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IRENA
International Renewable Energy Agency

BIG BUSINESS RETHINKS ITS ENERGY HABITS

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Forward-looking multinationals are reducing their carbon footprint and boosting their long-term profitability by investing in renewable energy projects

At the United Nations Climate Summit in New York on 21 September, business leaders stepped forward to demonstrate their commitment to reducing carbon-dioxide (CO_2) emissions. Some 1,000 companies and investors joined the call by many governments for carbon pricing, which would allow effective taxation or a cap-and-trade system, the World Bank said. Such measures would encourage faster technological innovation and allow businesses to clean up in rational, profitable ways, stimulating rather than holding back economic growth.

In July, US software giant Microsoft said it would buy 175 megawatts of wind power

Recognising the danger of global warming, multinational corporations are turning increasingly to renewable energy to meet their massive power needs, as noted in *REthinking Energy*, recently published by IRENA.

In July, US software giant Microsoft said it would buy 175 megawatts (MW) of wind power under a 20-year power purchase agreement with the Pilot Hill Wind Project south of Chicago. "Long-term commitments like Pilot Hill help ensure a cleaner grid to supply energy to our data centres," said Brian Janous, Microsoft's director of energy strategy. Last November, Microsoft purchased 110 MW from a Texas wind farm.

Other non-energy companies have also become major renewable energy players, with a view to diversifying their energy supply, hedging against fossil-fuel price and supply volatility, reducing their long-term operating costs and earning market-based returns on investment, as well as cutting emissions that contribute to global warming.

IKEA, the Swedish home furnishings retailer, aiming to be 100% renewable by 2020, has invested directly in wind farms and solar panels at sufficient scale to produce surpluses to sell through the grid. In 2013, its renewable installations produced

1,425 gigawatt-hours (GWh) of electricity, equivalent to 37% of the company's total energy needs.

"This investment is great for jobs, great for energy security, and great for our business"

IKEA has emerged as Canada's largest retail wind-energy investor and has also invested in wind farms in Denmark, France, Germany, Ireland, Poland, Sweden, the United Kingdom and the United States. It made its largest wind power investment to date (and first in the US) by purchasing Hoopeston Wind in April. "We are delighted to make this investment," said IKEA Group's chief sustainability officer, Steve Howard. "It is great for jobs, great for energy security, and great for our business. Importantly, it's great for the future of our climate."

The wind farm, near Chicago, is expected to generate up to 380 GWh of renewable power each year, equivalent to the electricity needs of 34,000 average American households or the energy consumption (electricity and heat) of 70 IKEA stores, IKEA says.

The leading US retailer, Walmart, is also working towards 100% renewable energy, with 335 renewable energy projects worldwide by the end of 2013, including onsite solar power generation at its stores. These projects now provide over 2,200 GWh of renewable electricity per year to Walmart facilities, the company says.

Over two-thirds of companies on the Fortune Global 100 list and nearly half of the Fortune 500 have made pledges to scale up renewables or cut emissions, with more expected to follow.

For more on how private companies and institutional investors are making the transition to renewable energy, see the first edition of IRENA's flagship publication, REthinking Energy (www.irena.org/rethinking), and particularly Chapter 3: "Financing renewable energy projects is becoming easier and cheaper – but variations remain."

Business leaders endorsed Renewables at the Climate Summit

Photo: United Nations

Biomass moves into modernity

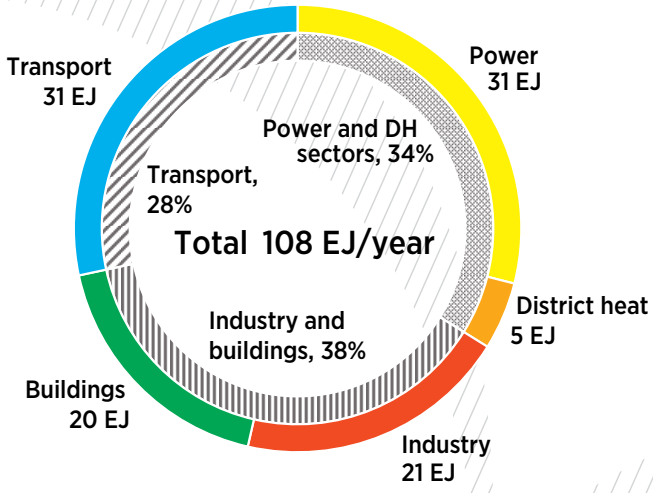
Throughout the world at least 2.6 billion people lack access to modern fuels for cooking and heating, relying instead on traditional biomass to meet those vital energy needs. "Traditional biomass", according to the International Energy Agency (IEA), refers to consumption of such resources in the residential sector, typically in developing countries, through the often-unsustainable use of wood, charcoal, agricultural residues or animal dung for cooking and heating.

Burning biomass on open fires or cookstoves results in significant exposure to indoor air pollution, emissions of greenhouse gases, black carbon and carbon monoxide, as well as degradation of forests that harms soil quality. Women, children and the elderly face higher health risks due to their increased time spent around traditional fuel-based fires. The World Health Organization says 4.3 million people die each year from such household air pollution.

However, the future role of bioenergy in the world's energy supply is promising, with many organisations, including IRENA, foreseeing a major role for modern, sustainable biomass and biofuel technologies. Around 80% of all renewable energy use (in final energy terms) came from biomass in 2010. Most of this was traditional use, which accounted for half of the world's total renewable energy use, according to the IEA.

The technologies already exist for biomass to replace conventional energy in an affordable and sustainable manner, and this could lead to significant changes in biomass practices worldwide. One scenario outlined in REmap 2030, IRENA's global renewable energy roadmap, predicts that 30% of total world biomass could be used for power and district heat

Biomass energy consumption by sector in 2030 when all technology options are applied



Note: EJ stands for exajoule. 1 EJ is equivalent to 174 million barrels of oil

Transporting traditional biomass (fuelwood) in Niger, Africa

Photo: H. Lucas

generation, 30% for liquid biofuels production and the remainder for cooking, heating, and building and industrial uses. This transition depends on increased use of liquid biofuels together with combined heat and power (CHP) in the electricity and industrial sectors, along with the steady reduction of traditional uses of biomass. Liquid biofuels and CHP could amount to 20% of global primary energy supply, and 60% of total final renewable energy use by 2030. But is there sufficient biomass feedstock to meet growing global demand in an affordable manner, with security of supply and sustainability? Questions remain over how to balance food, energy, land and water needs in the raising of bioenergy crops.

Biomass can be broadly divided into three categories: energy crops; residue and waste; and forest products. IRENA's *Global Bioenergy Supply and Demand Projections: A working paper for REmap 2030*, analyses bioenergy feedstock supply and trade potential, as well as supply costs, based on a bottom-up analysis of 116 countries, showing global biomass supply could reach between 97 exajoules (EJ) and 147 EJ, while still maintaining a sustainable food, energy, land and water balance. International bioenergy trade could account for 20% - 40% of global bioenergy demand by 2030. Domestic supply costs for primary biomass would range between USD 3 and USD 17 per gigajoule (/GJ).

Food security, energy security and job opportunities, along with water resource availability and the environmental impacts of land use change associated with energy crop production must all be examined further. This underlying complexity of a sustainable and affordable bioenergy system requires a mix of energy and resource policies at national and international levels. Diversification of the energy system helps to avoid heavy dependency on any single type of resource.

Ocean energy offers staggering potential, but upfront investment is necessary

Photo: C. Van Lennep/Shutterstock

OCEAN ENERGY: An abundant resource, but what are its long-term prospects?

The oceans of the world offer staggering potential as an energy source – more than sufficient to meet global electricity demand well into the future. Even though efforts are being made by technology developers and policy makers to tap this reservoir of energy, the present situation puts ocean energy technologies on choppy waters.

Deployment projections to 2020 have been reduced by both industry and market analysts. Yet technology development, demonstration projects, involvement of key technology providers and utilities, and registration of patents continue globally with activity hotspots in Australia, Canada, France, Japan, the Republic of Korea, the UK and the United States. Despite the signs of progress, is ocean energy technology commercially viable today or is wider deployment still far off?

Ocean energy resources vary – from tides and waves, to temperature and salinity gradients. Similarly, the energy conversion technologies for these resources also vary and are at different levels of maturity. Around 500 megawatts (MW) of tidal range capacity has been deployed commercially for years, mainly at two sites in France and Korea; other ocean technologies have been demonstrated at scale with a total of 14 MW for tidal and 12 MW for wave energy currently installed. The next step for tidal and wave energy is to connect these MW plants into arrays. To date salinity gradient energy conversion technologies are only being demonstrated in one small-scale (5 kilowatt [kW]) application. The contribution of ocean energy to the global energy mix is therefore dwarfed when compared with other emerging renewable energy types, including over 140 gigawatts (GW) of installed capacity for solar photovoltaic (PV) and 320 GW for wind power.

Deployment projections in 2020 have been reduced by both industry and market analysts

The levelised costs of ocean energy technologies are currently substantially higher than those of other renewable energy technologies. Costs and economic viability are highly dependent on location, for example, the La Rance tidal range plant in France, which was constructed in the 1960s, has since recovered its costs and currently generates electricity at just under USD 0.05 per kilowatt-hour (kWh), whilst tidal stream and wave energy technology are producing electricity for USD 0.30 -0.60 per kWh. However, commercial maturity- that is to say, cost competitiveness with

other renewable energy technologies, for both tidal stream and wave energy, is expected from the 2020s onwards, with cost reductions largely depending on investment, installation, learning and innovation rather than just on time.

Ocean energy technologies offer predictability, reliable baseload, a low land use footprint and global resource abundance — attributes that can greatly complement other renewable power generation technologies as countries make the transition to a more sustainable energy mix. Furthermore, ocean energy technologies can contribute to energy independence, decarbonisation and job creation. Equally, their development and deployment offer unique opportunities for niche applications in such areas as aquaculture, cooling, water desalination and sustainable tourism.

The operating environment for ocean energy deployment is challenging. While valuable experience could be transferred from the offshore oil and gas industry, the infrastructure is not in place to link ocean power plants to the grid. Reaping ocean energy's enormous benefits requires investments and action years in advance.

The technological challenges of energy conversion have mostly been overcome, but other technical and environmental issues must still be addressed — including operation and maintenance, access to grid connections and how to deal with harsh marine environments.

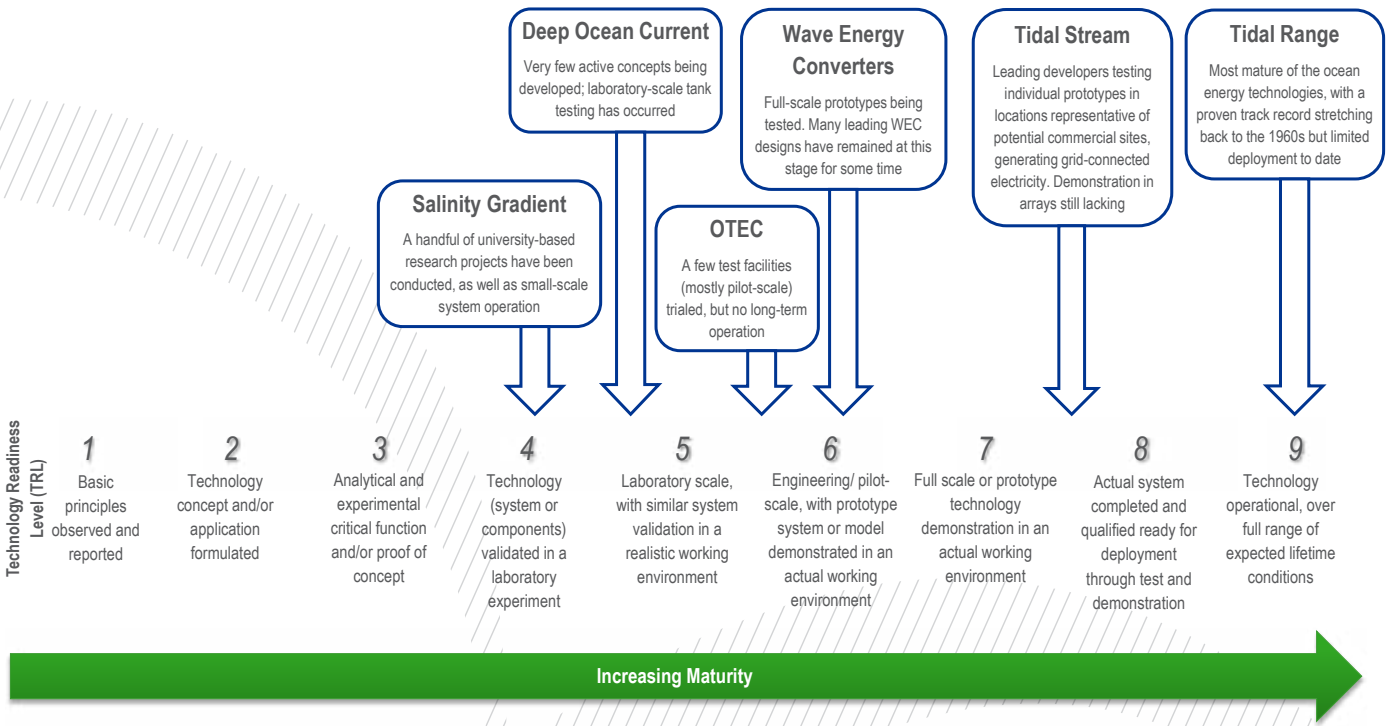
So whilst ocean energy has the potential to make a substantial contribution to the clean energy transition, technical, economic, environmental and infrastructure barriers need to be removed for this to happen.

The operating environment for ocean energy deployment is challenging

Policy makers can take a proactive approach to support ocean energy: making capital grant funding available for research and demonstration of prototypes and small arrays; providing a premium price per unit of energy generated to signal the creation of a long-term market; supporting institutional efforts on resource mapping and road-mapping; promoting best practices and test centres; and enabling international collaborative research and technology transfer. In the drive to tap into ocean energy however, policy makers also need to be realistic with the time scales for the full benefits to materialise.

For more information see the IRENA report and technology briefs on Ocean Energy: Technologies, Patents, Deployment Status and Outlook.

Technology Readiness of Ocean Energy Technologies



Vanuatu entrepreneurs demonstrating solar lighting systems

Photo: S. Craine/Village Infrastructure Angels

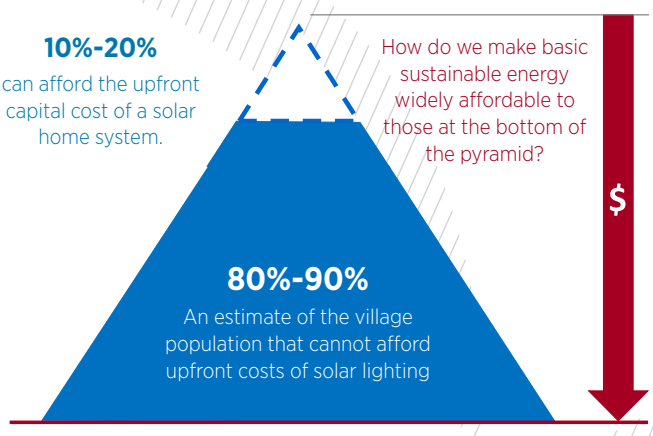
CAPACITY BUILDING FOR MARKET TRANSFORMATION

Empowering entrepreneurs to deliver sustainable energy services for all

In many development initiatives, a drumbeat of calls cites *capacity building* as the missing link. Yet the term needs clarifying, in some cases, capacity building is implemented as a one-time intervention, without the continuity implied in building. In fact, one of its main value propositions is market transformation; that is, creating a long-term, lasting shift in behaviour and strengthening the enabling environment for growth.

One area where capacity building could spur such a transformation is the off-grid renewable energy sector. The full potential of off-grid renewables — crucial for the estimated 1.3 billion people worldwide who lack access to reliable modern energy services — has yet to be unlocked, despite advances that have transformed many aspects of energy use. These include:

Estimated proportion of village population that can afford solar lighting



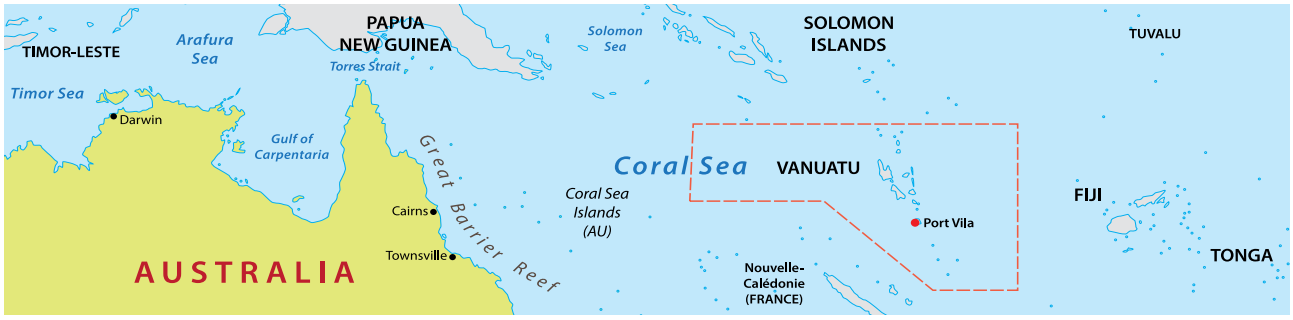
- The sharp decline of renewable energy technology costs, particularly for solar photovoltaic (PV) technology, for which installed costs and module prices have dropped 75%-80% since 2008 (IRENA, *REthinking Energy*, 2014);
- Energy efficiency technologies, including light emitting diodes (LEDs), provide the means to curb demand instead of building new power plants;
- The mass dissemination of mobile phones and to some extent prepaid meters, and remote monitoring in rural areas, allowing new, scalable business models and delivery options; and
- Increasing space for the private sector to provide energy services.

Despite these developments, energy access persists as a major development challenge. A lack of long-term financing is often blamed for hindering the off-grid market. Moreover, to achieve "energy for all", financing needs to be affordable at the bottom of the pyramid, making consumer finance critical. In recent years, energy-access entrepreneurs have stepped in to bridge the financing gap and build energy infrastructure for the poor in rural areas. But such efforts remain sporadic or lack sufficient support. Capacity building — strengthening institutional processes, as well as individual skills and knowledge — could accelerate such efforts for local service networks, enhancing project attractiveness for private investors.

The value of capacity building has been clearly demonstrated this year on Tanna Island, an outer island of Vanuatu, where 20 entrepreneurs were assisted by the International Renewable Energy Agency (IRENA) to roll out a pilot project for solar lighting to replace expensive and harmful kerosene in 200 households. The project is one of the few subsidy-free models based on an "energy lending" principle, rather than a "cash sale" model, allowing it to reach the poorest households on Tanna Island.

In partnership with Village Infrastructure Angels, the project mobilised USD 40,000 from private investors and successfully completed the installation of 200 solar home systems in two villages. Village Infrastructure Angels raises capital from investors to procure solar lamps, which are delivered to villagers by entrepreneurs and paid for over a three-year period. IRENA supported the capacity building component, including designing progressive training programmes, using the local language as required and monitoring the performance

Map showing geographic location of Vanuatu



The boundaries and names shown on this map do not imply official acceptance or endorsement by IRENA.

Building local renewable energy delivery capacity

Component of delivery network	Stakeholders	What capacity building addresses
Manufacturing PV panel components	International suppliers	• How to modify some components of solar power systems to match project design and help achieve deep market penetration
Shipping and delivery	Local importers	• How to conduct efficient freight forwarding of services, not wholesaling
Distribution	District managers Local entrepreneurs	• How to conduct efficient freight forwarding of services to the last mile to reach villagers.
Installation	Local entrepreneurs	• How to properly and safely install solar PV systems • Principles of accounting and bookkeeping
Maintenance and services	Local entrepreneurs	• How to manage and operate the charging stations • How to provide technical support • How to manage spare parts • How to collect payments from households
Enterprise development	District managers Local entrepreneurs	• Training for local trainers on project design, business models, product operation, fund management • How to identify other business ideas; such as solar-agro processing • How to increase customer and geographical range • How to attract crowd funding • Marketing and communication

An entrepreneur installing inline fuses in batteries

Photo: K. Chen/ Village Infrastructure Angels

Training a trainer in the use of solar PV

o: S. Craine/Village Infrastructure Angels

VANUATU

Land area: 12,200 km^2

Population (estimated, 2011): 225,000

Number of islands: Over 80, of which 65 are populated

GDP per capita in terms of power purchase parity (PPP):* USD 5,100

Electricity access: 28% (Includes rural electricity access through solar home systems)

*A measure of the amount of a given currency needed to buy the same basket of goods and services, traded and non-traded, as one unit of the reference currency.

TANNA ISLAND PROJECT INFORMATION

Objective: Empower local entrepreneurs to replace kerosene for lighting with affordable solar energy, using a sustainable and subsidy-free energy lending model.

IRENA's role: Support training for local entrepreneurs along the delivery network.

System sizes: 2.5 Wattpeak (Wp), 1-lamp solar system and 6 Wp, 3-lamp system (both with phone charging capability)

Capital raised by Village Infrastructure Angels and its investors: USD 40,000

Number of households benefiting from solar lights: 200

of entrepreneurs, loan collection rates and customer satisfaction.

Along with providing efficient lighting at night, the project helps to build and retain knowledge and skills in the community. Fully owned by villagers, the project can grow organically based on their needs.

Entrepreneurs from the programme are seeking to expand their services through funding campaigns supported by KIVA, the giant crowdfunding platform. A similar IRENA project in Papua New Guinea uses solar energy to power agro-processing machines.

However, attaining energy access on a larger scale requires mainstream finance, led by debt. Grants and other types of fiscal incentives and public finance are also crucial. Using grants to support entrepreneurs demonstrates the feasibility of market-driven, subsidy-free investment in renewable energy. IRENA is embarking on similar capacity buidling programmes for energy efficiency and renewable energy audits. Much remains to be done in Vanuatu's outer islands and similar areas, with the hope that public finance will pave the road for mainstream finance to turn innovation from pilot to scale.

For more information see IRENA's publication, Pacific Lighthouses: Renewable Energy Roadmapping for Islands. A special acknowledgment is due to Stewart Craine and his Village Infrastructure Angels team, including the investors behind this project.

Storm worthy turbines: Power to withstand the elements

For islands, wind and other renewable power options hold enormous potential, generating electricity much more cheaply than the diesel-fuelled power stations that are more generally used. Most islands pay USD 0.35 or more per kilowatt-hour for electricity, and wind power can cut this cost by more than half. But islands face special challenges: storms and floods frequently damage equipment, while the salty marine environment also exerts wear and tear; and the more remote the island, the more repairs are likely to cost.

A pair of 275 kilowatt wind turbines in Samoa can retract to the ground in 20 minutes in case of a cyclone

Vulnerable technologies are evolving to withstand island conditions. For example, a pair of 275-kilowatt wind turbines built in Samoa this year, is designed to retract to the ground in 20 minutes in case of a cyclone that would otherwise damage the rotor blades. The Vergnet turbines were provided to Samoa by the Abu Dhabi Pacific Fund, in a project coordinated by Masdar, the United Arab Emirates clean tech company.

When islands seek private financing, detailed wind measurement campaigns are essential to demonstrate the prevailing wind speeds and the resulting power generation revenues that can be anticipated. The *Global Atlas for Renewable Energy (http://globalatlas.irena.org/)* gives a preliminary indication of good wind sites, based on "meso" data of average speeds in plots of one to several square kilometres. However, detailed measurements are needed to take account of numerous local effects related to terrain.

IRENA and AWS truepower (a renewable energy consultancy) have recently developed Wind Measurement Guidelines for Islands. These guidelines take account of the harsh marine environment and difficulty of repairs, factors that require especially sturdy wind measurement masts. Other challenges include choosing the right equipment, testing that it works properly, selecting a team with the skills for correct installation and ensuring installations are safe. Once installed, the wind measurement system needs to be properly operated and maintained, while data should be properly collected, handled, validated, and compiled into reports. With these guidelines as a starting point, IRENA intends to form partnerships with donors and multilateral financial institutions to fund detailed measurement campaigns on islands with promising wind resources.

After such verification of the wind output and revenues, public-private partnerships can step in to build wind turbines at favourable sites, allowing more islands to benefit from clean, sustainable wind power.

Dignitaries are treated to a demonstration of Samoa's retractable wind turbines

Photo: J. Skeer/IRENA

Wind Farms benefit from crucial support from municipalities and local government

Photo: JPL Designs/Shutterstock

Municipalities drive wind power deployment

In the city of Rock Port, Missouri, wind power projects have far exceeded initial expectations. Along with energy independence, energy security and environmental protection, the facilities in the city's agricultural outskirts in recent years have also yielded additional tax revenues, job creation and increased incomes for land owners.

The success in Rock Port — the first entirely wind powered community in the United States — has provided a model that other municipalities are eager to follow. Around the world, many mayors are paying attention to successful renewable energy projects and are supporting wind energy development within their own municipal jurisdictions.

Wind power projects, whether in rural or urban areas, require crucial support from municipalities and local governments, which can substantially influence the energy choices of citizens.

Municipal administrations are in close proximity to people and businesses; manage and regulate water and power supply, waste management, public transportation and other services; and tend to own many buildings and extensive land. In general, the mandate to generate electricity in most countries rests with national government and not municipalities. Yet, urban centres are increasingly enjoying more political power and have substantial influence over decision makers at higher level of government.

The world's economies and wealth generation are anchored to cities, which can often raise their own financing, by for example, issuing "green bonds" to finance climate friendly expansion. A shift towards decentralised power generation is also evident in all developed economies and in this respect, many municipalities seek to expand and upgrade their local power infrastructure to suit their economies, a scenario where renewable energy technologies fit in very well.

Yet apart from some municipalities in North America, Europe and China, wind energy has so far not seriously entered the realm of municipal politics. Often municipalities are unaware of how much they can do, politically, as well as technically and economically, to scale up renewable energy, or lack adequate information regarding wind technology and its short-, medium- and long-term benefits.

These concerns were highlighted in a workshop held by IRENA on exploring public-private partnerships as an effective business model for renewable energy deployment in cities. The meeting earlier this year, attracted more than 50 high level city representatives, including 11 mayors from Africa and Asia, 15 private companies and 5 international organisations.

IRENA is developing a guidebook for new-to-the-market municipal decision makers at different levels of administration, along with utilities, developers, interested parties and the civic community involved in appraising wind projects.

This guide (forthcoming) is not intended for a specific wind development project or to define which level of municipal administration should assume responsibility for the process. Each municipality is advised to proceed according to its own prerequisites and to determine relevant and appropriate decision-making considerations. If favourable conditions for wind energy development are present, municipal agencies may find the guide helpful for configuring an effective wind energy development strategy.

More information can be found in the IRENA report, 30 Years of Policies for Wind Energy: Lessons from 12 Wind Energy Markets.

Global investments of USD 250 billion in renewable energy in 2013: A snapshot of recent developments

Investments in renewable energy have seen significant growth, from USD 60 billion in 2004 to over USD 300 billion in 2011. In 2013, despite a recent market slowdown, overall investment levels remained above USD 250 billion for the third year in a row. This can be seen as indicating a certain maturity in renewable energy markets. But investments were down 25% when compared to 2011.

Among the reasons for the drop are reduced technology costs, policy uncertainty and overall energy market conditions. In particular:

- Solar photovoltaic (PV) costs have fallen by 80% since 2008. In 2013, investments in PV went down by 22% to USD 102 billion, while 39 gigawatts (GW) new capacity was installed, up 30% from 30 GW in 2012.
- In Europe, uncertainty over government commitments to renewable energy - not limited to economic support - caused investors to delay projects. An even more pronounced reduction of investment levels could be seen in countries with retroactive policy changes affecting renewables, such as Italy and Spain.
- In the United States, due to the growing availability of shale gas, reduced prices for generated power pulled down the achievable tariffs for renewables power purchase agreements, making it more difficult to attract investors.

But there are also positive developments. In Asia, China continues to dominate, with a stable market constituting 26% of global investments. Japan, due to a generous feed-in tariff, saw large growth in residential and commercial solar PV sectors, putting the country at the top for small distributed capacity. Elsewhere market activity is growing in Canada, the UK and some developing economies. These include countries like Chile, Costa Rica, Mexico, the Philippines and Uruguay where projects are moving ahead without subsidises.

While investments of USD 250 billion annually may sound substantial, the transition to a sustainable energy future will require, on average, annual investments in renewable energy of USD 550 billion until 2030, according to research and analysis by IRENA. These investment levels, coupled with increased emphasis on energy efficiency, would scale up renewable energy to 36% or more of the total energy mix globally, while limiting the greenhouse gas emissions that contribute to climate change, sufficiently to keep the global temperature increase within safe limits.

To close this investment gap, policy makers have an important role to play. If they make it clear that renewable energy will be a larger part of their national energy mix, and commit to long-term, non-financial support mechanisms, they could reduce uncertainty and attract more investors. Setting clear and credible targets and putting in place the necessary supporting regulatory framework will send strong signals to the market. In emerging economies, public financing will remain important until domestic market structures are developed sufficiently for renewable energy projects to flourish.

The outlook for 2014 is positive. Investments in project finance indicate recovery, with quarter-on-quarter growth between 10% and 20% for the first three quarters of 2014. The rise of YieldCos — publicly traded companies formed to reap long-term dividends from installed assets, protecting investors against regulatory changes — and the outlook of green bonds, which today amounts to around USD 40 billion, ensure better refinancing prospects and, hopefully, new investments in renewable energy down the line. Time will tell if this is enough for a successful energy transition.

Solar PV costs continue to fall

Photo: Gui Jun Peng/Shutterstock

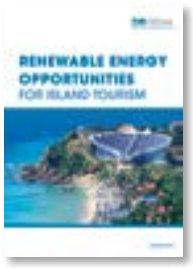
Recent publications

REthinking Energy: Towards a new power system

The first publication in IRENA's flagship series, analyses the transformation of the global power sector, while reviewing progress in the transition to a sustainable energy future. The report argues that a system based on renewables would enhance energy access and security, create jobs and safeguard health and the environment. However, more work is needed on electricity-systems planning and market design, policy frameworks and funding, and training and education in this fast-growing sector.

Estimating the Renewable Energy Potential in Africa: A GIS-based approach

This joint working paper between IRENA and Sweden's Royal Institute of Technology (KTH) presents a practical methodology for using online maps to determine power generation potential, which when combined with Geographic Information System (GIS) data, can be fine-tuned to cover any geographical area. The findings are intended to help policy makers and energy planners plan effectively and efficiently.



Renewable Energy Opportunities for Island Tourism

Tourism is an important economic driver for island economies. This report analyses four renewable energy technologies, confirming that their use can boost the competitiveness of the island tourism sector significantly. In time this could reduce the islands' vulnerability to the environmental impact of fossil-fuel use, as well as to oil price volatility.

www.irena.org/publications

About IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international cooperation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy, in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity.

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