



A methodology to allocate the cost of national support schemes for RES-E among final energy consumers

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Cost allocation of national support schemes for RES-E Contents

- Introduction
- Renewables support schemes classification
- RES-E support burden sharing
- Proposal
- Motivation
- Drivers and beneficiaries assessment
- Allocation methodology
- Application to Spanish case

Renewable support schemes classification

Three major approaches

- Price mechanisms
 - Feed-in tariffs
 - Administratively fixed tariff paid for MWh produced
 - Fixed price (Germany)
 - Premiums (Spain, 20% of the income linked to energy market prices)
 - Fiscal incentives
 - Soft loans
- Quantity mechanisms
 - Renewable Obligations/Green Certificates/Renewable Portfolio Standards
 - Requirement to purchase/sell a minimum of electricity from renewable sources
 - “Cap & trade” or “Just cap” (no trading allowed)
- Centralized competitive auctions
 - Indirect way for feed-in tariff discovering plus long-term contracting to reduce risk aversion



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Renewable support schemes classification

Assessment of the three major approaches

- Feed-in tariffs
 - Commonly accepted as the most successful mechanism up to now
 - 45 countries worldwide have some kind of feed-in tariff
 - Risk of falling short (no investment if the economic support is not enough) or too long (too much and too expensive)
 - Without premiums, no (or little) exposure to market signals
 - No incentives for predicting generation, to minimize imbalances
- Renewable obligations
 - In principle, the most economically efficient alternative
 - Exposes investors to two market signals (green certificates and wholesale generation market) increasing risk premium
- Competitive auctions
 - In principle, keeps the advantages of feed-in tariffs (income certainty) but allows getting to the right amount of investment
 - In case of non-mature technology development has proven to be ineffective (too many uncertainties to deal with)



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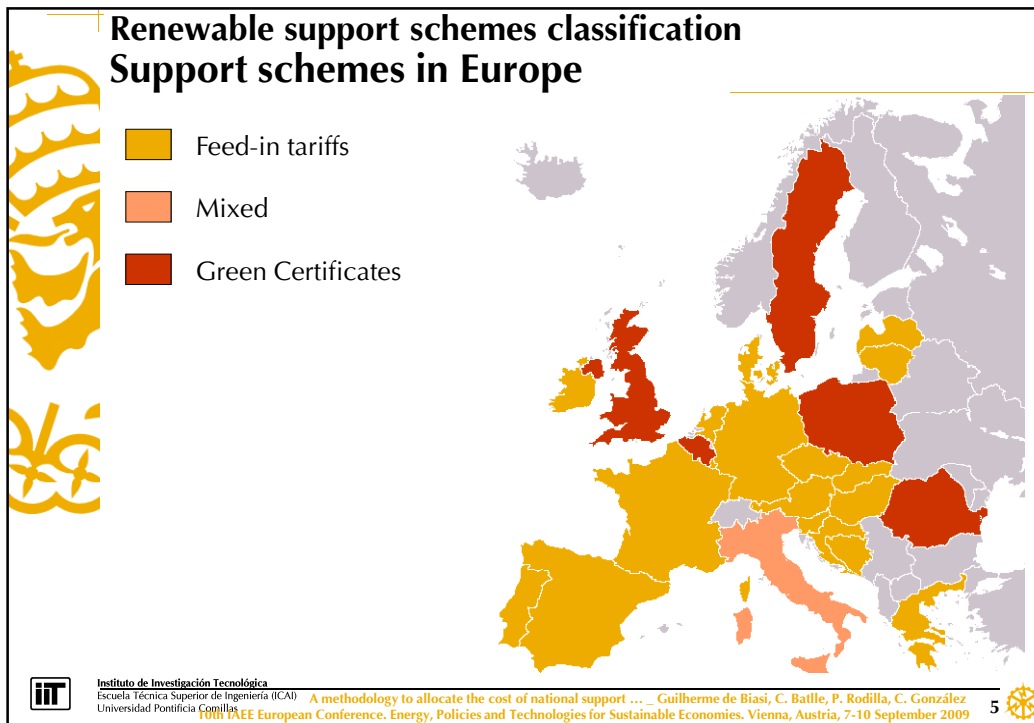
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Renewable support schemes classification

Who bears the RES-E extra-costs?

- The allocation criteria is implicit in three of the alternative support mechanisms
 - Green certificates
 - Electricity consumers [per MWh]
 - Allocation is implicitly determined, suppliers (i.e. consumers) pay for the opportunity cost of RES-E production
 - But retailers might be free to allocate costs differently among their consumers
 - e.g. it might lead to a proxy of Ramsey allocation (less to the more elastic consumers)
 - Tax incentives
 - Tax payers (whoever they might be)
 - Funded from State Budget
 - Soft loans
 - The tax payers if the financial institution is national and public

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Renewable support schemes classification

Who bears the RES-E extra-costs? (ii)

- In case of feed-in tariff, the regulator has to explicitly design a cost allocation methodology
 - According to very different (and often non-transparent) criteria
 - Economical efficiency criteria
 - Ramsey rule (or any proxy)
 - To weight any other signal embedded in the tariff design that might be considered of interest (energy efficiency of domestic customers)
 - Cost causality/beneficiaries
 - Strategic social/industrial policy
 - Equity criteria
 - Three major alternatives in force
 - Electricity consumers via access tariffs ...
 - Allocated to three different major charges
 - [Per MW] (capacity contracted), [Per MWh] (energy consumption), [Per consumer] (often differentiating among types of consumers)
 - ... or even via the State Budget
 - Assigned to retailers



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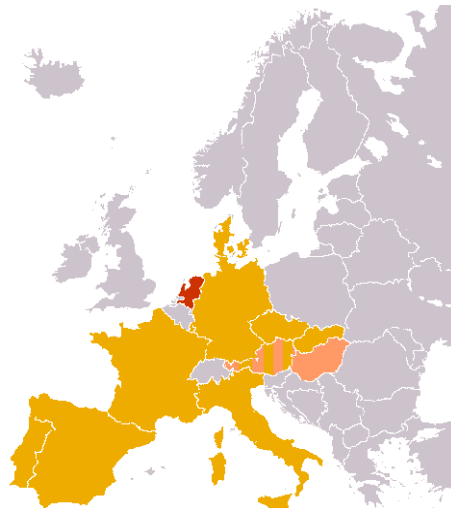
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Cost allocation of national support schemes for renewable

How extra-costs are allocated?

- Access tariff
- Assigned to retailers
- State Budget



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Cost allocation of national support schemes for renewable Allocation through the access tariff

- Proportional to consumption [Per MWh]
 - Good causality and responsibility properties
 - RES-E support arises due to the consumption of non-renewable energy
- Dependant on voltage level to which each consumer is connected to (HV, MV or LV)
 - Often used for competitiveness purposes (mainly of large consumers)
- Fix amount
 - Bigger burden to small consumers
 - According to contracted capacity [Per MW]
 - Poor proxy of the per-MWh solution
 - [Per consumer]
 - Poor for equity purposes







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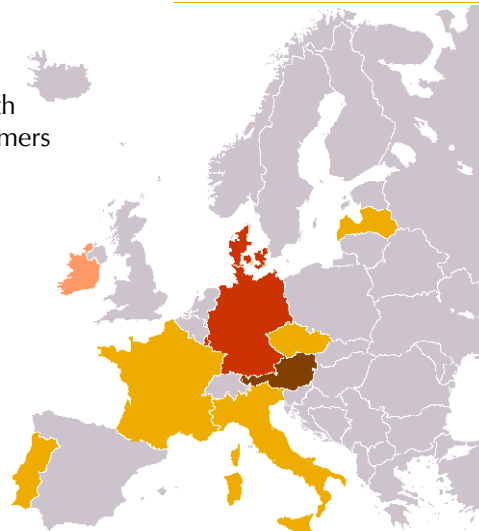
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Cost allocation of national support schemes for renewable Allocation in the access tariff

-  Proportional to consumption
-  Proportional to consumption with differentiated tariff for big consumers
-  Fix amount
-  Fix amount differentiated by voltage level



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Cost allocation of national support schemes for renewable Cost allocation methods per country

Country	Access tariff	Fixed amount	Per MWh	Dependant of voltage level	Assigned to retailers	Reduction to large consumers	State Budget
Austria ¹		X		X	X		
Croatia			X				
Czech Republic	X		X				
Denmark			X				
France	X		X				
Germany	X		X			X	
Hungary					X		
Ireland		X					
Italy	X		X				
Latvia			X				
Luxembourg			X	X		X	
Netherlands							X
Portugal	X		X				
Slovakia	X		X				
Spain	X						

¹Two methodologies combined



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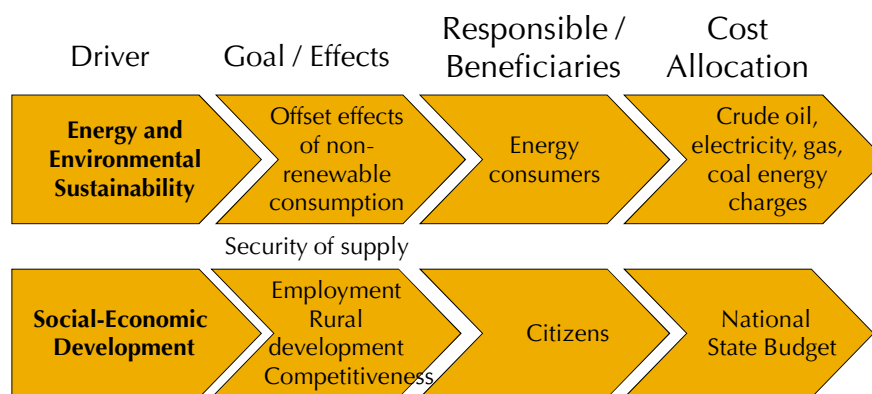
Cost allocation of national support schemes for renewable EU RES-E Directive (20-20-20)

- The EU directive justifies the binding objective on the fact that RES-E play an important role in all three aspects
 - Promotion of national resources to reduce energy dependency
 - GHG emission reduction
 - Technological/industrial development linked to these sources
- According to the causality criterion ...
 - It is fair that the ones paying are those responsible and/or benefited by the regulatory measure
- ... these policy pillars can be grouped into two:
 - Environmental sustainability of energy
 - Aims to offset the effects of non-renewable energy consumption
 - Social-economic development
 - Employment, competitiveness
 - Development of rural areas
 - Security of supply is transverse to both



Cost allocation of national support schemes for renewable Drivers and Beneficiaries of RES-E Policy

- Principle of Causality



Cost allocation of national support schemes for renewable Proposed Methodology

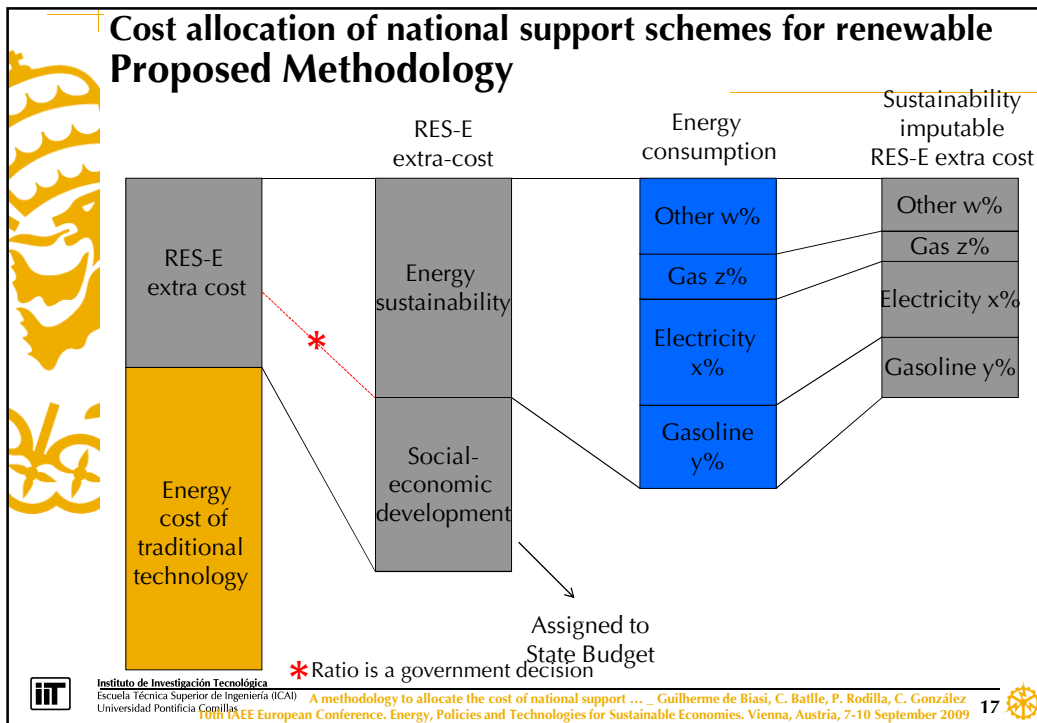
- First step
 - Calculation of the extra-cost derived from RES-E support
 - Assess all RES-E support schemes and gather them together to get to the total cost to be allocated
 - In case of feed-in tariff
 - Tariff paid [per MWh] minus the wholesale market price
 - Additional impacts on energy final prices might be considered
 - i.e. grid reinforcements, back up needs, effects on wholesale prices
- Second step
 - Definition of the share of the RES-E support attributable to social-economic development
 - Government decision
 - Assigned to citizens through State Budget
 - Complementary part is attributable to energy and environmental sustainability aims
 - Assigned to energy consumers in a per-unit basis



Cost allocation of national support schemes for renewable Proposed Methodology (ii)

- Third step
 - Distribution of costs among the different fuel final consumers (crude oil, electricity, gas and coal)
 - Estimation of each fuel's future consumption share in total consumption
 - RES-E costs attributable to energy consumers should be defrayed to each fuel according to this proportion
 - In the case of each of the fuels, the charge is allocated in proportion to the energy consumption
 - Gasoline [€/liter], electricity [€/MWh], gas [€/MWh or €/Btu], coal [€/ton]



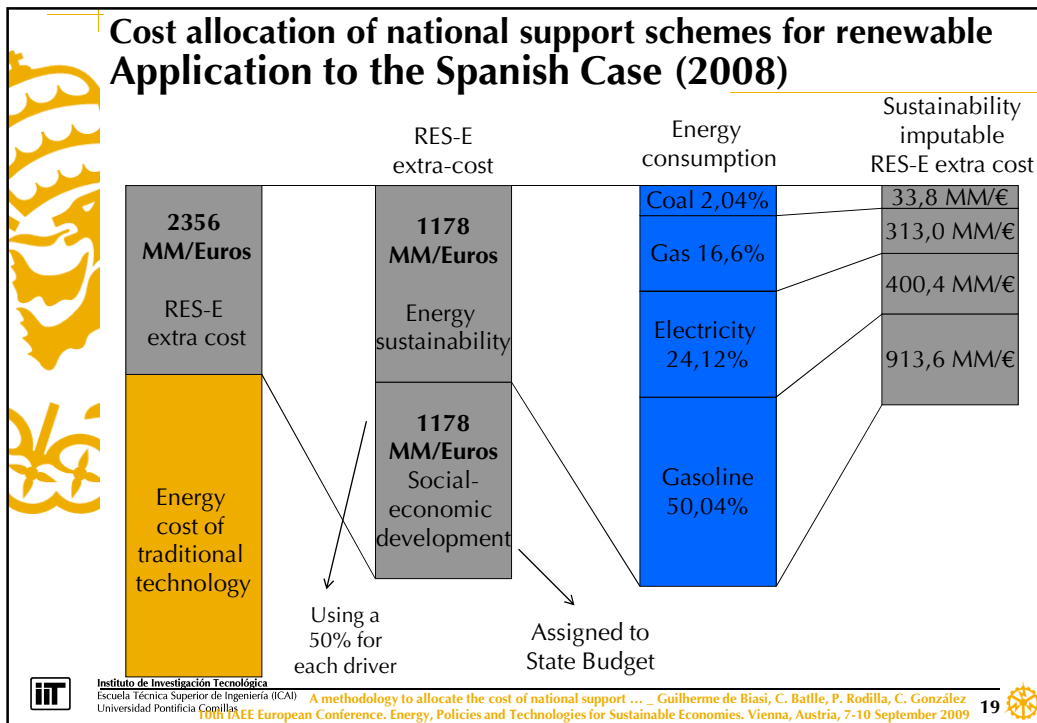


Cost allocation of national support schemes for renewable Application to the Spanish Case

- Royal Decree 661/2007 disciplines the feed-in support scheme (the so-called Special Regime)
 - Producers can choose between
 - receiving a full fix tariff or
 - a fix tariff plus a premium over market price (with cap and floor)
- High penetration of wind generation
 - ~17 GW in 2009 out of a peak demand of less than 45 GW
 - Governmental objective for 2016: 29 GW
- Estimated extra-costs [Spanish Energy Commission] of RES-E amounts to ~4500 M€ in 2016
- Currently is charged to consumers through access tariffs

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- ### Cost allocation of national support schemes for renewable Application to the Spanish Case (2008)
- Under the current allocation criteria, the burden of RES-E extra-cost for the electricity tariff amounts to
 - around 8% in 2008
 - ~2400 million euros out of a total cost of ~30 billion
 - around 15% in 2016
 - ~4500 million euros out of a total cost of ~35 billion
 - Applying the presented methodology, this percentage would be
 - In 2008
 - If no allocation is charged to the State Budget: 2,6% (800 M€)
 - If 50% of the extra-costs are passed through to the State Budget: 1,3%
 - In 2016
 - If no allocation is charged to the State Budget: 4% (1400 M€)
 - If 50% of the extra-costs are passed through to the State Budget: 2%
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Cost allocation of national support schemes for renewable Application to the Spanish Case (2008)

	Sustainability RES-E extra cost	Energy consumption
Coal	33,8 MM/€	2021 ktep
Gas	313,0 MM/€	19094 ktep
Electricity	400,4 MM/€	24475 ktep
Oil	913,6 MM/€	55859 ktep



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