

The Outlook for Renewables

REMAP 2030

Joint IRENA-ETSAP Session
Paris, 17 June 2013



Introduction

- **Background:** SE4ALL target to double the share of renewable energy in the global energy mix by 2030
- **Aim:** operationalise pathways by identifying technology deployment, investment and policy needs on a national and global level
- **Objective:** create comparable cost supply curves across countries, and allow country engagement through national REMAP experts



Areas for cooperation

- REMAP analysis is based on Excel spreadsheet
- Definition of reference technology is at the discretion of the analyst
- MARKAL/TIMES provides a more robust reference
- Accounts for grid integration cost
- Accounts for longer term systems planning issues that may affect 2030
- Accounts for competition for scarce resources eg biomass
- Accounts for capital stock turnover
- Objective: assess if the cost for increasing shares of RE are similar in MARKAL/TIMES type models and back-of-envelope calculations

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Methodology

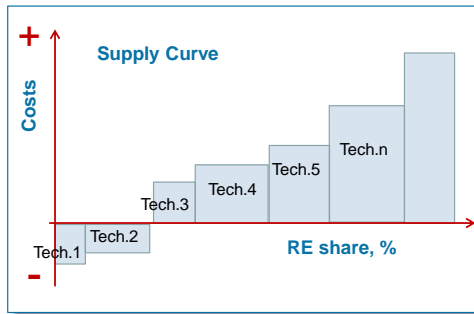
- RE accounting framework documented in Global Tracking Framework (May 2013)
- Reference scenario based on country studies
- Additional potentials based on country comparisons of technology uptake, country specific scenarios
- Technology based assessment of potentials and cost of additional options
- Two sets of cost curves:
 - Local cost and price factors (incl. taxes and subsidies, local cost of capital)
 - Standardized cost and price factors (no taxes and subsidies, 10% cost of capital)
 - Optional sensitivity analysis 5% discount rate

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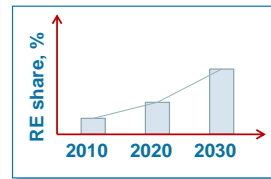
Country Analysis: Main Outcome



The key outcome of the country analysis is a *supply curve (cost-quantity curve)* which highlights the potential for increasing the RE share in the country energy mix by further deployment of RE technologies, and the associated costs. The country supply curves will be used to build the global supply curve.



A supply curve, NOT a prescriptive scenario



REMAP Tool



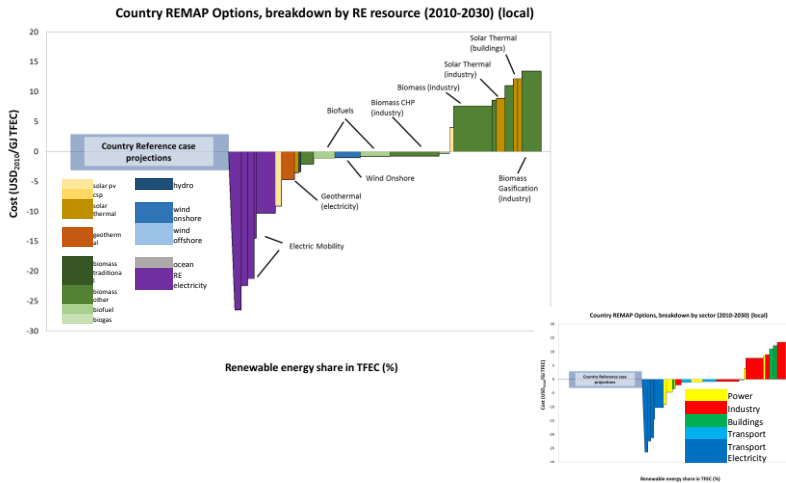
An Excel accounting framework IRENA has developed allowing users to:

- Create a reference scenario for 2020 and 2030
- Input country specific commodity, technology cost and performance criteria
- Enter potential of RET to substitute conventional energy technologies resulting in a "average incremental cost of substitution"
- Plot in a cost-supply curve the reference case developments and the substitution potential and costs, as % of TFEC
- The tool is aimed at users with moderate to advanced proficiency of national energy systems and energy technologies
- IRENA has internal staff assigned to assist REMAP country experts with the tool

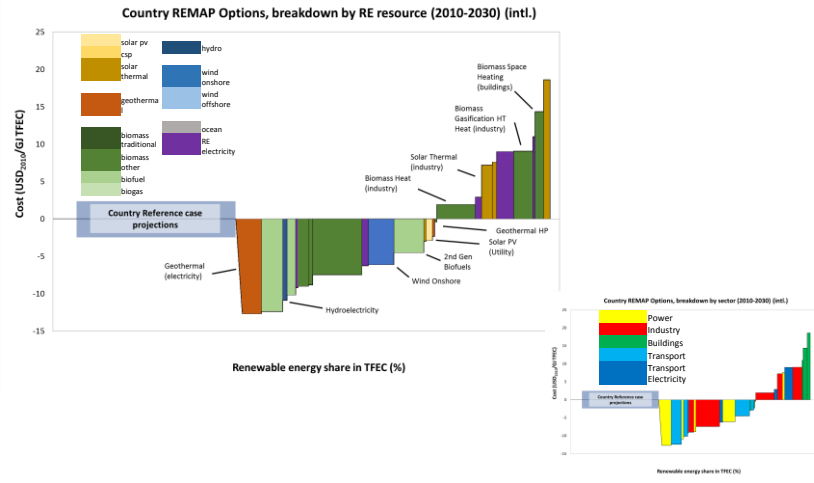
HOMEP
DISCLAIMER
Worksheet: 0: W00: EB_2010
Worksheet: 1: W01: COUNTRY_DATA
Worksheet: 2a: W02a: TECH_LIST
Worksheet: 2b: W02b: TECH_LIST
Worksheet: 3: W03: INDUSTRY
Worksheet: 4: W04: BUILDINGS
Worksheet: 5: W05: TRANSPORT
Worksheet: 6: W06: POWER
Worksheet: 7: W07: TFC
Worksheet: 8: REMAP_SUMMARY
Cost supply curve for REMAP options: CURVE_REMAP_1
Cost supply curve for REMAP options: CURVE_REMAP_2
Cost supply curve for Reference case: CURVE_REFERENCE ASSUMPTIONS

Renewable energy technology	Power production: new capacity	Renewable energy capacity	Manufacture (incl. Electrical)	Production cost	Conventional Fuel Cost & Hydroelectricity	Total substituted fossil fuel	Production cost	Annualized total costs: F0P0	Annualized total costs: substituted fossil fuels	Average incremental cost of substitution
2020	(Mw)	(MW)	(t)	(USD/GJ)	2020	(t)	(USD/GJ)	(USD/yr)	(USD/yr)	(USD/GJ)
POWER SECTOR					POWER SECTOR					
All/Non-activity					All/Non-activity	50	24	474,443,576	473,543,348	-1.2
Solar PV (utility)	20.0	3,523	0	21	Coal	38	64	972,369,372	967,898,366	-20.3
Nuclear (large)	15.0	351	0	11	Oil	38	64	1,024,398,736	1,047,024,731	0.8
Wind onshore	50.0	4,172	0	22	Natural gas	38	21	1,524,433,883	1,547,927,587	1.6
Biomass gasification (CC)	40.0	1,632	Hydro, biomass	49	Hydro	0	24	0	0	0.0
Wind offshore	0	0	0	37	Nuclear	0	24	0	0	0.0
Solar PV (Residential/Commercial)	0	0	0	30	Solar PV (utility)	0	24	0	0	0.0
Solar PV (utility)	0	0	0	23	Solar CSP (no storage)	0	24	0	0	0.0
Solar CSP (no storage)	0	0	0	64	Hydro	0	24	0	0	0.0
Nuclear (small)	0	0	0	96	Coal	0	24	0	0	0.0

Sample Cost-Supply Curve (local)



Sample Cost-Supply Curve (standardized/international)



Country coordinators



Country	Responsible IRENA analyst	DRAFT report	Country focal point
Australia	Dolf Gielen		
Brazil	Asami Miketa		
Canada	New REMAP analyst		
China	Dolf Gielen		
Denmark	New REMAP analyst		
France	Ruud Kempener		
Germany	Ruud Kempener		
India	Asami Miketa		
Indonesia	Masaomi Koyama		
Italy	Ruud Kempener		
Japan	Masaomi Koyama		
Malaysia	Masaomi Koyama		
Mexico	Asami Miketa		
Morocco	New REMAP analyst		
Nigeria	Asami Miketa		
Russia	Dolf Gielen		
Saudi Arabia	Masaomi Koyama		
South Africa	Asami Miketa		
South Korea	New REMAP analyst		
Tonga	New REMAP analyst		
Turkey	Ruud Kempener		
United Arab Emirates	Dolf Gielen		
United Kingdom	Ruud Kempener		
United States	Ruud Kempener		

 completed
 in progress

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Session programme



	IRENA-ETSAP SESSION: REMAP 2030
10.50 – 11.00	Introduction: Dolf Gielen – Introduction to REMAP
11.00 - 11.40	Global RE cost supply curves: Helena Cuesta Cabal Edi Assoumou Tom Kober Maryse Labriet (global/US)
11.40 – 12.40	Regional/national RE cost supply curves: Michael Wiesmeth (Germany) Maryse Labriet (India) Eng. Maria Gaeta (Italy) Brian O Gallachoir (Ireland) Hiroshi Hamasaki (Japan) Julia Seixas (Portugal)
12.40 – 13.00	Discussion on opportunities for collaboration

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THANK YOU!