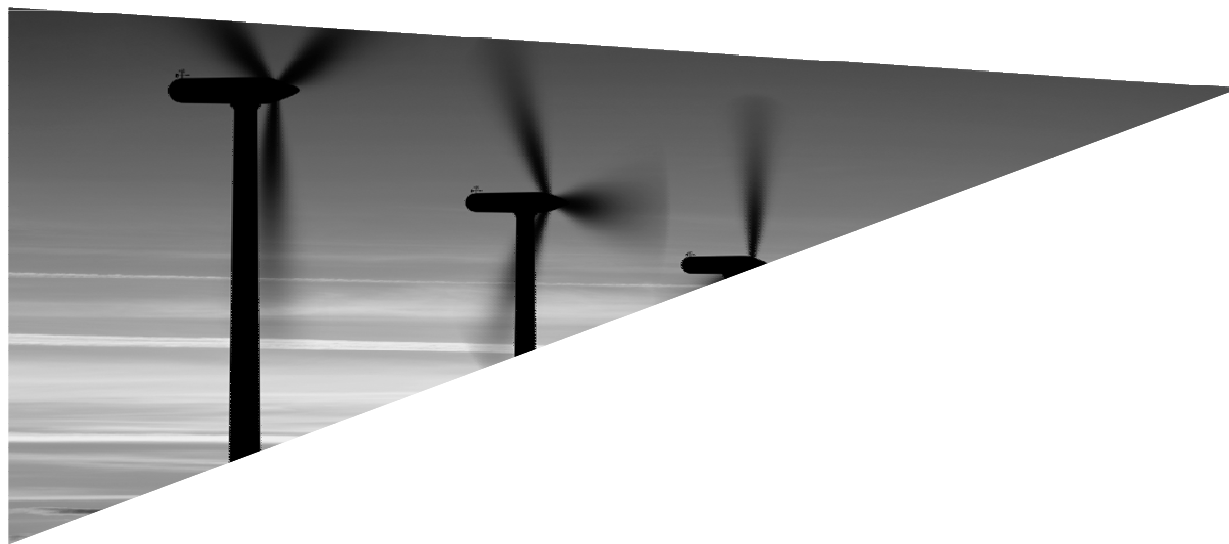


# Ernst & Young Country Attractiveness Indices (CAI) and renewable energy strategy

Wind Energy Convention 2010

Madrid, 15 June



# Introductions

## Agenda for today's presentation

- ▶ Introduction to the Ernst & Young
- ▶ Introduction to EY Country Attractiveness Indices (CAI)
- ▶ CAI methodology
- ▶ CAI history and commentary
- ▶ Competitiveness: a path of predictable costs against the uncertainty of fossil fuels?
- ▶ Implications for renewable energy strategy



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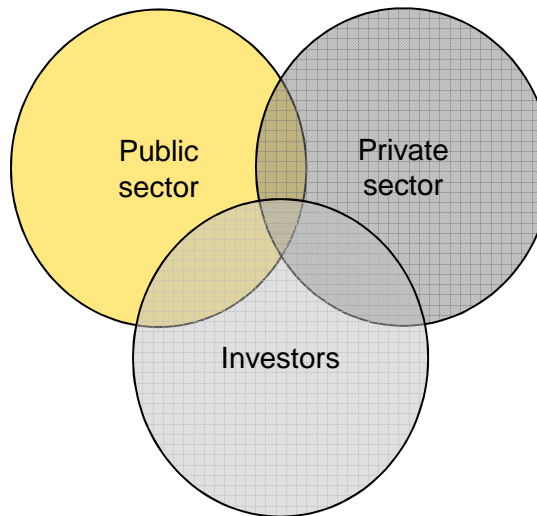
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# EY Relationships with all stakeholders provide complete market understanding

- ▶ Deep understanding of policy and regulatory frameworks designed to stimulate investment through monetizing CO2 reductions
- ▶ Experience of direct government interventions for new infrastructure programmes (PPP / PFI), competitions and procurement



- ▶ Supporting private sector to build and finance new infrastructure, and engage/contact/transact with Government
- ▶ Evolve appropriate business models for the 21st Century energy market
- ▶ Support capital raisings and treasury management, enabling model investments to be made

- ▶ Introducing new capital to fund growth.
- ▶ Evaluating and managing investor risks
- ▶ Providing integrated investor due diligence services

## Ernst and Young expertise

- ▶ Bring renewable energy sector and infrastructure expertise to existing local team
- ▶ Enable global flow of capital, required to supplement local funding, to satisfy demand

# Introduction to the Ernst & Young Country Attractiveness Indices (CAI)

## The CAI publication

- ▶ In production since 2003
- ▶ Distributed to over 3,500 industry specialists and investors
- ▶ Produced quarterly

## What is the CAI's purpose?

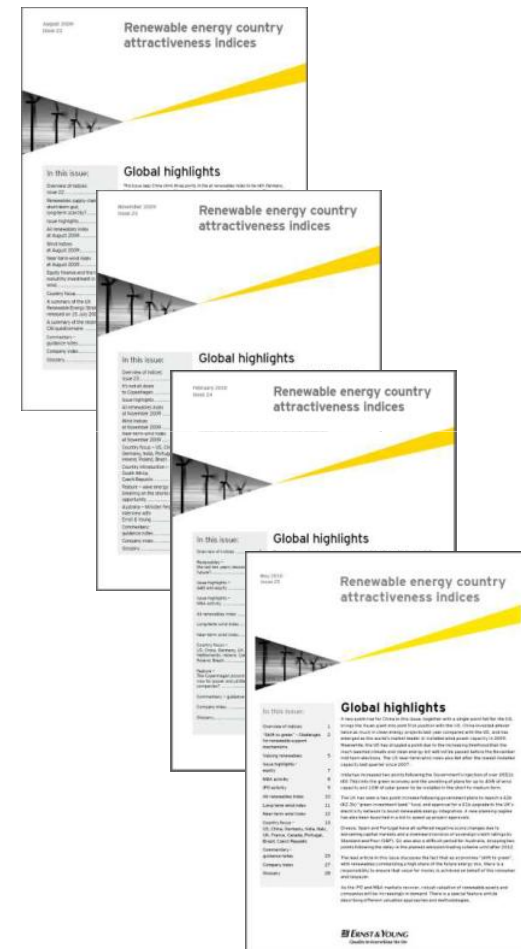
- ▶ Quantifies the attractiveness of a renewable energy market for investment
- ▶ Distinguishes by technology
- ▶ Distinguishes by country

## What is the investment horizon?

- ▶ The All Renewables and Long-term indices – consider a long-term (> 5 year) horizon
- ▶ The Near-Term Index – considers the wind markets over a 2 to 5 year forward period

## CAI website:

- ▶ [http://www.ey.com/GL/en/Industries/Oil---Gas/Oil\\_Gas\\_Renewable\\_Energy\\_Attractiveness-Indices](http://www.ey.com/GL/en/Industries/Oil---Gas/Oil_Gas_Renewable_Energy_Attractiveness-Indices)



# 2010 Q1 Ernst & Young Country Attractiveness Indices

Rank 2010	Rank 2009	Country	All Renewables	Wind Index <sup>(a)</sup>	Onshore Wind <sup>(a)</sup>	Offshore Wind <sup>(a)</sup>	Solar Index	Solar PV	Solar CSP	Biomass/Other	Geothermal	Infra-structure <sup>(b)</sup>
1	(1)	US <sup>(c)</sup>	69	70	75	57	73	72	75	63	67	65
1	(2)	China	69	74	77	66	59	66	40	57	51	74
3	(3)	Germany	64	65	64	70	59	72	23	64	55	63
4	(4)	India	63	64	72	42	66	67	63	57	44	63
5	(5)	Italy	61	61	64	53	64	66	59	56	65	66
5	(6)	UK	61	67	64	75	38	51	0	58	38	69
7	(8)	France	58	60	61	55	53	63	24	58	29	61
8	(6)	Spain	57	58	63	43	64	64	67	50	33	55
9	(9)	Canada	53	60	65	46	32	44	0	49	34	62
10	(10)	Portugal	51	54	58	42	48	57	22	45	32	56
10	(11)	Ireland	51	58	58	57	26	36	0	47	28	61
12	(11)	Greece	49	51	55	40	54	59	41	40	32	50
12	(11)	Australia	49	49	53	40	53	56	45	45	58	50
12	(14)	Sweden	49	53	53	53	32	43	0	55	34	51
15	(15)	Netherlands	48	53	52	58	35	47	0	41	22	44
16	(16)	Poland	45	50	53	42	31	43	0	41	22	46
16	(17)	Belgium	45	52	50	57	28	38	0	37	28	52
16	(19)	Brazil	45	46	50	34	40	44	29	47	21	43
19	(17)	Denmark	44	47	44	56	29	40	0	45	32	51
19	(19)	Norway	44	45	48	39	22	52	25	35	40	49
21	(19)	Japan	43	48	49	45	45	30	0	44	30	49
22	(22)	New Zealand	41	46	50	35	23	31	0	33	49	41
22	(23)	Turkey	41	43	45	35	39	43	28	36	43	44
24	(23)	South Africa	40	43	46	34	37	34	44	34	31	41
25	(26)	Austria	37	34	46	0	40	54	0	49	34	52
26	(25)	Czech	34	33	44	0	40	54	0	38	31	43
26	(27)	Finland	34	35	34	37	19	26	0	49	23	37

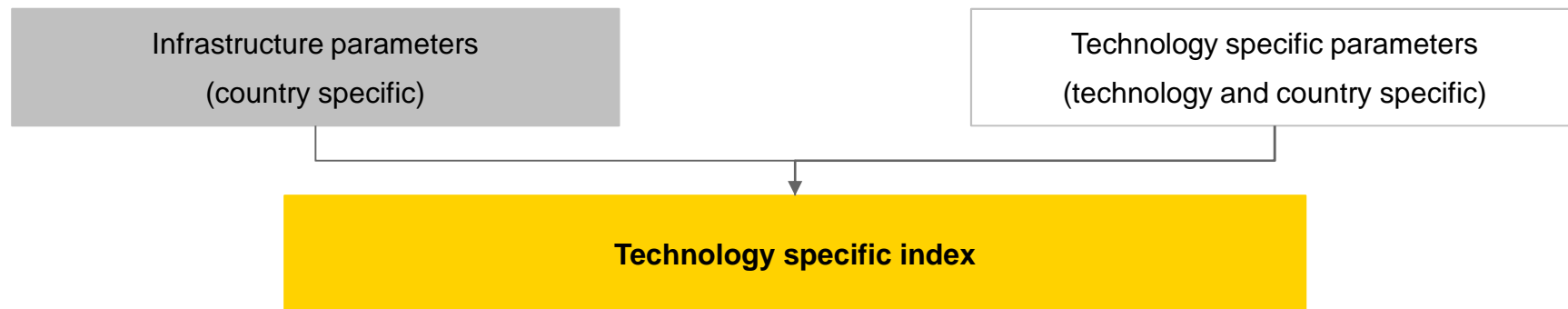
(a) Wind indices are for long-term investment horizon

(b) Combines with each set of technology factors to generate the individual technology indices

(c) This indicates US states with RPS and favourable renewable energy regimes

Source: Ernst & Young LLP

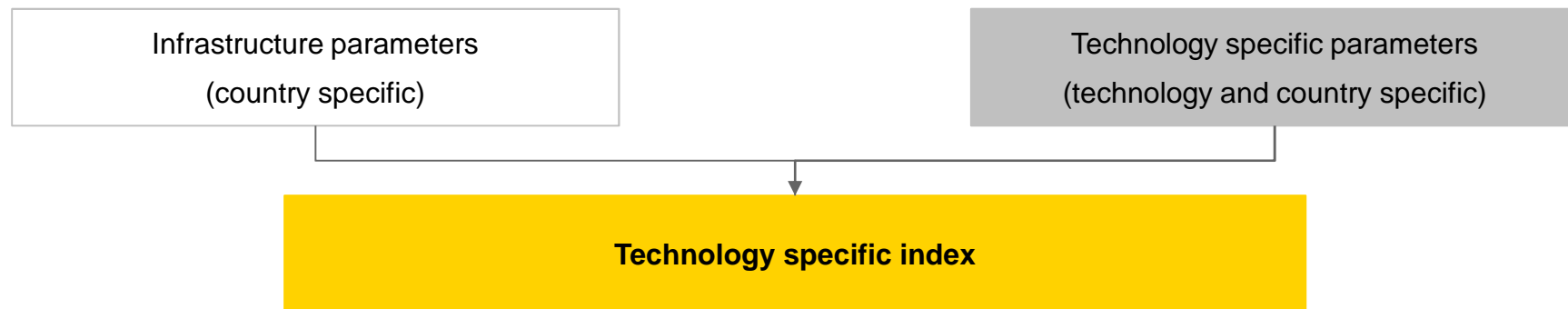
# CAI methodology



## Infrastructure parameters

- ▶ **Electricity market regulatory risk (29%)** – this ranks the countries based on the potential risks inherent in operating renewable technology in a country
- ▶ **Planning and Grid connection issues (42%)** – more favourable planning environments increases score, therefore new legislation and expansion plans are the key underlying data
- ▶ **Access to finance (29%)** – higher scores for countries that have easier and/or cheaper financing opportunities for renewables

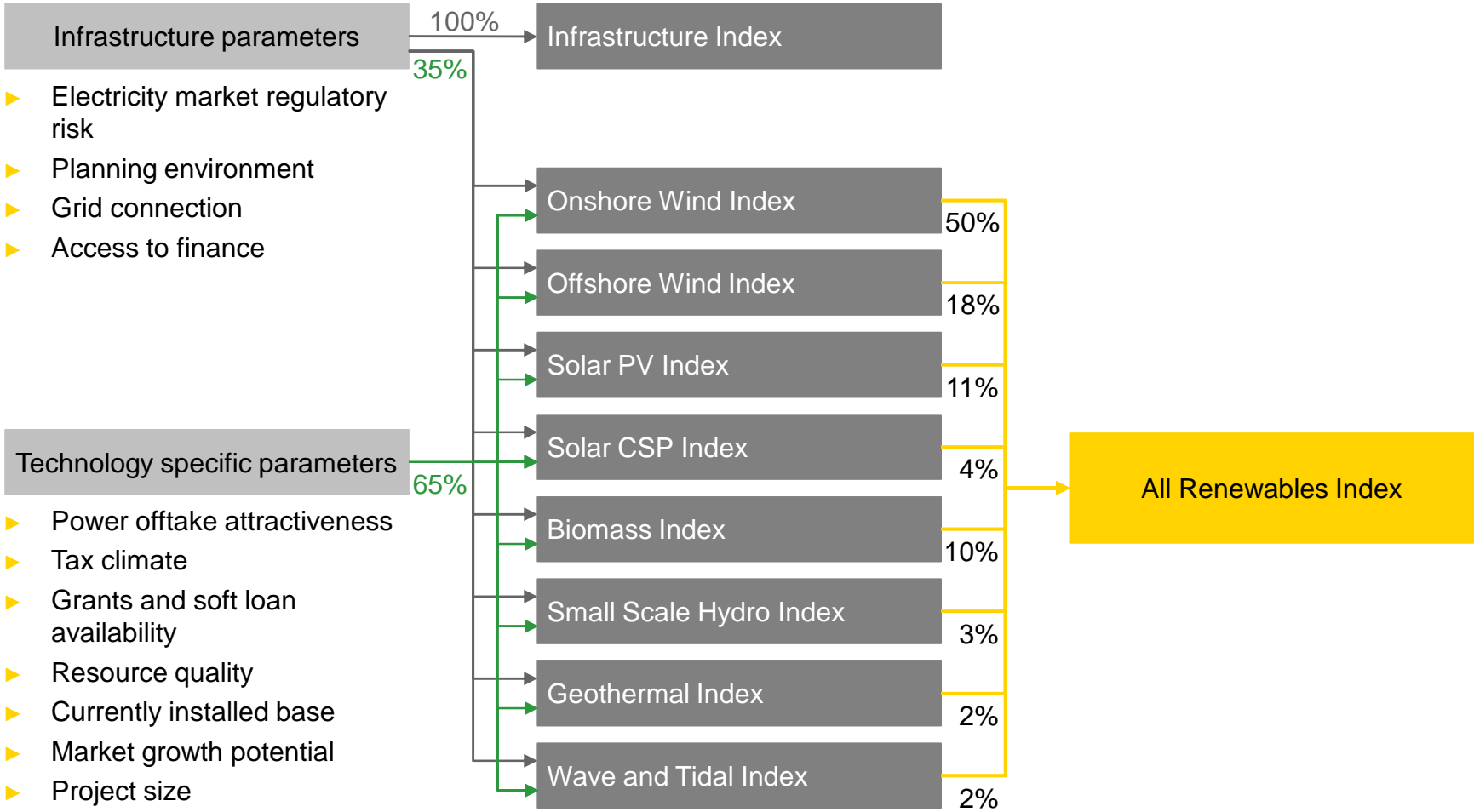
# CAI methodology (cont'd)



## Technology specific parameters

- ▶ **Power offtake attractiveness (19%)** – based on the price received for energy output and considers price fluctuations. Score is altered if a country's government introduce a new tariff or alter an existing one
- ▶ **Tax climate (11%)** – score changes are based on alterations to the taxation regime relating to renewable energy
- ▶ **Grant/soft loan availability (9%)** – influenced by grants and/or soft loans made available for specific technologies or renewable energy as a whole
- ▶ **Market growth (18.5%)** – influenced by current capacity against expected future capacity, based on studies and published targets
- ▶ **Current installed base (8%)** – based on total current capacity that the country has in place, updated annually from market reports
- ▶ **Resource quality (19%)** – e.g., wind speed, solar intensity, etc. This is initially based on wind and solar maps and is unlikely to be changed unless new resource becomes available (more applicable to biomass)
- ▶ **Project size (15.5%)** – larger projects indicate larger economies of scale therefore the average project size is considered. Scores increase when project sizes are seen to be necessary

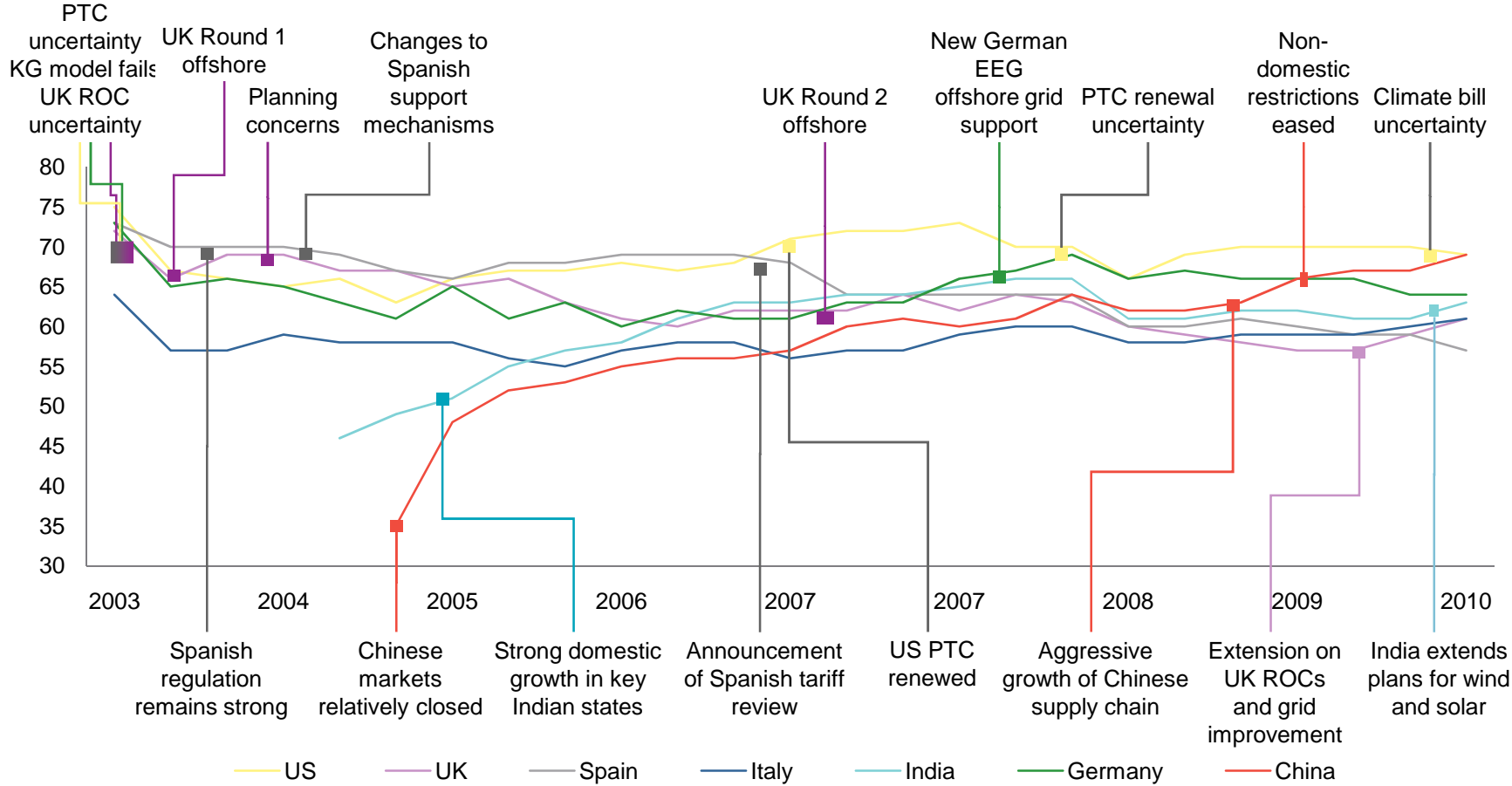
# CAI methodology (cont'd)





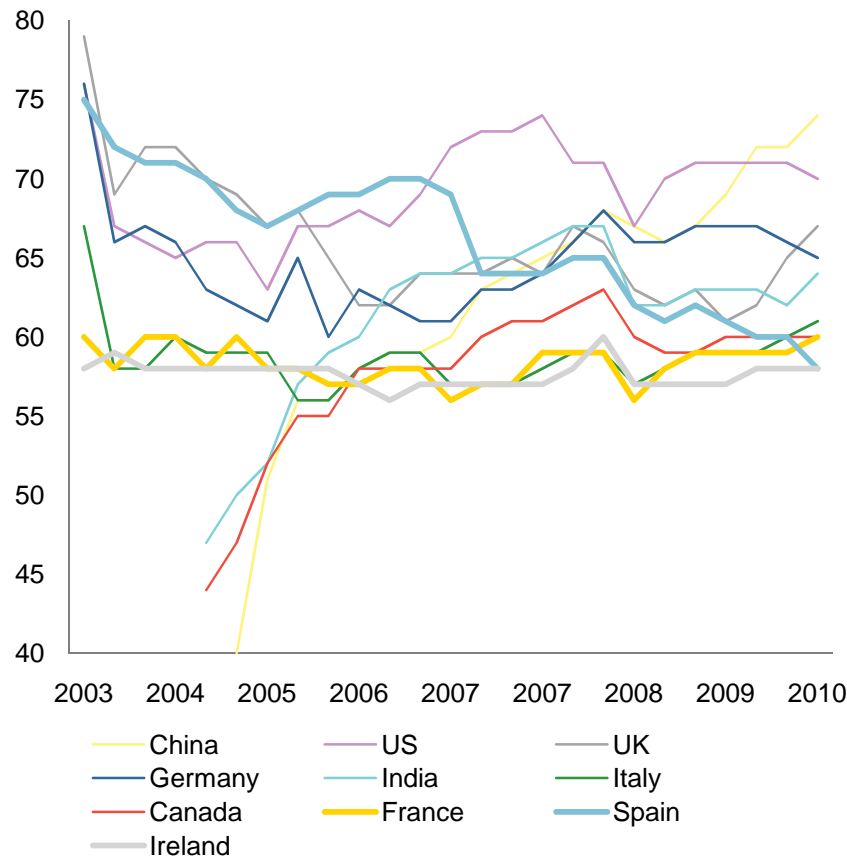
# CAI All Renewables Index history

All Renewables Index scores since 2003 for selected countries



# CAI Wind Index commentary

## Wind Index scores since 2003 for top-10 countries in 2010 Q1



### Headlines in 2010 Q1

- ▶ **China** - overtakes US as leader of both near-term and long-term wind indices. 14.4GW installed in 2009 compared to 9.9GW in the US.
- ▶ **China** – position also improved following plans to standardize grid connection procedures.
- ▶ **Germany** - Increase in offshore score following commissioning of Alpha Ventus and announcement of plans to have 25GW installed by 2030.
- ▶ **UK** - benefited from news that investments in turbine manufacturing plants by companies such as GE, Siemens, Clipper and Mitsubishi.
- ▶ **UK** - new green investment bank will initially focus on funding for offshore wind projects.
- ▶ **India** - in January the Government announced a new generation-based incentive (GBI) scheme for up to 4GW of wind.
- ▶ **Greece, Spain and Portugal** - all suffered negative score changes due to debt exposure in the Eurozone.
- ▶ **Benchmarking exercise** - adjusted planning scores, taking into account report published by EWEA on consent times for onshore wind project applications.

# Competitiveness: a path of predictable costs against the uncertainty of fossil fuels?

## Technology cost

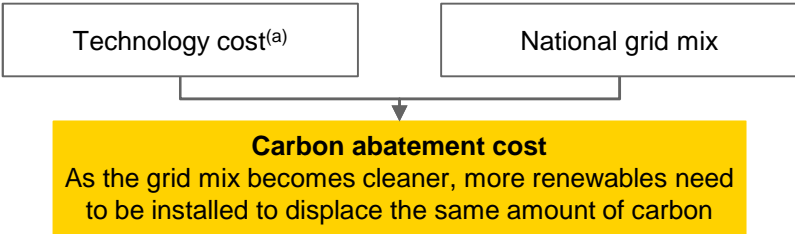
Is driven mainly by:

- ▶ Commodity costs (e.g., steel, copper, iron ore, cement)
- ▶ Experience/efficiency improvements
- ▶ Supply/demand balance

## National grid mix

The carbon intensity of the electricity generation mix is driven by:

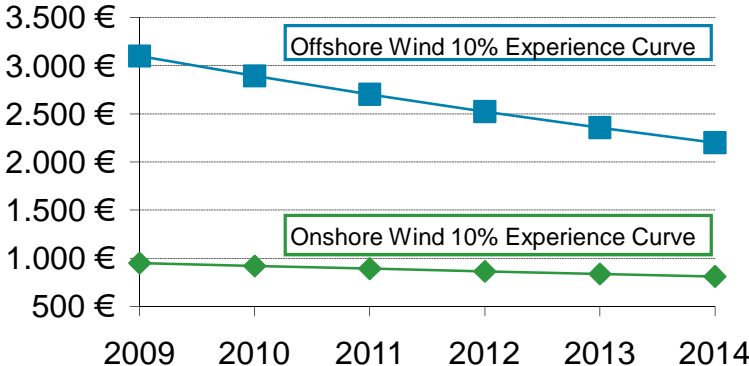
- ▶ Current RE share
- ▶ Future RE target share (e.g., by 2020)
- ▶ Take-up of RE
- ▶ Decline in fossil fuel use
- ▶ Increase/decrease in total demand



(a) Levelised cost which represents the overall cost of generation (including construction costs, O&M costs, cost of capital) expressed as a \$/MWh

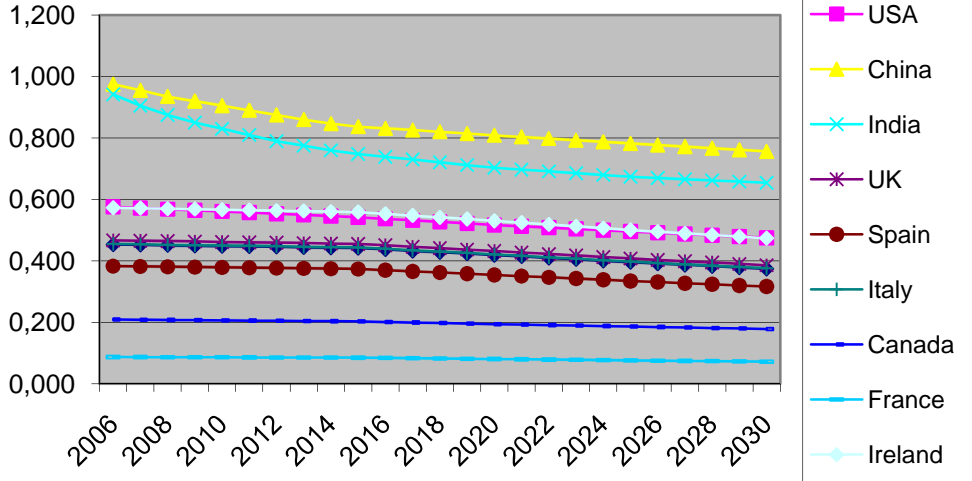
## Projected technology cost (€ per kW) for Germany

Source: Ernst & Young analysis, New Energy Finance



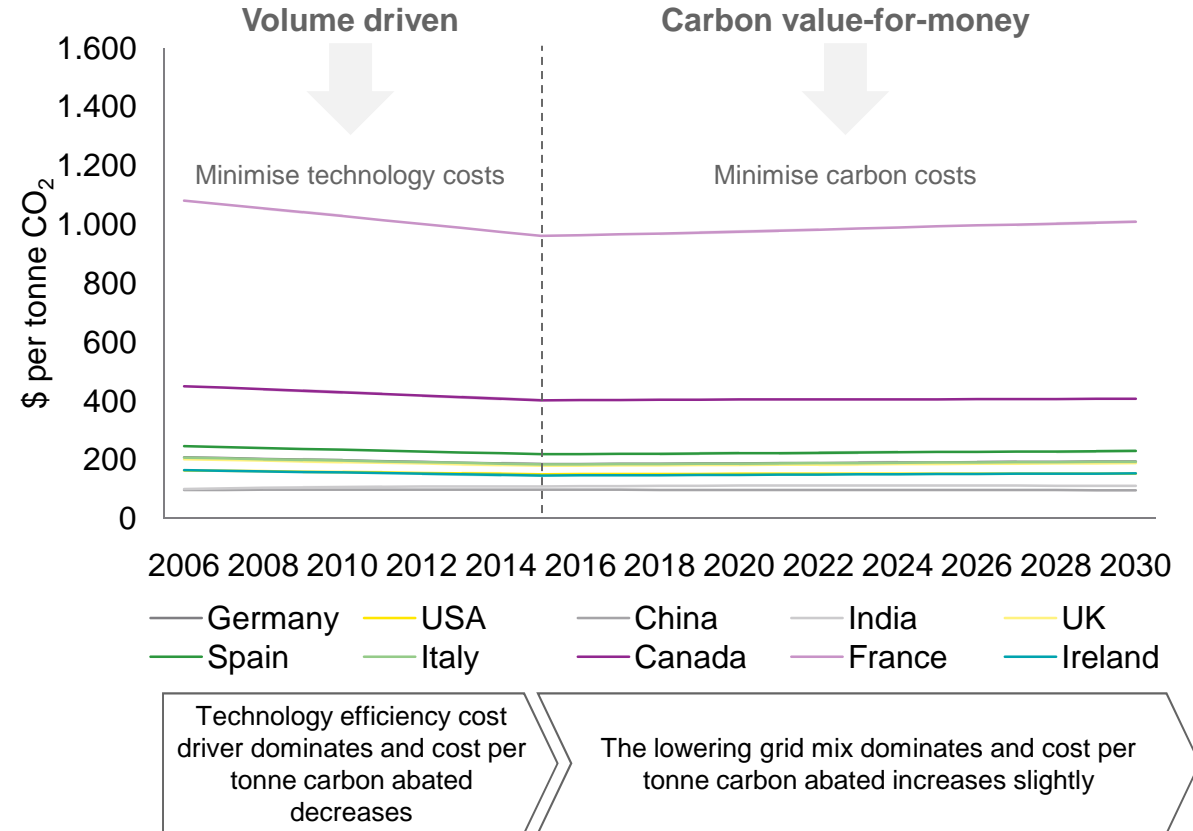
## Projected national grid mix (tonnes CO<sub>2</sub>/MWh)

Source: Ernst & Young analysis, International Energy Agency



# Implications for renewable energy strategy

## Wind onshore



Source: IEA and Ernst & Young

- ▶ Renewable Energy investment in a 'high carbon' country yields a better return in terms of tonnes of CO<sub>2</sub> abated per \$ invested
- ▶ Where carbon markets exist, a high carbon mix will lead to attractive revenues for renewables as they displace carbon from the grid

# Renewables - the Market context

## Energy security and volatile prices

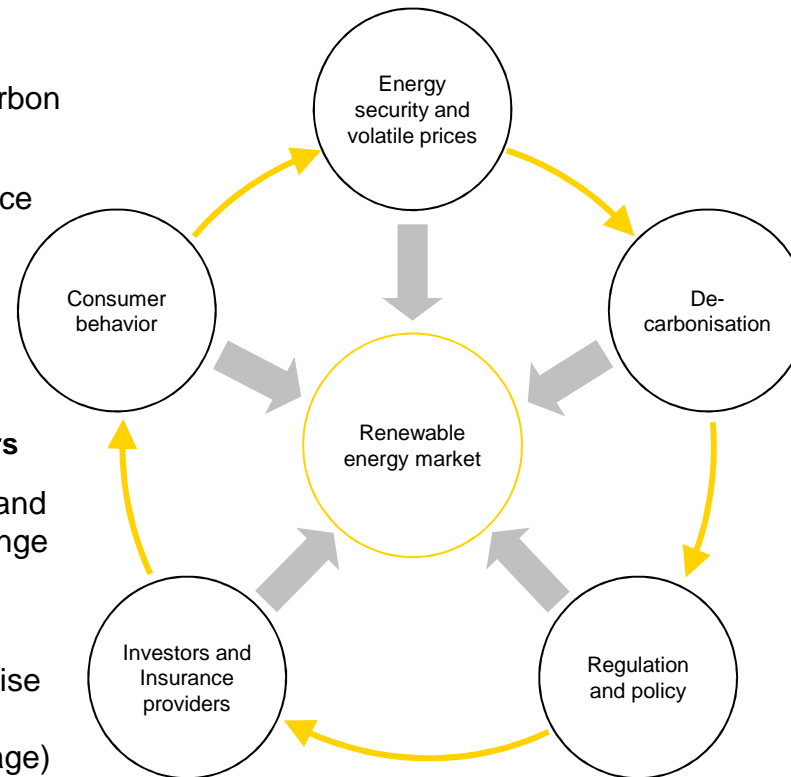
- ▶ Energy cost represent increasingly large share of cost base
- ▶ Price volatility and energy security increasingly important business risk

## Consumer behaviour

- ▶ Changing attitudes to low carbon products
- ▶ Demand for energy & resource efficiency

## Investors and insurance providers

- ▶ Investors demanding clarity and transparency on climate change risk faced by investee companies
- ▶ Insurers beginning to recognise climate change risks to businesses (e.g., flood damage)



## De-carbonisation

- ▶ Government policy and regulation driving decarbonisation of business and society
- ▶ Carbon pricing, taxes and other fiscal measurements adding increasing cost to carbon intensive business

## Regulation and policy

- ▶ Strategic policy making becoming apparent:
  - ▶ Green jobs and economic stimulus
  - ▶ Value for money and affordability
  - ▶ Security of supply
  - ▶ More direct Government interventions?

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