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# 25 years of European climate policies

**Xavier Labandeira**

Universidade de Vigo; RSCAS Fellow

*European Union Studies Group  
EUI, 22 November 2017*



Universidade de Vigo

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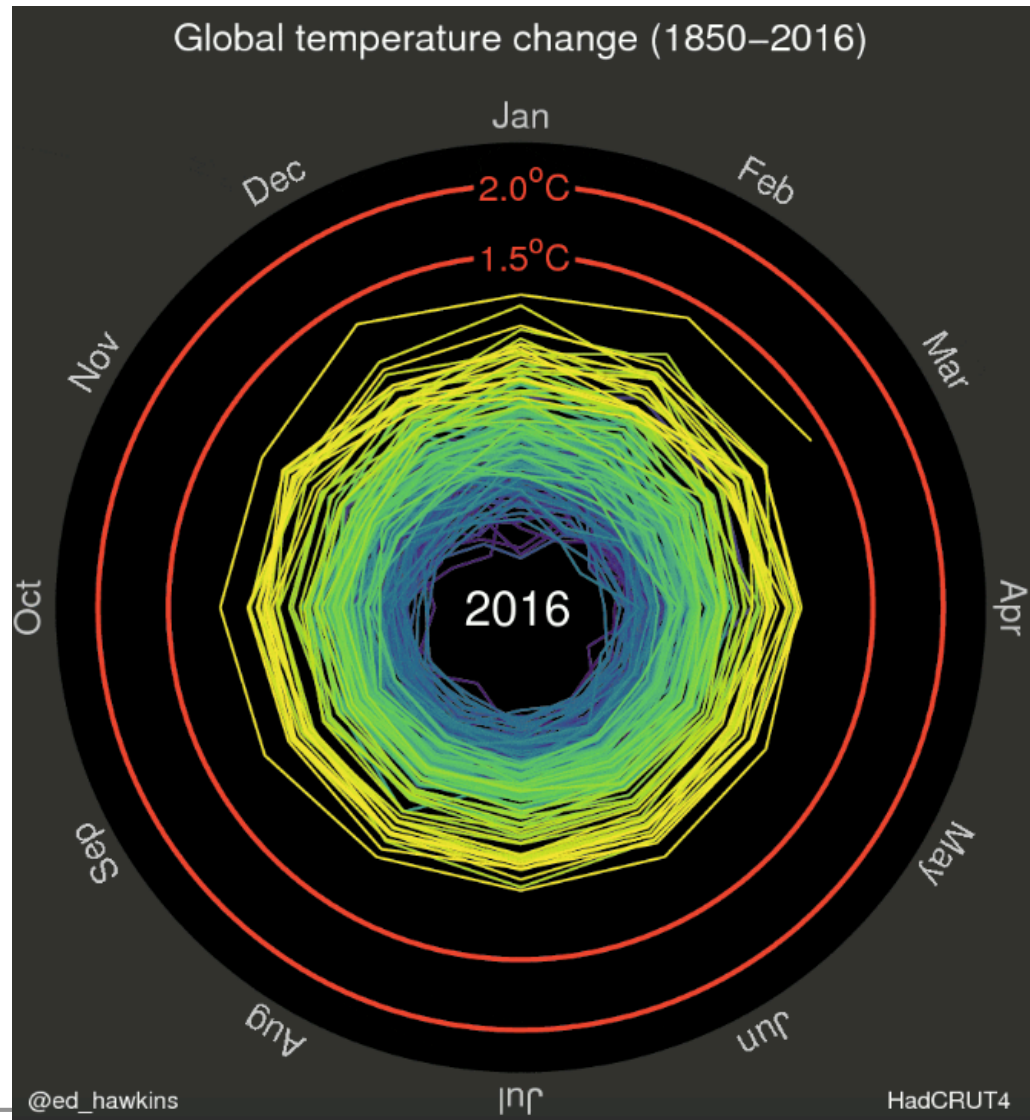


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# Contents

- ❑ The context
  - ❑ What is European Climate Policy and how to assess it?
    - ❑ *EU ETS*
    - ❑ *Renewable support schemes*
    - ❑ *Energy efficiency policies*
    - ❑ *Energy/carbon taxation*
  - ❑ Constraints and opportunities
  - ❑ Conclusions and research challenges
-

# 'Spiralling temperatures'



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# Dealing with climate change

## ❑ A 'perfect' negative externality

- Global public bad (with varying responsibilities and impacts)
- Intergenerational issues and non-reversibilities
- Uncertainty and extreme events

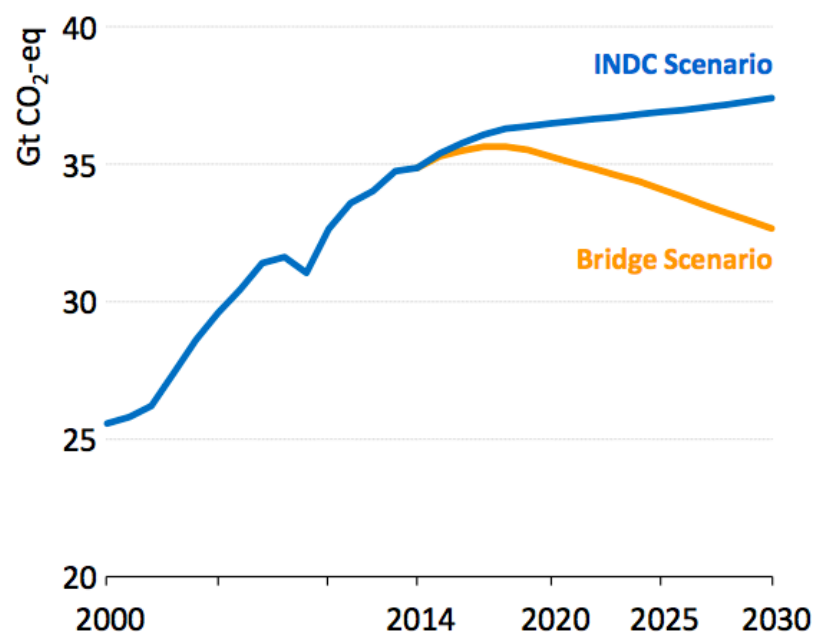
## ❑ The Paris Agreement

- The 'road' to Paris
  - A step to deal with the global externality? NDCs
  - Bonn: How to fill the gap and equity issues
-

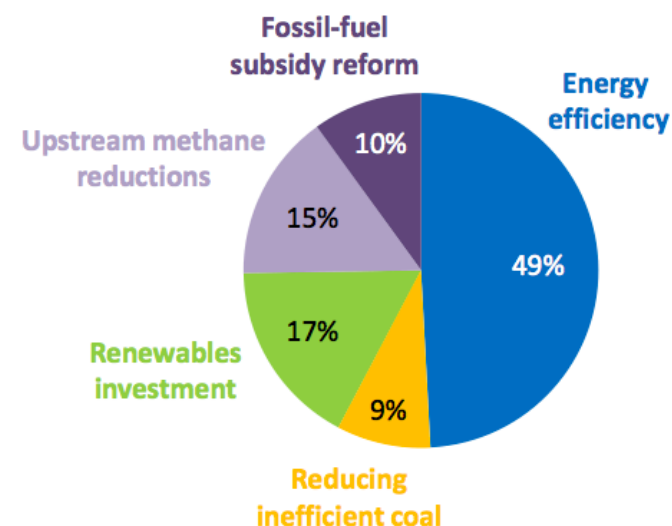
# 1. Peak in emissions: IEA strategy to raise climate ambition

WEO Special  
Report on  
**Energy &  
Climate  
Change**

Global energy-related GHG emissions



Savings by measure, 2030



**Five measures – shown in a “Bridge Scenario” – achieve a peak in emissions around 2020, using only proven technologies & without harming economic growth**

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# Economics of climate policies

- ❑ (Mitigation and adaptation)
- ❑ Efficiency and distribution
- ❑ First-best policy: GHG pricing of external damages
- ❑ Second best departures
  - Exogenous objectives
  - Other market failures
  - Leakage
  - Public revenues
- ❑ Sub-optimal prices and
- ❑ Interactions and synergies with other policy instruments

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(OECD, 2011)

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# Relevance of EU climate policies

- ❑ A very relevant experience (the '*Grand Policy Experiment*')
    - In comparative terms
    - Sophisticated (role of Economics) and complex approximation
    - Increasing academic literature
    - In a moment of intense policy change/debate
  - ❑ Relevance for post-Paris?
    - A prototype?
    - Learning by doing for the world? NDCs
  - ❑ Research needs and challenges
-





## Minding the Gaps in US Climate Policy

**Karen Palmer**  
Resources for the Future

7<sup>th</sup> Atlantic Workshop on Energy and Environmental Economics  
27 June 2016

This analysis draws on research funded by the Sloan Foundation, the Energy Foundation, the National Renewable Energy Laboratory and RFF's Center for Energy and Climate Economics.



### Attitudes to adopt for this talk



WHEN **Congress** GIVES  
YOU LEMONS... MAKE  
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[goo.gl/qlvAFg](http://goo.gl/qlvAFg)

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# What is European Climate Policy?

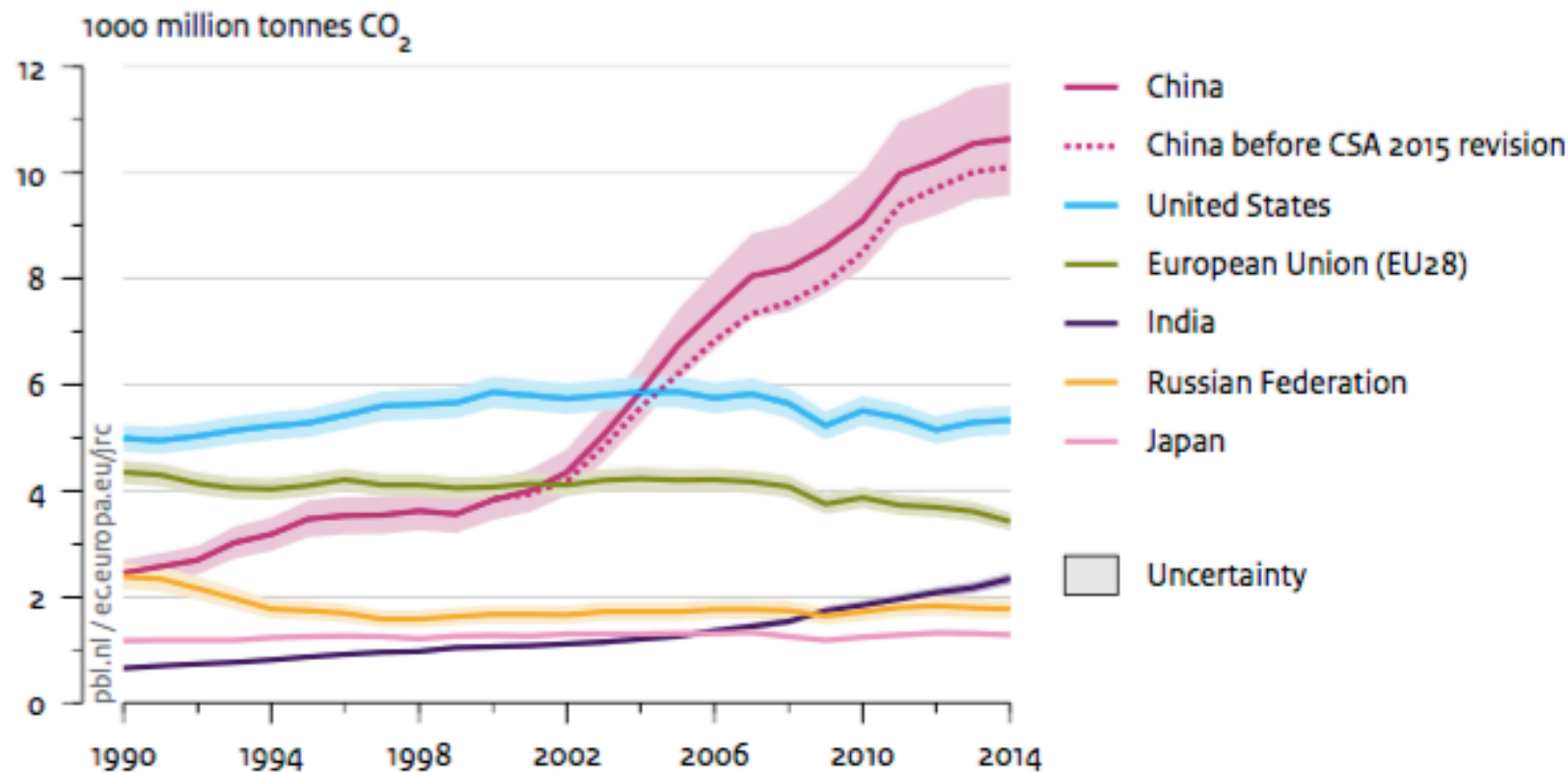
- ❑ Explicit (eg EU ETS) and implicit instruments (eg RES promotion)
- ❑ EU, national and subnational strategies
  - Linked/related or not

## How to assess it?

- ❑ Complying with its GHG mitigation objectives
  - ❑ Cost-effectiveness
  - ❑ Contribution to international agreements (Böhringer, 2014)
  - ❑ Distributional issues
-

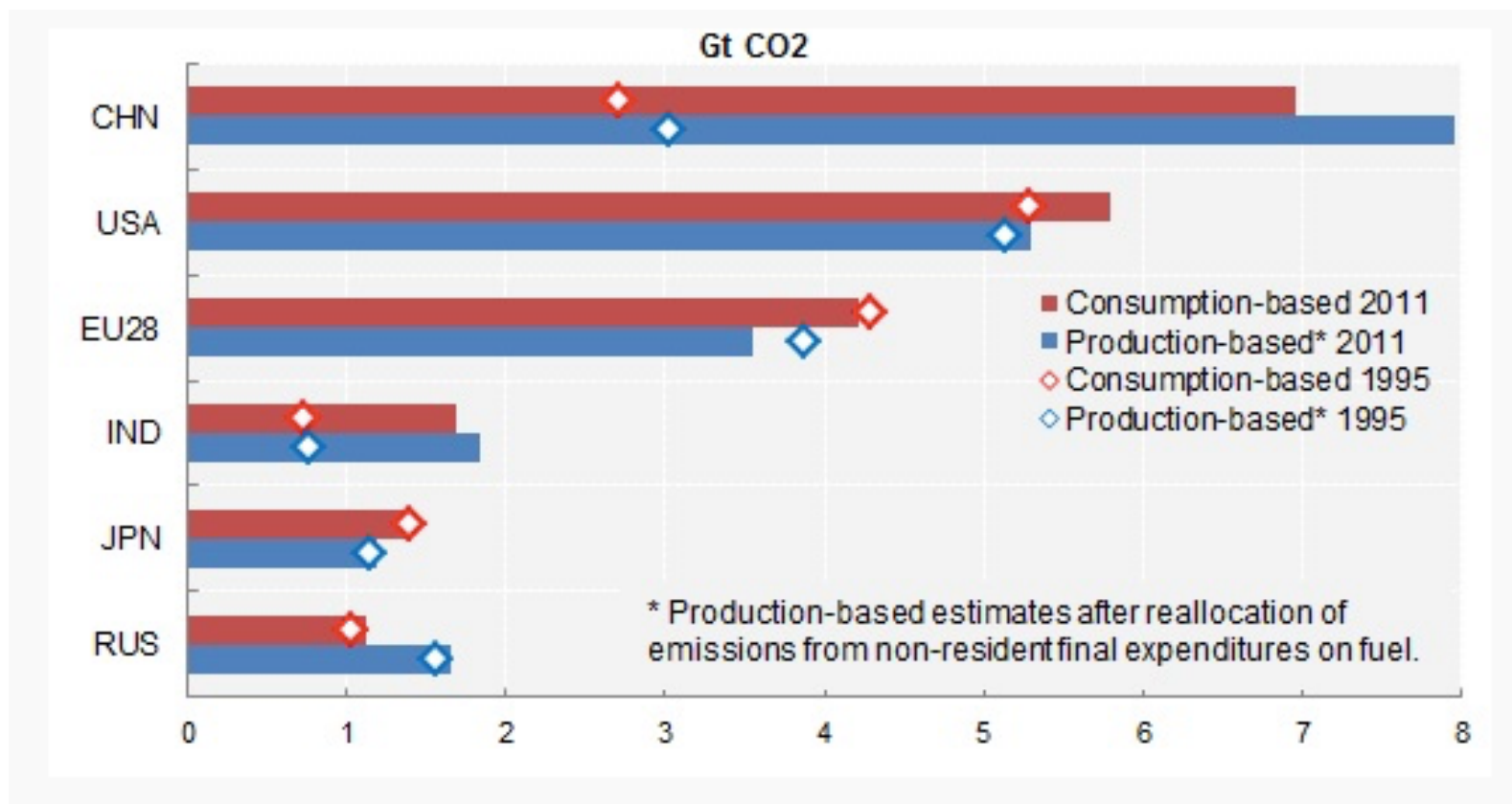
# EU GHG emissions at two glances

CO<sub>2</sub> emissions from fossil-fuel use and cement production in the top 5 emitting countries and the EU



Source: EDGAR 4.3 (JRC/PBL, 2015) (1970-2012; notably IEA 2014 and NBS 2015); EDGAR 4.3FT2014 (2013-2014): BP 2015; GGFR 2015; USGS 2015; WSA 2015

## Production and consumption-based emissions, EU-28



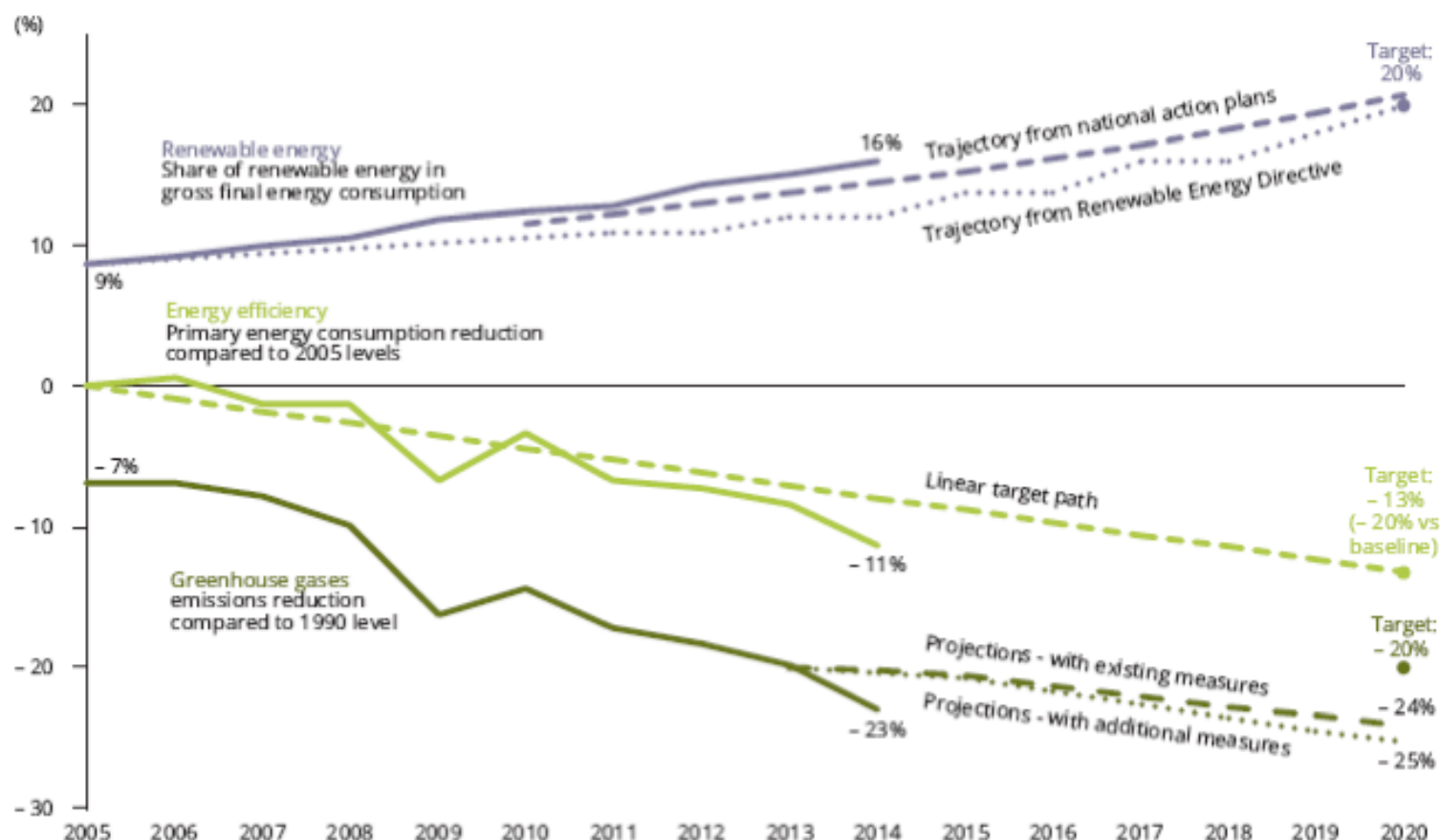
Source: OECD

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# EU climate policy: setting and pillars

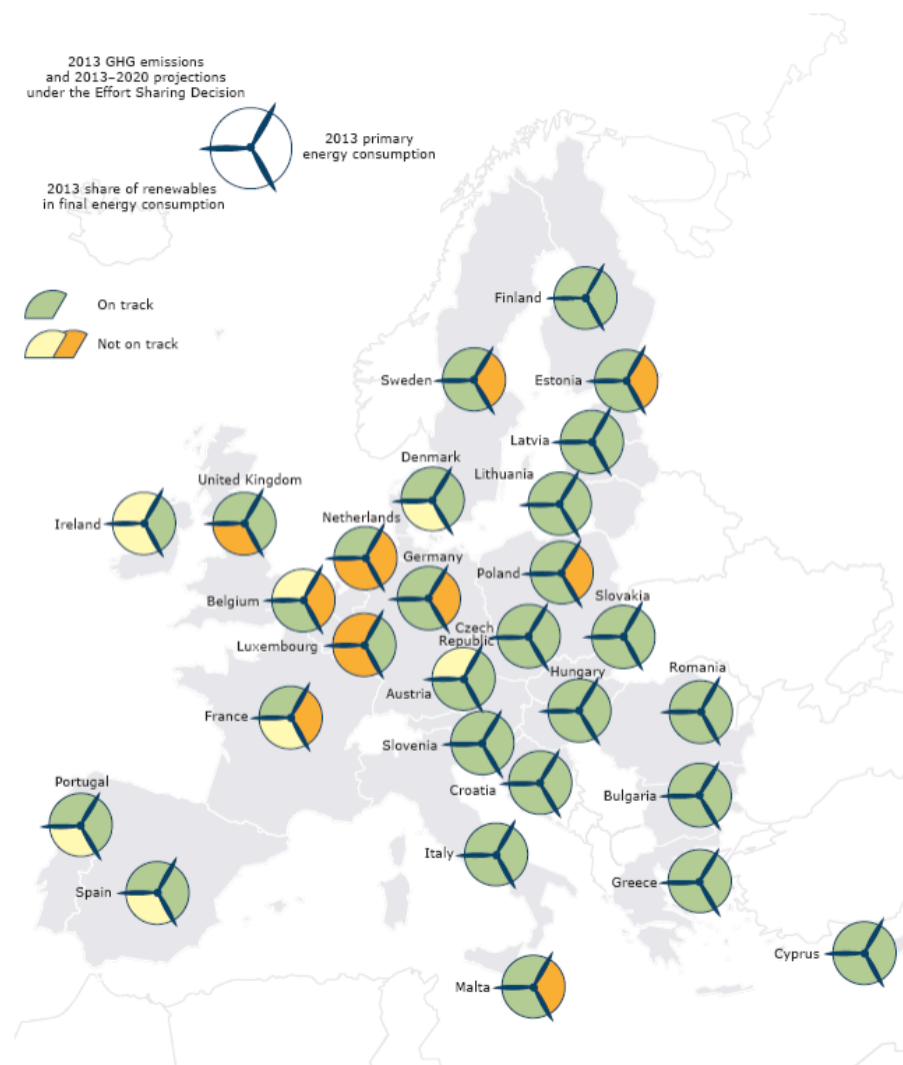
- ❑ The roadmap to 2050 (Skaereth et al., 2016)
  - ❑ From the origins of EU climate policy to 20-20-20
  - ❑ 2030 framework for energy and climate
    - Targets: -40% GHG, 27% RE consumption, 27% BAU energy savings, 15% energy interconnection, *ESD for non-EU ETS*
    - Policies: reformed EU ETS, Energy Union (competitiveness, security)
  - ❑ Four traditional components of EU climate policies:
    - EU ETS
    - Renewable support schemes (and CCS)
    - Energy efficiency policies
    - Energy/carbon taxation
    - (Transport)
-

**Figure 2.1 EU progress towards 2020 climate and energy targets**



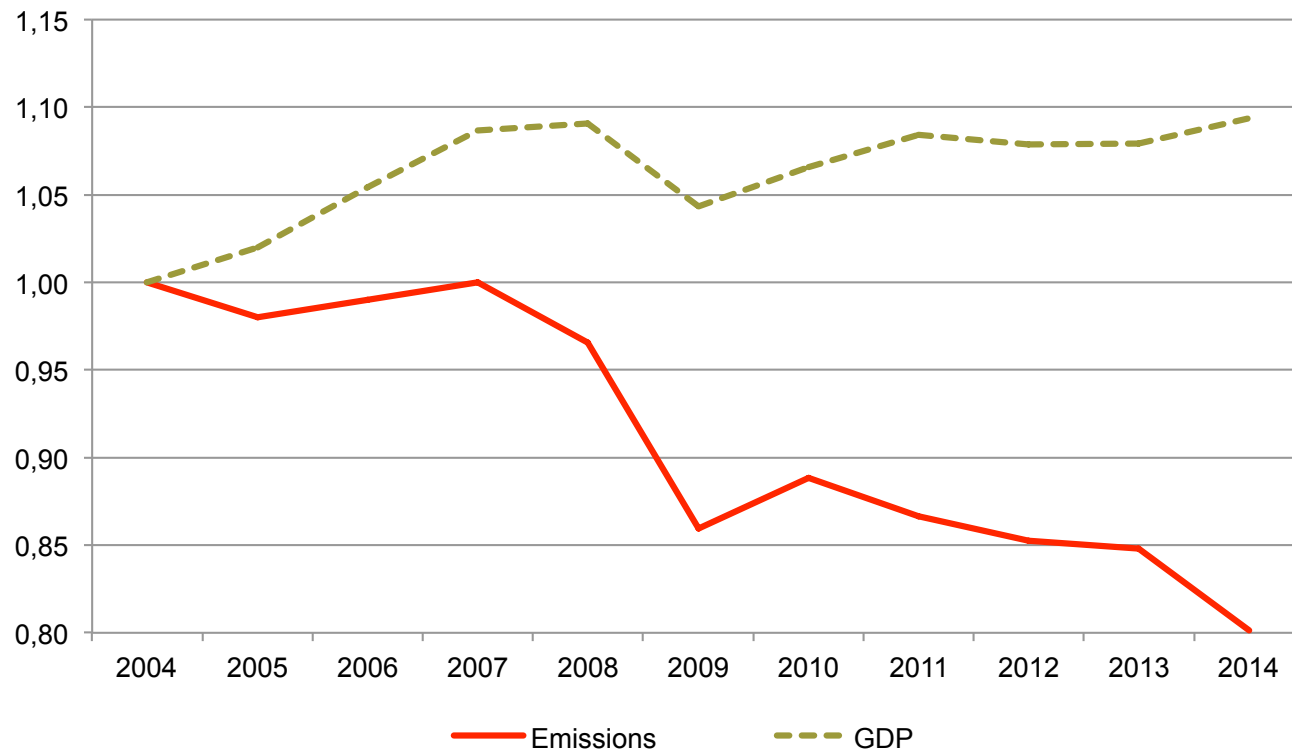
**Note:** The energy efficiency target for 2020 is defined as an absolute target, set 20% below the level in primary energy consumption projected for 2020 in the 2007 Energy Baseline Scenario of the European Commission. In this figure, this target is expressed as a relative change compared to 2005 levels of EU primary energy consumption, in order to show the required reduction in primary energy consumption over time. The year 2005 was chosen because it is used as a base year for GHG (in the EU ETS and under the ESD) and for renewable energy targets. It also corresponds to a peak in energy consumption in the EU.

Figure ES.2 Progress of Member States towards 2020 climate and energy targets



**Note:** The Effort Sharing Decision sets individual binding annual targets for GHG emissions not covered by the EU ETS for all Member States for the period from 2013 to 2020. The Renewable Energy Directive sets individual binding targets for the 2020 share of renewable energy sources in gross final energy consumption, as well as indicative trajectories up until 2020. Under the Energy Efficiency Directive, Member States set their own target on energy consumption for 2020.

# EU CO<sub>2</sub> emissions and GDP



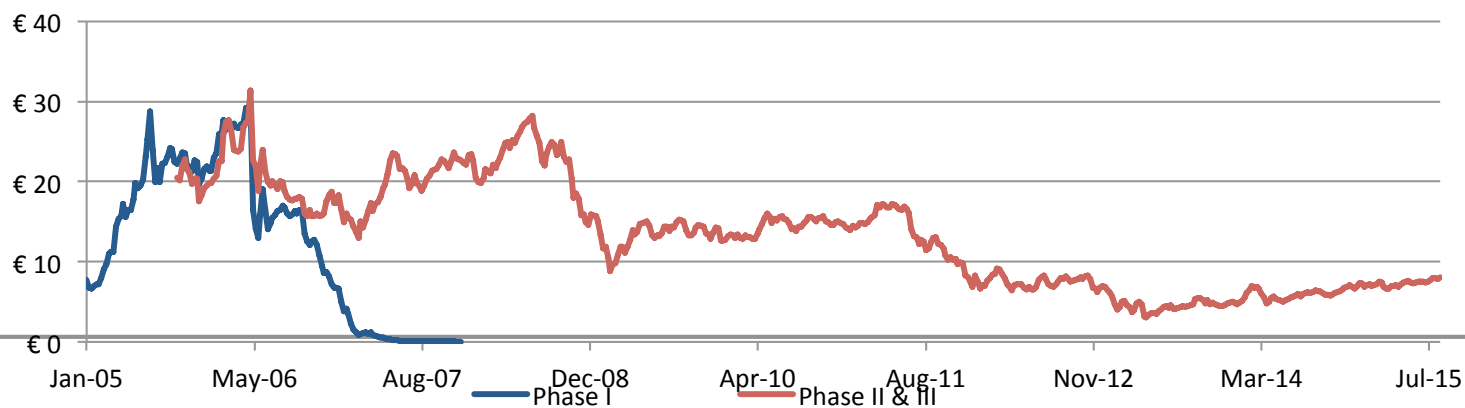
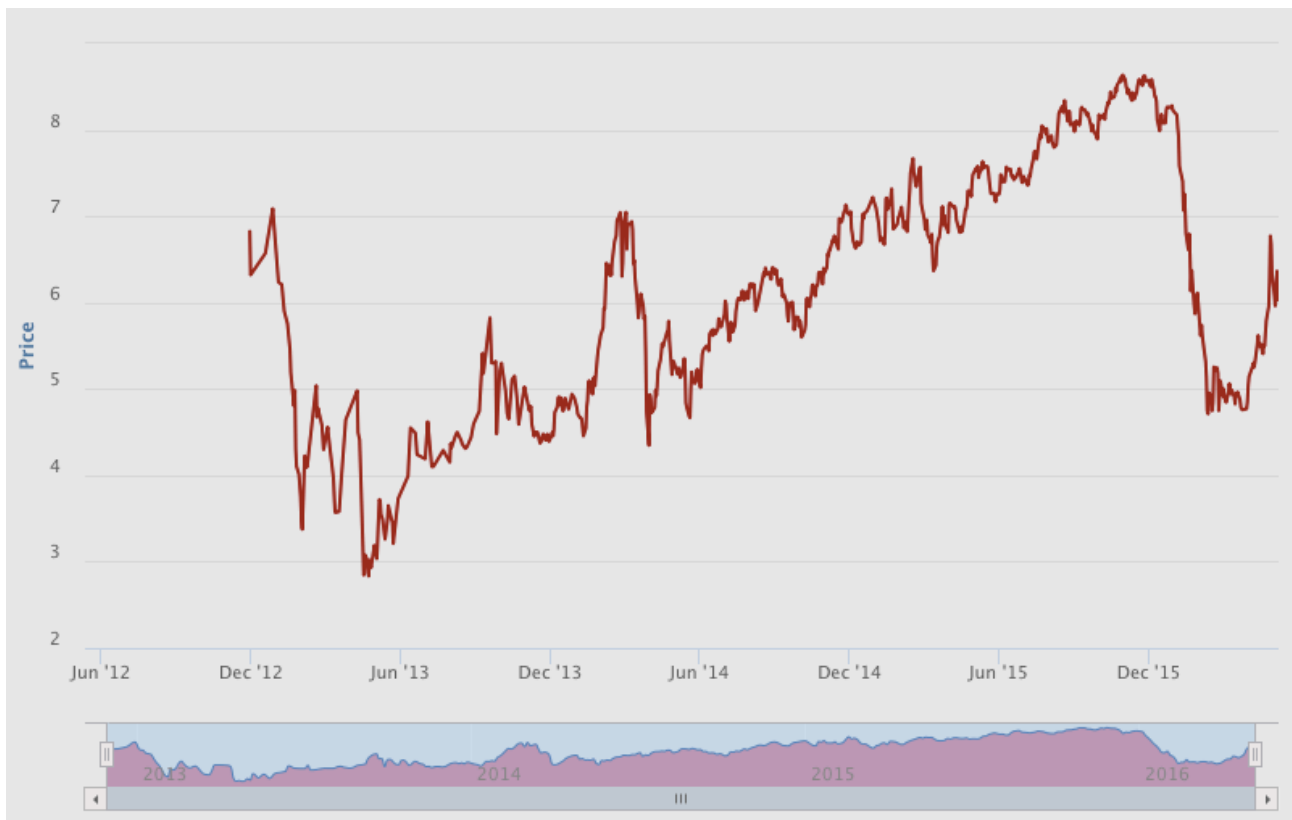


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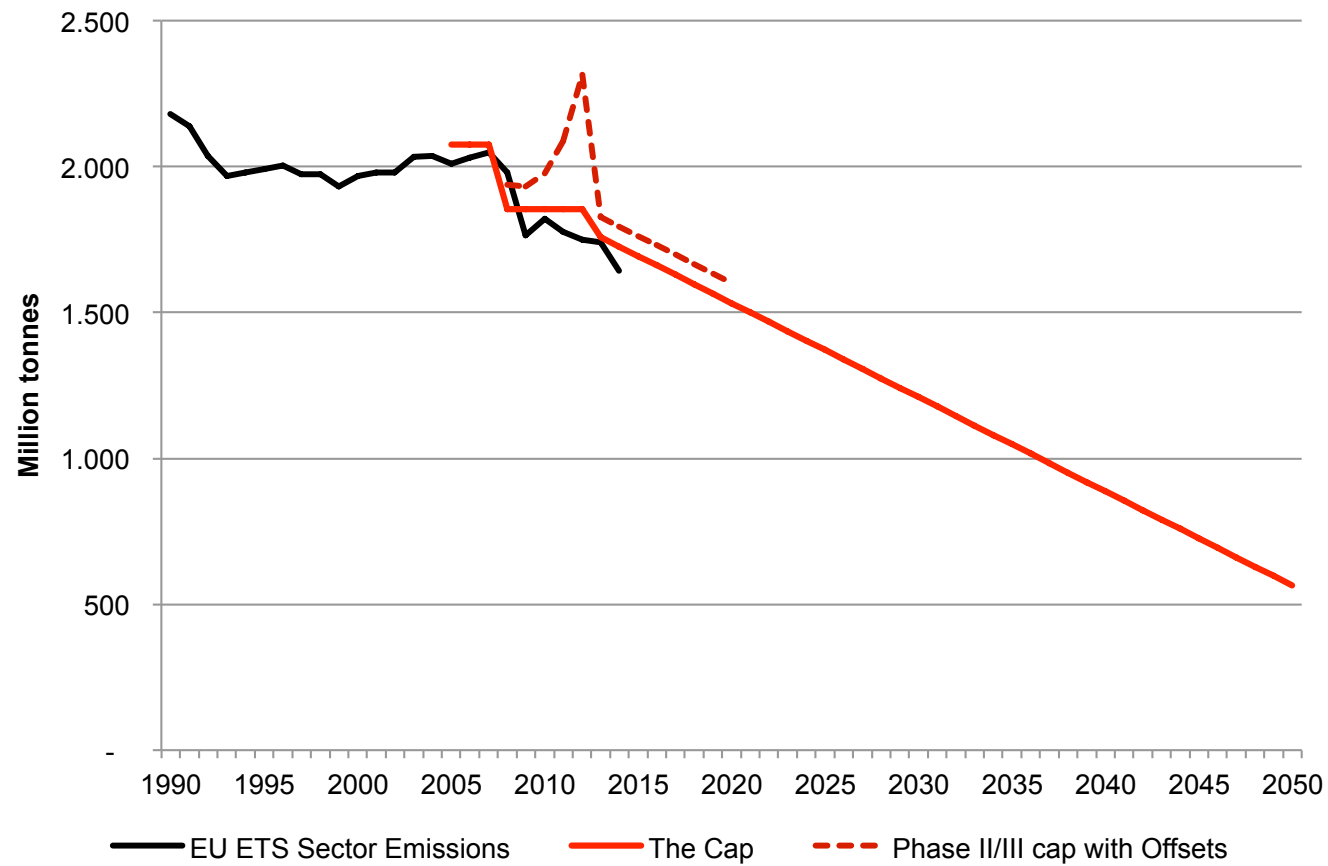
# **(1) EU ETS**

- ❑ A market-based approach, after the failure of the tax**
  - ❑ A continuously-reformed 2003 Directive (Learning by Doing)**
  - ❑ A brief history: phases I and II (Ellerman et al., 2015)**
  - ❑ The current phase III: EU cap, benchmarking and supply**
  - ❑ A reformed EU ETS after 2020:**
    - Declining cap**
    - Reinforced MSR**
    - Free allocation and benchmarking**
    - Distributional matters**
-

## Prices and trade volume in the EUA secondary market (EEX)



## The EU ETS cap



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# **An economic appraisal of the EU ETS**

## **❑ Environmental effects**

- **Aggregate emissions (Ellerman and Buchner, 2008; di Maria, 2011)**
- **Firm-level data (Wagner et al, 2013)**
- **Power sector (Delarue et al., 2008)**

## **❑ Competitiveness and leakage**

- **Firm-level data (Abrell et al., 2011)**
- **Surveys (Martin et al., 2014)**
- **Pass-through (Fabra and Reguant, 2014)**

## **❑ Innovation (Calel and Dechezlepretre, 2015)**

## **❑ Investment (Borghesi et al, 2012)**

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## **The EUA price ‘debate’**

- ☐ **Reasons**
- ☐ **Backloading and MSR**
- ☐ **The French ‘soft collar’ proposal**

## **Distributional issues**

- ☐ **Allocation**
  - ☐ **Pass-through**
  - ☐ **Compensations among countries**
-



# 10<sup>th</sup> Anniversary EU ETS, Florence



fsr.eui.eu/event/looking-back-at-ten-years-of-the-eu-ets-lessons-learnt-and-future-perspecti



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[Home](#) > Looking Back at Ten Years of the EU ETS: Lessons Learnt and Future Perspectives

This event has passed.

## Details

**Date:**  
21st May 2015

**Event Categories:**  
[Climate](#), [Energy](#)

## Venue

[Teatro, Badia  
Fiesolana](#)

*Via dei Roccettini, 9  
San Domenico di  
Fiesole, FL 50014  
Italy*

## Looking Back at Ten Years of the EU ETS: Lessons Learnt and Future Perspectives

21st May 2015



This conference aimed to take stock of the challenges, lessons and achievements of the EU ETS in Europe and in the rest of the world and to discuss future perspectives. The event was organised in collaboration with **DG Climate Action**, European Commission.

## Interviews

**Jorge Moreira da Silva** | Minister for Environment, Spatial Planning and Energy, Portugal

# LIFE *SIDE* at FSR Climate: 2016-2018

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Adaptation to climate change ▶

**EU budget & LIFE ▼**

**LIFE Climate Action ▼**

**Grants and projects**

Financial instruments



### LIFE Climate Action: Project grants and NGO support

**Grants are available for a variety of climate action projects. Non-governmental organisations (NGOs) working towards environmental and climate goals at European level can also obtain funding for their operational and administrative costs.**

#### Action grants for projects



#### Read more

[Publications](#)  
[Climate law](#)

#### Latest news

19/05/2016 LIFE programme: Call for climate action project proposals open

08/12/2015 LIFE financial instrument supports energy efficiency in France

04/12/2015 EU delivering on international climate finance



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## **(2) Renewable Energy**

- ❑ Directive 2009/28/EC**

- Mandatory national targets**

- ❑ Overall share of energy from renewable sources in gross final energy consumption**
    - ❑ Share of renewable energy in transport**

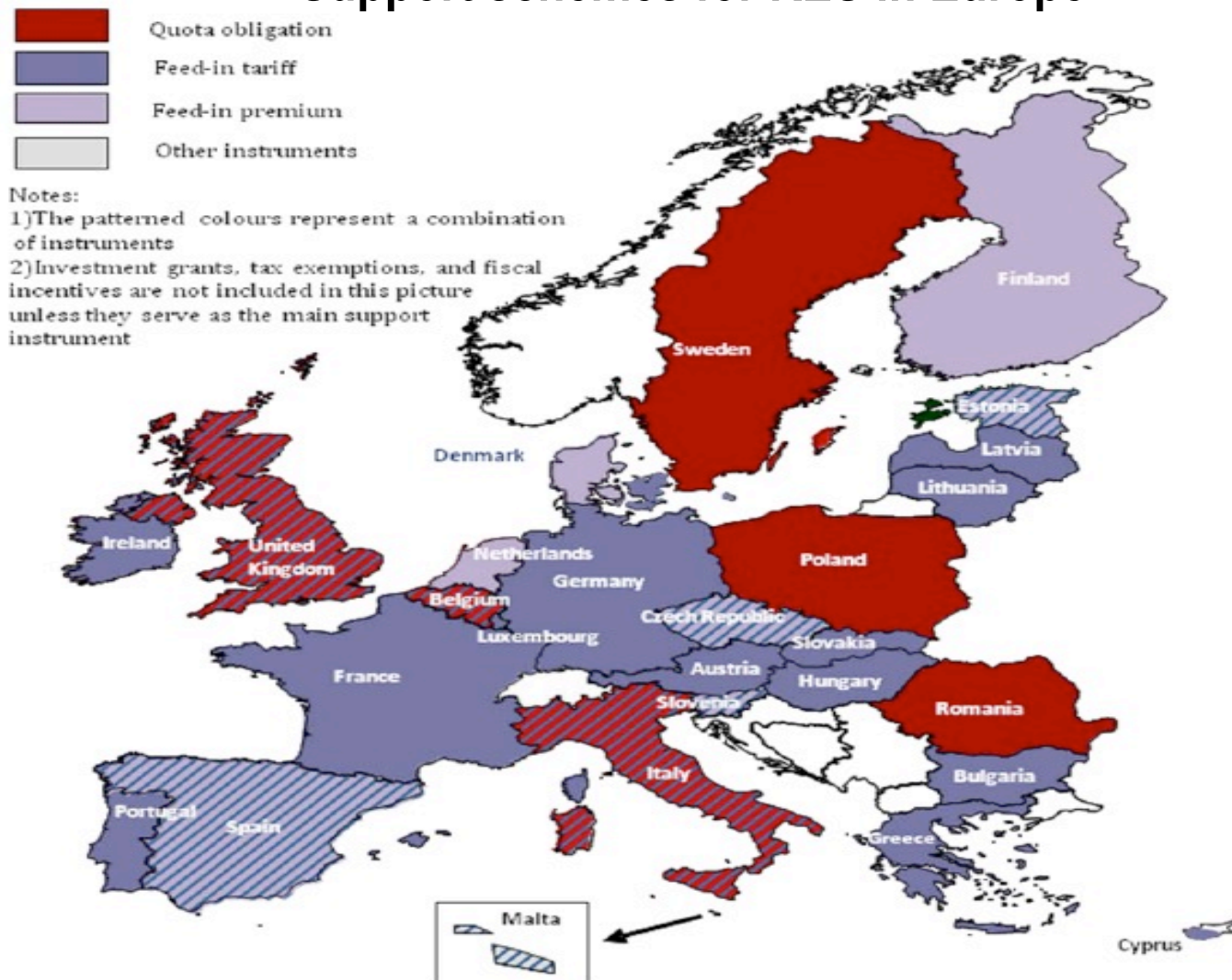
- In order to reach the targets, Member States may apply**

- ❑ Support schemes (investment aid, tax exemptions or reductions, tax refunds, renewable energy obligation support schemes, direct price support). New Guidelines**
    - ❑ Measures of cooperation between different Member States and with third countries**

- ❑ Guidelines for renewable policies (2014/C 200/01)**

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## Support schemes for RES in Europe



Source: Steinhilber et al (2011)

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## Evaluating experiences

- ❑ EC (2015). Progress in renewable energy development. However, economic crisis, administrative and infrastructure barriers and policy and support schemes disruption are slowing this progress
- ❑ EEA (2016) Heterogeneous situation of EU countries: almost 50% need to increase renewable penetration to comply with 2020 objective
- ❑ Steinhilber et al (2011). Member States renewables policy in 2003-2010. Performance is rather heterogeneous depending on the final energy sector, the renewable energy technology and the individual Member State.

## A bigger picture

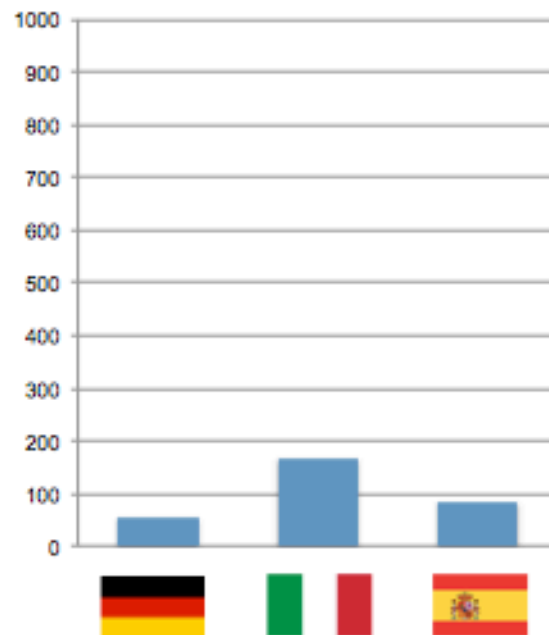
- ❑ Learning by doing/learning by research
  - ❑ Picking 'global' and effective technologies
-

# Renewables as Climate Policies

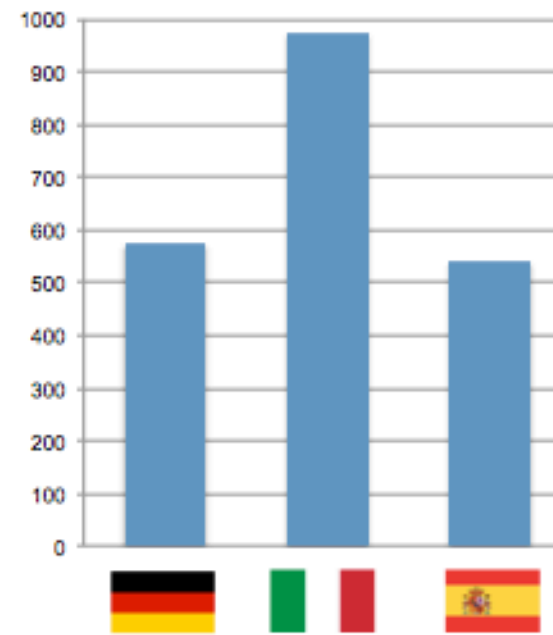
Implicit carbon price [€/tCO<sub>2</sub>]



**WIND**



**SOLAR**



*Germany 2006-2010; Italy 2008-2011; Spain 2010-2012*

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### **(3) Issues for Energy Efficiency**

- ❑ Not an end in itself (emissions, energy imports, etc.)**
  - ❑ Complex issue: multiple barriers and conditions**
    - Energy efficiency gap (buildings and transport)**
    - Sectoral and country variations (NEEAPs)**
  - ❑ Packages vs collection of single instruments**
  - ❑ New policy approaches: information; nudging**
  - ❑ Energy efficiency and income distribution**
  - ❑ How to evaluate and implement (global) cost-effective options?**
-

# The legal framework



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# Directive 2012/27/UE

- **Efficiency in energy use (Filippini et al, 2014; Ó Broin et al, 2015)**
    - ❑ Building renovation
    - ❑ Energy efficiency obligation schemes
    - ❑ Energy audits and energy management systems
    - ❑ Metering and billing information (Ramos et al, 2015)
    - ❑ Consumer information and empowering programme
  - **Efficiency in energy supply (Bertoldi et al, 2010)**
    - ❑ Promotion of efficiency in heating and cooling
    - ❑ Energy transformation, transmission and distribution
  - **Horizontal provisions**
    - ❑ Availability of qualification, accreditation and certification schemes
    - ❑ Information and training
    - ❑ Energy services
-

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# Policy developments reported in some 2014 NEEAPs

## ❑ France

- Doubling of the ambition level of the EE obligation scheme
- Fund for building refurbishment
- Taxation in the transport sector could bring additional savings

## ❑ Germany

- Primary energy consumption will be almost 10% lower than target
- Existing measures will be strengthened, including building efficiency requirements, taxation, advice/awareness-raising and support for investment.
- An important element will be the development of the ESCO

## ❑ Italy

- Strengthen the minimum standards for the construction of new buildings and the renovation of existing
  - Consolidate tax deductions for the refurbishment of buildings and strengthen incentives for buildings owned by public bodies
  - Strengthen the system of EE certificates (white certificates)
-



# Scoping meeting Energy Efficiency



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## ***Energy Efficiency and Climate Policies: A Scoping Meeting for the FSR Climate***

Organiser: **Xavier Labandeira** | Director, FSR Climate/EUI

Sala del Capitolo, Badia Fiesolana  
Via dei Roccettini, 9 – San Domenico di Fiesole

**7 November 2014**

### **■ PROGRAMME**

#### **08.45-10.45 Session 1: General framework**

- 08.45 Introduction and presentation of participants, **Xavier Labandeira**
- 09.00 Energy efficiency and climate policy: the big picture, **Tyler Bryant**
- 09.20 Energy efficiency policy instruments: issues for application, **Lisa Ryan**
- 09.40 EU energy efficiency policies, **Serena Pontoglio**
- 10.00 Energy efficiency and interactions with other climate policy instruments, **Oskar Lecuyer**
- 10.20 Debate

10.45-11.15 COFFEE

#### **11.15-13.15 Session 2: Research needs and gaps**

- 11.15 Issues for future energy efficiency policies in the EU residential sector, **Paolo Bertoldi**
- 11.35 Energy efficiency policies: the vision of an international power company, **Gonzalo Sáenz**
- 12.55 Funding energy efficiency, **Juan Alario/Manuel Dueñas**
- 12.15 Unlocking energy efficiency in transport, **Andreas Schäfer**
- 12.40 Debate

13.15-14.30 LUNCH

#### **14.30-16.40 Session 3: Ex-post analysis**

- 14.30 Energy efficiency policy: issues, methods and data, **Matthew Kotchen**
- 15.00 An overall assessment of energy efficiency instruments, **Magnus Söderberg**
- 15.20 Nudging energy efficiency, **Giovanna D'Adda**
- 15.40 Policy packages, distribution and empirical results for Spain, **Xavier Labandeira/Ana Ramos**
- 16.00 Some empirical results for France, **Louis-Gaëtan Giraudet**
- 16.20 Some empirical results for Germany, **Kathrine Von Graevenitz**

16.40-17.30 Debate, wrap up and departure

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## **(4) Energy/carbon taxation**

- ❑ Current Situation: (Harmonized) energy taxes at national level**
  - ❑ Proposal for a Council Directive (2011)**
    - Again, harmonization but higher rates**
    - CO<sub>2</sub> component**
    - Energy component**
  - ❑ Carbon taxation**
  - ❑ Green tax reforms**
  - ❑ Transport**
-

# Heterogeneity in EU energy taxation

	Households light fuel oil (per 1000 litres)				Non-commercial automotive diesel (per litre)				Unleaded gasoline (per litre)				Households natural gas (per MWh GCV)				Households electricity (per kWh)			
	Excise	VAT (%)	Total	PPP (%)	Excise	VAT (%)	Total	PPP (%)	Excise	VAT (%)	Total	PPP (%)	Excise	VAT (%)	Total	PPP (%)	Excise	VAT (%)	Total	PPP (%)
Impuestos sobre la energía (€) 2013																				
Germany	61,35	19,00	194,63	58,70	0,47	19,00	0,70	87,76	0,66	19,00	0,91	96,20	5,50	19,00	16,88	100,65	96,30	19,00	142,90	221,44
Austria	109,18	20,00	267,00	75,68	0,42	20,00	0,65	76,45	0,51	20,00	0,74	73,42	5,96	20,00	17,62	98,73	30,70	20,00	64,90	94,51
Belgium	18,49	21,00	164,89	46,73	0,43	21,00	0,68	80,70	0,61	21,00	0,90	89,42	2,60	21,00	14,05	78,73	19,60	21,00	54,80	79,80
Denmark	403,87	25,00	714,14	164,00	0,40	25,00	0,71	67,69	0,59	25,00	0,93	74,87	35,39	25,00	54,96	249,53	109,95	25,00	169,35	199,82
Slovenia	176,60	21,00	351,40	137,78	0,45	21,00	0,69	111,80	0,57	21,00	0,82	113,25	4,79	21,00	16,78	130,07	16,50	21,00	44,30	89,24
Spain	87,30	21,00	245,60	84,97	0,37	21,00	0,61	87,27	0,47	21,00	0,71	86,46	0,18	21,00	14,33	98,01	8,80*	21,00	41,10*	73,06
Estonia	110,95	20,00	277,03	118,49	0,39	20,00	0,61	109,32	0,42	20,00	0,64	96,25	2,18	20,00	10,51	88,87	13,20	20,00	35,15	77,25
Finland	163,43	24,00	377,19	97,51	0,47	24,00	0,76	82,00	0,65	24,00	0,97	87,63	10,33	24,00	19,85	101,45	17,00	24,00	46,50	61,76
France	56,60	19,60	208,59	58,42	0,44	19,60	0,66	76,94	0,61	19,60	0,87	84,92	1,29	19,60	11,29	62,51	25,14	19,60	46,65	67,13
Greece	330,00	23,00	567,24	205,30	0,33	23,00	0,59	88,44	0,67	23,00	0,98	124,71	5,40	13,00	18,53	132,59	26,10	13,00	44,85	83,40
Hungary	n.d.	27,00	n.d.	n.d.	0,38	27,00	0,69	157,35	0,42	27,00	0,71	137,68	0,00	27,00	8,27	89,90	4,10	27,00	32,37	91,45
Ireland	88,66	13,50	215,50	62,59	0,48	23,00	0,76	92,24	0,59	23,00	0,89	90,10	3,70	13,50	12,39	71,14	0,00	13,50	26,20	39,10
Italia	403,21	21,25	650,56	204,06	0,62	21,25	0,91	118,56	0,73	21,25	1,04	113,80	n.d.	21,25	26,67**	165,38	56,20	10,00	77,10	124,26
Luxemburg	10,00	12,00	96,58	24,70	0,34	15,00	0,49	52,58	0,46	15,00	0,64	57,01	1,08	6,00	4,44	22,45	11,40	6,00	20,20	26,54
Netherlands	254,42**	21,00	360,89	102,29	0,45	21,00	0,69	81,76	0,75	21,00	1,05	104,72	19,28	21,00	32,84	184,02	11,40	21,00	45,00	65,53
Poland	55,27	23,00	229,66	125,99	0,35	23,00	0,59	134,87	0,40	23,00	0,64	123,33	0,00	23,00	9,58	103,87	4,76	23,00	32,40	91,32
Portugal	323,70	23,00	564,40	221,29	0,37	23,00	0,63	102,33	0,59	23,00	0,88	121,08	0,00	23,00	16,55	128,29	0,00	23,00	39,40	79,37
United Kingdom	131,17	5,00	170,27	49,30	0,68	20,00	0,96	115,53	0,68	20,00	0,95	95,97	0,00	5,00	2,76	15,77	0,00	5,00	8,24	12,26
Czech Republic	25,40	21,00	254,62	117,00	0,42	21,00	0,66	126,79	0,49	21,00	0,74	118,55	0,00	21,00	10,97	99,66	1,15	21,00	28,02	66,16
Slovakia	n.d.	20,00	n.d.	n.d.	0,37	20,00	0,60	115,59	0,52	20,00	0,77	123,69	0,00	20,00	8,87	80,89	0,00	20,00	29,50	69,92
Sweden	451,94	25,00	760,10	179,05	0,53	25,00	0,87	85,40	0,62	25,00	0,95	78,61	30,62	25,00	55,13	256,77	31,90	25,00	67,04	81,14
Weighted average (PPP)	201,39	18,74	425,08	100	0,66	20,88	1,02	100	0,83	20,88	1,21	100	3,96	18,50	21,50	100	42,76	17,07	82,73	100

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# Carbon taxes in EU countries

- ❑ Finland (1990)
  - ❑ Netherlands (1990)
  - ❑ Norway (1991)
  - ❑ Sweden (1991)
  - ❑ Denmark (1992)
  - ❑ UK (2001)
  - ❑ Ireland (2010)
  - ❑ France (2014)
-

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## **Green tax reforms (Gago et al, 2014)**

- ❑ Multiple dividends?**
- ❑ The generations**
  - Scandinavian model**
  - German model**
  - Post-crisis applications**

## **Taxing transport**

- ❑ Multiple externalities**
  - ❑ Constraints of current taxation**
  - ❑ New transport taxes**
-

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# Evaluating experiences

- ❑ EEA (2016) Updated situation on EU energy and environmental taxes
  - ❑ Martin et al (2014). Climate change levy UK. Strong negative impact on energy intensity and use of electricity
  - ❑ Hammar et al (2013). Sweden's CO2 tax. Major impact on fuels used for heating purposes.
  - ❑ Lin and Li (2011). Northern European carbon taxes. Stronger effectiveness of the Finish tax due to exemptions in other countries
  - ❑ Vollebergh (2008). Energy tax reform in Netherlands. Considerable amount of tax revenue from a green tax base
  - ❑ Our work for Spain
-

# Scoping meeting Taxation

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This event has passed.

## Details

### Date:

12th December 2014

### Event Category:

[Climate](#)

## Organiser

[Barbara Morganti](#)

### Phone:

[+39] 055 4685 789

### Email:

[Barbara.Morganti@eui.eu](mailto:Barbara.Morganti@eui.eu)

## Venue

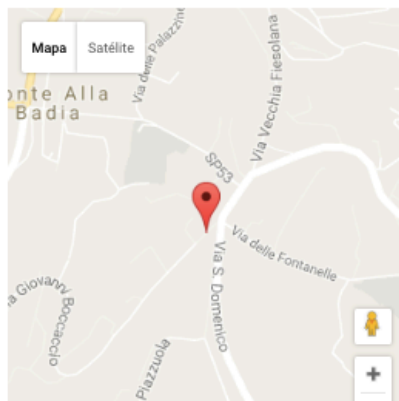
[Villa Malafrasca](#)

*Via Boccaccio, 151*

*Florence, FL 50133 Italy* [+ Google Map](#)

### Phone:

[+39] 055 4685 2880



## Energy/Carbon Taxation and Climate Policies: a Scoping meeting for FSR Climate

12th December 2014

This workshop focused on the role of carbon and energy taxes in climate change mitigation. It was organised in three sessions on the general framework, empirical analysis for the EU, and the assessment of obstacles to policy progress. The event was designed as a scoping meeting for future research activities of FSR Climate in this area and also to explore collaborative work with other academic and non-academic institutions operating in the field.

[Download the programme](#)

## Workshop Highlights



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# Summing up on EU climate policy instruments

- ❑ (cost) Effectiveness: short-term vs long-term
  - ❑ Supplementary effects
    - 'Low prices'
    - Market failures
  - ❑ Coverage-non coverage by EU ETS
  - ❑ Other non-GHG objectives (Tinbergen)
  - ❑ Distribution
-



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# Constraints

- ❑ **Competitiveness**
- ❑ **Distributional concerns**
- ❑ **Institutional setting**

## and Opportunities

- ❑ **Overcoming constraints through a climate club after Paris?**
  - ❑ **Learning by doing for the world?**
    - **EU ETS as a prototype for other systems; and linkage towards a global price**
    - **Rearranging priorities in renewable promotion: R&D, potentials...**
    - **Coordinating policy tools and jurisdictions?**
-



# CLIMATE ACTION

European Commission > Climate Action > News > Carbon market experts gather to discuss emissions trading systems worldwide



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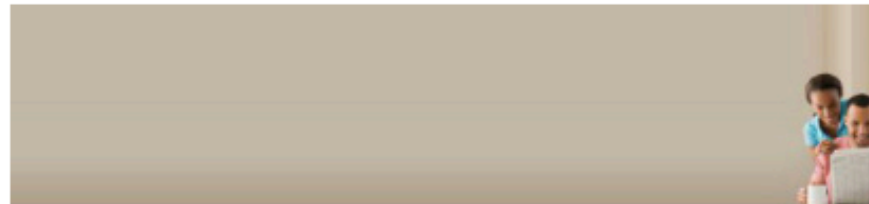
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## Carbon market experts gather to discuss emissions trading systems worldwide



26/09/2017

**Carbon market experts from around the globe gathered yesterday for a workshop in Florence, Italy, to exchange experiences from emissions trading systems put in place by different countries and regions.**

The Carbon Market Workshop, organised by the European Commission and European University Institute, brought together senior policy makers from carbon markets worldwide – California, Canada, China, EU and New Zealand – as well as stakeholders from the academic, industry and NGO sectors.

The participants discussed and exchanged experiences from the design and implementation of emissions trading, also acknowledging the future potential of carbon markets as countries move to implement their Nationally Determined Contributions (NDCs) under the Paris Agreement.

Jos Delbeke, Director General of the European Commission's Directorate-General for Climate Action, said: "Carbon markets can play a key role in reducing global greenhouse gas emissions cost-effectively. We are pleased to see the increasing uptake of emissions trading around the world, as this can help us on our path towards achieving the goals of the Paris Agreement."

The workshop was held within the framework of the LIFE SIDE project co-funded under the EU's LIFE Programme. Since September 2016, the LIFE SIDE project is supporting policymakers with the implementation of the EU ETS. LIFE SIDE is managed by the climate group of the Florence School of Regulation at the European University Institute in Florence.

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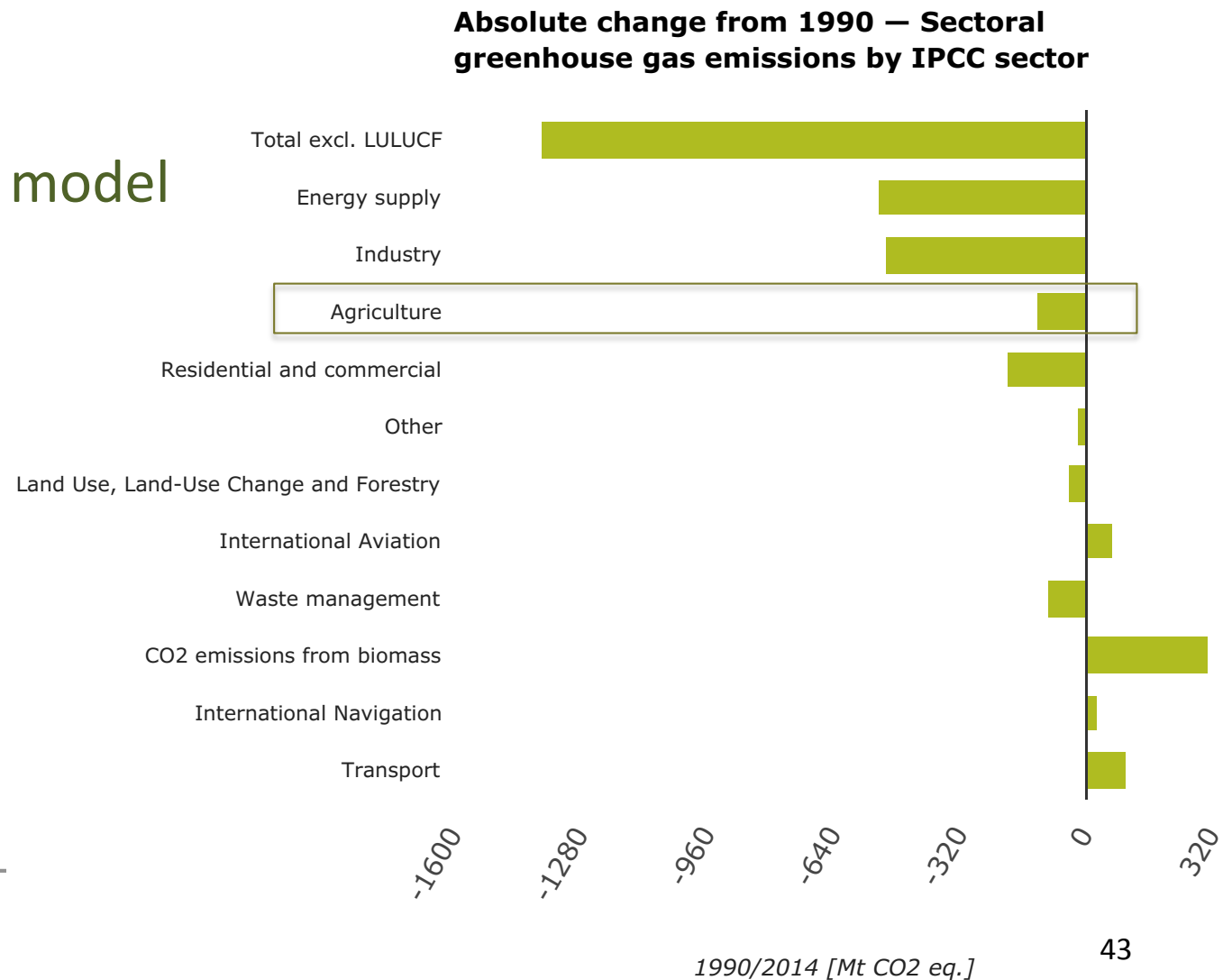
Roadmap 2050  
moving to a  
low-carbon  
economy

# Agriculture & GHG Emissions in EU

*(Bozzola et al., 2016)*

Stable % of emission compared to other sectors: lacking behind?

Policy – EU as role model





# **ENERGY EFFICIENCY IN THE RETAIL SECTOR: A FIELD EXPERIMENT**

**XAVIER LABANDEIRA  
MARIA LOUREIRO**

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# THANKS

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