European Climate Policies: Lessons and Perspectives

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Contents

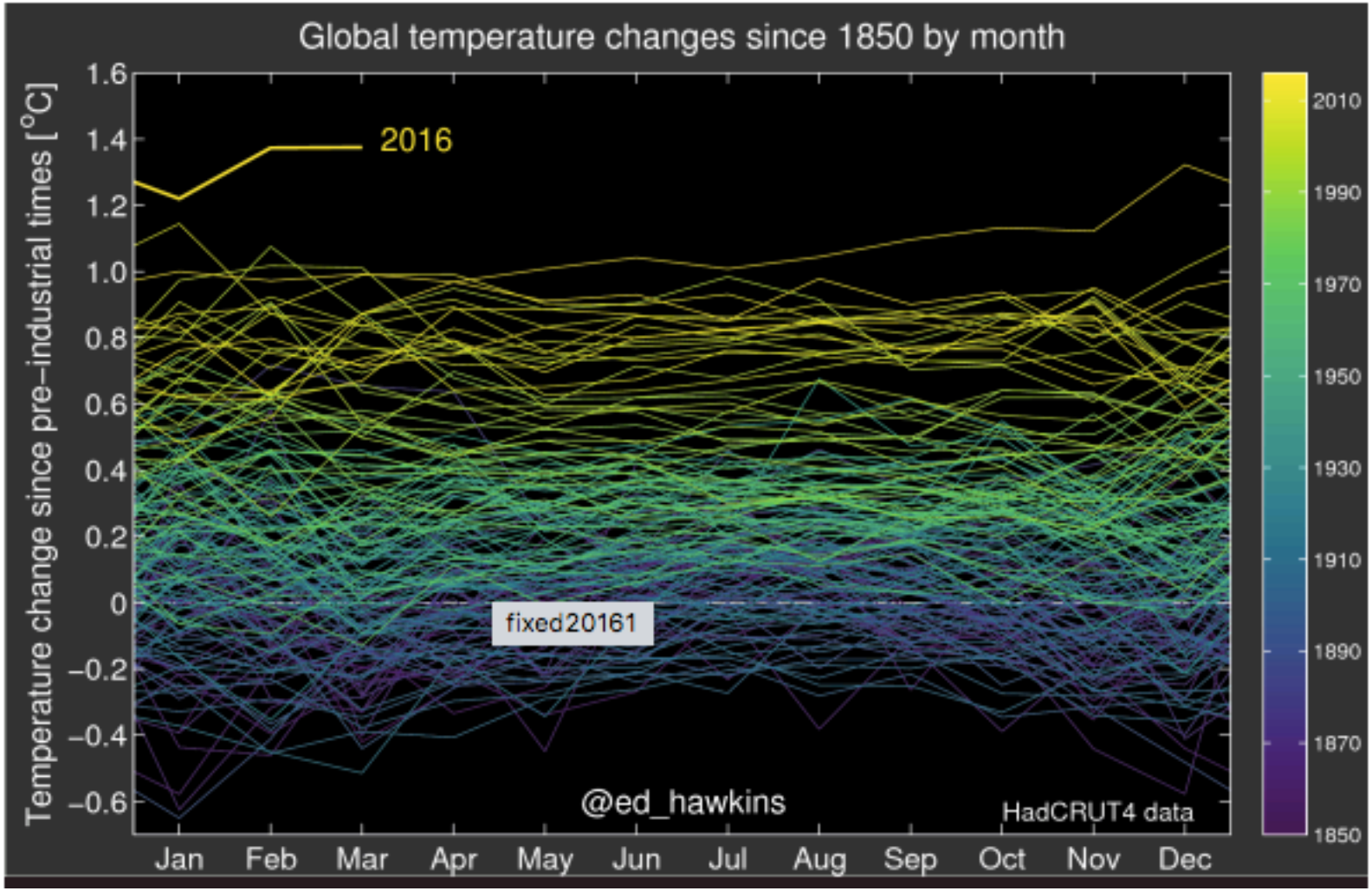
- What is ECP and how to assess it?
- Climate change and international action
- Economics and climate policies
- EU Climate Policy: setting and pillars
  - EU ETS
  - Renewable policies
  - Energy Efficiency
  - Taxation
- Constraints and opportunities

What is European Climate Policy?

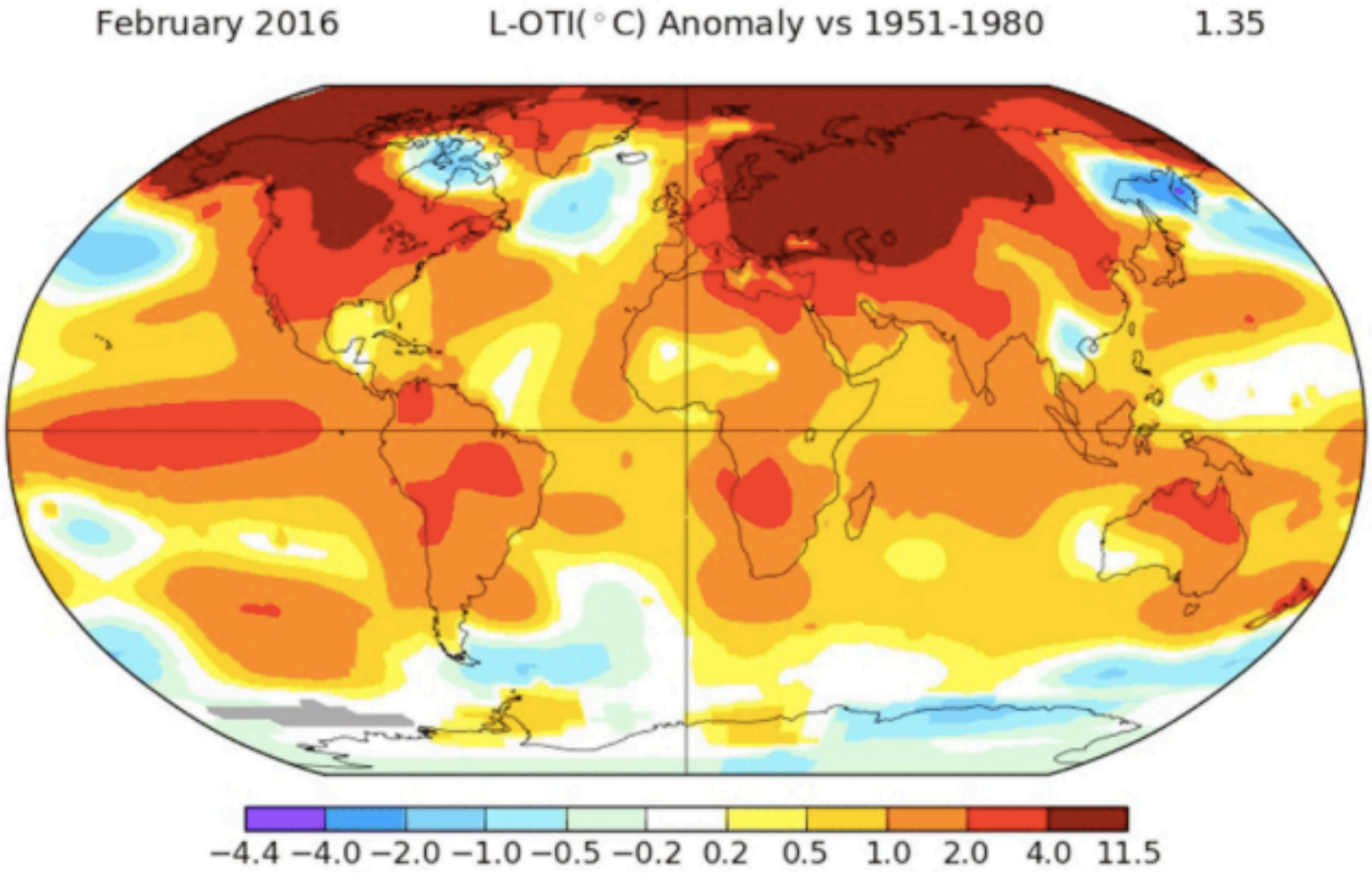
- Explicit (eg EU ETS) and implicit instruments (eg RES promotion)
- EU, national and subnational strategies
  - Linked/related or not

How to assess it?

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


Global temperature changes since 1850 by month
Temperature change since pre–industrial times [°C]
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
2016
fixed20161
@ed_hawkins
HadCRUT4 data
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2010
1990
1970
1950
1930
1910
1890
1870
1850

Climate change and international action



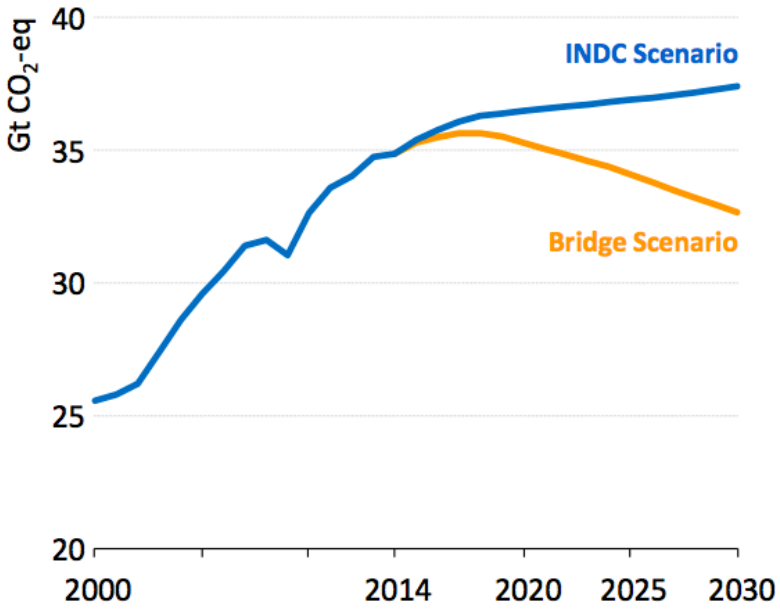
Smoke filling the street in deserted downtown Fort McMurray in Alberta, Canada, last week. A devastating fire in the region continues to rage. Tyler Hicks/The New York Times

- **A ‘perfect’ negative externality**
  - Global public bad (with varying responsibilities and impacts)
  - Intergenerational issues and non-reversibilities
  - Uncertainty and extreme events
- **The EU in the road to Paris**
  - Commitments but diminishing influence?
- **Assessing the Paris Agreement**
  - Inappropriate to deal with the global externality
  - The best possible solution?
  - How to fill the gap?

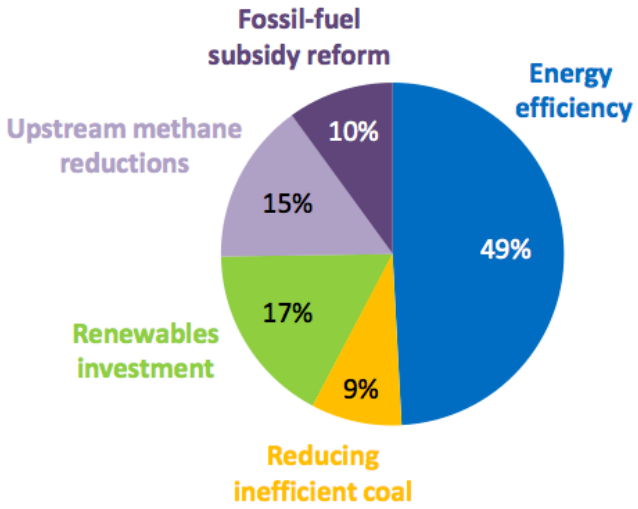
1. Peak in emissions:
IEA strategy to raise climate ambition

WEO Special Report on Energy & Climate Change

Global energy-related GHG emissions



Savings by measure, 2030



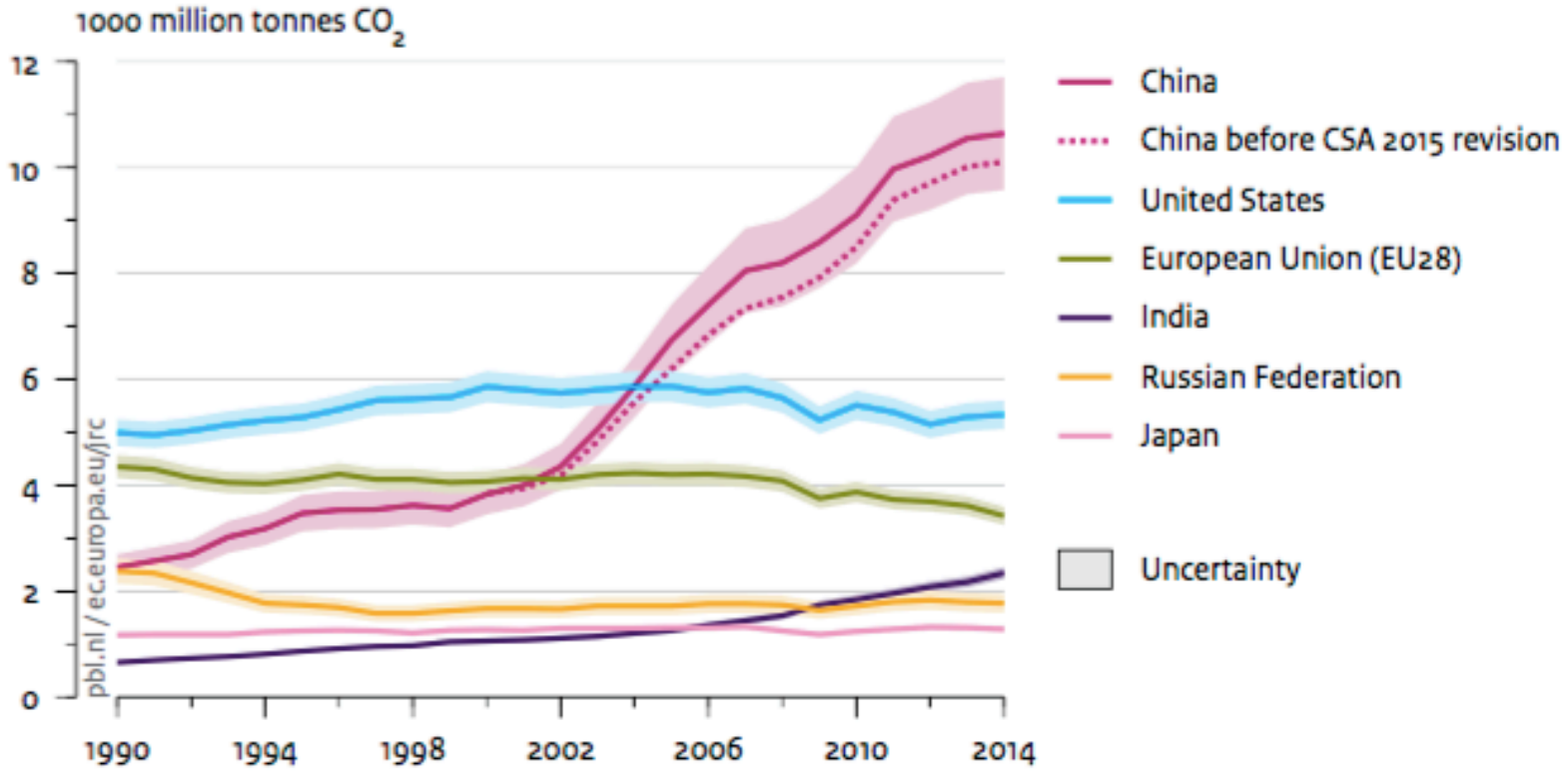
Five measures – shown in a "Bridge Scenario" – achieve a peak in emissions around 2020, using only proven technologies & without harming economic growth

Economics and climate policies

- Efficiency and distribution
- First-best policy: GHG pricing (External damages)
- Second best departures
  - Other market failures
  - Exogenous objectives
  - Leakage
  - Public revenues
- Sub-optimal prices and
- Interactions and synergies with other policy instruments (EU ETS; RES promotion; EE)

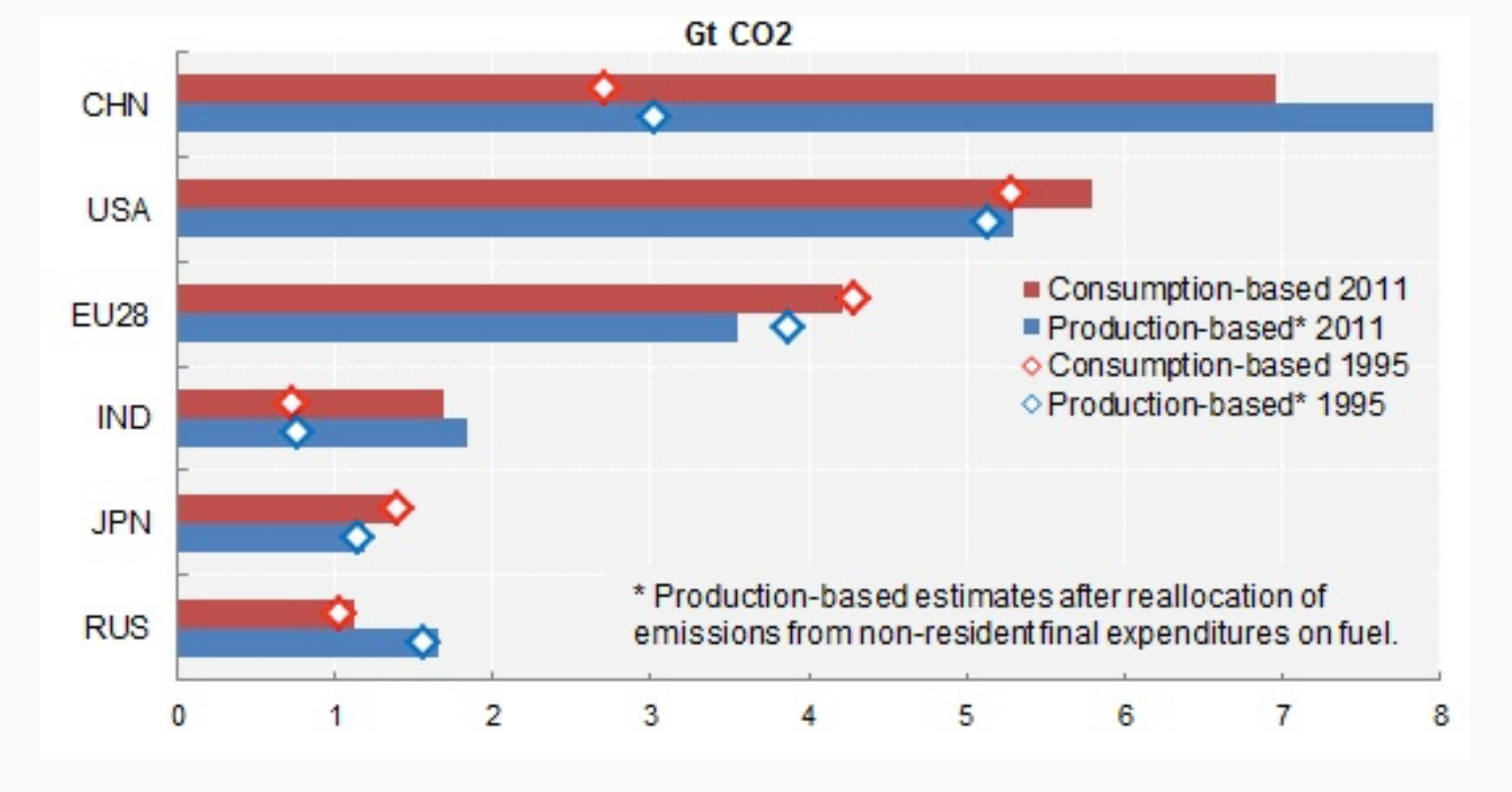
EU GHG emissions at two glances

CO_2 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

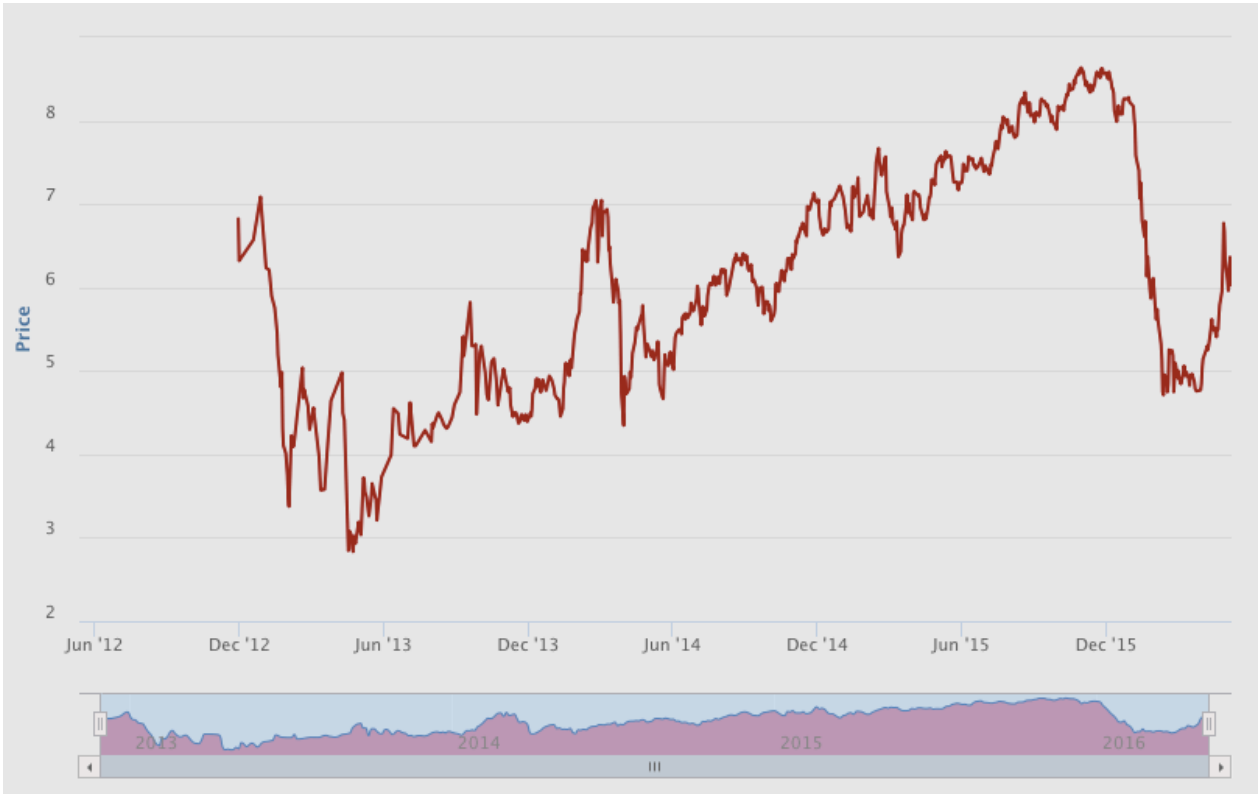
EU climate policy: setting and pillars

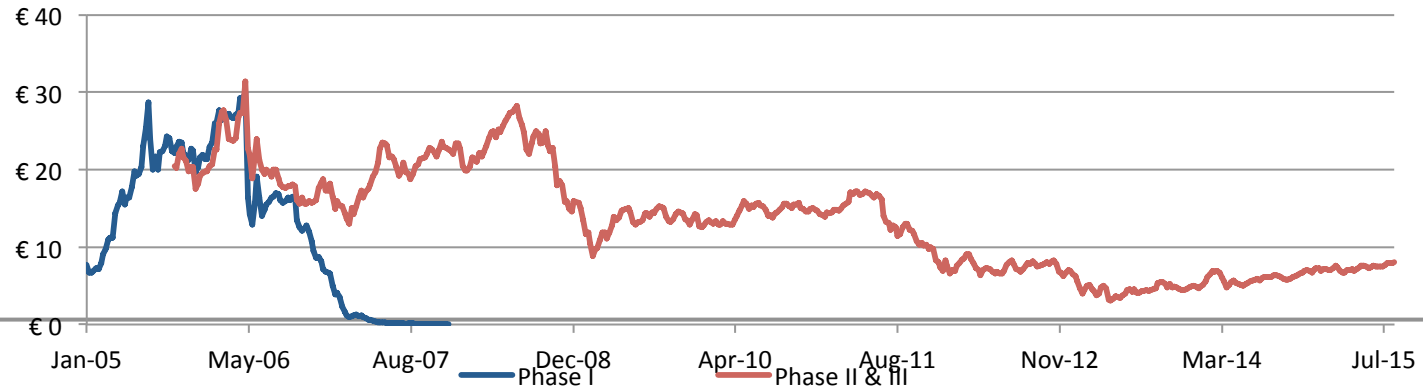
- The roadmap to 2050
- From the origins of EU climate policy to 20-20-20
- 2030 framework for energy and climate
  - Targets: -40% GHG, 27% RE consumption, 27% BAU energy savings, 15% energy interconnection between MS
  - Policies: reformed EU ETS, Energy Union (competitiveness, security)
- Four traditional components of EU climate policies:

(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
- The current phase III: EU cap, benchmarking and MSR
- A reformed EU ETS after 2020:
  - Declining cap
  - Free allocation and benchmarking
  - Distributional matters

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





The EUA price ‘debate’

- Reasons
- Effects
- Quantity and price arrangements

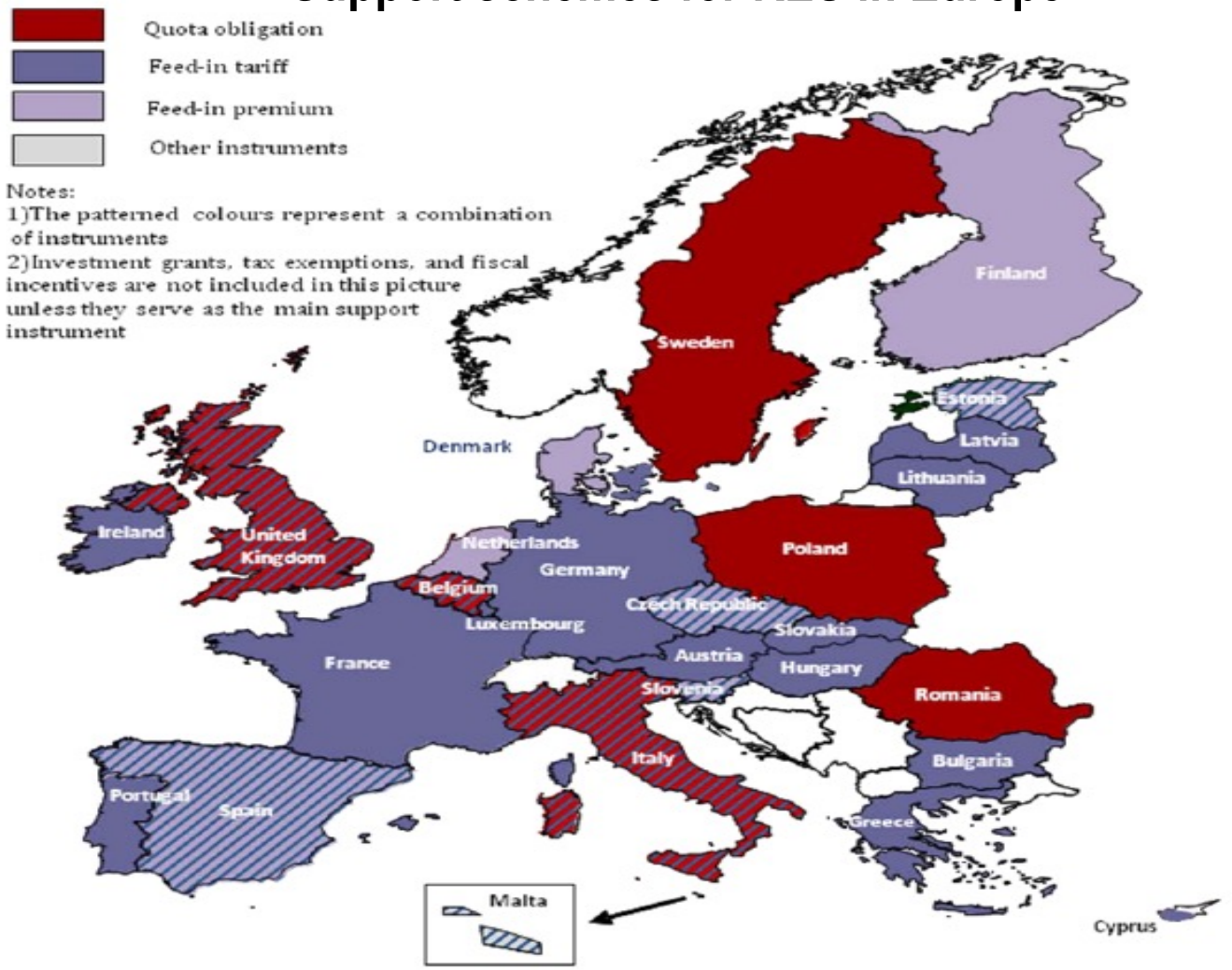
Assessing the EU ETS

- Environmental effects
- Competitiveness and leakage
- Innovation
- EEA (2016); FSR Climate; etc.

(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

Support schemes for RES in Europe



Source: Steinhilber et al (2011)

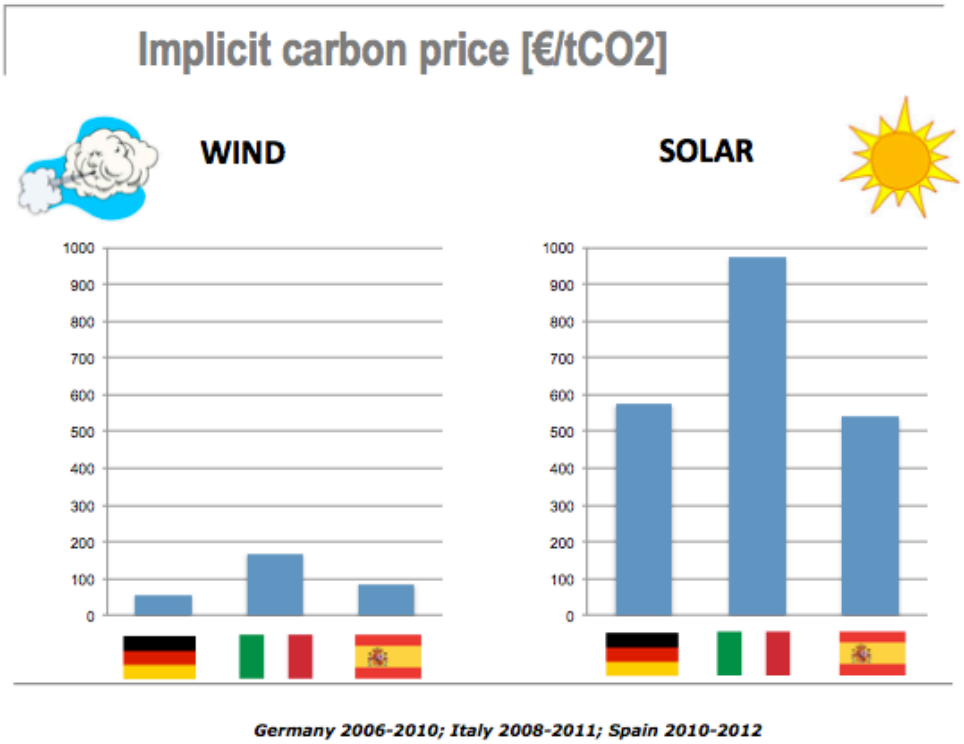
Evaluating experiences

- 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.

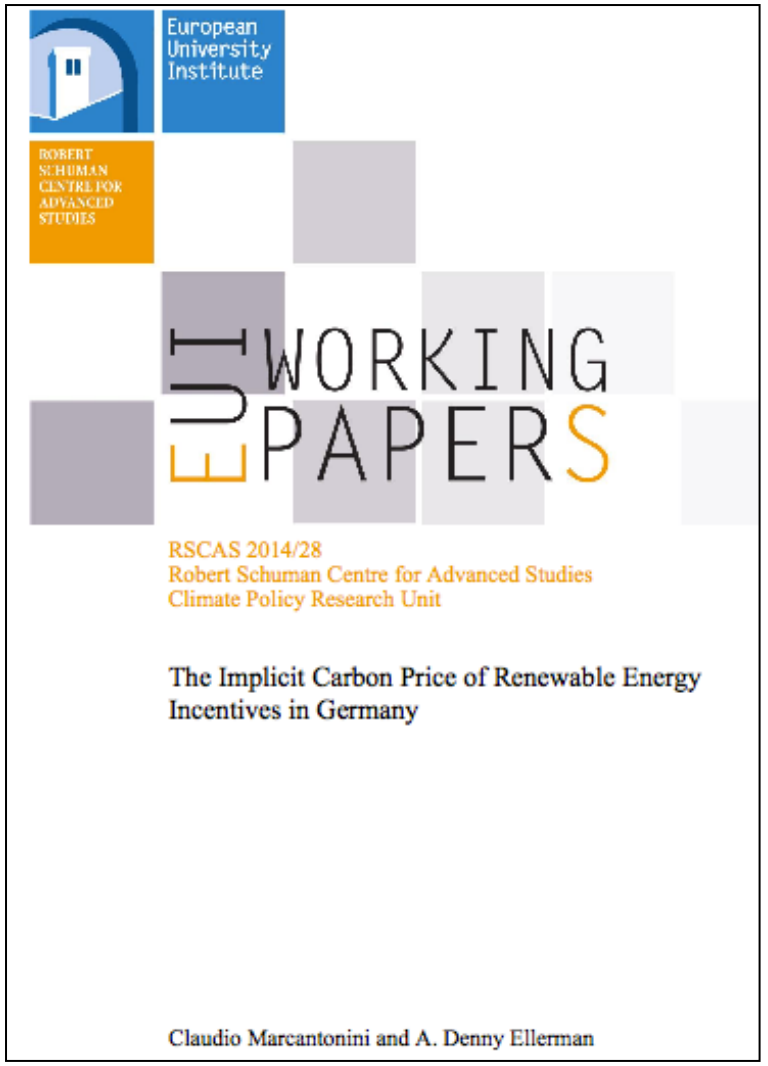
A bigger picture

- Learning by doing/learning by research
- Picking ‘global’ and effective technologies

Renewables as Climate Policies



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



(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

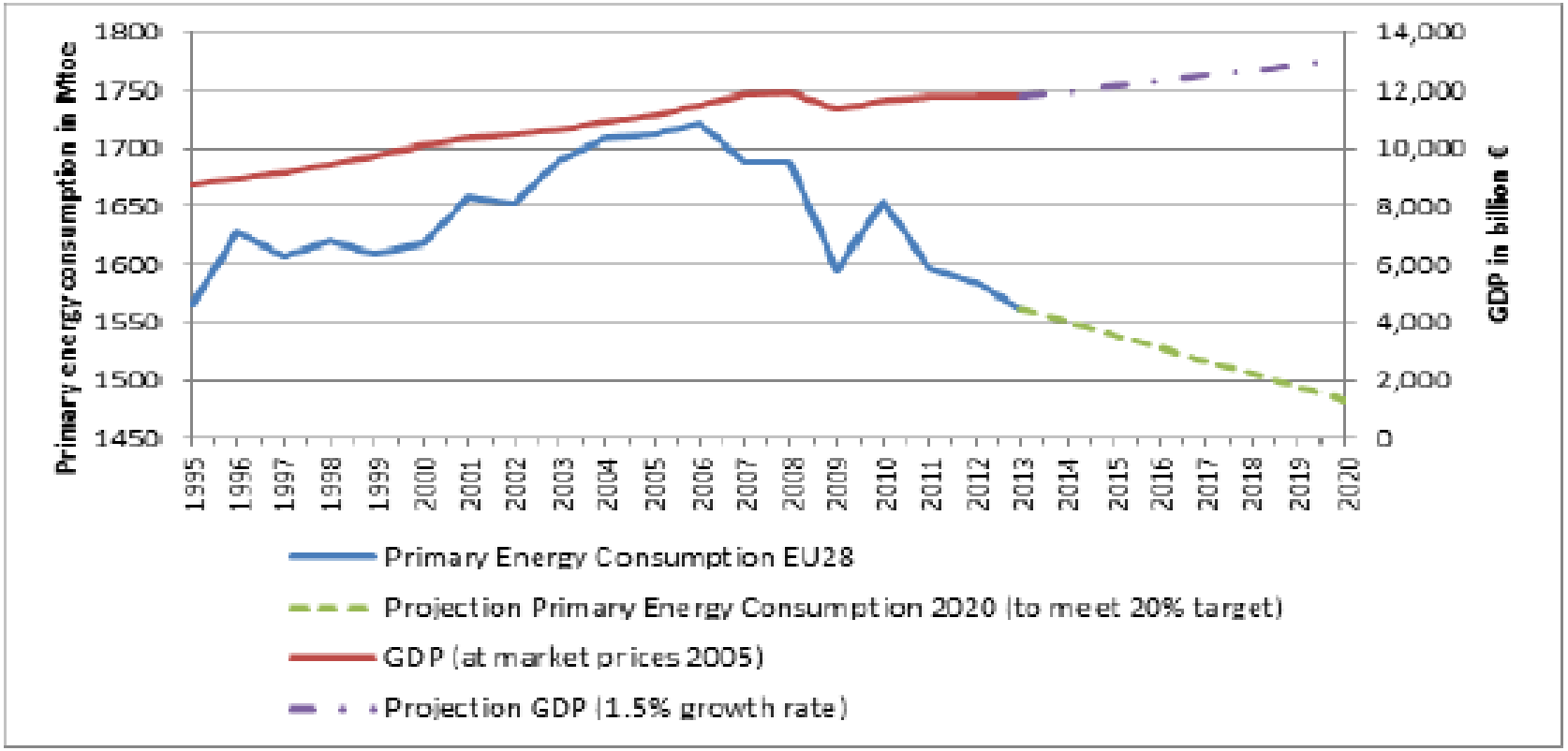
Directive 2012/27/UE

- Efficiency in energy use
  - Building renovation
  - Energy efficiency obligation schemes
  - Energy audits and energy management systems
  - Metering and billing information
  - Consumer information and empowering programme
- Efficiency in energy supply
  - 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

Policy developments reported in some 2014 NEEAPs

- France
  - Doubling of the ambition level of the EE obligation scheme
  - Fund fo 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-rising 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
  - Stregthen the system of EE certificates (white certificates)

Evolution of primary energy consumption and GDP in the EU-28



Source: Commission services based on EUROSTAT data

(4) Taxation

- Current Situation: (Harmonized) energy taxes at national level
- Proposal for a Council Directive (2011)
  - Again, harmonization but higher rates
  - CO_2 component
  - Energy component
- Carbon taxation
- Green tax reforms
- Transport

Heteorgeneity in EU energy taxation

Impuestos sobre la energía (€) 2013	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 (%)
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

Carbon taxes in EU countries

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

Green tax reforms

- Multiple dividends?
- The generations

Taxing transport

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

A caveat on the difficulties of energy/carbon taxation from Spain

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

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

Constraints

- Competitiveness
- Equity 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?

Some normative messages

- Targets
- GHG prices
- Instrument mix
- Distributional issues
- International dimension: the debate on BTA

Implications for Economics

- Beyond Energy and Environmental Economics
- Role of Empirical Economics (Ex ante and Ex post)
- Need for experimental approaches

Grazie!

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