

**REPAN
RENEWABLE ENERGY
POLICY ADVICE NETWORK**

**APEC Expert Group on New and
Renewable Energy Technology
Hanoi, Viet Nam, 2-3 April 2013**

Where can countries get advice on deploying RE?



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- Some look for a study or a report
 - Grid integration technology road map
 - Some look for examples of best practices
 - IEA/IRENA Policies and Measures Database
 - **Some look for advice from experts**
 - Renewable Readiness Assessment: **priority actions**
 - **Project Navigation**: finance, build, operate
 - **Value Chains**: contributing to local economy
 - Building capacity to **measure resources**
 - Building capacity to plan, build, and operate **grids** with a higher share of renewable power
 - Building capacity to plan, build and operate **waste-to-energy** and **desalination** plants

Where are the experts?



- **RE Experts are found in many places:**
 - Government agencies and laboratories
 - Research institutions and universities
 - Industry associations and NGOs
 - Regional networks (IEA, APEC, ECOWAS, OLADE)
- **IRENA is joining experts in a global network**
 - One stop shop to find an expert in any RE field
 - All sectors (power, buildings, transport, services)
 - All technologies (solar, wind, hydro, geothermal)
- **Key is to match experts with country needs**
 - Each expert tagged by sector and technology
 - Expert curricula vitae available for consideration

How can we join the experts together to help our members?



- Establish a single, unified, one-stop, **global** RENEWABLE ENERGY POLICY ADVICE NETWORK.
- Get countries to nominate experts who will contribute their **services free of charge** (to those who seek their advice).
- Maintain a **web platform** for countries to see the experts available and the types of policy advice they may seek, as well as to request assistance.
- Experts also **assist with IRENA's initiatives** to get more renewables on islands and on power grids on every continent – compiling best practices and building capacity.

Building upon a platform



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- **A platform for the expert network is up and running at the Clean Energy Solutions Center**
 - System in place to match experts with needs.
 - **We would like to build on the platform.**
 - Establish new REPAN web page jointly sponsored by IRENA and Clean Energy Solutions Center.
 - Link to REPAN web page from existing IRENA and Clean Energy Solutions Center websites.
 - Ask IRENA members to nominate more experts from more countries in more fields for better service.
 - Engage with countries of the Clean Energy Ministerial (CEM) to support the joint activity.

Renewable Readiness Assessment: Priority Actions



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- IRENA conducts about eight RRAs each year to help countries identify **priority actions** for accelerating renewable energy deployment, with support from all concerned stakeholders.
 - Practitioners may wish to join RRA team visits.
 - Actions to support RE on **power grids**.
 - Actions to support RE in **buildings**.
 - Actions to support RE in **transport**.
 - Actions to support RE for **services**.

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- Autonomous interest clusters forming:
 1. RE **Resource Assessment** for islands
 2. RE **Readiness Assessment** for islands
 3. RE **Technology Deployment Roadmaps** for islands
 4. RE **Project Development Navigator** for islands
 5. RE **Power Grid Integration** on Islands
 6. RE **Water Desalination** Systems on Islands
 7. RE **Waste-to-Energy** Systems on Islands
 8. RE **Tourist Industry** Applications on Islands
 - Expert advice could be helpful to them.

Renewable Energy Grid Integration



- **Every region faces challenges in integrating a greater share of variable renewable power.**
 - Variable wind and solar resources are becoming more and more cost-effective on power grids.
 - Smart grid and advanced storage technologies can boost the share of variable resources yet maintain a stable grid and reliable service.
 - Hydropower and geothermal baseload resources can help boost the renewable share as well.
 - Virtual storage through hydro and natural gas plants can help boost the wind and solar share.
- **Experts can help grids in Africa, Asia, Latin America and Islands assess how great a share of renewable electricity generation they can technically absorb.**

Ask An Expert Policy Advice



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- The Ask an Expert service has responded to 67 requests for advice in its first two years.
 - Advice can be provided, free of charge, on a wide range of energy policies and programs:
 - Enterprise development
 - Renewable energy finance
 - Renewable energy technologies
 - Geothermal
 - **Photovoltaic**
 - Biofuels
 - Electricity market design to support RE
 - Sustainable energy planning

Effective Regulation to Encourage Renewable Energy



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- Countries want to choose the right mix of regulations to promote renewable energy:
 - Feed-in tariffs
 - Renewable portfolio standards
 - The Solutions Center is assembling regulatory experts to help countries choose wisely.

**RENEWABLE ENERGY POLICY ADVICE NETWORK
QUESTIONNAIRE FOR IRENA DELEGATES**



Which types of renewable energy policy advice would interest your country?

Type of Renewable Energy Policy Advice	Interested?
Advice on how to accelerate RE deployment on POWER GRIDS	
Advice on how to accelerate RE deployment in BUILDINGS	
Advice on how to accelerate RE deployment in TRANSPORT	
Advice on how to implement RE WASTE-TO-ENERGY systems	
Advice on how to implement RE DESALINATION systems	
Advice on how to promote RE through effective REGULATION	
Advice on ACTIONS to promote RE for key technologies and uses	

Would you like to nominate an expert or practitioner for the network?

Type of Renewable Energy Expert or Practitioner	Nominate?
Expert/Practitioner on RE deployment on POWER GRIDS	
Expert/Practitioner on RE deployment in BUILDINGS	
Expert/Practitioner on RE deployment in TRANSPORT	
Expert/Practitioner on RE WASTE-TO-ENERGY systems	
Expert/Practitioner on RE DESALINATION systems	
Expert/Practitioner on effective RE REGULATION	
Practitioner for COUNTRY RRA (Renewable Readiness Assessment)	

THANKS FOR LISTENING!



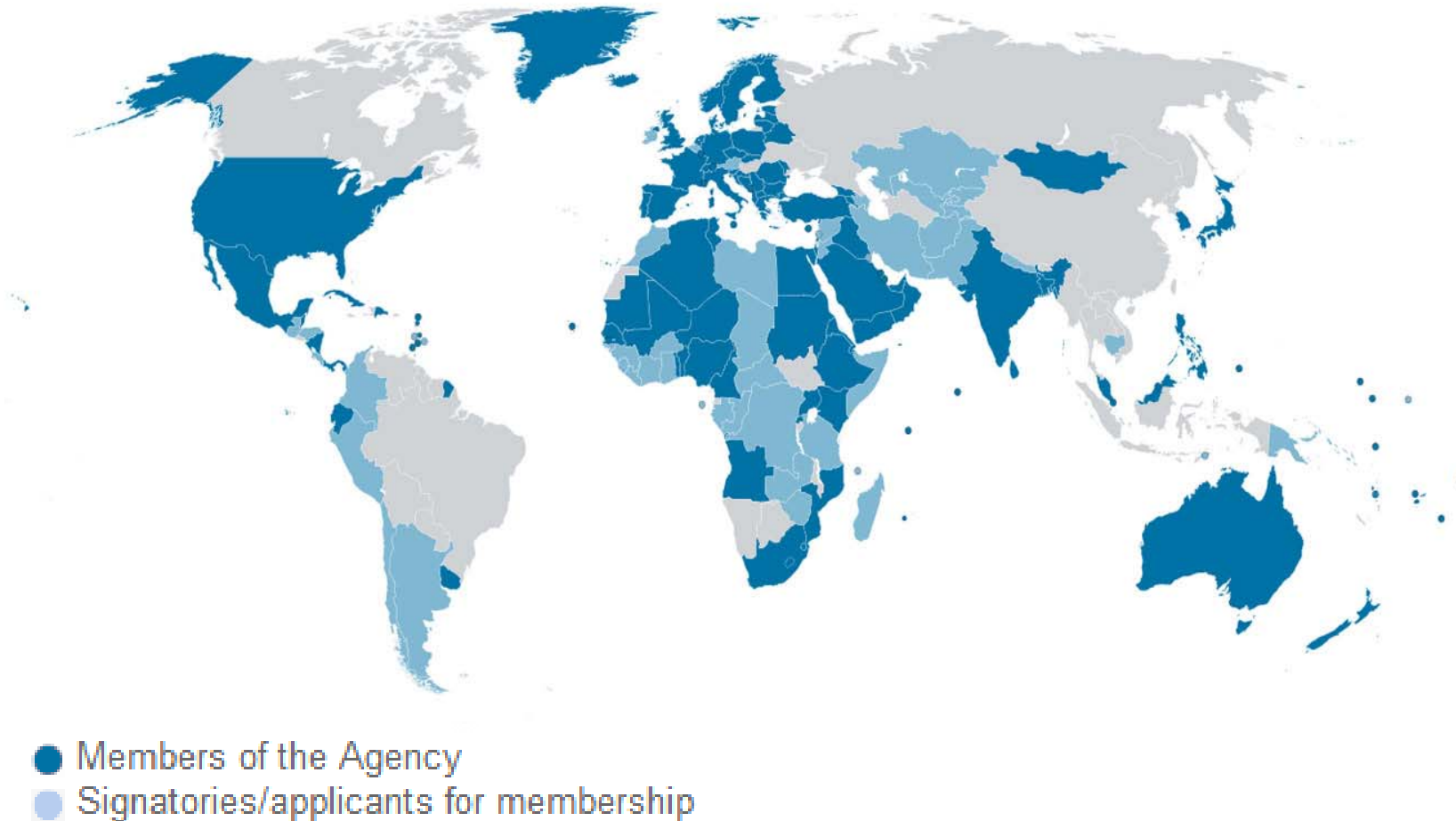
Global Renewable Energy Islands Network (GREIN)

Malta Communique on Accelerating Renewable Energy Uptake for Islands

- Ministers and others called on IRENA to establish a **Global Renewable Islands Network (GREIN)** as a platform for pooling knowledge, sharing best practices and seeking innovative solutions for accelerated uptake of clean and cost-effective renewable energy technologies on islands.
- Information developed could be of value not only to island states, but also to other **countries with islands or virtual islands** far from transmission grids – which share the burden of high costs of energy from distant sources which renewable energy may displace.

IRENA Membership

Members: 160 affiliates - 109 ratified



Vanuatu Wind Farm



GREIN Membership

- Open to all interested countries
 - Countries that attended Malta Conference (48)
 - IRENA members (29 countries)
 - IRENA signatories (14 countries)
 - Others (4 countries)
 - Other selected countries with numerous islands
- Open to qualified parties in each country
 - Nominated by IRENA officials or self
 - Approved by IRENA delegates

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Island-Led Interest Clusters to Accelerate RE

- Renewable Energy [Resource Assessment](#) for Islands
- Renewable Energy [Readiness Assessment](#) for Islands
- Renewable Energy [Technology Deployment Roadmaps](#) for Islands
- Renewable Energy [Project Development Navigator](#) for Islands
- Renewable Energy [Power Grid Integration](#) on Islands
- Renewable Energy [Water Desalination Systems](#) on Islands
- Renewable Energy [Waste-to-Energy Systems](#) on Islands
- Renewable Energy [Tourist Industry Applications](#) on Islands

Sources of Advice and Support for GREIN

- Island-focused organisations (AOSIS, CARICOM, SIDS, many others)
- Multilateral financial institutions (World Bank, ADB, IADB)
- Experts on RE systems (desalination, waste-to-energy, buildings)
- Renewable equipment manufacturers and traders
- Countries that are island states (AOSIS and SIDS countries)
- Countries with numerous islands (Indonesia, Japan, Philippines)
- Countries with islands in their neighborhoods (New Zealand)

Nauru PV Pumps Water



RE Technology Deployment Roadmaps for Islands

- Power sector (mini-grids and micro-grids)
 - hybrid systems of PV, wind, geothermal, marine with diesel)
 - waste-to energy systems (two problems solved at once)
- Transport sector (cars and trucks)
 - indigenous biofuels from crops or cooking oil
- Building sector (housing and tourist hotels)
 - solar heating and cooling
 - solar water heating

RE Power Grid Integration on Islands

- Islands typically rely on expensive diesel for electricity
 - Often 40 cents per kilowatt-hour or more to ship in
- Displacement of diesel gives renewables easy market entry
- Some islands have baseload resources to apply
 - Geothermal
 - Marine
- All islands have variable resources, requiring careful integration
 - Wind
 - Solar

RE Tourist Industry Applications on Islands

- Hotels are energy-intensive
 - Air conditioning
 - Showers
- Renewables are cost-effective
 - Hybrid cooling systems
 - Solar hot water heating

Tonga Solar Farm



RE Resource Assessment for Islands

- Geothermal
- Marine
- Wind
- Solar
- Hydro
- Bioenergy

RE Water Desalination Systems on Islands

- Water is expensive to bring in from overseas
- Natural market for high-cost desalination
- Solar energy provides the indigenous resource

RE Waste-to Energy Systems on Islands

- Waste is costly to ship away from islands.
- Tourist industry generates large quantities of waste.
- Waste-to energy solves two goals at once
 - Cost savings in waste disposal reduce generating cost per kWh

31680W SOLAR POWER ON GRID SYSTEM



現在發電量 kW
Instant Generating Capacity

8857

日射量 W/m²
Solar Radiation

88881

模組溫度 °C
Module Temperature

8827

Grid-Connected PV System



累積減少之二氧化碳排放量 kg
Cumulative CO₂ Emissions Reduction

8884290

累積發電量 kWh
Cumulative Generating Capacity

8886724

RE Readiness Assessment for Islands

- Actions to accelerate renewable energy technology deployment
 - Identify service-resource pairs
 - Services such as desalination and cooling hotel rooms
 - Resources as identified in study of resource potential
- Develop body of recommendations applicable to a range of islands.
- Follow-up deployment activities (extension modules):
 - Renewable energy supply chains for islands
 - Financing renewable energy on islands

Project Development Navigator for Islands

- Identify cost-effective projects
- Assess project feasibility
- Perform conceptual design studies
- Perform detailed design studies
- Obtain investment financing
- Successful Installation
- Operation and Maintenance
- Decommissioning

Kiribati PV Drives PC



REMAP 2030

Country Analysis Process

DRAFT 27 March 2013

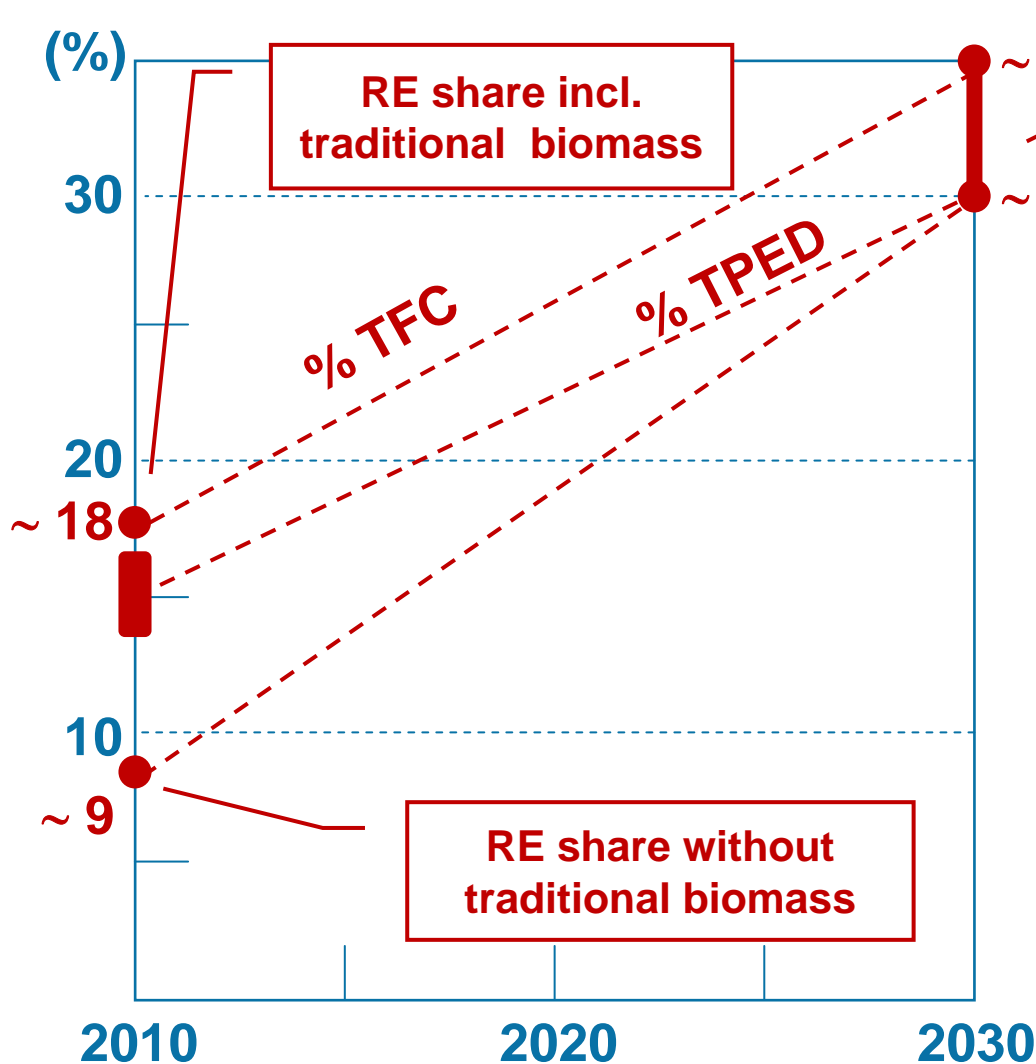
Context

- ❑ On Member Countries' request, the IRENA Secretariat is developing a roadmap (i.e. **REMAP 2030**) aimed to doubling the renewable energy (**RE**) share in the global energy mix by 2030.
- ❑ REMAP 2030 is intended to contribute the UN Secretary General's *Sustainable Energy for All (SE4ALL)* initiative, which aims to three major objectives by 2030:
 1. Ensuring universal access to modern energy services,
 2. Doubling the global rate of improvement in energy efficiency,
 3. **Doubling the share of RE in the global energy mix.**
- ❑ IRENA has been requested to act as the RE hub for the SE4ALL initiative.
- ❑ Explorative analysis by IRENA published in January 2013 (available at www.irena.org) suggests that doubling the RE share in the global energy mix by 2030 is technically feasible. However, **a detailed assessment at country level is needed** as energy policy and technology implementation usually occurs at this level.

REMAP 2030 Objectives

- ❑ The REMAP 2030 goal is to identify viable pathways to double the RE share in the global energy mix by 2030, while ensuring universal access to modern energy and doubling the energy efficiency growth rate (SE4ALL targets).
- ❑ This goal means achieving a 30-35% “modern” RE share in the world’s total final consumption (TFC) by 2030, up from today’s level of about 18%, which includes the use of traditional biomass.
- ❑ The analysis is carried out at a country level, where energy policies are usually implemented. The first phase focuses on a group of 17 countries with high energy demand, accounting for 70% of the global energy use.
- ❑ While some countries already exceed a 30% RE share in their energy mix (though including the use of traditional biomass), achieving this target by 2030 can be very challenging for many countries.
 - ❑ What happens with policies in place or under consideration?
 - ❑ What would be the implications of doing more?

RE Share in the Global Energy Mix



RE share in 2010 (incl. traditional biomass)

- RE share in TFC ~ 18%
- RE share in TPED ~ 13-17%

TFC = Total Final Consumption
 TPED = Total Primary Energy Demand

The RE share in TPED depends on efficiency used to convert RE into primary energy equivalent

Measuring the RE share in TFC instead of TPED reflects more correctly the actual role of RE in the global energy mix

REMAP Country Analysis

- ❑ The country analysis aims to explore the country potential to contributing the global target of doubling the RE share by 2030. Country-related results as well as policy recommendations will be cleared with national IRENA focal points.
- ❑ Starting from country energy policy and plans, the analysis explores how the RE share in the local energy mix can be increased, based on realistic assumptions on RE technology deployment. The technical and economic feasibility of **further** RE technology deployment, as well as the associated costs and benefits will be assessed.
- ❑ To understand local potential, peculiarities and needs, the REMAP country analysis requires a close cooperation between IRENA and country experts.
- ❑ Participating Countries are kindly invited to nominate Experts to actively contribute the analysis. Engagement of Country Experts is estimated to be less than one month of work.

Country Analysis: Steps

The analysis includes the following steps that will be carried out in close consultation with country experts:

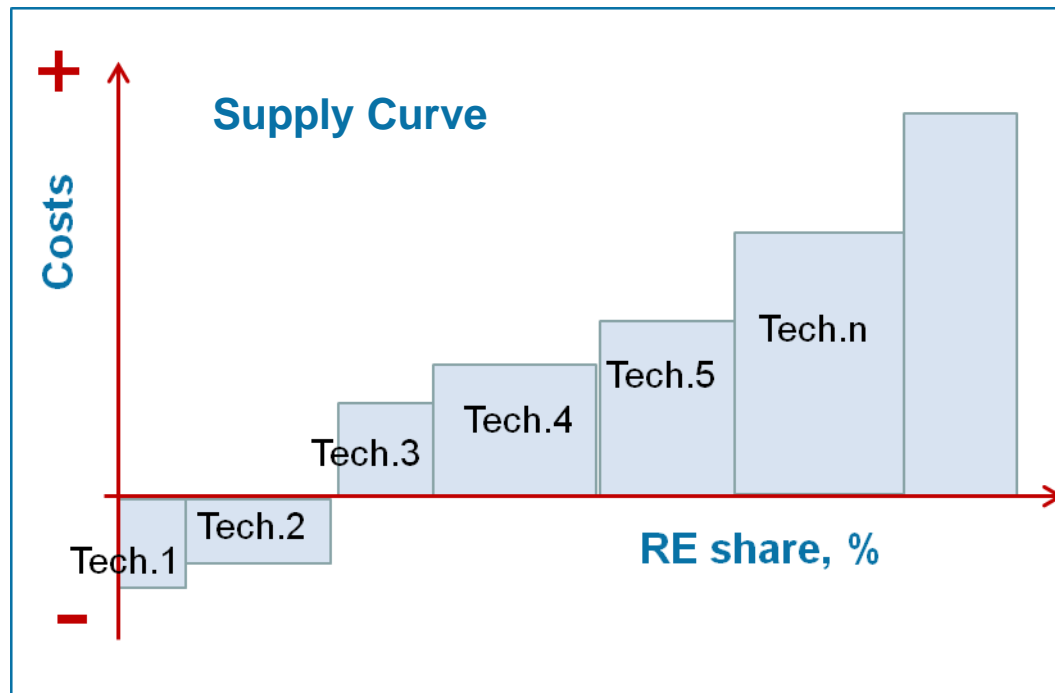
1. Analysis of country 2010 energy balance and most recent trends for RE implementation, as well as energy plans and projections to 2030;
2. Identification of energy sectors (power, industry, buildings, transport) and subsectors in which further RE technologies can be realistically deployed by 2030, taking into account local resources, country energy demand and policy, local market and economic activity;
3. Analysis of potential for retrofitting and end-of-life substitution of conventional technologies with RE technologies, as well as new RE installations to meet growing energy demand;
4. Assessment of net investment costs and benefits of technology substitution (fossil fuels and GHG emissions saving, RE share increase, macro-economic impacts)

Country Analysis: Timeline

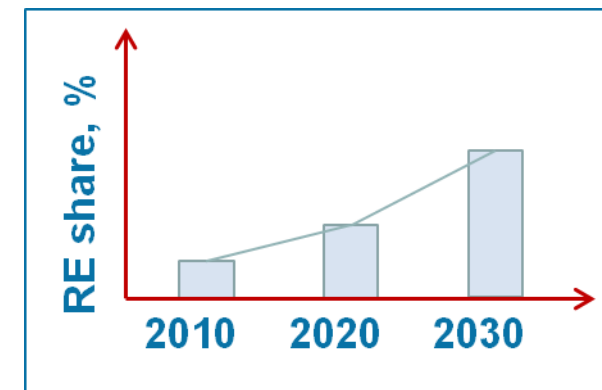
- ❑ 1st set of draft results to be presented at the IRENA Council 26-27 June 2013
- ❑ Final results to be presented at the IRENA General Assembly in January 2014
- ❑ 20 countries invited in the first phase : Australia, Brazil, China, France, Germany, Japan, India, Indonesia, Italy, Malaysia, Mexico, Nigeria, Russia, Saudi Arabia, South Africa, Turkey, UAE, UK, US, Pacific Islands
- ❑ Country analysis will be complemented with regional analysis for complete picture
- ❑ Set of spreadsheet tools has been developed
 - ❑ Will be filled by IRENA secretariat for country expert validation
 - ❑ Review of assumptions by country experts - agree on technology substitution potentials and cost
- ❑ Approach is piloted in Australia, Germany, Italy, Japan (ongoing)
- ❑ Other country analyses starting now
- ❑ Macro-economic impact analysis second half 2013

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



Analysis with technology focus

- Around 100 technologies identified
- Scope covers industrialized and developing countries
- Emphasis on proven technologies – 2030 is only 17 years away
- Account for capacity bottlenecks and maximum market expansion rates (PV!)
- Account for development time needs
 - Planning and permitting procedure
 - Feasibility study, business plan, proposal, financing
 - Project development (engineering, procurement, construction)
 - Start-up, grid connection etc.
 - Varies widely by country (eg Brazil wind 3 years, Japan wind 9 years)

Questions for country focal points

- What is the most representative energy scenario for policies in place/under consideration in your country until 2030?
 - Who can provide quantitative details?
- Which information is available regarding technology options (potentials and cost) for renewable energy between now and 2030?
 - Which authoritative studies have been published for your country?
- What is known regarding macro-economic impacts of a transition towards renewables in your country?
- Who should be the counterparts for IRENA to work with in your country on this project?

THANK YOU !

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