UNIVERSITY OF CAMBRIDGE | Energy Policy Research Group

Energy subsidies at times of economic crisis:

A comparative study of Italy and Spain

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CONTENTS

- Background context – EU
- Background – Italy and Spain
- Policy evolution - Italy and Spain
- Lessons from the past
- Scenarios & methodology
- Results of scenario analysis
- Policy implications

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- Background – Italy and Spain
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- Lessons from the past
- Scenarios & methodology
- Results of scenario analysis
- Policy implications

Background - EU

- *EU Renewable directive* targets for 2020:
  - 20% RES share in energy consumption (via Renewables Directive)
    - 10% target for the transportation sector
  - 20% reduction in GHG emissions (from 1990 levels)
    - Conditional increase to 30% if major economies contribute towards it
  - 20% energy efficiency *(indirectly through EE directive)*
  - Country specific targets

- *EU 2030 Climate and Energy Framework*:
  - 40% reduction in GHG emissions (from 1990 levels) to be shared out at the national level (-43% in ETS, -30% in non-ETS sectors)
  - 27% EU-wide RES target but no national level enforced targets
  - 27% energy efficiency target

Background - EU

- *New State Aid Energy & Environment guidelines for 2014-2020*:
  - Emphasis on improving the efficiency of public support measures and reduce market distortions
  - Continues to allow aid to a wide range of RES in form of operating or investment aid
  - FiTs to be replaced by a premium (in addition to the market price) or tradable green certificates by 1 Jan, 2016
  - In principle, all aid should be granted in a competitive bidding process (from 2017) although cases can be made if not possible or desirable
  - Although guidelines only hold through 2020, EC argues subsidies and exemptions from balancing responsibilities should be phased out in a degressive way between 2020 and 2030. Although this outlook has no legal effect, it makes clear the Commission's aim to abolish all subsidies for established renewables in the longer term

State Aid: Measures containing a selective advantage granted through Member State resources which threatens to distort competition within the internal market and affects trade between Member States *(EEA Guidelines, 2014)*

Background - EU

- Energy Union:
  - Fully integrated European energy market
  - Improve energy security
  - Energy Efficiency improvements for fuel demand reductions
  - Decarbonising the economy
  - R&I and competitiveness

- More focused on addressing energy security issues after EU-Russia disputes
- Fast-tracking completion of internal market for electricity and building additional interconnection capacity prioritized
- Achieving these objectives while balancing additional renewables in the grid is a key challenge to be addressed

CONTENTS

- Background context – EU
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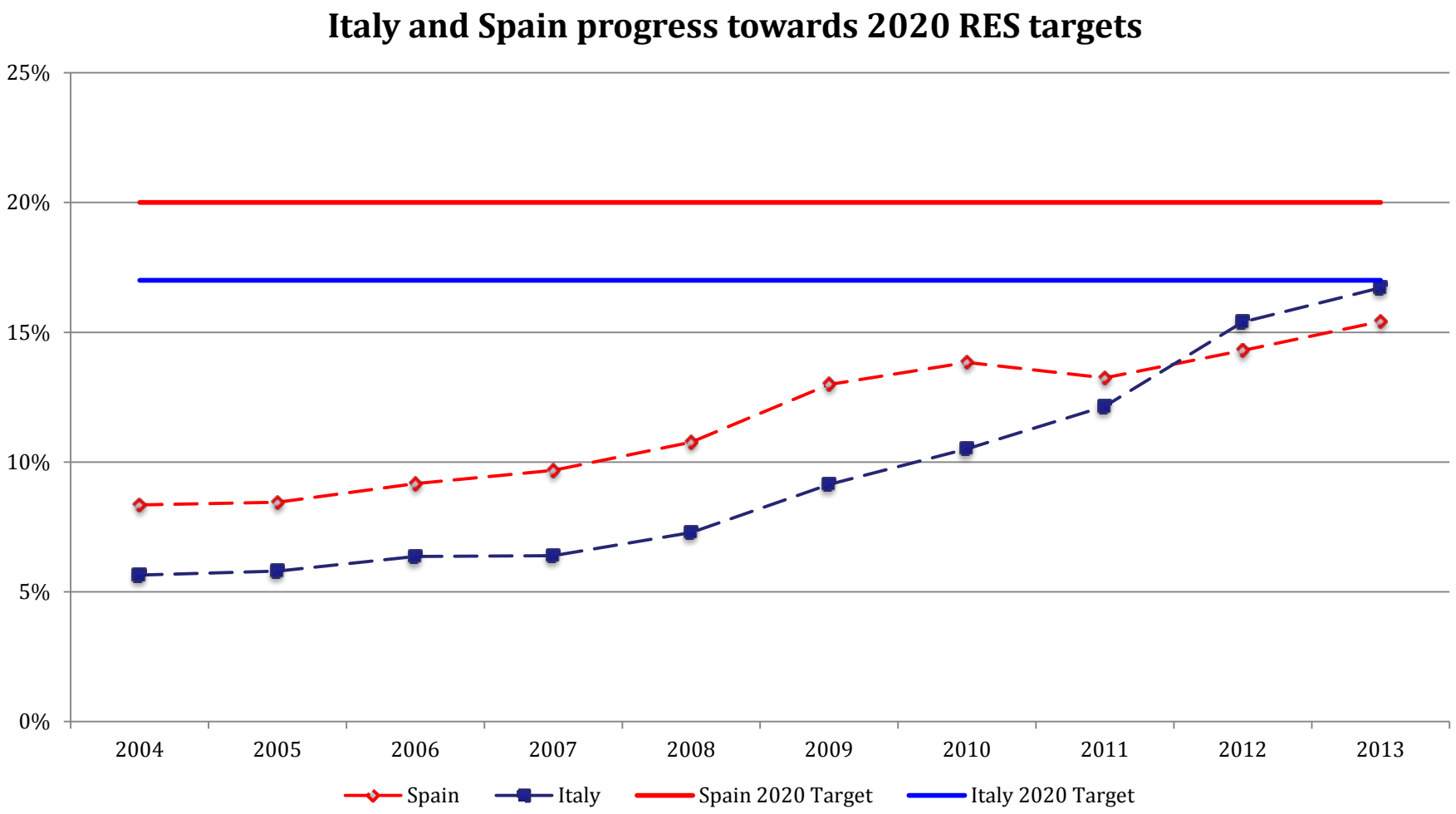
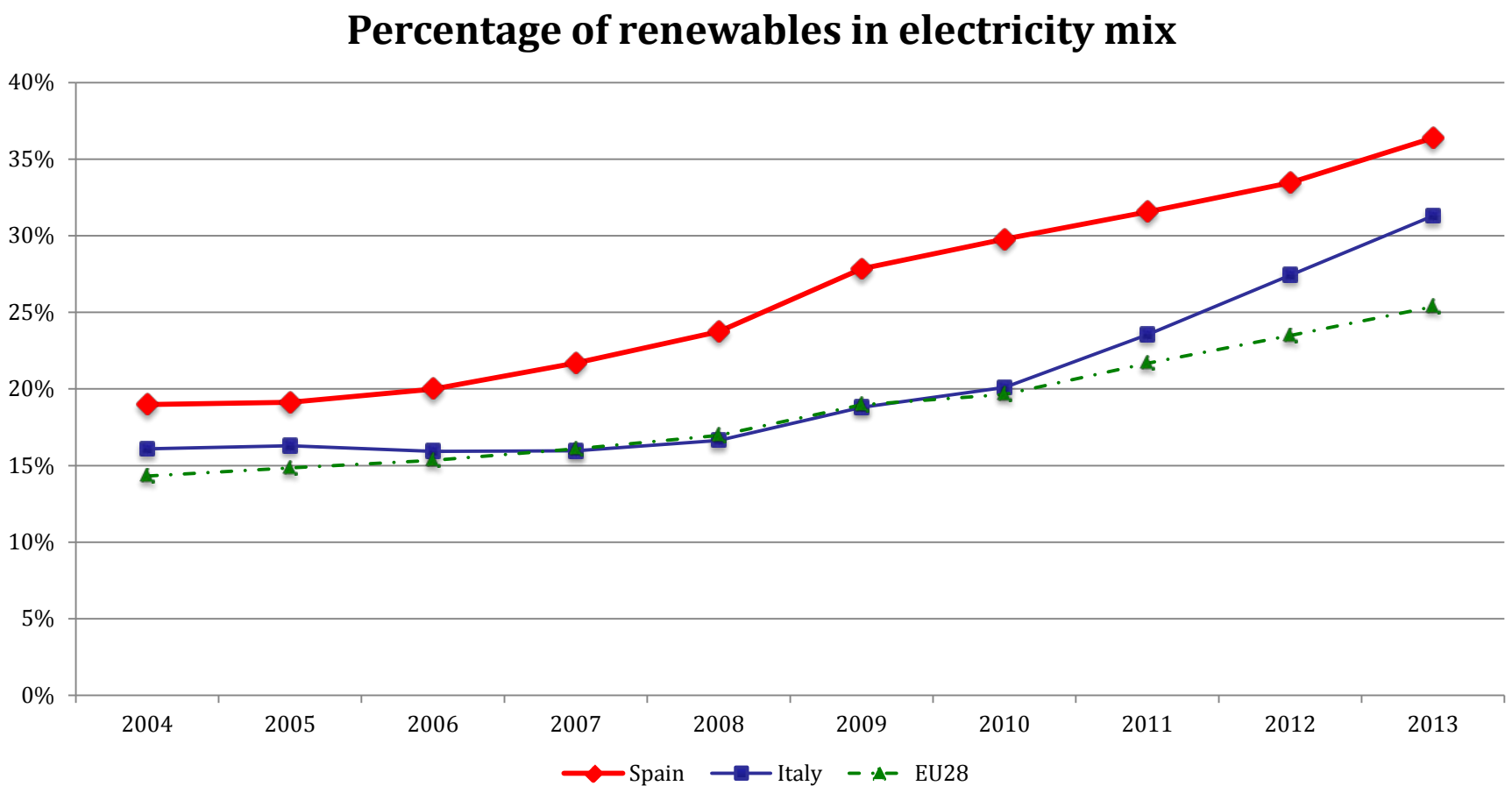
- Lessons from the past
- Scenarios & methodology
- Results of scenario analysis
- Policy implications & lessons for Enel

Background – Italy & Spain

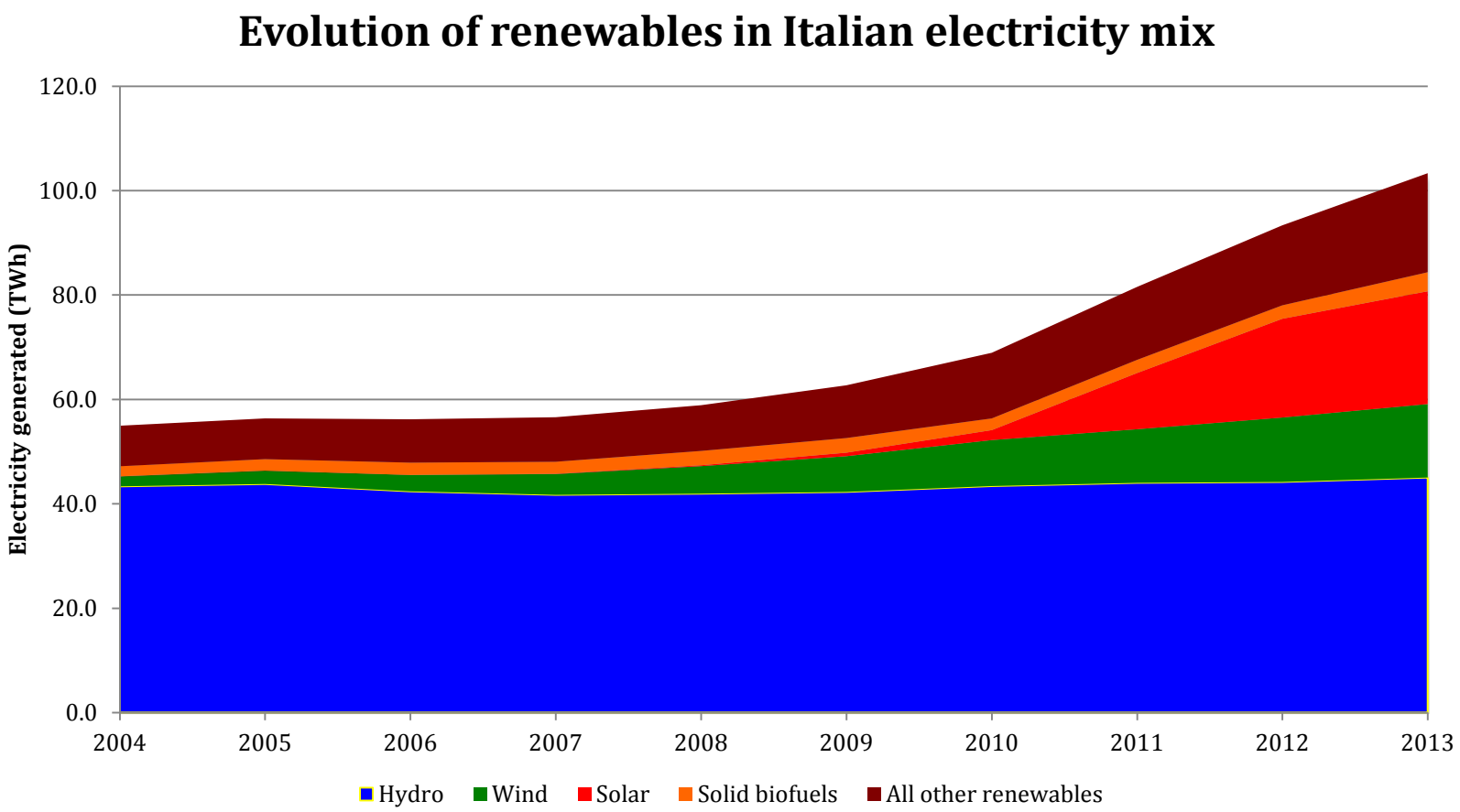


Background – Italy & Spain



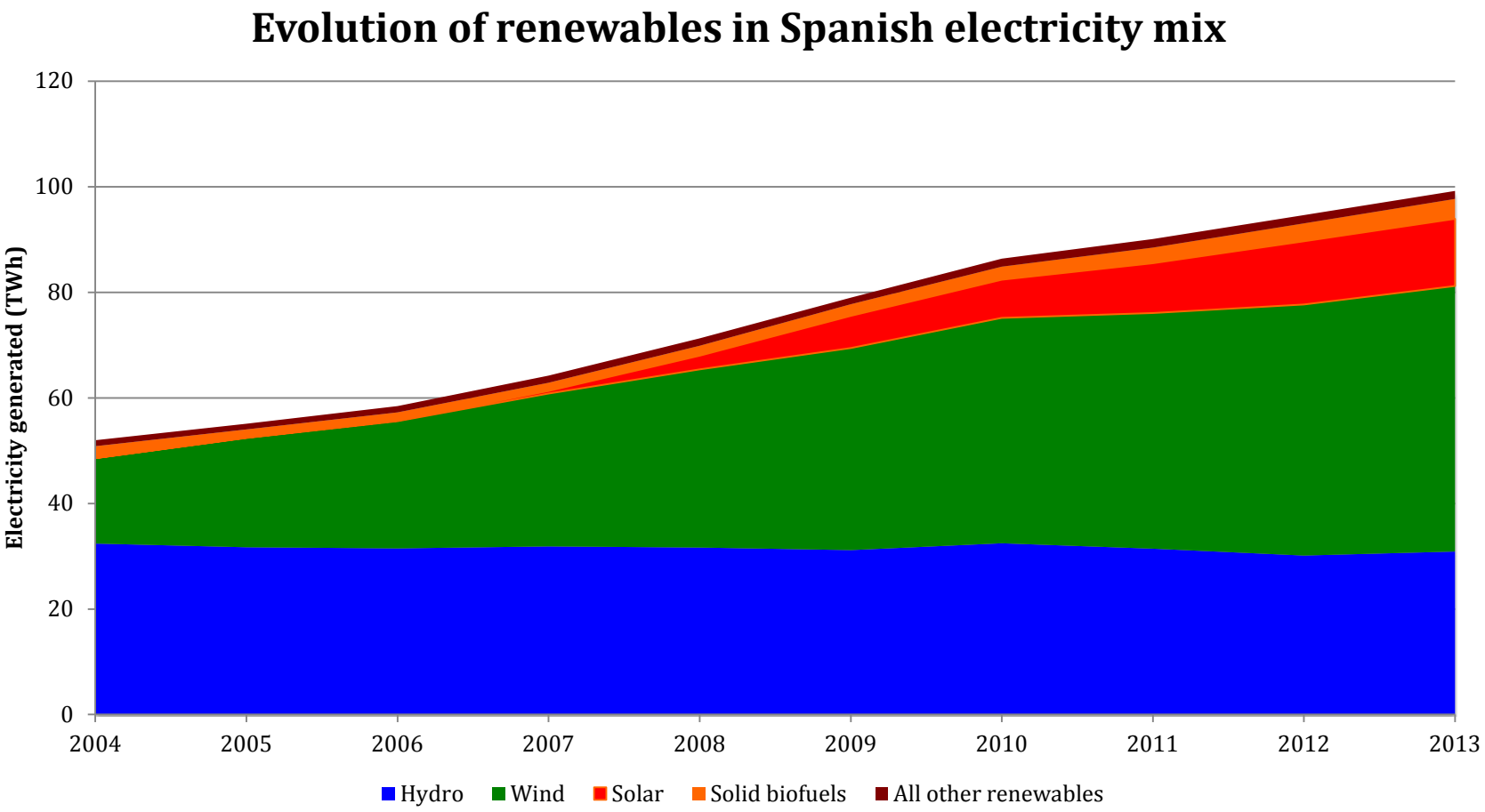
Source: Eurostat database

Renewables in Italy



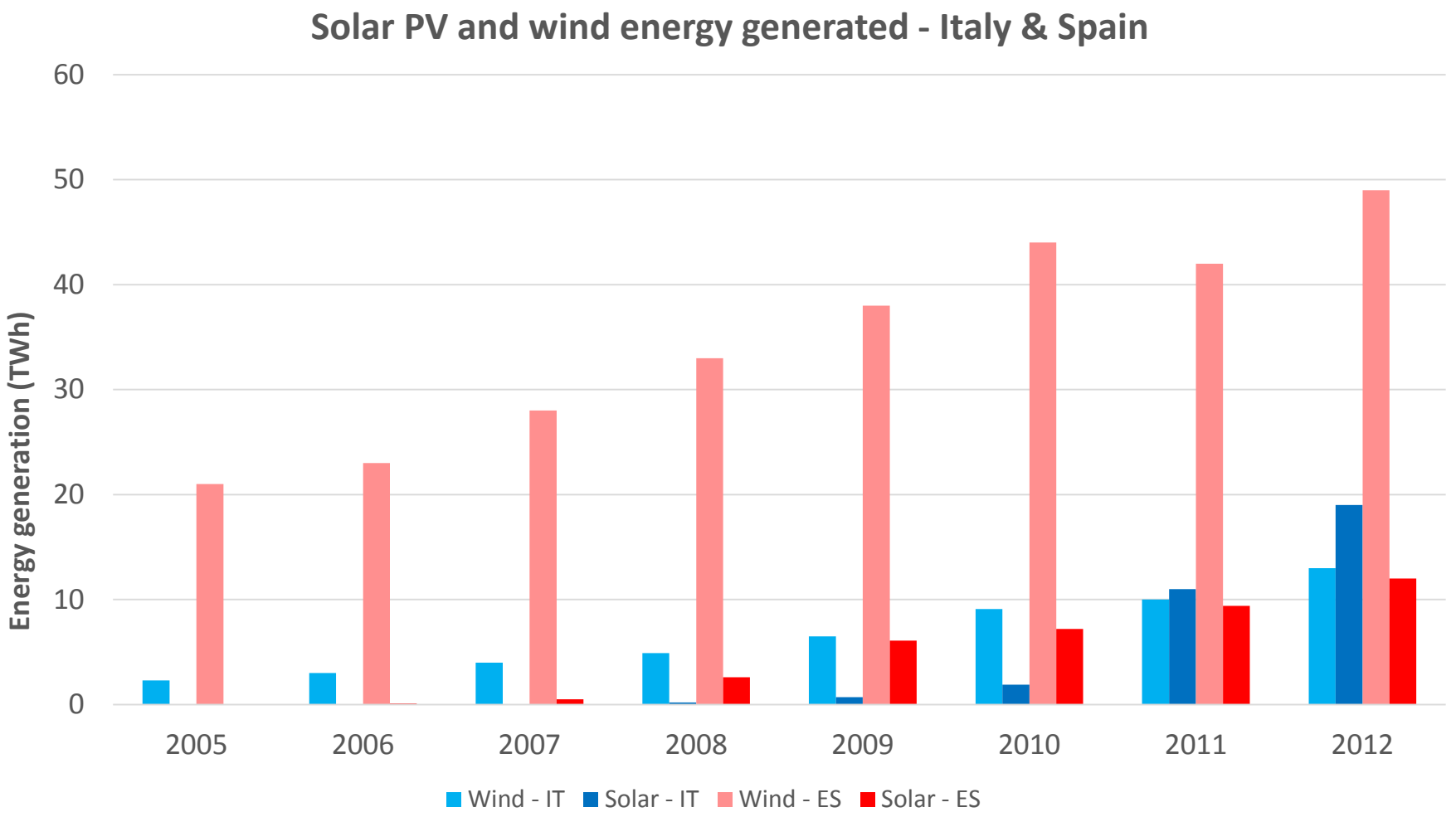
Source: Eurostat database

Renewables in Spain

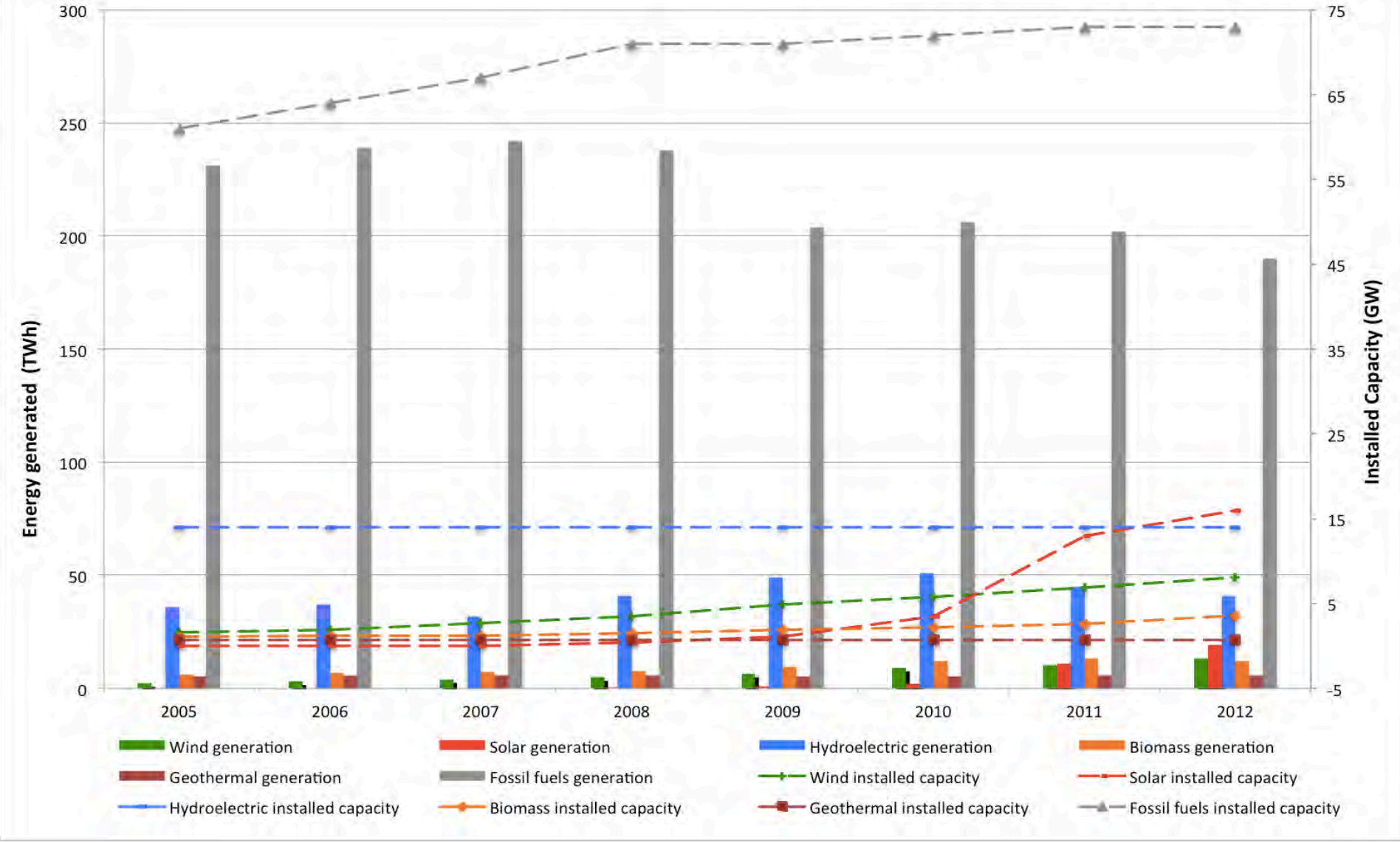


Source: Eurostat database

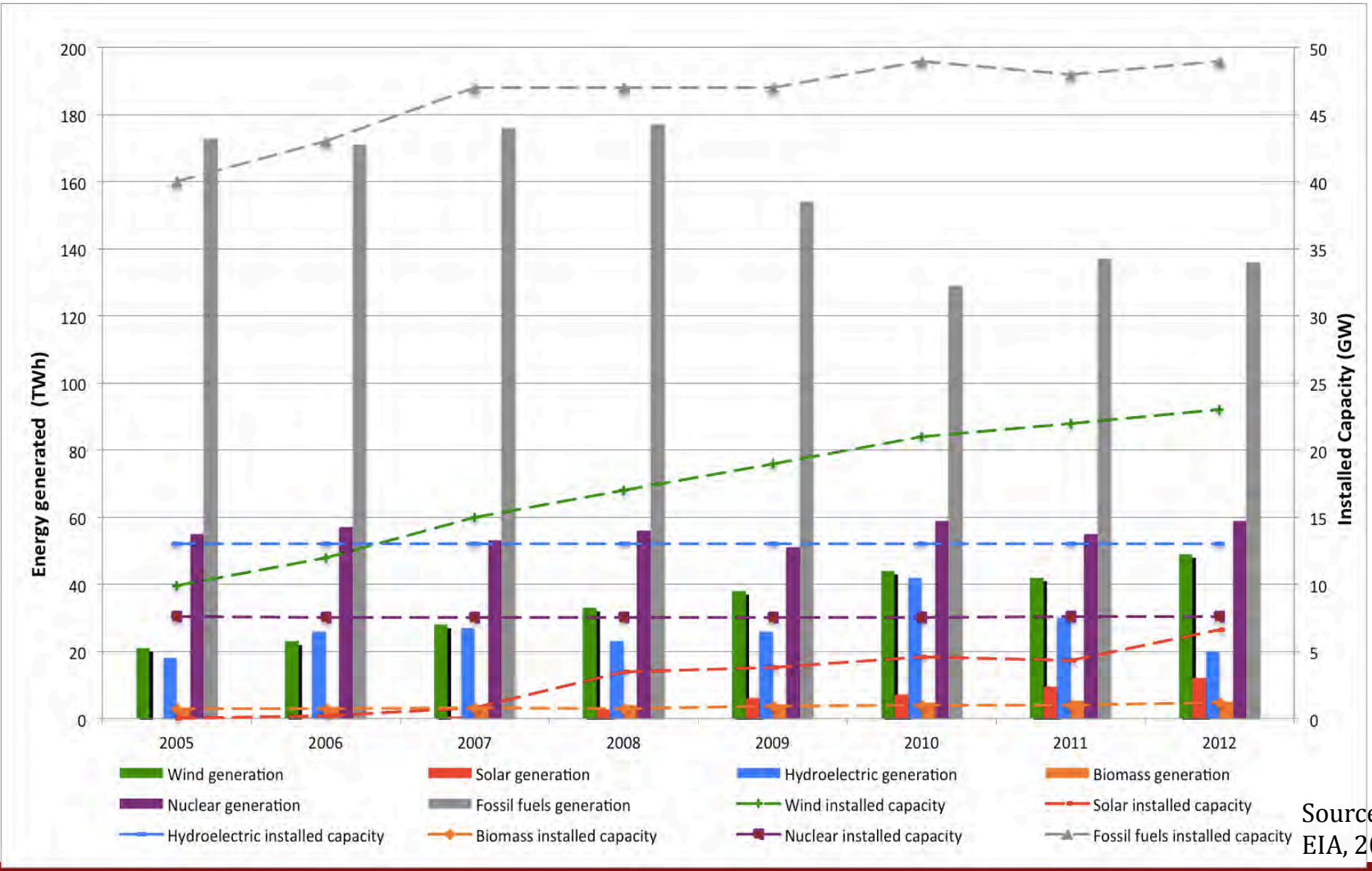
Evolution of Solar & Wind Generation



Trends in Italian electricity generation and installed capacity by technology, 2005-12

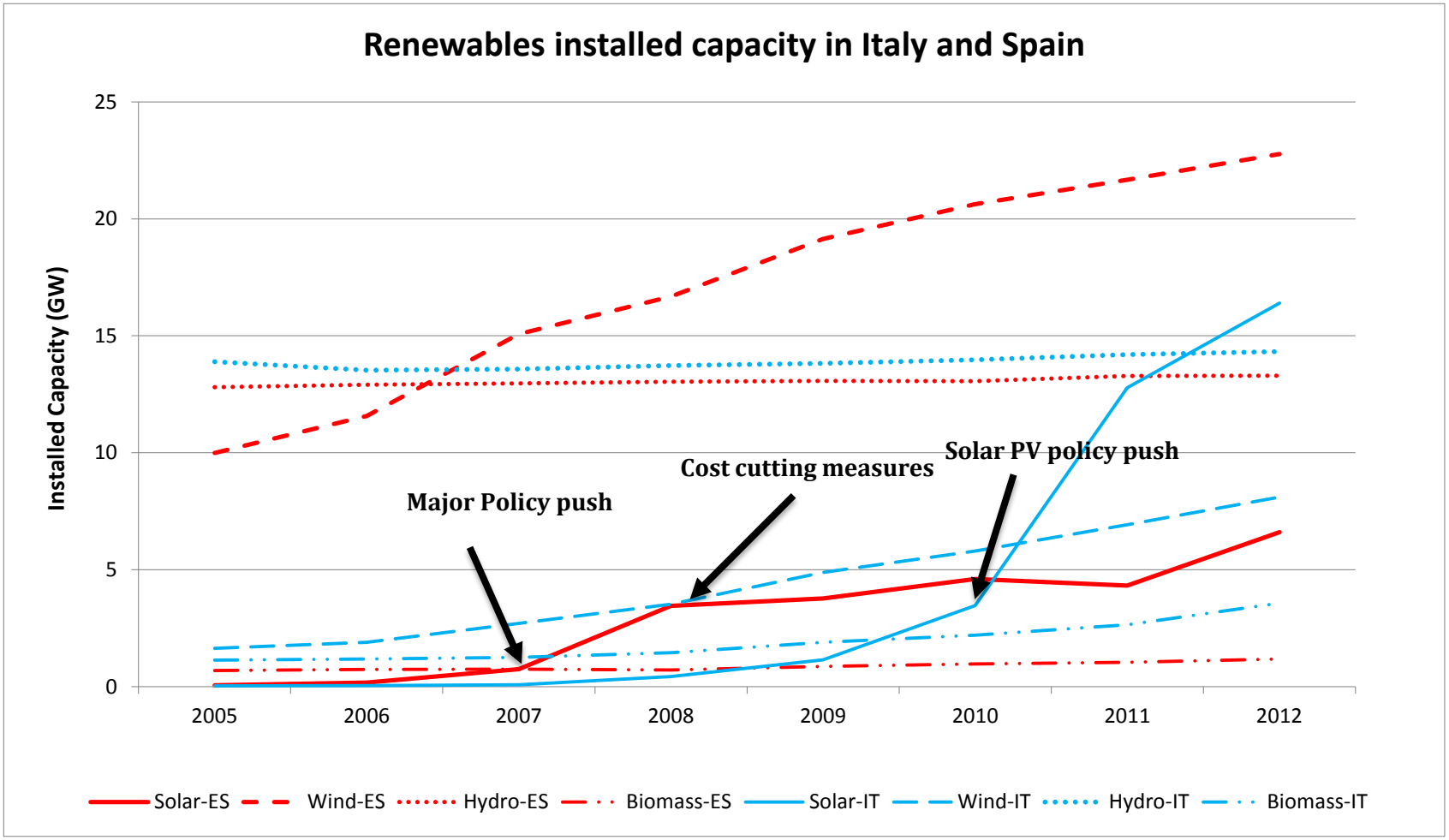


Trends in Spanish electricity generation and installed capacity by technology, 2005-12



Source: EIA, 2015

Background – Italy & Spain



Source: EIA database & EEA (2014)

CONTENTS

- Background context – EU
- Background – Italy and Spain
- **Policy evolution - Italy and Spain**
- Lessons from the past
- Scenarios & methodology
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- Policy implications

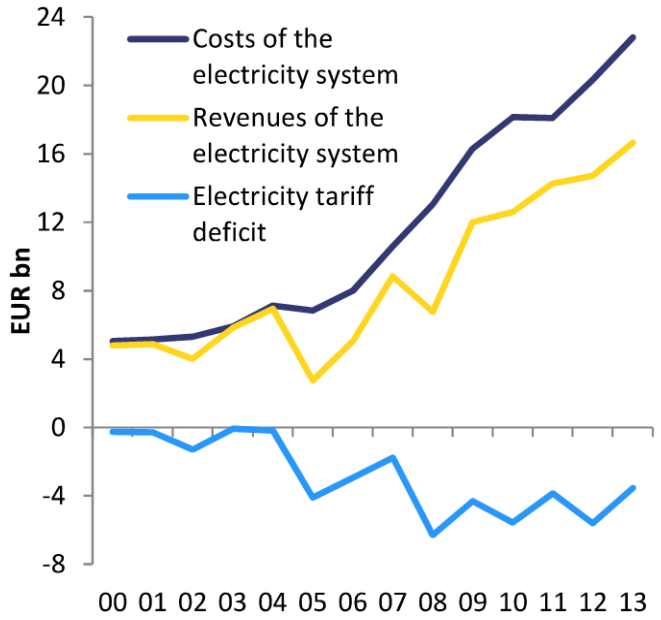
ITALY

Measure	Objectives
Green Certificate Program (1999)	• Established annual RES-E requirements for power producers & importers • Awarded TGC for qualified renewable electricity entities
Conto Energia (2005)	• Resulted in a special FiT for solar PV projects • Later modified in 2006, 2007, 2010 and 2011 with regards to FiT rates and eligibility of support for solar PV projects
FiT for small projects (2008)	• Small RES-E projects other than solar RES plants smaller than 1 MW (or smaller than 200 kW for wind plants) shall either choose TGC or FiT remuneration
Conto Energia V (2011)	• Mandatory registration with the GSE (Italian TSO) in order to receive FiT • Annual cap of €6.7 billion set for incentives
FiP for non-solar projects (2012)	• Starting Jan 2013, non-solar RES-E projects eligible for FiP and TGC to be phased out by 2015 • Annual cap of €5.8 billion for incentives program • Depending on capacity, projects either apply, pre-register or bid for incentives competitively
Law 116 (August 2014)	• Solar PV plants over 200 KWp should choose between partial deferral of subsidy payment or tariff cuts (depending on the size of the plant), with possible extension of subsidy from 20-24 years, effective from November 2014 • 5% general system charge to be paid by solar PV owners to cover administration costs, effective from January 2015

SPAIN

Law	Objectives
Law 54/1997	• First attempts to introduce FiT • Preferential price arrangement for renewables
RD 436/2004	• 12% share of RES in energy demand by 2010 • 1/3 of electricity to be met by RES with efficiency improvements
RD 661/2007	• Delink FiT from Average Electricity Tariff (AET) • No more choice on FiT vs FIP (only FiT available) • Cap-and-floor set for remuneration (sliding premium)
RD 1578/2008	• First cost cutting measure after rapid upsurge of solar PV • Reduction in tariff levels; cap on eligible output; maximum duration of eligible benefits set
RD 1565/2010	• Further cost cutting • New correction factors; 25 years duration applied to all plants • Aimed to reduce cost by €2.3 billion in 3 years
RDL 1/2012	• Moratorium on all new registration for benefits ***(indefinitely)*** • Abolished preferential tariffs for all RES-E • Prevent rising system costs and prevent revenue bleeding • Lead to Electricity Sector Reform in July 2013

Spanish Energy Debt and Deficit

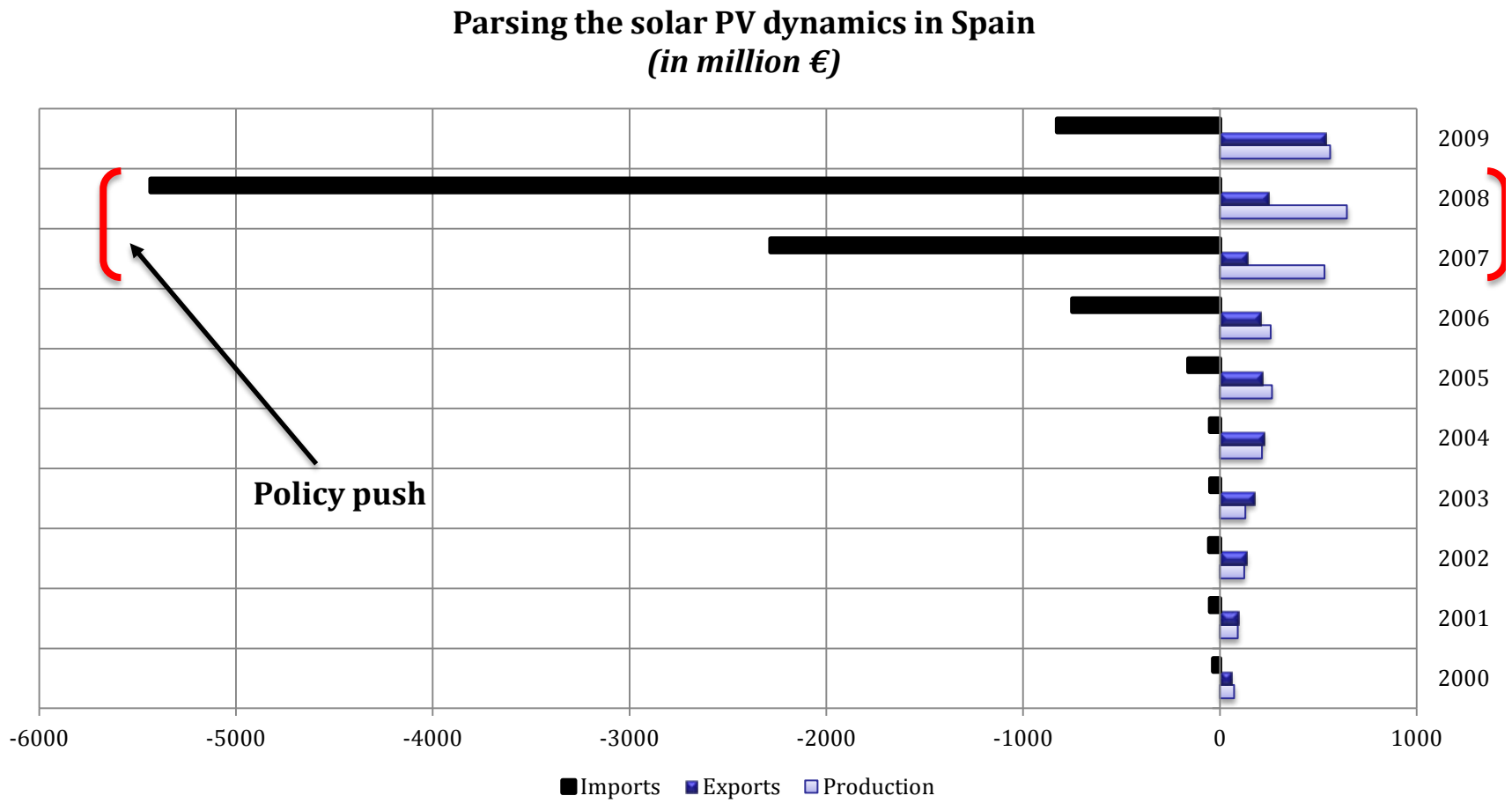


Source: CNMC, CNE, European Commission

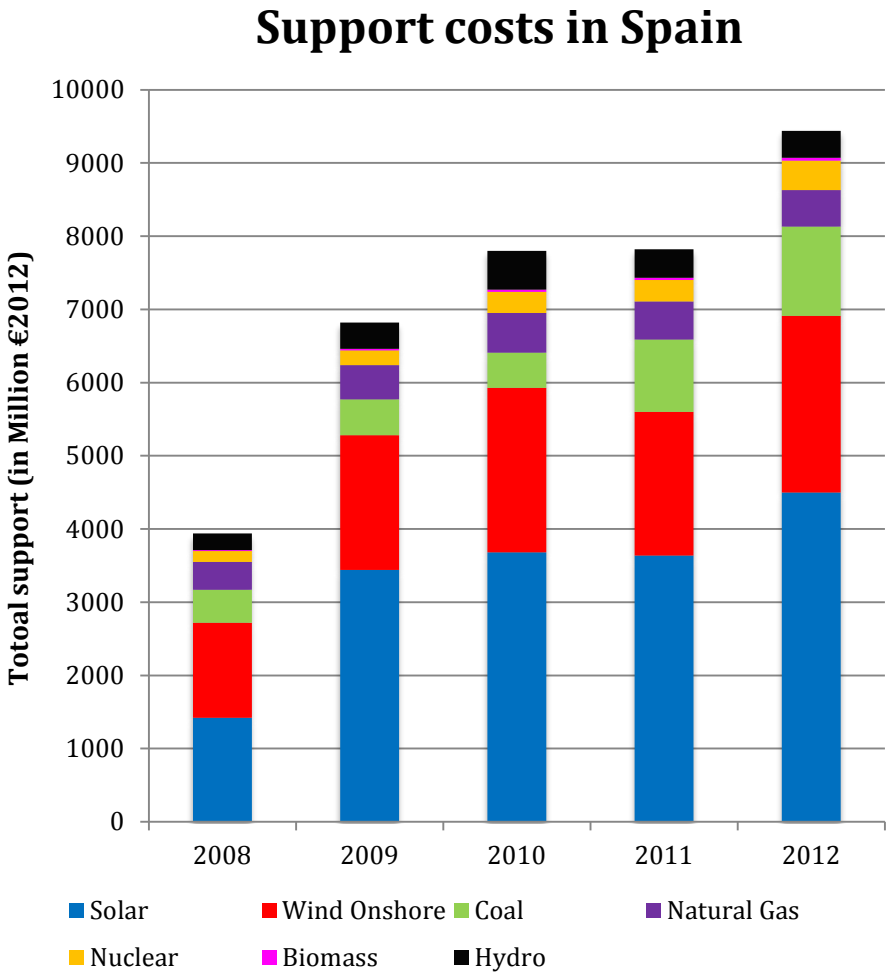
Source: CNE (2013)

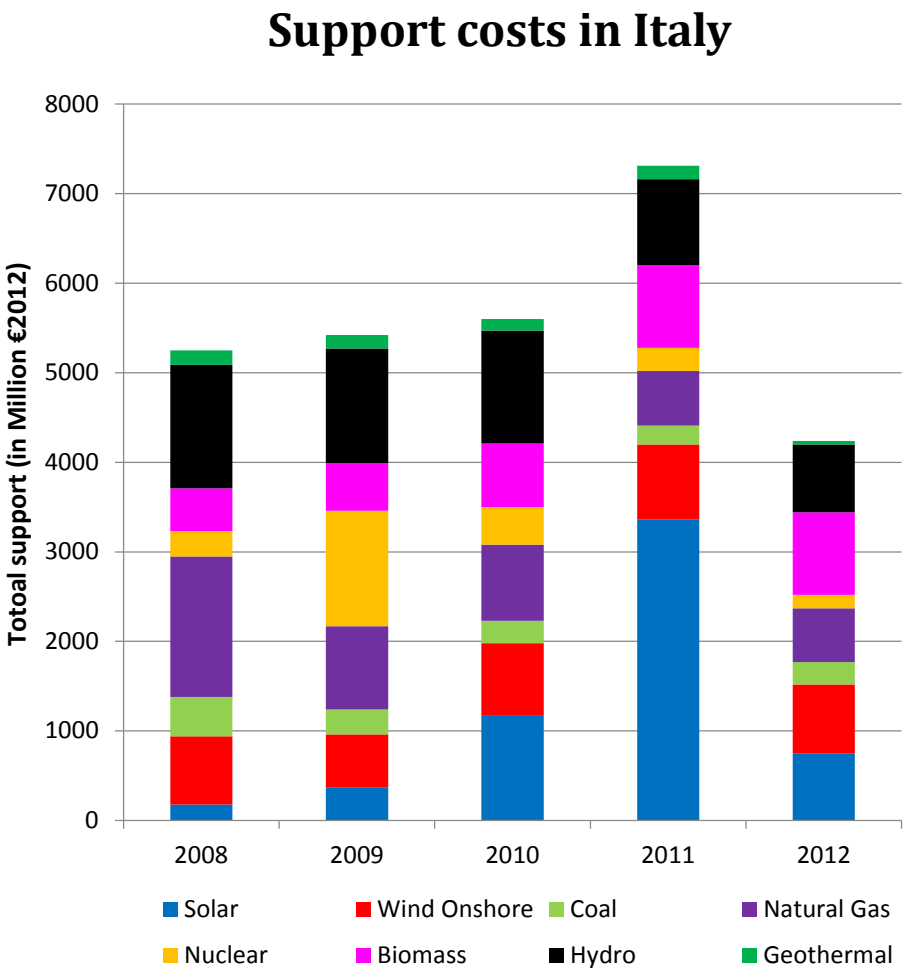
- €26 bn cumulative debt through mid-2013, despite efforts to repay and regulatory changes
- Highest outstanding energy debt in the EU
- In 2013, it was estimated to be 3% of Spanish GDP (€3.6 bn)
- Costs of RES support increased from €1.2 bn to €8.4 bn between 2005 and 2012

PV technology industrial policy



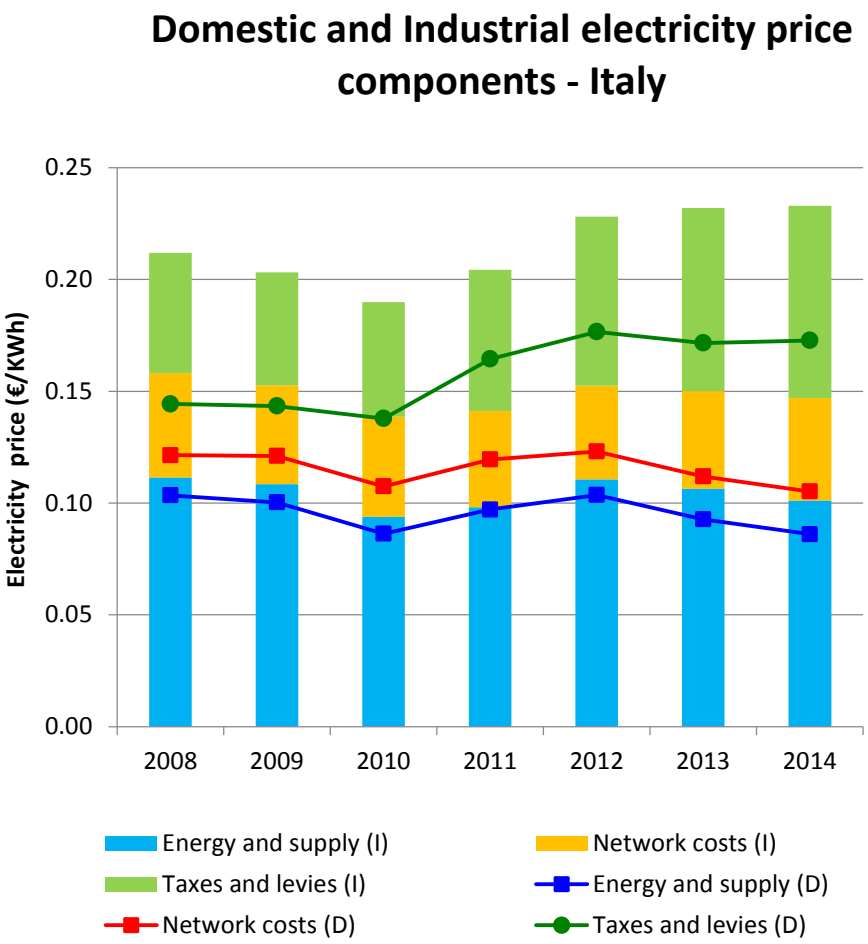
Technology-specific support

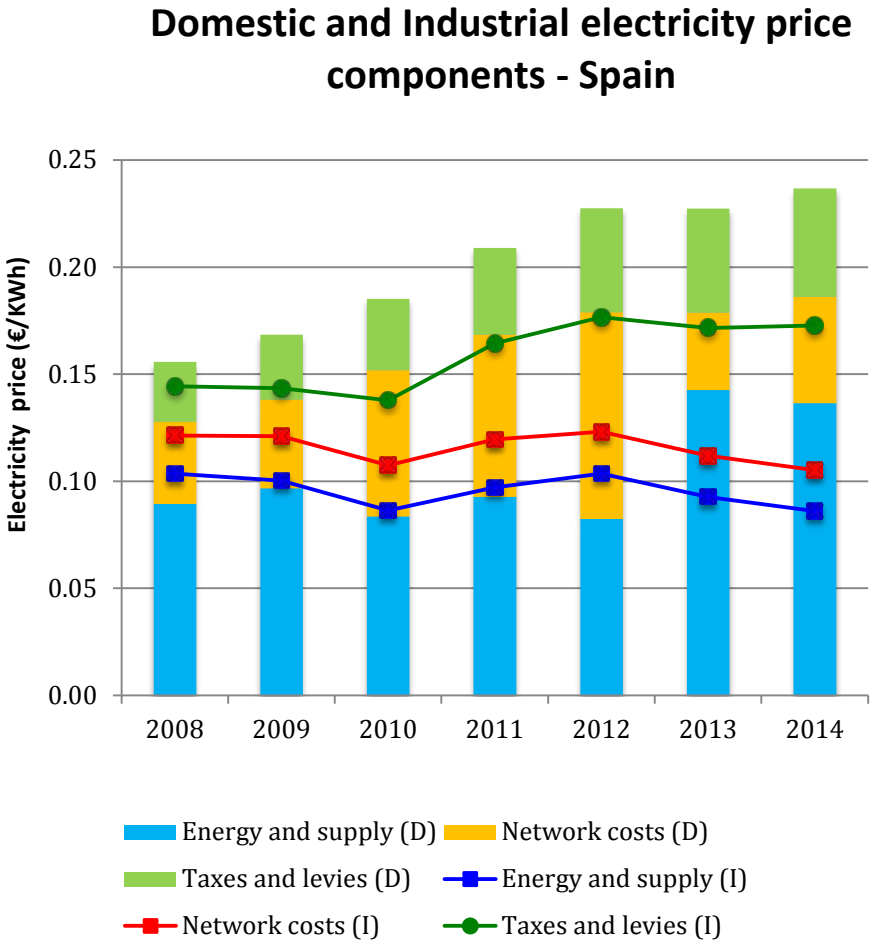




Source: Ecofys (2014)

Electricity Prices

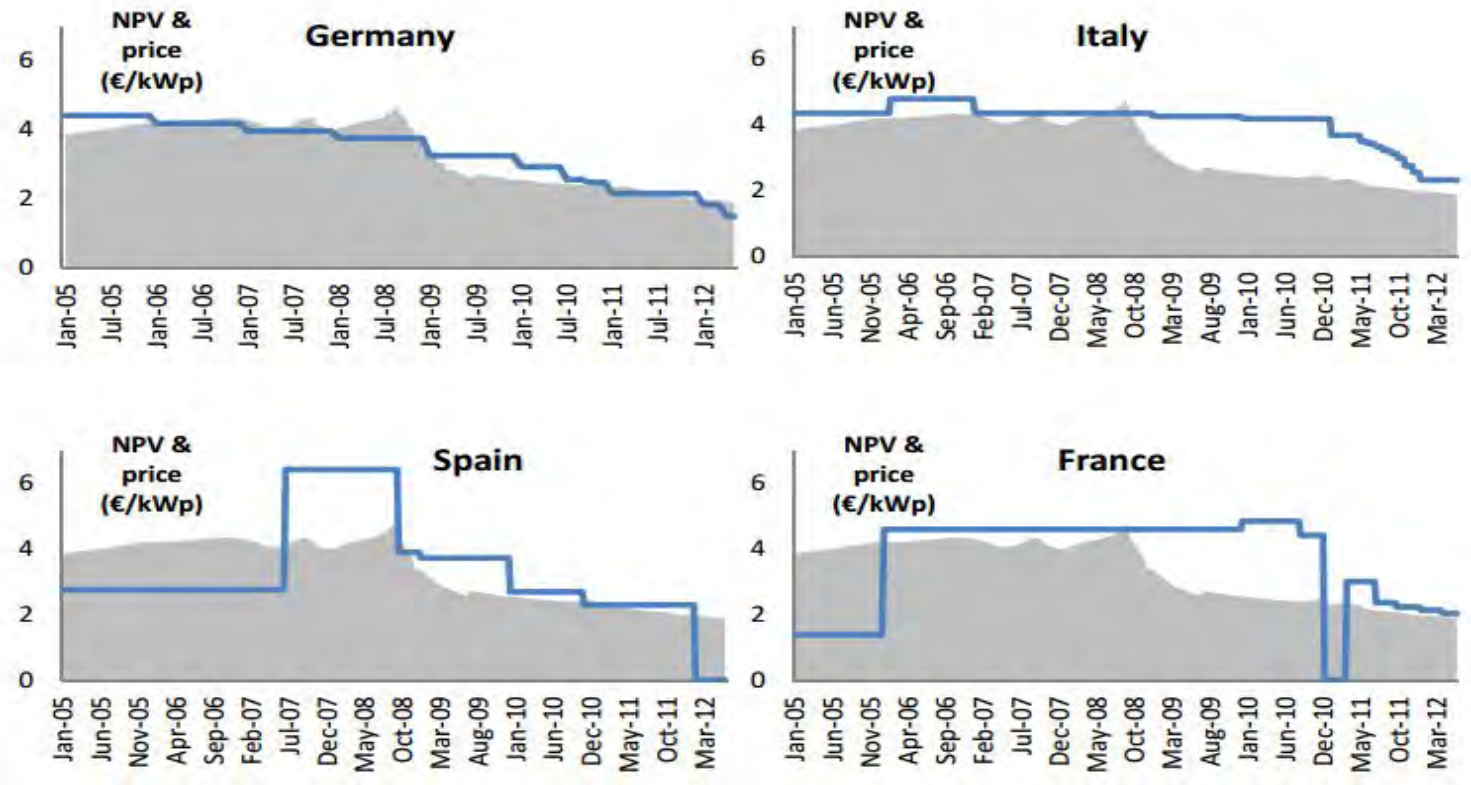




Source: Eurostat database

ITALY & SPAIN – FiT evolution

Comparison of PV systems price and the FiT levels (dark line) over the years



Source: de la Tour & Glachant (2013)

CONTENTS

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- **Lessons from the past**
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Impacts of past policies - Italy

- Solar PV installed capacity surged upwards between 2008 and 2012 due to measures such as Conto Energia and FiT for small installations leading to spiralling support costs
- Italy did not reduce FiT levels until late 2011 despite substantial PV system cost reductions
- Onshore wind installed capacity increased steadily over the years from 2005, along with support costs
- Biomass installed capacity increases can be seen between 2010 and 2012 accompanied by commensurate support costs
- Geothermal energy contribution developed with minimal support but still at relatively low level
- Both residential and industrial electricity prices increased (~10-20%) between 2008-10 and 2012-14

Impacts of past policies - Spain

- Solar PV FiT support tariffs before 2007 were much less than costs of PV systems, resulting in almost no investment
- Policy changes in 2007 reformed existing FiT levels, resulting in generous payments and upsurge in solar PV installed capacity that did not adjust quickly enough to declining unit costs
- Spanish wind investment grew steadily over 2005-12 except for a dip in 2011, but combined with dramatic increase in solar costs, continued support was unsustainable
- Rising tariff deficit eventually led to complete withdrawal of subsidies but not before massive debt had accumulated
- Residential and industrial electricity prices both rose significantly (~40%) between 2008-10 and 2012-14

Outcomes of hasty subsidy reversal

- Since Nov 2011, investor-state arbitration cases under Article 26 of Energy Charter Treaty has almost tripled driven by solar claims: 27 v Spain, 4 v Italy (+ 6 v Czech Rep, etc) and keep coming
- Suits often involve multiple parties, e.g., 16 parties in *PV Investors v. Spain*
- Italy has withdrawn from the ECT, but this will not protect it from solar claims (claims against government actions through 1 Jan 2016, 20 year 'sunset' clause)
- EC has signalled its preference to be the arbiter in intra-EU disputes, which also threatens to undermine ECT

CONTENTS

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SCENARIOS

		RENEWABLE SUBSIDIES	
		Historical	**Removed**
EU CLIMATE POLICY	**Strong (>€50/tCO$_2$)**	**Abundant support**	**Carbon price only**
	Weak (<€5/tCO$_2$)	**Subsidy only**	**Minimal support**

METHODOLOGY

- The general assumptions for the base case are:

  (i) Renewable costs in 2020 measured from 2012 levels,

  – 50% reduction in investment costs for solar PV
  – 30% for CSP
  – 10% for onshore wind and biomass technologies;
  – 5% for geothermal (IRENA, 2015)

  (ii) fossil fuel costs for 2020 are adjusted by a factor of 1.17 for coal and 1.1 for natural gas, derived from IEA World Energy Model 2013, and

  (iii) O&M costs, electrical and thermal efficiencies, capacity factors of all technologies (except geothermal, where it rises to 65% due to expected new thermal storage methods), WACC and hours of operation of all plants are held constant between 2012 and 2020

SENSITIVITY VARIANTS

- We also consider *high (and low) fuel cost variants* assuming a 30 percentage points (p.p.) increase (or decrease) in the fuel costs from the base case assumptions
- Similarly, in a *techno-optimistic (or techno-pessimistic) state* is one wherein the investment costs of renewable technologies and nuclear are 20 percentage points lower (or higher).
- Data for capital costs, financial and technical parameters are based on the estimates reported in Ecofys (2014) report to Commission

Defining Cost-Competitiveness

- Renewable technologies to be 'cost-competitive' only if their Levelized Cost of Electricity (LCOE) estimate, measured in €2012-cents/kWh, is lower than that of both natural gas and coal for electricity generation.
- Nuclear and CSP assumed confined only to Spain, and geothermal only to Italy for purposes of this study
- Calculate based on the method adopted in Ecofys (2014) and calibrated against the mean LCOE figures in Ecofys for the 2012 reference case.

CONTENTS

- Background context – EU
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- Lessons from past
- Scenarios & methodology
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RESULTS

Scenario	Italy					Spain				
	Base Case	High Fuel Cost	Low Fuel Cost	Techno-optimistic	Techno-pessimistic	Base Case	High Fuel Cost	Low Fuel Cost	Techno-optimistic	Techno-pessimistic
Minimal Support	*Wind*		*Wind*		*Wind*	*Wind*		*Wind*		*Wind*
			Geo-thermal		*Geothermal*	*Nuc-lear*	*Nuc-lear*	*Nuclear*	*Nuclear*	*Nuclear*
					Solar PV			*CSP*		*CSP*
										Solar PV
Carbon Price Only								*Wind*		*Wind*
						Nuc-lear		*Nuclear*		*Nuclear*
								CSP		*CSP*
Subsidy only						*Nuc-lear*	*Nuc-lear*	*Nuclear*		*Nuclear*
Abundant Support						*Nuc-lear*		*Nuclear*		*Nuclear*

Technologies in red indicate they are not cost-competitive and ones in blue denote that under certain carbon price or support levels they may become competitive

CONTENTS

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POLICY IMPLICATIONS

- Italy is on target to meet its 2020 renewables targets whereas Spain is not, which may provoke greater scrutiny from Commission closer to 2020
- Recent shifts in subsidy regimes in both countries has led to investor uncertainty, ECT arbitration cases and threats of further legal action
- Any LCOE analysis is inherently limited, but we find that with minimal support many RES technologies are cost competitive in Italy and Spain so any support regimes should focus on innovative renewables and the need for learning
- Removing renewables subsidies may simplify the 2030 discussion but the challenge of a binding 40% target seems to be underestimated. Aside from expected fights over equity, the target is largely viewed with misplaced complacency

THANK YOU!

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