APEC Forum on Low-Carbon Energy Supply Policies
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Effectiveness of policies: Main lessons learnt and recommendations for successful implementation in APEC economies

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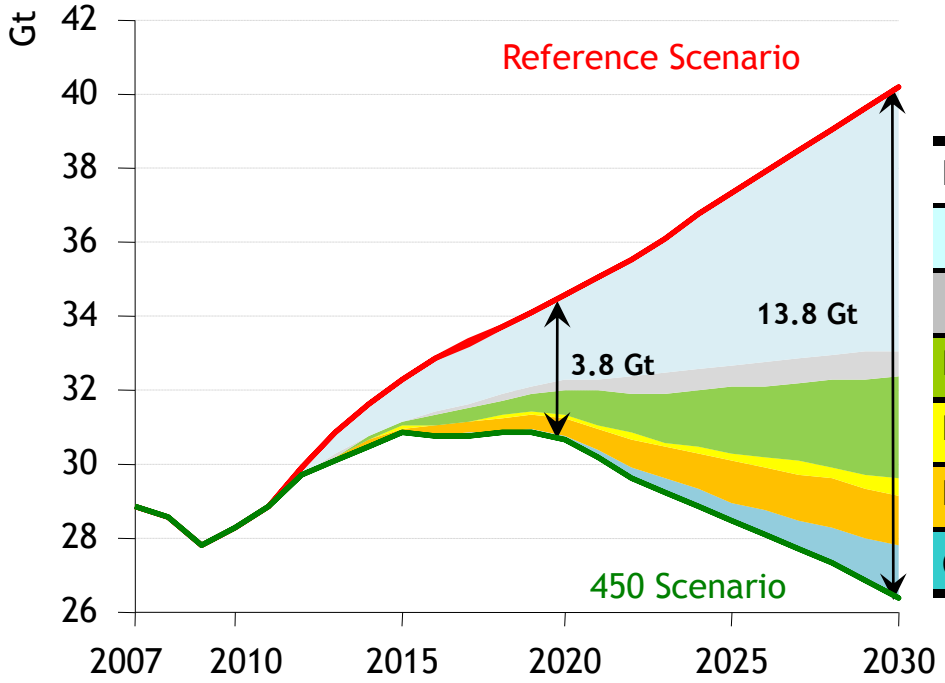
World abatement of energy-related CO2 emissions in the 450 Scenario



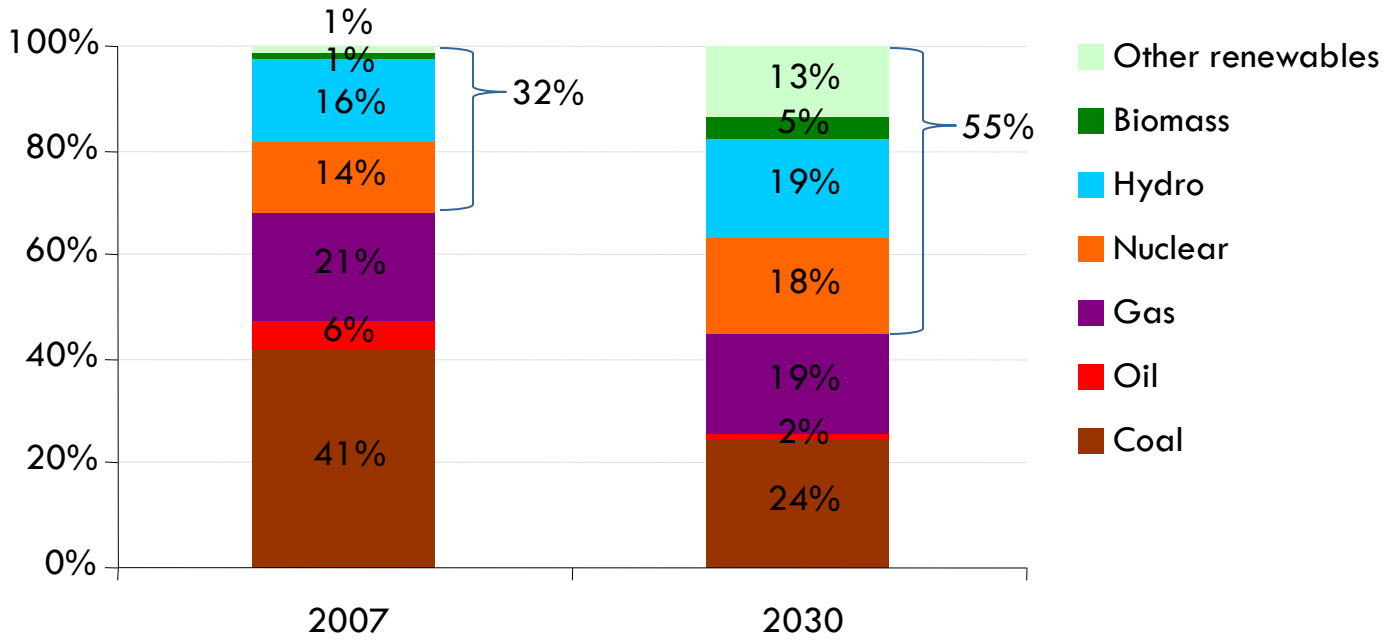
Share of abatement %

	2020	2030
Efficiency	65	57
End-use	*59*	*52*
Power plants	*6*	*5*
Renewables	18	20
Biofuels	1	3
Nuclear	13	10
CCS	3	10

Source: WEO 2009

In the 450 Scenario, renewable energy is the second largest contributor to CO2 emissions abatement after energy efficiency

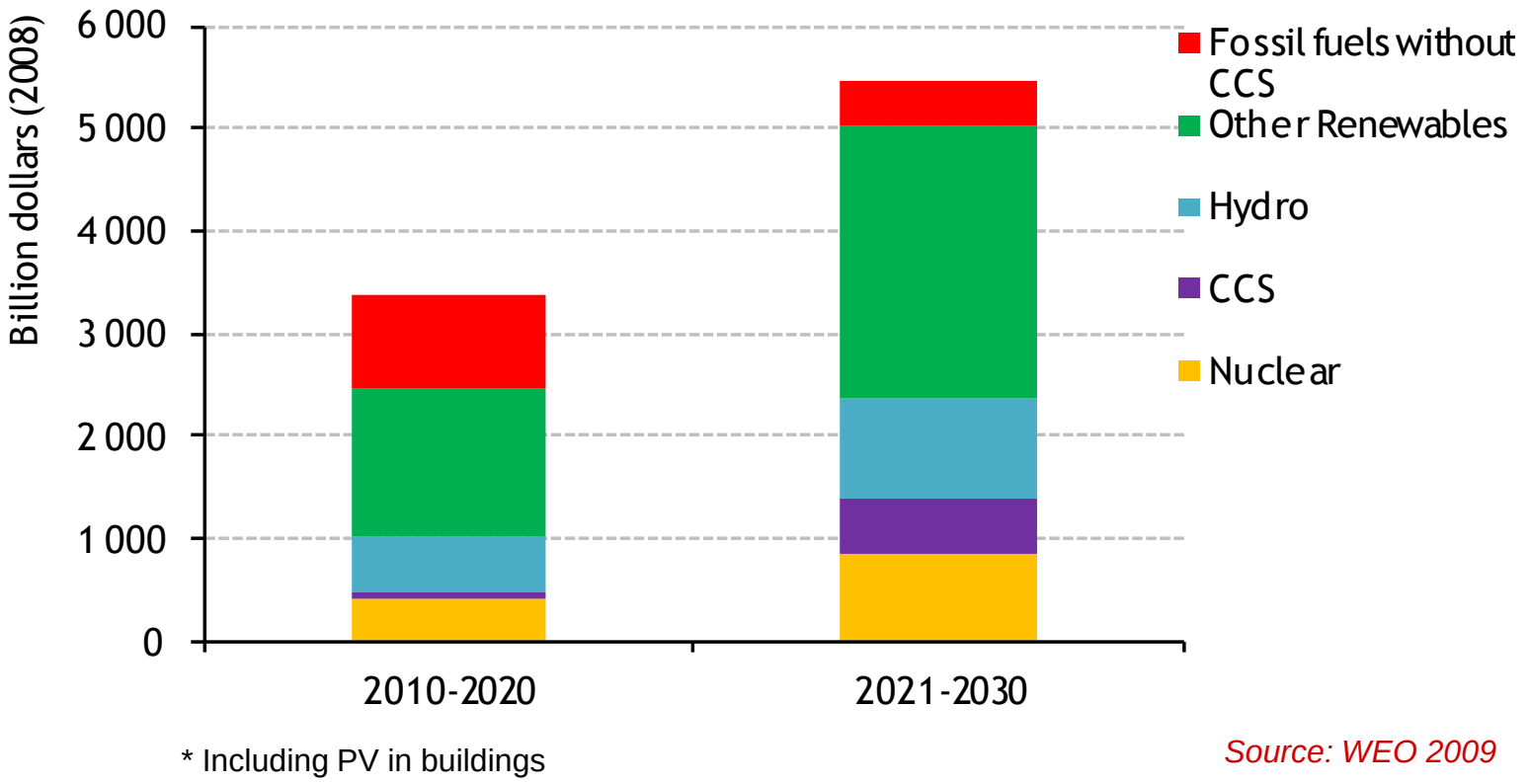
Share of zero-carbon fuels in world electricity generation in 450 Scenario



Source: WEO 2009

Renewable electricity share grows from 18% today to 37% in 2030
Non-hydro renewable generation increases more than ten-fold in absolute terms

Global asset investment needs in renewable power generation



* Including PV in buildings

Source: WEO 2009

Total annual investments in renewable power assets need to significantly ramp up in order to achieve the 450 policy scenario objectives

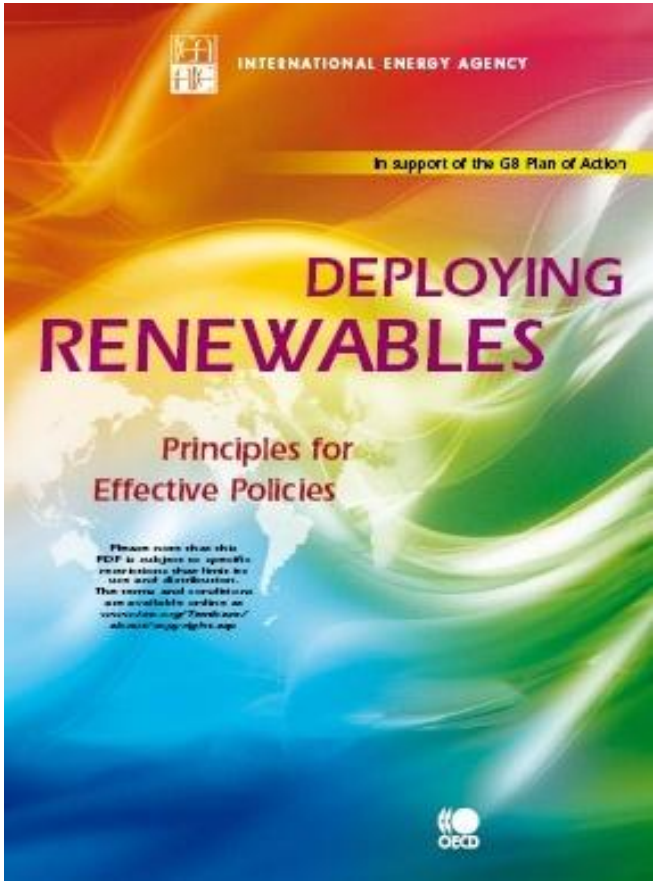
How do we get there from here?

- Implementation of effective and cost-efficient support policies in an increasing number of countries
- Invest in infrastructure and smart grids to address issue of integration
- Ensure sustained support to RD&D

Five principles of good policy design

1. Non-economic barriers must be addressed
2. Predictable and transparent incentives
3. Transitional decreasing over time
4. Tailored to suit technology and market maturity
5. System friendly

- *International policy framework from post-Copenhagen negotiations would help!*



IEA Renewable Energy Markets & Policies Analysis

International Energy Agency

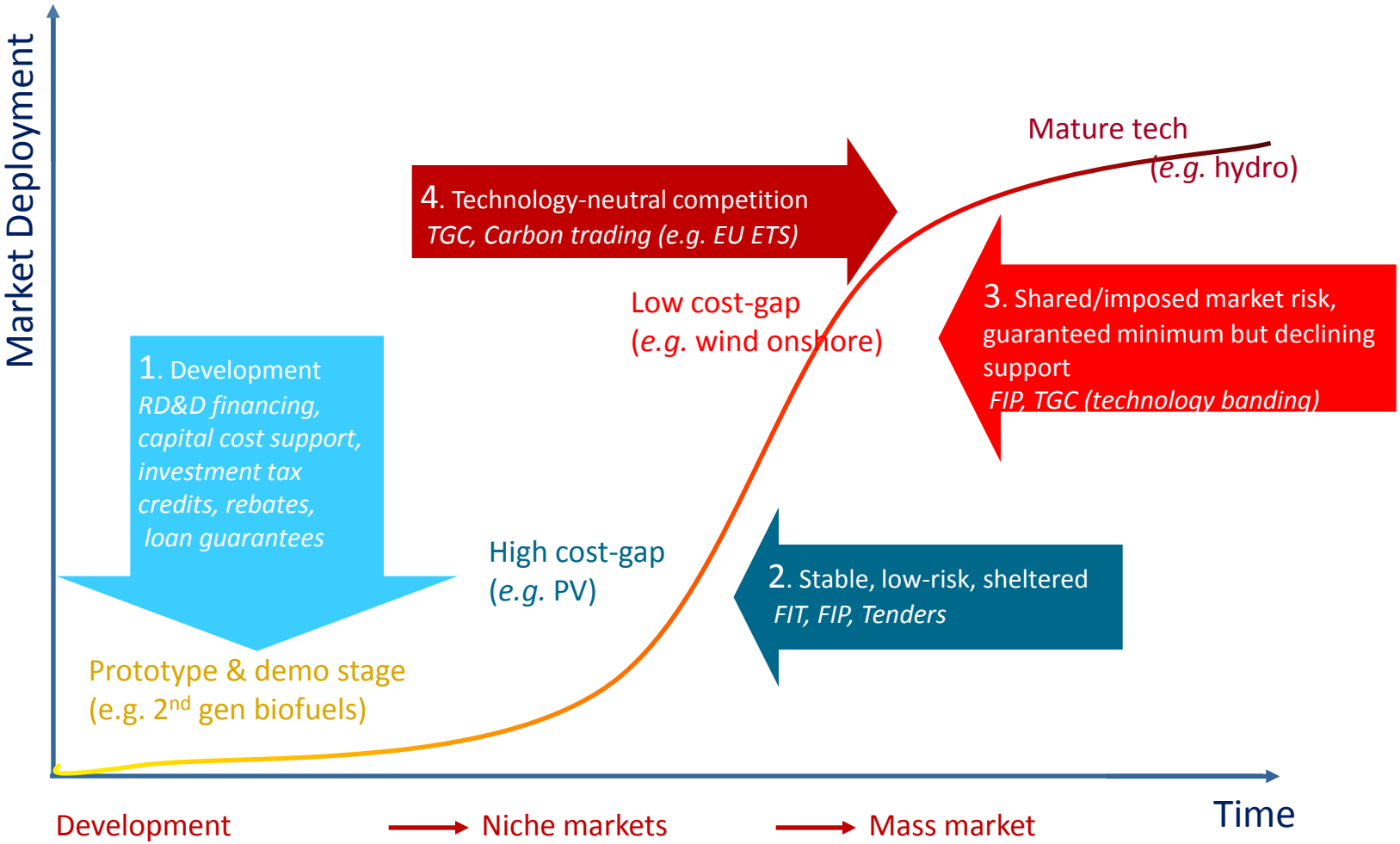
- Extending geographical focus
  - Southeast Asia: report due end of March 2010
  - *Deploying Renewables: Worldwide Prospects and Challenges*: due end of 2010
  - MENA, Sub-Saharan Africa, Latin America, ex-Soviet Union
- Analytical strands
  - Policy effectiveness and efficiency
  - Non-economic barriers
  - Policy options to reduce investor risk
  - Socio-economic benefits of renewables

Quantitative Analysis

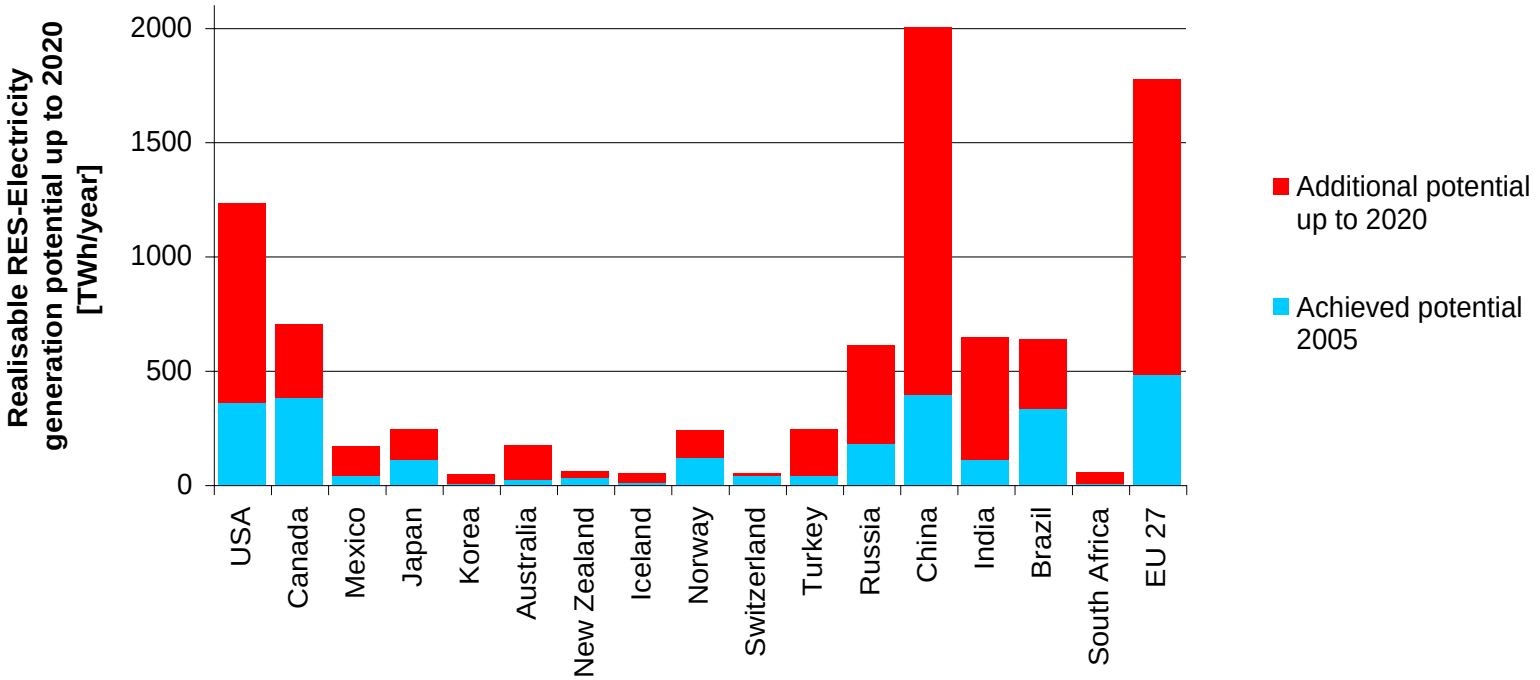
- **Chosen policy effectiveness indicator on a yearly basis:**

$$\frac{\textit{Incremental RE generation in a given year}}{\textit{Remaining additional realisable potential (by 2020)}}$$

Fostering RETs' transition towards mass market integration

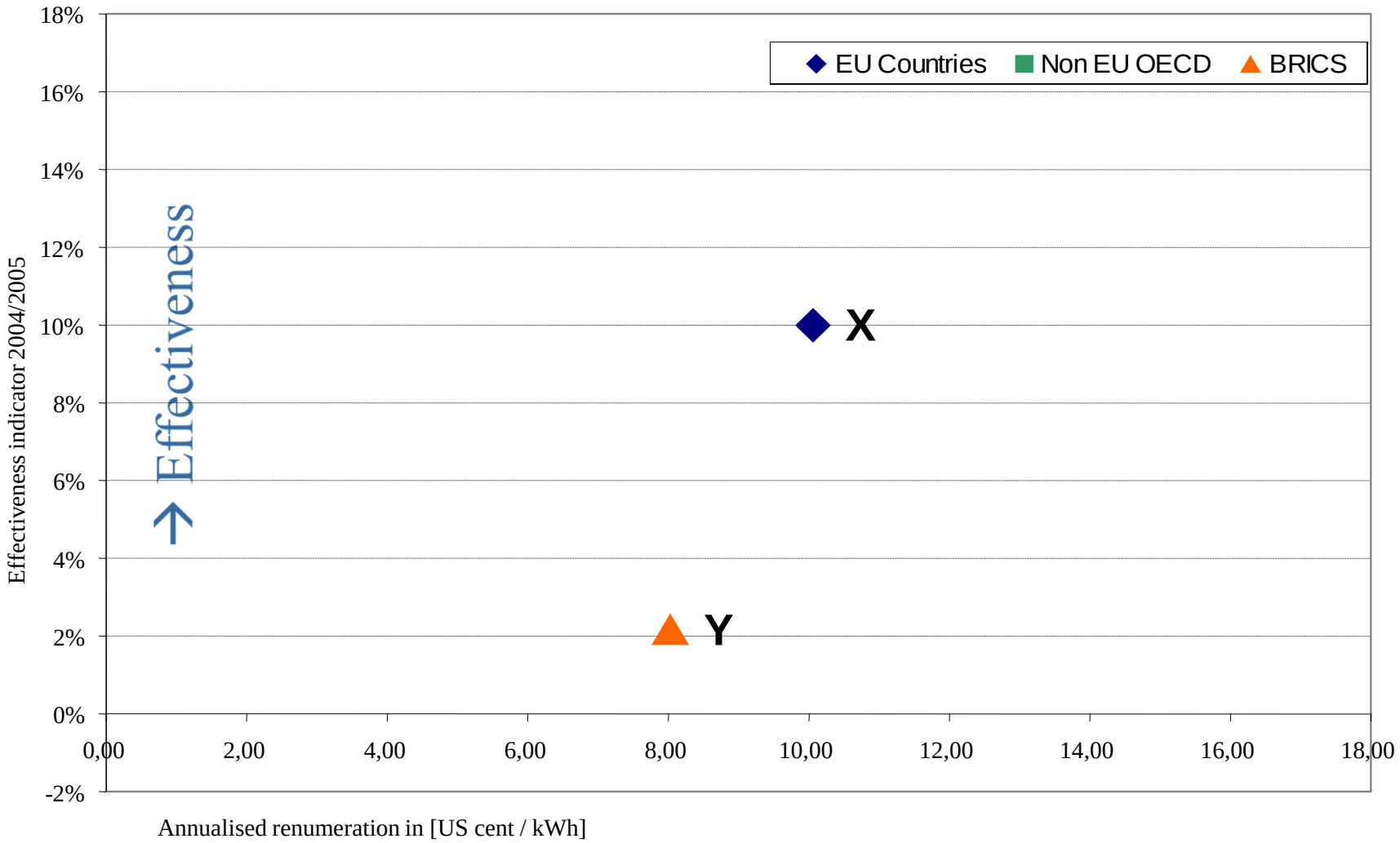


Achieved (by 2005) and additional realisable mid-term potential (by 2020) for RES-E



Achieved (2005) and additional realisable mid-term (up to 2020) potential for RES-Electricity by country (OECD+BRICS) – in absolute terms (TWh)

Effectiveness & Efficiency
Wind On-shore 2005 (OECD & BRICS)



Source: IEA & Fh-ISI, 2008

Effectiveness & Efficiency
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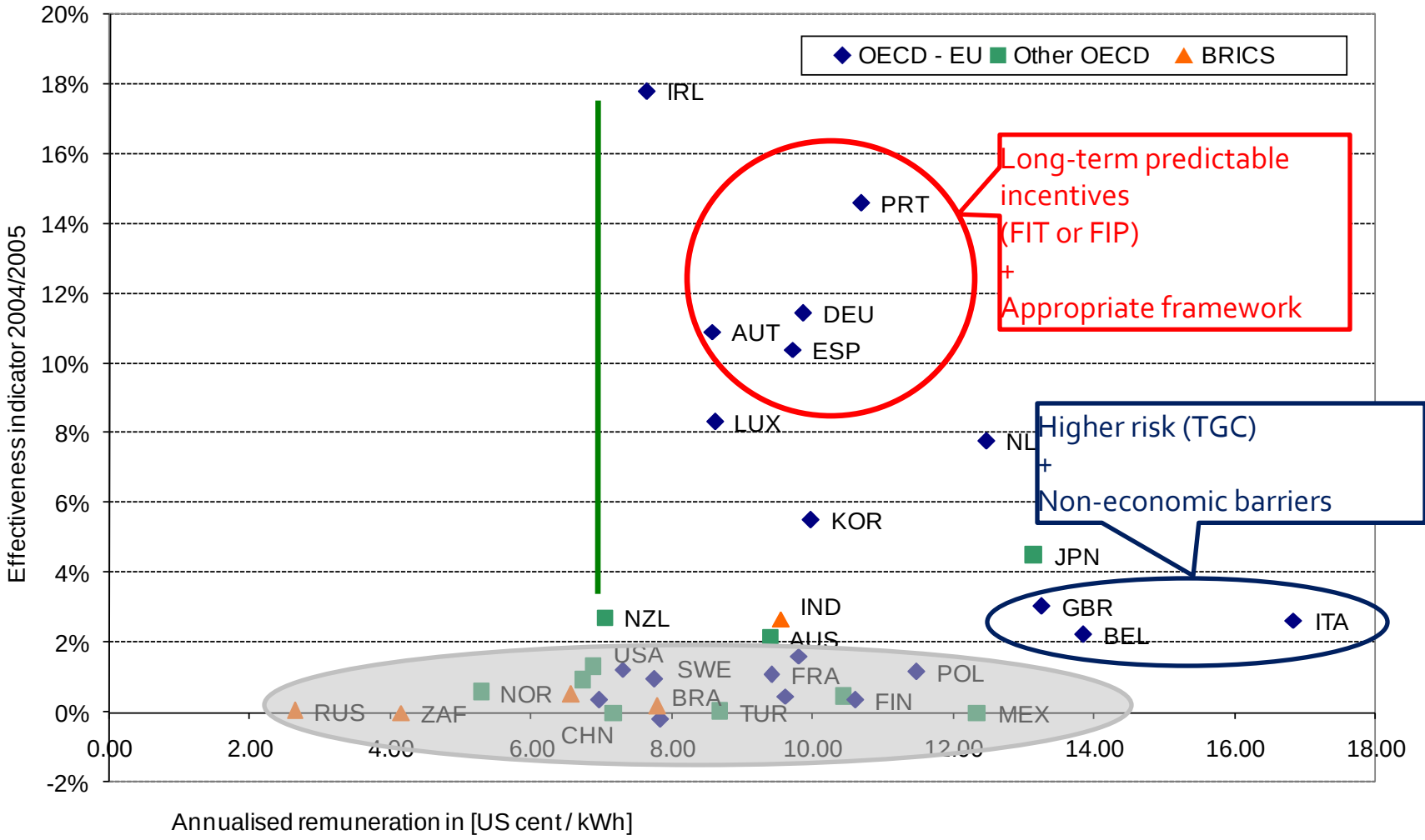


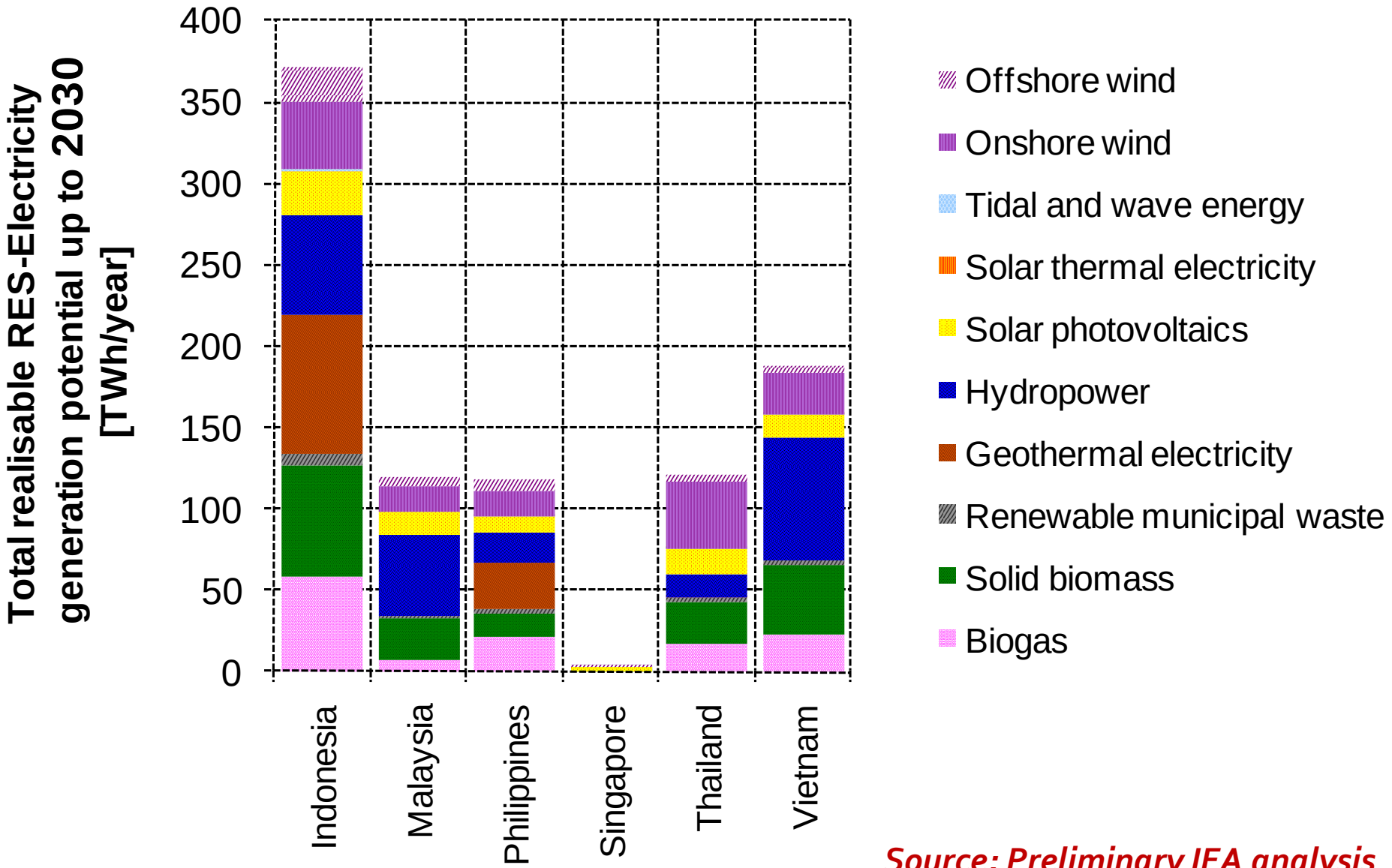
Source: IEA & Fh-ISI, 2008

Implications for APEC economies

Exciting outlook for renewables in APEC economies …

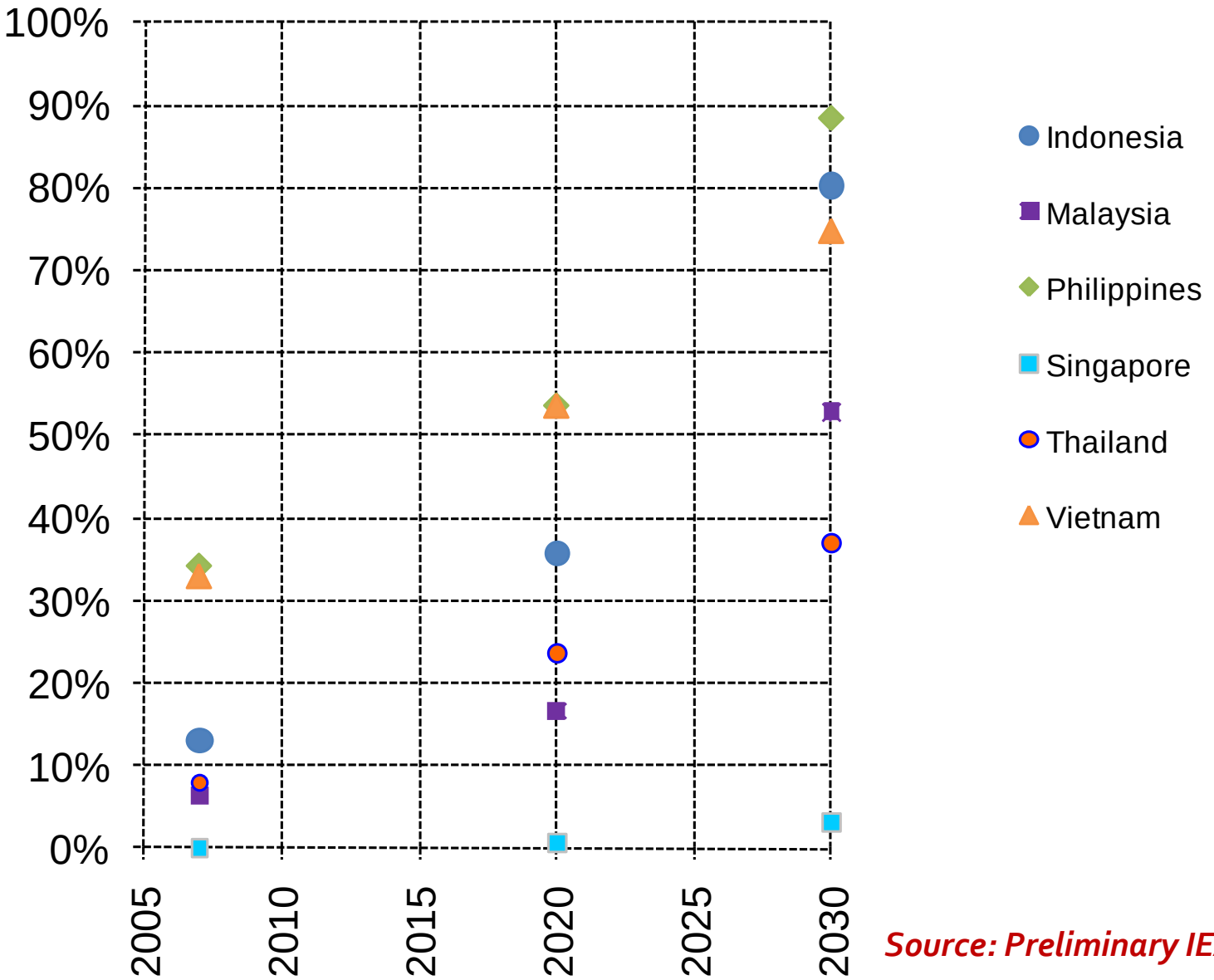
- **Market leaders in some renewables**
  - Wind: USA, China
  - Geothermal: USA, Philippines, Indonesia, Mexico
  - Solar PV: Japan, USA,
- **Rapid growth in renewables technology deployment**
  - Wind: China, USA, Canada
  - Solar PV: Japan, Korea, USA
- **Substantial realisable potentials for all renewables**
  - Wind, solar (PV and CSP), biomass
- **Favourable general RE policy frameworks**
  - Investment subsidies predominate, while production support is less widespread

Potentials for selected APEC countries: Total realisable RES-Electricity generation by 2030



Source: Preliminary IEA analysis

Selected APEC: Realisable RES-Electricity generation potential versus dynamic electricity demand



Source: Preliminary IEA analysis

Selected APEC - Renewable energy policy framework and measures

Country	RES Targets	Programmes, measures & incentives (examples)
Australia	**2020:** 20% RES-E	Feed-in tariffs (state-level), RPS, TGCs, capital subsidies, net metering (state level)
Canada	State-level : *e.g.* Ontario (2015: 10'000 MW increase over 2003 levels)	Feed-in tariffs (state-level), RPS, TGCs, Capital subsidies, Net metering (state level)
New Zealand	**2025:** 90% RES-E	Capital subsidies, tax incentives
USA	State-level: *e.g.* California (2020: 33% RES-E)	Feed-in tariffs (state-level), RPS, TGCs, capital subsidies, tax incentives, net metering (state level)
China	**2020:** 15% RE in primary energy demand	Feed-in tariffs , RPS, tenders, capital subsidies, tax incentives
Rep. of Korea	**2030:** 11% RE in final energy consumption	Feed-in tariff, capital subsidies, tax incentives
Indonesia	**2025**: 15% renewable electricity, 5% biofuels	Feed-in tariff
Japan	**2020:** 10% RE in primary energy	Feed-in tariff, RPS, TGCs, net metering
Malaysia	**2010:** 350 MW grid-connected RE power	Feed-in tariff
Philippines	**2015:** 100% increase in RES-E capacity from 2005	Feed-in tariff (planned), RPS, capital subsidies, tax incentives
Thailand	**2022:** 20.3% RE in final energy demand	Feed-in tariff
Vietnam	**2020:** 5% RE in primary energy	

… but non-economic barriers remain to be overcome

Preliminary analysis indicates in many APEC economies

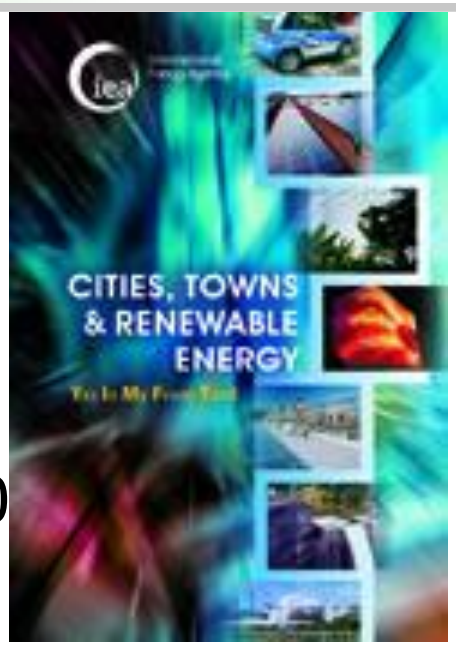
- **Regulatory/ administrative barriers**
  - Lack of powerful institutions to implement RET
  - Gaps in regulatory/legal framework
  - Absence of adequate and targeted incentives
- **Market barriers**
  - Lack of information and awareness
  - Bias towards conventional energies (*e.g.* subsidies)
- **Financial barriers**
  - High up-front costs for investors
  - High cost of capital for RET investments
- **Other barriers**
  - Technical/infrastructure
  - Social acceptance, etc.

Preliminary recommendations

- **Tackle non-economic barriers**
  - Grid infrastructure & access
- **Progressively shift subsidies (where applicable)**
  - Carefully assess social impact of RE incentives
- **Apply diverse set of measures**
  - RE and climate change policies & financing options to be complementary, not mutually exclusive
- **Implement effective financing options for off-grid applications (where applicable)**
  - *e.g.* Rural energisation funds (grants, soft loans, leasing, rural ESCOs)

Other IEA work on renewables

- RE in cities: yes in my front yard!
- RE Technology Roadmaps
  - Wind published
  - Solar PV and CSP soon
  - Geothermal and biofuels later in 2010



- Expand analysis of global renewable energy markets and policies
- Grid integration of variable Renewable Electricity
- ETP 2010: High Renewable Energy scenario
- WEO 2010: Special section on Renewables

Thank you very much for your attention!

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http://renewables.iea.org