

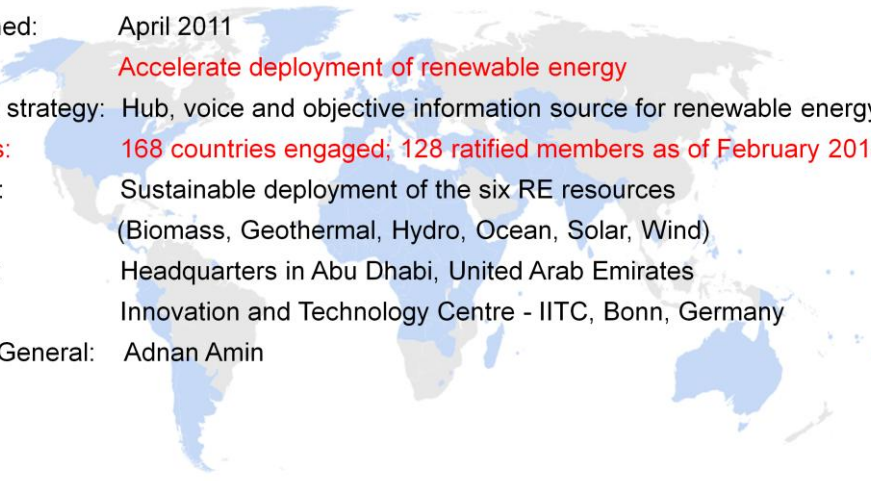
**Initiatives to
Accelerate the
Growth of
Renewable Energy
Around the World**



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Technology Cooperation, IRENA

**IEA Workshop on Gaps and
Strategic Opportunities in
International Collaboration on
Low-Carbon Energy
Technologies
Paris, 27 February 2014**

International Renewable Energy Agency (IRENA)

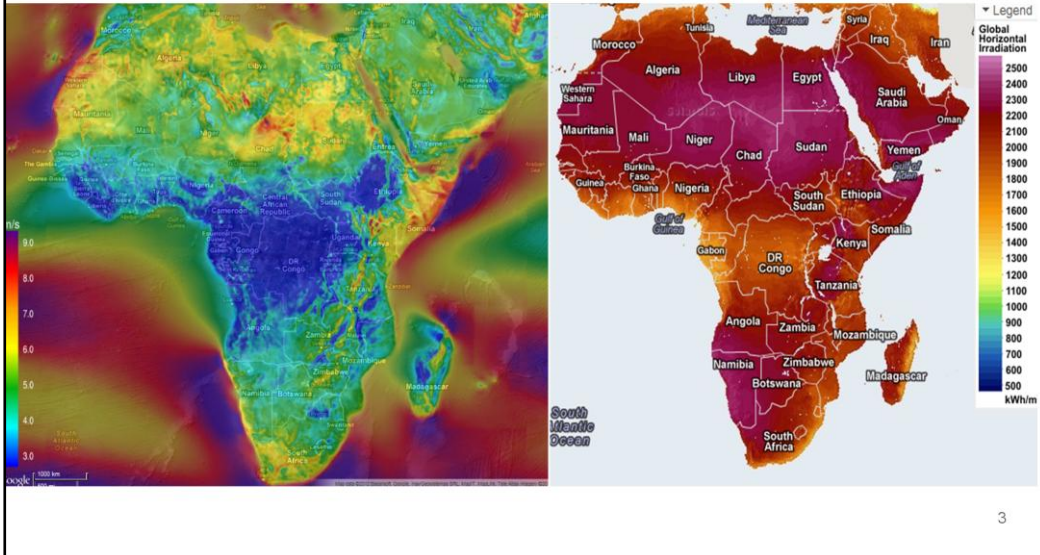


Established: April 2011
Mission: Accelerate deployment of renewable energy
Mid-term strategy: Hub, voice and objective information source for renewable energy
Members: 168 countries engaged; 128 ratified members as of February 2014
Mandate: Sustainable deployment of the six RE resources
(Biomass, Geothermal, Hydro, Ocean, Solar, Wind)
Location: Headquarters in Abu Dhabi, United Arab Emirates
Innovation and Technology Centre - IITC, Bonn, Germany
Director-General: Adnan Amin

2

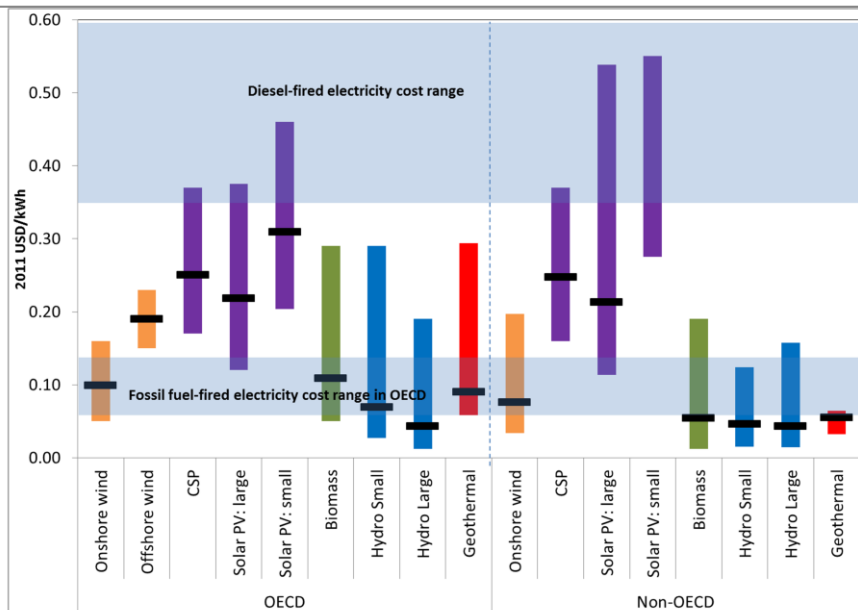
IRENA was established just three years ago but already has 118 full-fledged members and growing .

We are dedicated to accelerating the sustainable deployment of all renewable energy resources – including wind, of course.



IRENA may be best known for its Global Atlas. The wind and solar components are illustrated here. We are expanding the Atlas this year to hydropower and geothermal resources. The mesoscale data provided by the Atlas, free of charge, can help countries identify sites for detailed resource measurements which can then lead to financing of renewable projects – with resulting impacts on carbon emissions.

IRENA Costing Alliance: Renewable Power Competing



Note: assumes a 10% cost of capital

Source: IRENA

One key initiative we have to foster the deployment of low-carbon technologies is a costing alliance to show that renewable power options are cost-competitive – which should help to spur additional investment in these options. We have now collected empirical cost data from 9,000 renewable power plants around the world.

As you can see from this chart, the costs of renewable electricity compare favorably to those of fossil-fueled generation. Looking at the lower light blue band, which indicated typical costs for fossil fueled generation, wind in orange, biomass power in green, hydro in blue and geothermal power in red are all in a competitive range.

Looking at the upper light blue band, which indicates generating costs from diesel fuel in remote areas, all the renewable options are competitive, including photovoltaics and concentrating solar power. Of course, with rapid price declines in the last few years, solar power should soon reach economic parity on power grids as well.

Renewable power is growing fast and now accounts for half the new electric generating capacity installed each year around the globe. We are entering a virtuous circle where high technology learning rates as capacity expands are leading to major cost declines which in turn encourage further capacity additions.

(Renewable Power Generation Costs in 2012: An Overview)

- **Zoning:** renewable power development zones to cluster development and plan cost-effective transmission links to load centers
- **Planning:** integrated resource planning at country and regional level to incorporate a greater share of cost-effective renewables
- **Enabling:** open markets, reduce financial risks to boost renewable power investment.
- **Capacity Building:** to plan and operate power grids with higher share of renewables

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Ministers from 19 countries have endorsed our Africa Clean Energy Corridor initiative, with planks of zoning, planning enabling, capacity building and public information. We are also developing clean energy corridor initiatives for Central America, the Middle East, and South East Asia.

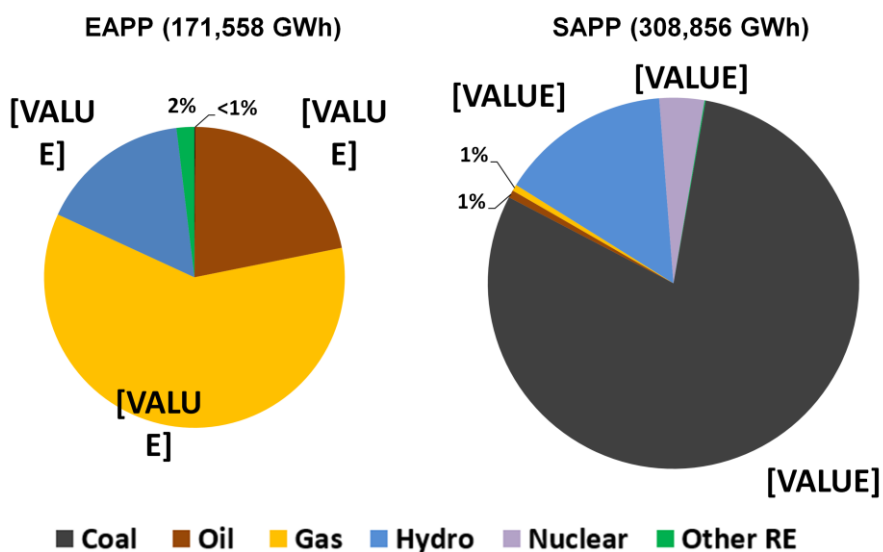
With **zoning** to cluster wind turbines, solar panel and other renewable resources together, it will be easier to build a cost-effective transmission corridors to load centers. Potential zones should be ranked in terms of the costs of generation and transmission, concentration of resources available, and other factors.

With integrated resource **planning**, power grids can incorporate more renewables and achieve greater economies.

A third area for action is **enabling** markets and financing to boost renewable power investment. Many markets are still closed to renewable power generation by building owners and independent power producers; regulations can change this. Africa suffers from real and perceived risks that are higher than elsewhere; improved understanding of technology costs and resource availability can lower these risks so that companies can finance renewable power projects at more reasonable rates of return on debt and equity capital.

Capacity building to ensure the skills are in place to plan, build and operate power grids with a higher share of renewable generation, is also important.

Renewable Business Case: Displacing Fossil Fuels



Sources: International Energy Agency / Southern African Power Pool / East African Power Pool

The carbon reducing potential of regional clean energy corridors is illustrated well by the case of Africa. In the southern African Power Pool, 80 percent of the generation is fired by coal. The Eastern African Power Pool, generates 60 percent from natural gas and 22 percent from oil. In both pools, less than a fifth is renewable.

Without steady effort, the fossil fuel shares may persist and increase. But with a commitment to include renewables more systematically in resource plans, to facilitate investment, and build human capacities, the fossil fuel shares can be whittled down, with major benefits for regional economies and environment.

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.

7

Ministers in Malta in September 2012 requested that IRENA establish a Global Renewable Energy Islands Network, or GREIN, to pool knowledge, share best practices and seek innovative solutions to accelerate the uptake of renewable energy technologies on islands and virtual islands far from regional power grids.

Costly fossil fuel imports from distant locations can burden island budgets and inhibit investment in socioeconomic development. Indigenous renewable energy resources can reduce these expensive imports and create important business and employment opportunities. And islands facing similar challenges can benefit by pooling knowledge and best practices for successfully overcoming them.

GREIN's Interest Cluster Concept

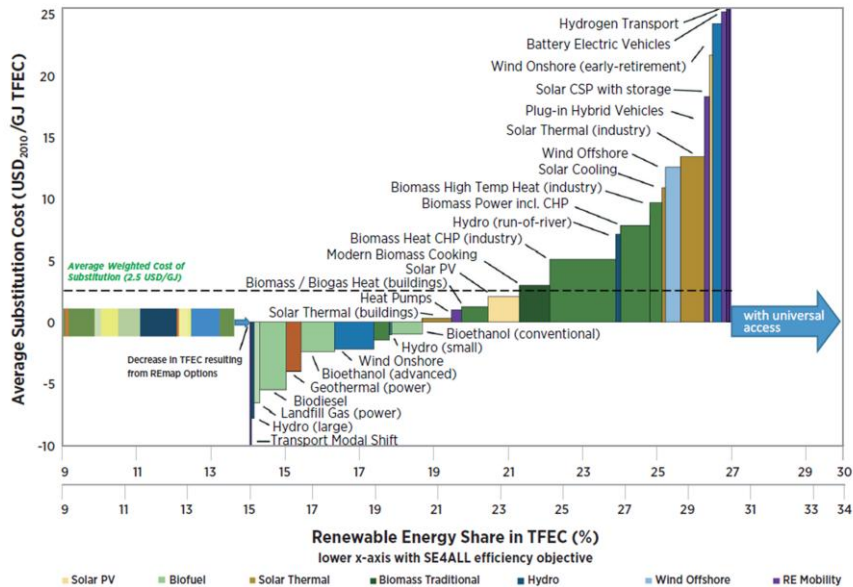
- Renewable Energy [Resource Assessment](#) for Islands
- Renewable Energy [Technology Roadmaps](#) for Islands
- Renewable Energy [Power Grid Integration](#) on Islands
- Renewable Energy [Water Desalination Systems](#) on Islands
- Renewable Energy [Waste-to-Energy Systems](#) on Islands
- Renewable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

GREIN is organized into several interest clusters, something like the tasks of IEA implementing agreements.

Many islands could integrate much higher shares of renewables into their power grids, even small islands. But analysis of grid stability is needed to show that the system can operate reliably with more renewable generation. This will give regulators the confidence to authorize investment by utilities, IPPs and building owners.

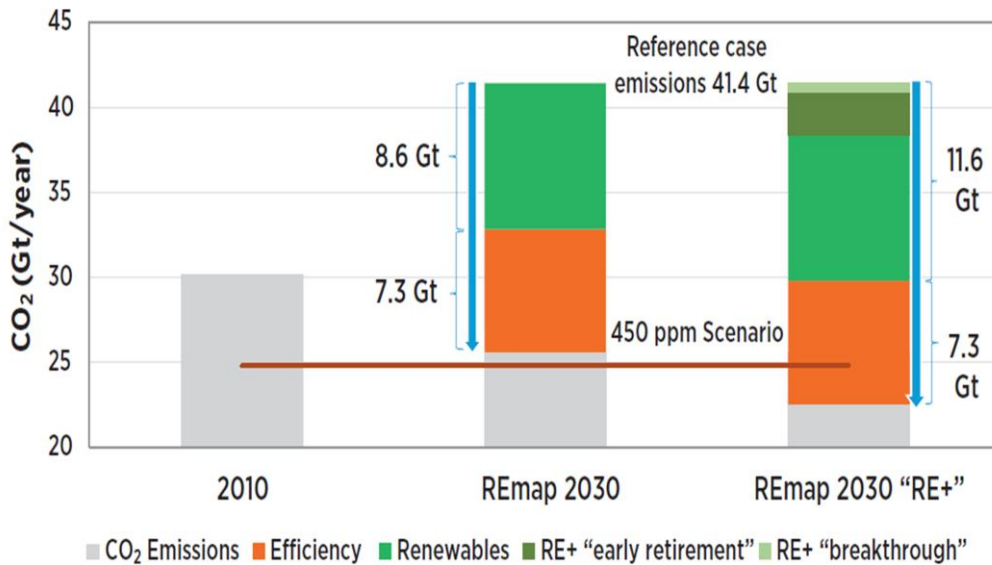
There is huge potential for renewable energy in island tourism. Tourists have to have hot water for showers, and solar hot water heaters provide a profit making solution for hotels that will grab it. Tourists need air conditioning, and solar absorption chillers or cool seawater can provide it. Tourists need electricity, and this can be provided by photovoltaics on hotel rooftops. By documenting the analytic results of hotel energy audits and the actual costs and savings of systems installed, we hope to demonstrate the business case with more hotels.

REMAP Options Cost Curve by Technology and Resource



IRENA’s REMAP effort to identify cost-effective renewable energy options that could double the share of renewable energy in the overall energy mix by 2030 reveals that the net cost is roughly zero. The cost-inducing options on the right are roughly balanced by the cost-saving options on the right – even without considering environmental externalities. If an external cost is assigned to greenhouse gases, there are net cost savings.

GHG Mitigation Potential of Renewables in 2030



In fact there is a GHG mitigation potential of some 8.6 gigatonnes carbon equivalent or even 11.6 gigatonnes if early retirement of fossil-fuelled energy facilities is considered. So renewable can play just important a role as energy efficiency in moving us toward a lower carbon concentrations in the atmosphere. By making countries more aware of this potential through our analysis, we can empower them to take the steps to make it happen.