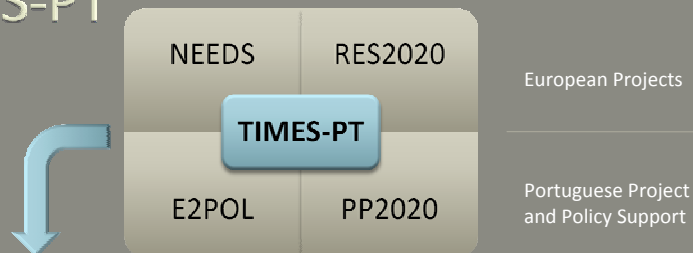


# The role of cost-effective measures in Portugal for compliance with the EU climate-energy targets

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## TIMES-PT



- ▶ Quantifying the Synergies and Antagonisms Between Energy and Environment Policy Instruments in Place – feed-in tariffs, EU ETS and on-budget aids to gas infrastructures;
- ▶ Energy and GHG Emissions – Evaluation of Long Term Scenarios for Portugal;
- ▶ Renewable Energy Sources Availability under Climate Change Scenarios – Impacts on the Portuguese Energy System;
- ▶ Evaluation of the Energy Savings Potential of the Portuguese Households;
- ▶ Competitiveness of Portuguese Industry in Post-Kyoto EUTS: Sector CO<sub>2</sub> MAC;
- ▶ Portugal Climate 2020: GHG Emission Scenarios in the Post-Kyoto regime
- ▶ H<sub>2</sub> technologies roadmap for Portugal for 2050

## TIMES-PT Updates

### ⦿ Energy demand:

- based on 2008 macro-economic and demographic scenarios – industry (validated)
- bottom-up approach to compute residential, commercial and transport energy service demand

### ⦿ Technology database:

- validation of the industry, transport, solar thermal and electricity production technologies by the Portuguese stakeholders

### ⦿ Delivery Costs

### ⦿ EU-ETS

- emissions disaggregated and possibility to model acquisition of allowances at different price and allocation scenarios

## The role of cost-effective measures in Portugal for compliance with the EU climate-energy targets

What is the contribution of “ cost-effective measures” in the residential and commercial sectors for GHG emission targets?

What are the hidden gains if changes in behaviour and technologies follow a perfect knowledge pattern?

# Scenarios

Analyzed:  
Non-trend "< zero cost"

Not analyzed:  
Trend "< zero cost"  
(e.g. Lighting, refrigeration)

**- Renew. and biofuels**

- 5% biofuels beyond 2010  
- 31% of renewable electricity in 2010

**+ Renew. and biofuels**

- 10% biofuels beyond 2010  
- 45% of renewable electricity in 2010

## Baseline

Evolution based on 2000-2005 trends (e.g. diesel lessons from past)

BAU

PQ

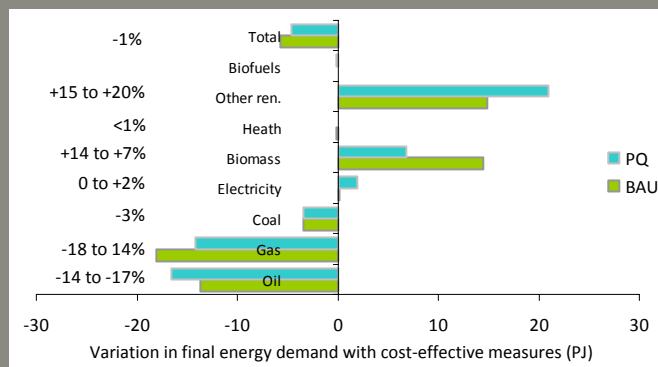
## "cost-effective measures"

Insulation, renewable heat, fuel shifts

BAUeff

PQeff

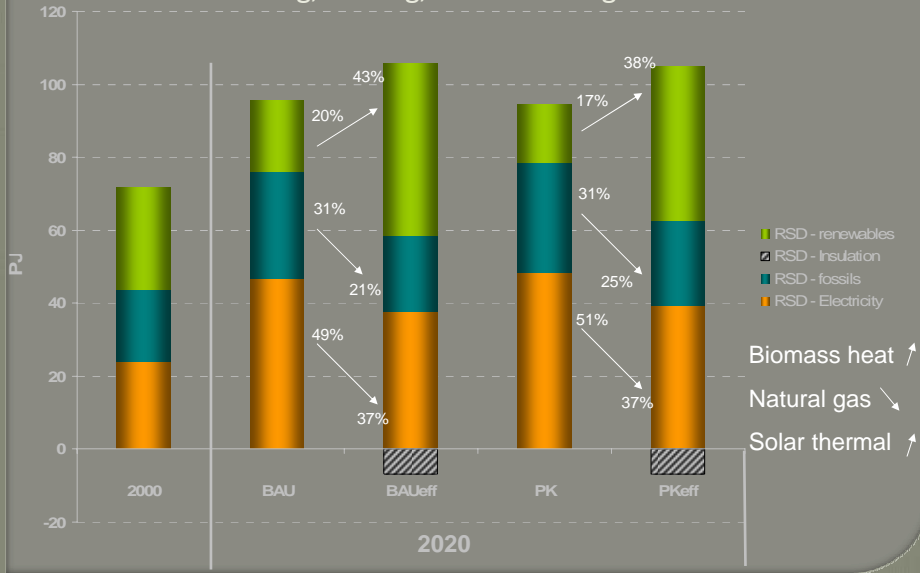
# Final energy demand in 2020



| Sector      | % variation in sector final energy demand |     |
|-------------|-------------------------------------------|-----|
|             | BAU                                       | PQ  |
| Commercial  | -15                                       | -11 |
| Residential | +10                                       | +8  |

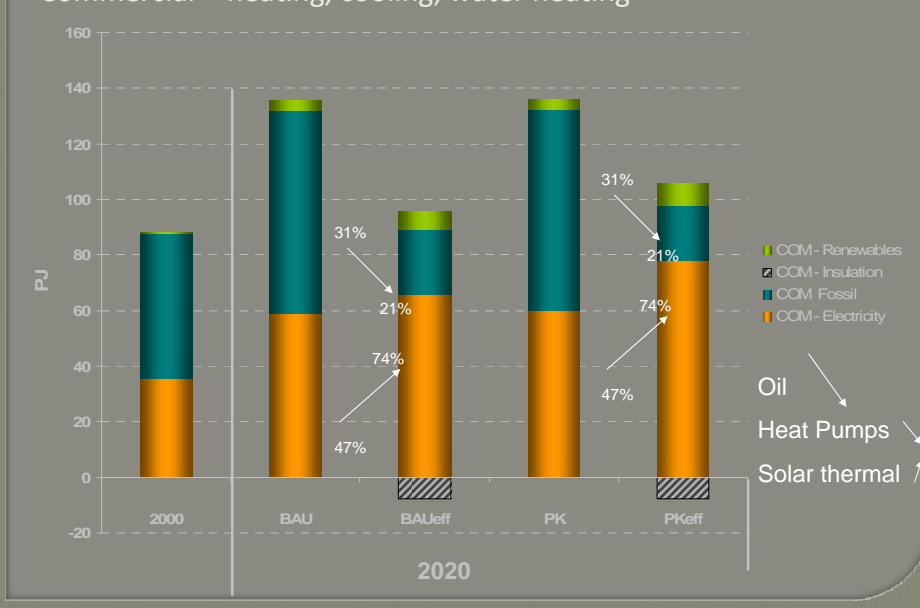
## Fuel and Technology change 2005 – 2020

### Residential – heating, cooling, water heating

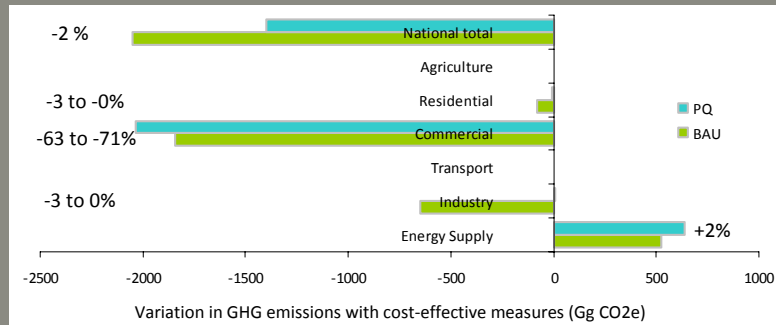


## Fuel and Technology change 2005 – 2020

### Commercial – heating, cooling, water heating



## GHG Emissions in 2020



| % variation from 2005 | GHG emissions |          |          |           | EU proposal for Portugal |
|-----------------------|---------------|----------|----------|-----------|--------------------------|
|                       | BAU           | BAUeff   | PQ       | PQeff     |                          |
| EU ETS                | 5             | 4        | 7        | 8         | EU ETS ?                 |
| Non EU ETS            | 1             | -2       | -5       | -9        | Non-EU ETS +1            |
| <b>National Total</b> | <b>3</b>      | <b>0</b> | <b>0</b> | <b>-2</b> |                          |

## Renewables

| Final energy consumption (PJ) | 2020       |            |            |            | EU proposal for Portugal |
|-------------------------------|------------|------------|------------|------------|--------------------------|
|                               | BAU        | BAUeff     | PQ         | PQeff      |                          |
| Renewable electricity         | 111        | 110        | 143        | 142        |                          |
| Renewable heating & cooling   | 83         | 114        | 69         | 96         |                          |
| Residential                   | 24         | → 51       | 20         | → 42       |                          |
| Commercial                    | 12         | → 19       | 12         | → 17       |                          |
| Industry                      | 48         | 44         | 37         | 36         |                          |
| Renewables in transport       | 16         | 16         | 27         | 27         |                          |
| <b>Total renewable (a)</b>    | <b>210</b> | <b>240</b> | <b>238</b> | <b>265</b> |                          |
| <b>Total final energy (b)</b> | <b>849</b> | <b>848</b> | <b>850</b> | <b>849</b> |                          |
| <b>% Renewables (a/b)</b>     | <b>25</b>  | <b>28</b>  | <b>28</b>  | <b>31</b>  | <b>+31%</b>              |

## Conclusions & remarks

- ◉ Savings of roughly 3000 M€
- ◉ Possible bias in results
  - Statistical info on biomass may bias results for residential sector
  - Diesel in commercial sector – evolution trend possible?
  - Potential for energy savings due to insulation
- ◉ Policy implications
  - Current policies for implementation of these measures are not ambitious enough and do not realize the full low hanging fruits potential
  - Increase renewable electricity and biofuels is needed for RES compliance
- ◉ Next steps
  - fully evaluate cost-effective options on remaining sectors