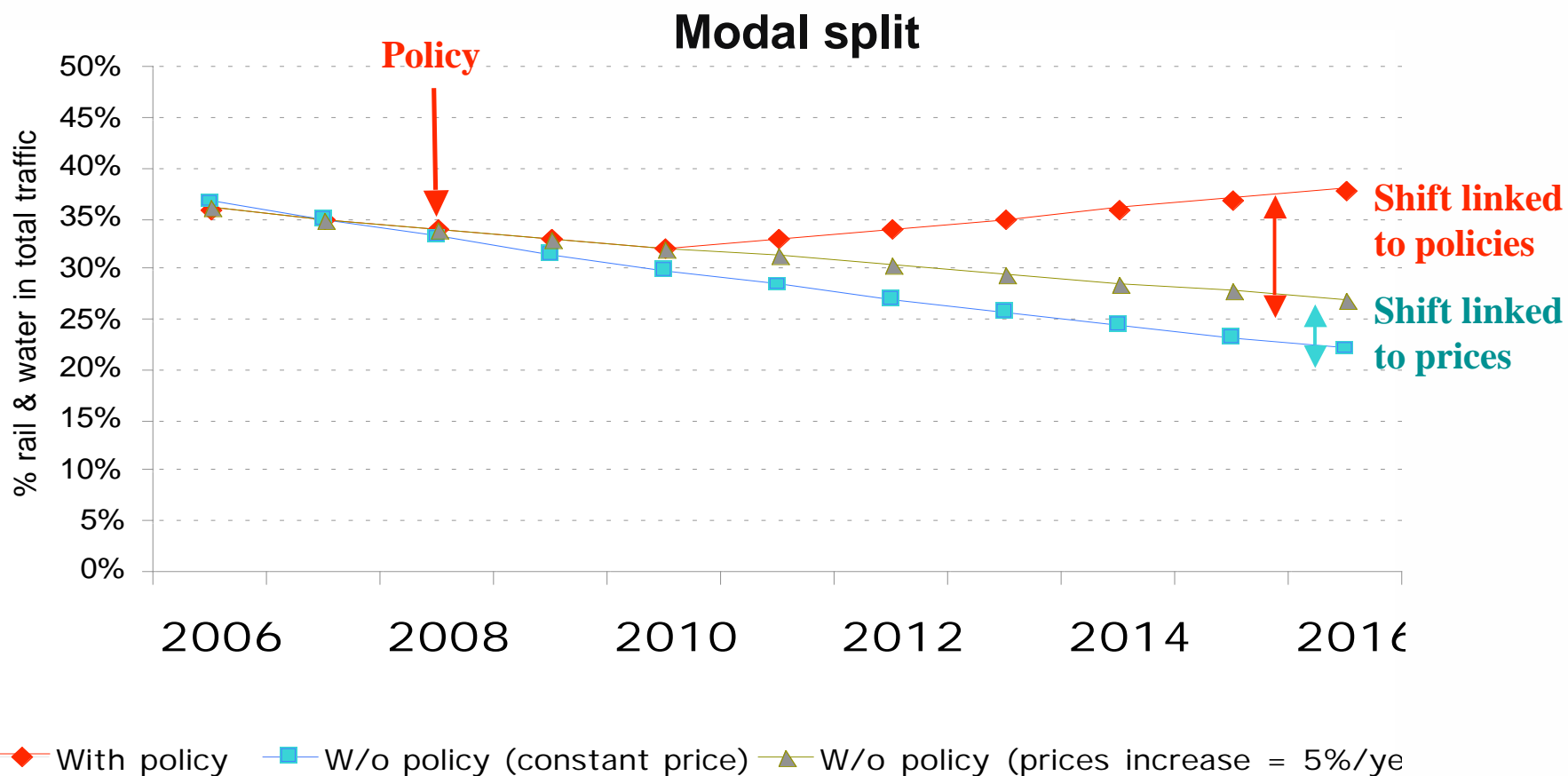


## Calculation of energy savings

- **Total energy savings** at year t calculated from the variation in the share of rail and water between year t and reference year/t-1 multiplied by the total traffic of good transport at t (in tkm) and the difference in unit energy consumption between road and rail/water at t (toe/tkm)
  
- Calculation of **ESD energy savings** in 3 steps:
  - 1) Modelling of baseline modal split;
  - 2) Modelling of baseline energy consumption
  - 3) Modelling of baseline energy savings (can be negative!) and calculation of ESD savings as difference between total energy savings and baseline savings

## Calculation of baseline modal split (example)

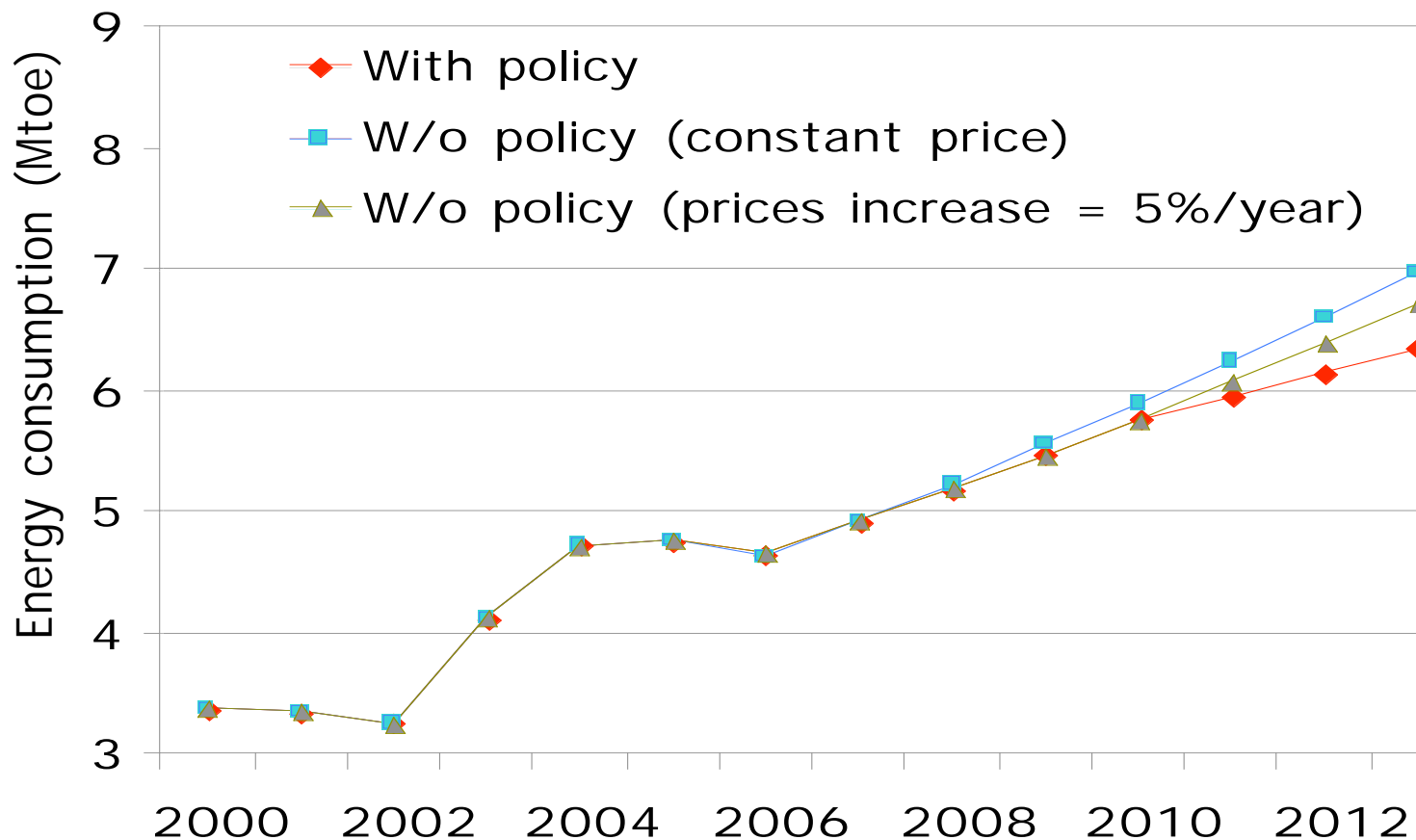
- Assumption of the implementation of a policy in 2008 with first impact in 2010 (rail and water traffic market share assumes to increase by 1% of each year)



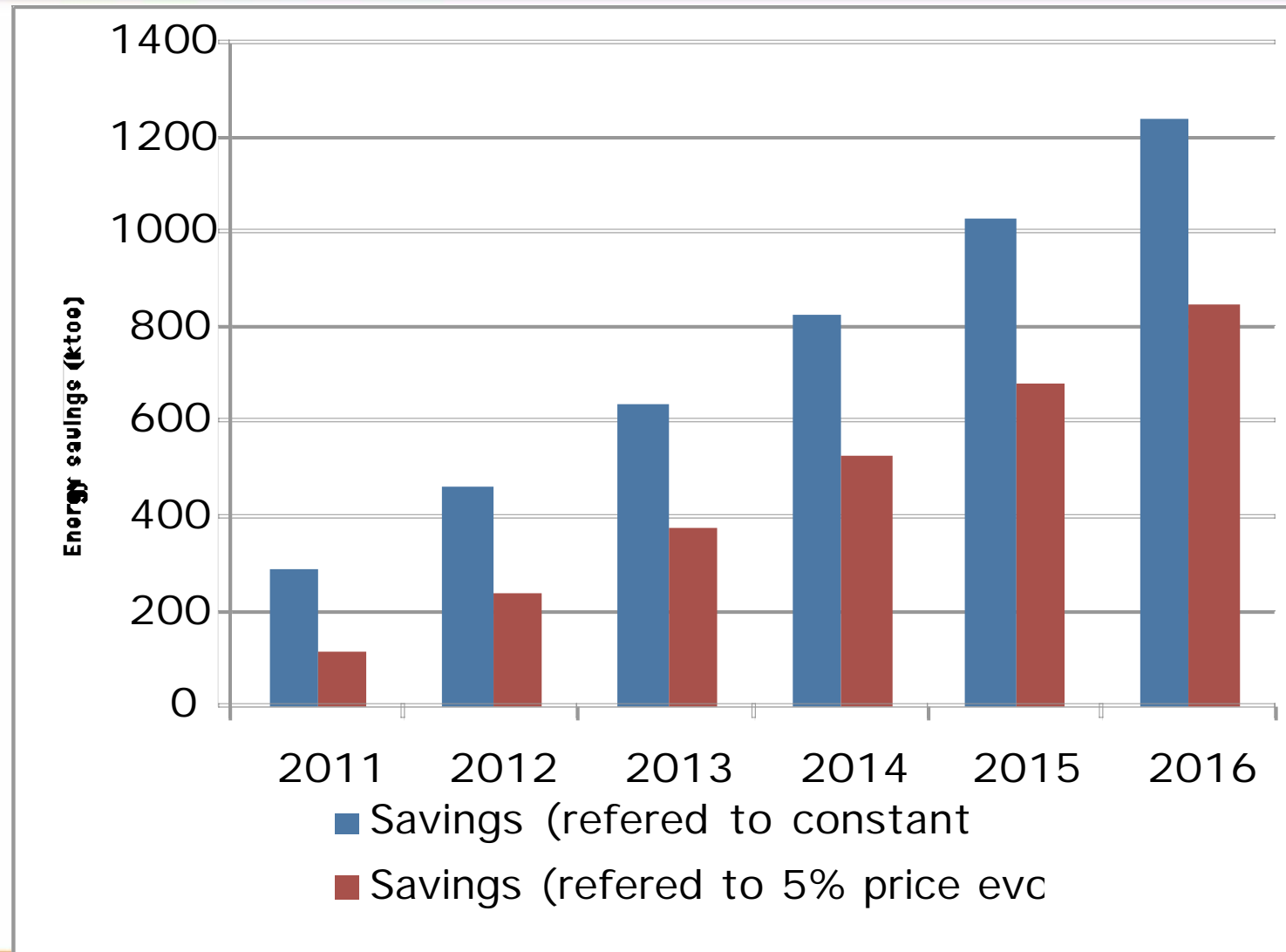
## Calculation of baseline energy consumption savings:

- Assumption implementation of a policy in 2008 and first impact of the policy in 2011

### Energy consumption



## Calculation of energy savings



## Conclusions and issues for replication on modal split for goods transport

- Validation of the methodology for price effect:
  - ✓ Same price elasticity
  - ✓ Asymmetric with lag (3 years, as a first estimate)
  
- Effect of policies negligible so far
  
- Selection of baseline trend to assess energy savings: most recent trend?