

# The efficiency of energy efficiency (in EU, with focus on Italy)

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# Index

- EU Directives on efficiency
- What we know about how this is working
- The cost of energy efficiency in Italy

# The EU view on energy efficiency: one tool for many goals

- Like for all parts of the EU energy policy, three objectives
  - Competitiveness
  - Environmental sustainability
  - Energy security
  
- Apparently, the best way to reach all of them
  - Reduce the oil bill
  - No emissions on energy not consumed
  - No need to buy abroad what we do not consume

## ...to this end...

- Long term efforts
  - Since Directive 2004/8/CE, several changes
  - More recently, Directive 2012/27/EU
  
- Targets
  - 2020 (20/20/20)
  
- Instruments
  - Things to do by Member States
  
- Incentives
  - What happens to MS if they (do not) achieve their targets

# The Winter Package

- Mainly focussed on other issues
  - Amendments to previous directives
  
- But two Directives on efficiency
  - Energy Efficiency Directive (EED)
  - Directive on Energy Performance of Buildings (EPBD)
  
- More ambitious targets
- Not binding country by country
- Great focus on housing
  - New funding

# New targets

- More ambitious targets
  - 2014: Consumption: -27% by 2030; now, - 30% by 2030
  
- EU target - No binding country level targets
  - Risk of free riding
  - Governance is key
  
- The present targets after the WP
  - At 2020, quantitative targets of primary and final energy consumption
  - EU to reduce consumption by 1,5% a year 2021 – 2030 (relative to average 2017-2019 level)
    - Should be additional – “on top” of what would happen with existing policies (only policies after 2014 and which produce effects after 2020)
    - Energy used in the transportation sector may be excluded from this calculation
    - Other detailed exclusion clauses

## How was it working?

- “In 2014,
  - ▶ primary energy consumption was only 1.6% above its 2020 primary energy consumption target.
  - ▶ final energy consumption was 2.2% below the 2020 target.
  - ▶ However, in 2015 compared with 2014, primary energy consumption increased by around 1.5%, and final energy consumption by around 2%”

## Previous targets

- Targets for each Member State, set by the MS themselves
- The 2016 Progress report (COM(2017) 56 final) refers:
  - The sum of national targets (17.6% reduction in primary energy consumption compared to forecasts) falls short of the 20% EU level target.
  - For seven countries (Croatia, Cyprus, Finland, Greece, Italy, Portugal and Romania) the target allows an increase in final energy consumption between 2013 and 2020.

## Easily predictable success...

- Member States set their national indicative 2020 energy efficiency targets in 2013
  - In 2014, the final energy consumption of 17 Member States was already below their indicative 2020 target
  - Similarly, 19 Member States achieved a primary energy consumption below their indicative 2020 primary energy target already in 2014
- Total national targets insufficient to meet the EU target
  
- Hence, the Winter Package with (i) more ambitious and (ii) EU-wide targets
  - Same risks (free riding) and needs (governance) as before

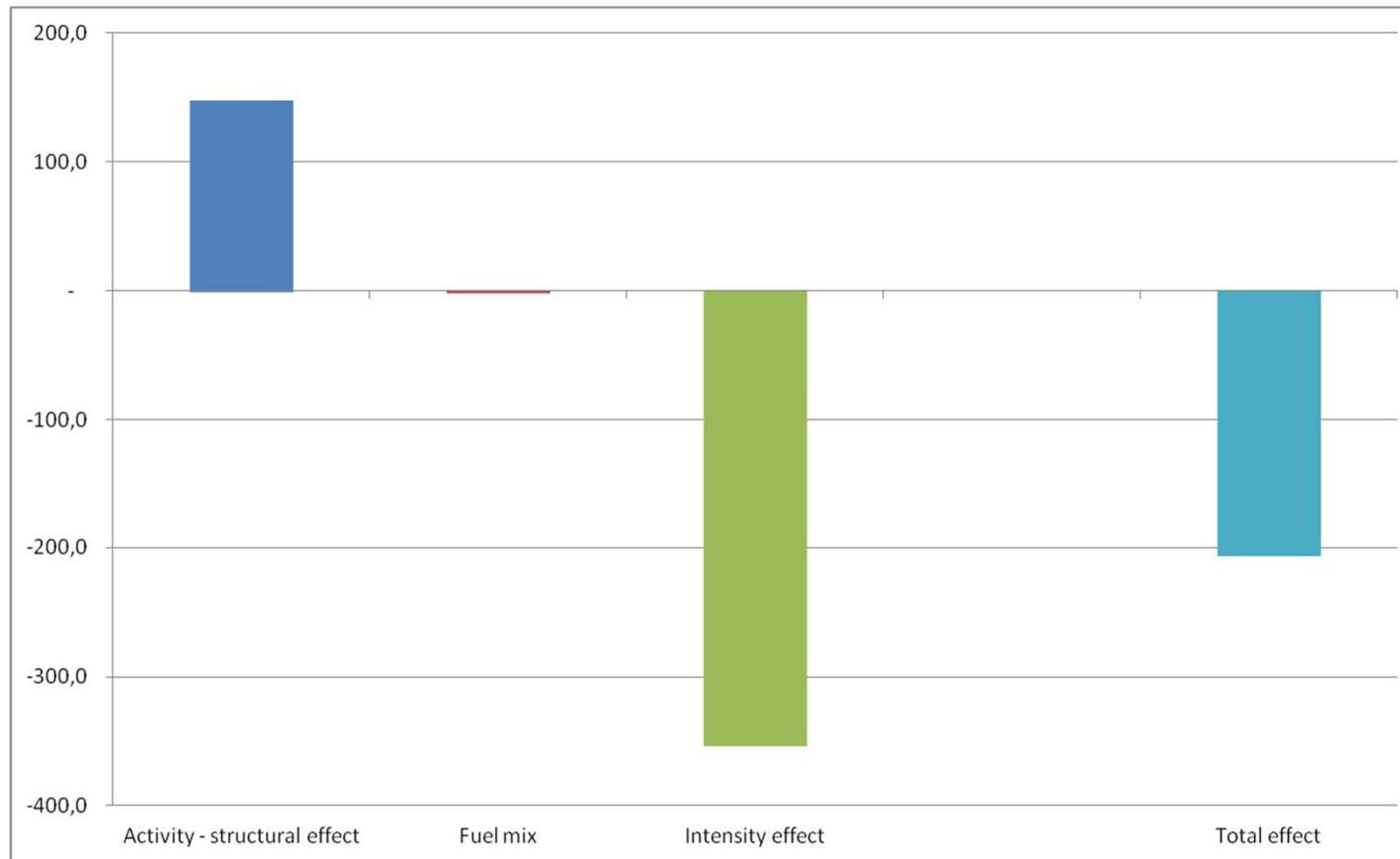
# Empirical literature on cost-effectiveness

- Boomhower and Davies (JPubEc, 2014): (Mexico)
  - most households would have participated even with much lower subsidy amounts.
  - about half of all participants would have adopted the energy-efficient technology even with no subsidy whatsoever.
- Charlier (EP, 2015): (France) Tax credits are relatively ineffective.
  - the government should focus on low-income tenants, and mandatory measures such as minimum standards seem appropriate.
- Alberini and Bigano (EnEc, 2015): (Italy)
  - even under optimistic assumptions, monetary incentives similar to those in the Italian tax credit program are generally not cost-effective.
- Alberini and Towe (EnEc, 2015): (Maryland)
  - informing households may be as effective as providing incentives

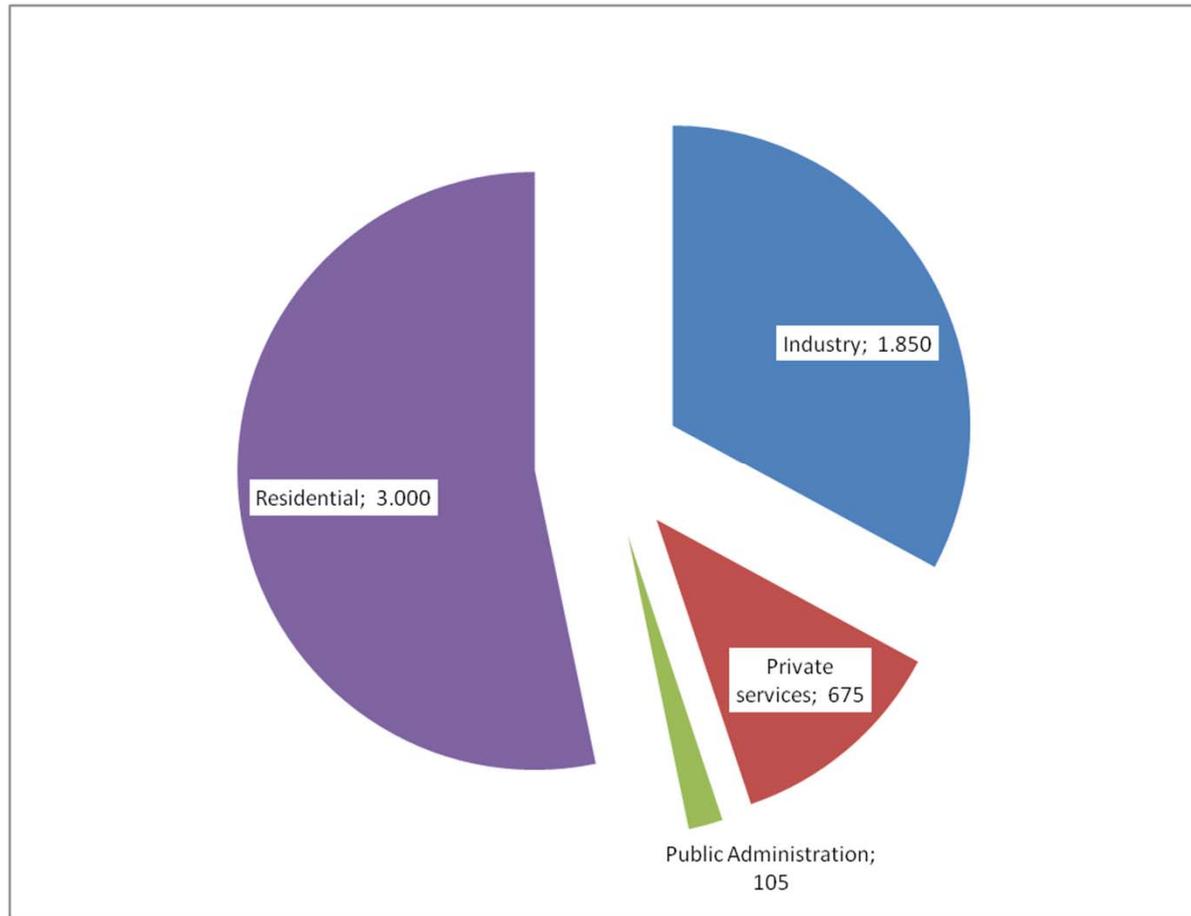
# The EC (self) assessment

- With a longer term view, how much of the results of the last years has been the outcome of the crisis?
- Decomposition analysis to assess the effect on MTOE (primary consumption)
  - No mention of costs
- Attempt to understand the contribution of different factors to the final result over the 2005-2014 period
  - Activity / structural effect (GDP)
  - Fuel mix effect (renewables)
  - Intensity effect

# The EC exercise – result (2005-2014)



## Italy's investment data (2015)



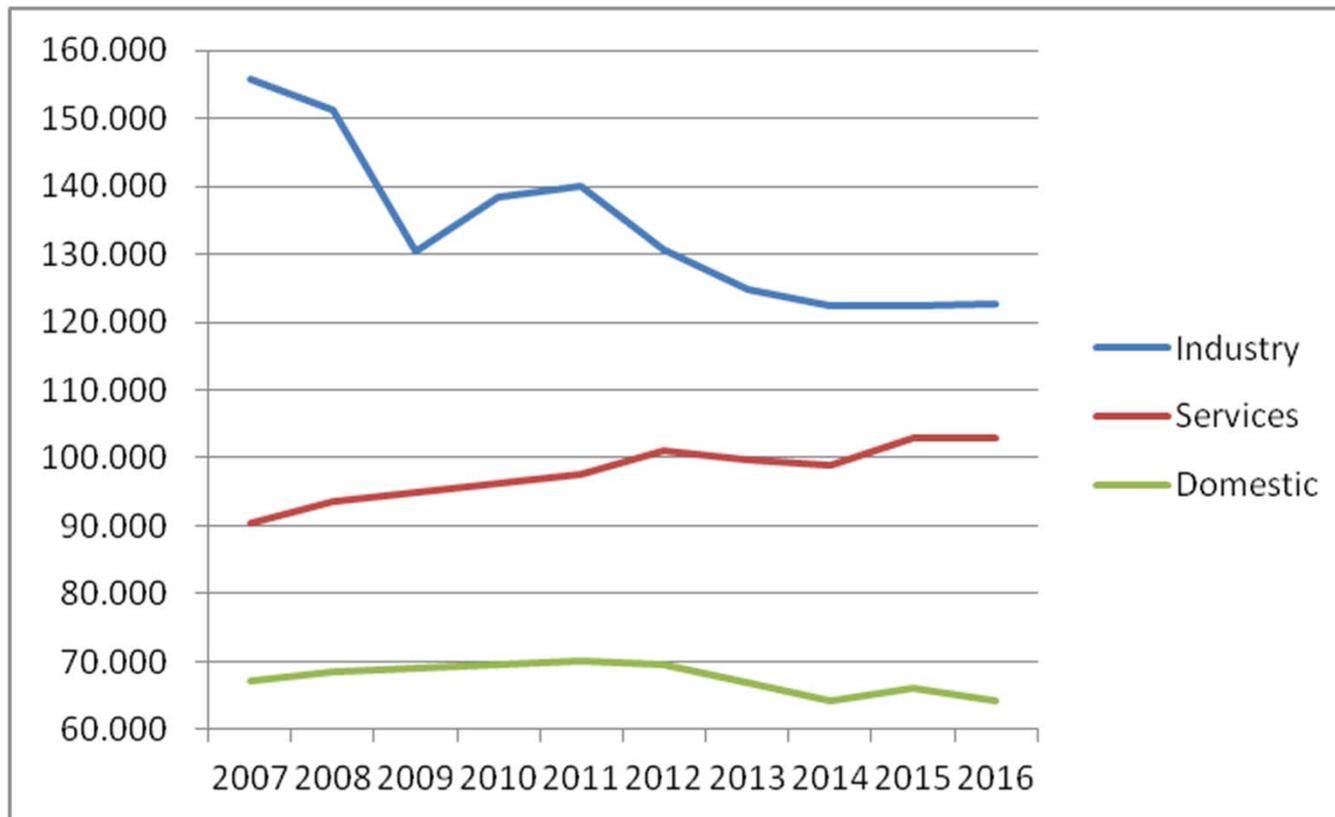
Data in € million . Source: Politecnico di Milano

Most of the investment in residential and industry

In industry, mainly energy intensive sectors (metals, paper, glass, ceramics)

The public administration lags behind

# Italy's electricity consumption data



Stronger effect  
for industry and  
residential (15%)

More limited for  
the service sector  
(2%)

Unclear results  
for public  
administration

# Interpretation of the data

- Industry? Economic downturn – still uncertain situation
- Services? No apparent effect
- Domestic – Apparent positive effect
  
- Possible explanation?
- Industry:
  - Suspicion that energy efficiency investments would not have needed much of an incentive
- Not much on rented premises
  - The owner does not pay the energy bill
- Still limited for public administration
  - Probably limited impact on public housing and fuel poor
  
- No idea whether it is the effect of policies

# The Italian incentive system

- Large number of channels – simplifying, three
  - White certificates (TEE) for energy and gas distributors
    - Price is quite variable within each year
  - Tax allowance
    - Spread over a 10 years period
  - Thermal account
    - Not more than 900 million/year for improvement of buildings
    - Spread over a period between two and five years
  
- Tax allowances are calculated in a relatively precise way
- The total annual cost of white certificates is not known with any precision

## How expensive?

- The intermediate goal is saving on energy consumption of fossil fuels (TOE – Tonns of oil equivalent)
- The market price of a tonn of oil is about € 300 (given current oil price and exchange rate USD/€)
- Italy (source: Enea):
  - Total incentive spent in 2016 : at least €1 billion
  - Total savings 2,03 Million TOE
  - Each tonn has been paid at least 500 € (underestimate)

## Some examples

- Italy (source: Enea):
  - Total incentive spent in 2016 : an estimate between 1,04 and 1,60 billion Euro
  - Total savings 2,03 Million TOE
  - Each TOE has been paid between 515 and 791 Euro
  
- On average:
  - Cost of tax breaks: 2,250 Euro/TOE
  - Thermal account: 8,400 Euro/TOE
  - White certificates: 567 Euro/TOE – but their cost is supposed to increase in the following years

## Some simple arithmetics

- PV in Italy are almost in grid parity
- A PV project in Italy
  - Assumptions
    - Cost: 1M€ per MW
    - 1200 hrs/year
    - Only incentive: super-amortization (140%)
    - Specific emission of alternative CCGT : 0,187 TOE/MWh
  - This leads to a tax saving of 1,08% of the investment cost (10.800 €/yr  $\Rightarrow$  9 €/MWh)
  - TOE avoided: 224,4, spending 10.800 €  $\Rightarrow$  48 €/TOE (less than 1/10 of the cost of white certificates)

# Specific issues – additional costs and benefits

- Energy security
- Developing local firms
- New gas and electricity meters
  - EU: Planned rollout of close to 200 million smart meters for electricity and 45 million for gas by 2020
  - Italy: accelerated deployment
  - Stranded costs in case of anticipated substitution of old meters

# Has Italy pursued energy efficiency efficiently?

- The total bill is potentially infinite (no cap on total incentives, as for renewables)
- Fortunately, no clear sense of an ending (no rush for efficiency)
  - Actually, the requirement of white certificates increases over time
- Impression: a bit better than the incentives given to renewables in the past
  - But some incentives are very generous
- But, with current cost of photovoltaic generation, probably a (small) incentive to PV would be more cost-effective