IRENA QUARTERLY
Q2 2019

RENEWABLES HELP ADDRESS URBAN ENERGY CHALLENGES

Photograph: Shutterstock

Ambitious renewable energy strategies can enhance the quality of life in cities.

Cities already account for nearly two-thirds of global energy use. Renewable-based solutions for cities, whether in buildings, power-generation, transport or other systems, help countries and regions to strengthen energy security and fulfil climate commitments, as well as provide social benefits for urban residents.

Renewables in buildings and transport will be crucial to ensure energy security

Around the world, forward-looking cities are making progress and achieving key successes in the shift to renewables.

With urban populations growing practically everywhere, action at the municipal level is a crucial element in the world's energy transformation. Governments, both national and municipal, can encourage, enable, measure and regulate the shift to new energy technologies.

Municipal leaders and administrators can also do much to inform local debate, raising awareness about changes before turning these into policies.

Argentinian city puts solar water heaters on the boil

Growing cities need power, heat and water in fast-increasing quantities. Argentina's third-largest city, Rosario, with a population approaching a million, is encouraging the use of solar water heaters to help meet energy needs sustainably.

> Rosario's public buildings must obtain half their hot water via solar installations

A solar thermal ordinance requires all new or upgraded public buildings – including sports facilities and community centres – heat at least half of their hot water through solar installations.

The policy, which took effect in 2012 as part of Rosario's Sustainable Building and Energy Efficiency Plan, aims to boost use of renewables in municipal building stock.

Rosario's households, on average, have reduced their energy costs for hot water by 80% compared to the cost of conventional water heaters.

Following this successful local implementation, the market for solar water heaters is expanding across Argentina. The municipality, working with national partners is providing dedicated training for other communities, along with loan options to expand installations.

Ordinances and mandates are common policy tools to encourage more sustainable building construction. For example, governments can set minimum requirements for the share of renewable energy in a building's overall energy consumption or establish specific energy-efficiency targets.

For more, see **Scaling up renewables in cities: Opportunities for municipal governments**

Photograph: Shutterstock

Renewable energy for cities: A pilot case in China


Photograph: Municipal Government of Zhangjiakou City

China's urbanisation over past half a century has been remarkably rapid and practically unique in scale. Yet the movement that helped bring millions out of poverty has sharply increased urban energy consumption. It has also the degraded the environment in and around cities.

City dwellers now make up 60% of China's population of 1.4 billion. The resulting challenges have brought the country to a crossroads in terms of energy and environmental security. The country is contemplating how it can sustain continued urbanisation for another three decades, with another 255 million city dwellers set to be added.

China is not alone in recognising the need to step up energy efficiency improvements, scale up the use of renewables, reduce environmental impact and make burgeoning cities liveable. In the northern city of Zhangjiakou, the municipal government is working with international partners to lay the foundations for a clean, low-carbon energy future.

Endowed with abundant renewable energy resources, the city of 4.5 million in Hebei province has 30 gigawatts (GW) of solar and 40 GW of wind power resource potential. If tapped in its entirety, this would nearly equal the renewable energy capacity installed across Germany today.

Solar, wind and other renewables already account for three-quarters of Zhangjiakou's installed power capacity of 17 GW and nearly half of its electricity output. Low-carbon energy has become a key objective ahead of the 2022 Winter Olympics, which the prefecture-level city is to co-host with nearby Beijing.

However, the final stretch to build a renewable-powered, low-carbon city requires intensified innovation in technologies and business models, along with forward-looking energy planning. One promising approach could be to channel excess renewable electricity through sector-coupled technologies for heating and transport energy.

Solutions must be identified from the long-term, system-wide perspective. For instance, high-efficiency electrical heating systems and smart charging for electric vehicles can help to avoid overloading the future power grid. Urban energy planning will be essential to select the right combination of tools in each case.

The State Council of China has granted Zhangjiakou the privilege of establishing the National Renewable Energy Development Demonstration Zone – the first zone of its kind in the country – as the testbed for advanced technologies to boost urban renewable energy use. The hope is for Zhangjiakou to establish the new paradigm for cities of the future.

Partners include the International Renewable Energy Agency (IRENA), with an initiave focusing on Chinese cities. Germany's Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU) supports these activities through its International Climate Initiative (IKI). IRENA also works on district-level low-carbon energy strategies in Suzhou, in close collaboration with State Grid researchers.

For more about urban energy opportunities, see IRENA's 2016 analysis, **Renewable Energy in Cities**

Simulators help cities visualise solar future

Urban energy planning is becoming increasingly important as developing countries seek ways to scale up renewable energy use. But one of the key options for urban settings – rooftop solar panels – is hard to reflect in planning or track in statistics.

Simulation tools can help to explore opportunities for solar photovoltaic (PV) power deployment in local municipal jurisdictions. One solar PV rooftop simulator, currently under development, aims to help municipal authorities, businesses and home owners assess their options for rooftop solar PV installation by testing different policy price and installation scenarios.

SolarCityEngine allows municipalities to assess the impact of different incentive schemes, such as tax rebates or credits and subsidies that could make rooftop installations more affordable to their citizens. The rooftop simulator could also show the potential profits and savings from installing solar PV installations on individual homes and businesses.

To start with, the software will demonstrate two city cases: Kasese, Uganda, and Zhangjiakou, China. Developed by the International Renewable Energy Agency (IRENA), the tool leverages expertise and infrastructure from IRENA's Global Atlas for Renewable Energy.

Solar PV simulators help cities find the optimal power mix

An additional study highlights a variety of PV simulators that can help to assess rooftop potential for homes and businesses. *SolarCityEngine* is designed for use in developing countries, where such tools can help with target setting, policy design and market facilitation.

See **Solar simulators: Application to developing cities.** *Also look out for* **SolarCityEngine** *on the IRENA website*

Results can aid:

Home owners

Business owners

Municipalities

Geothermal heat boosts food security and sustainability

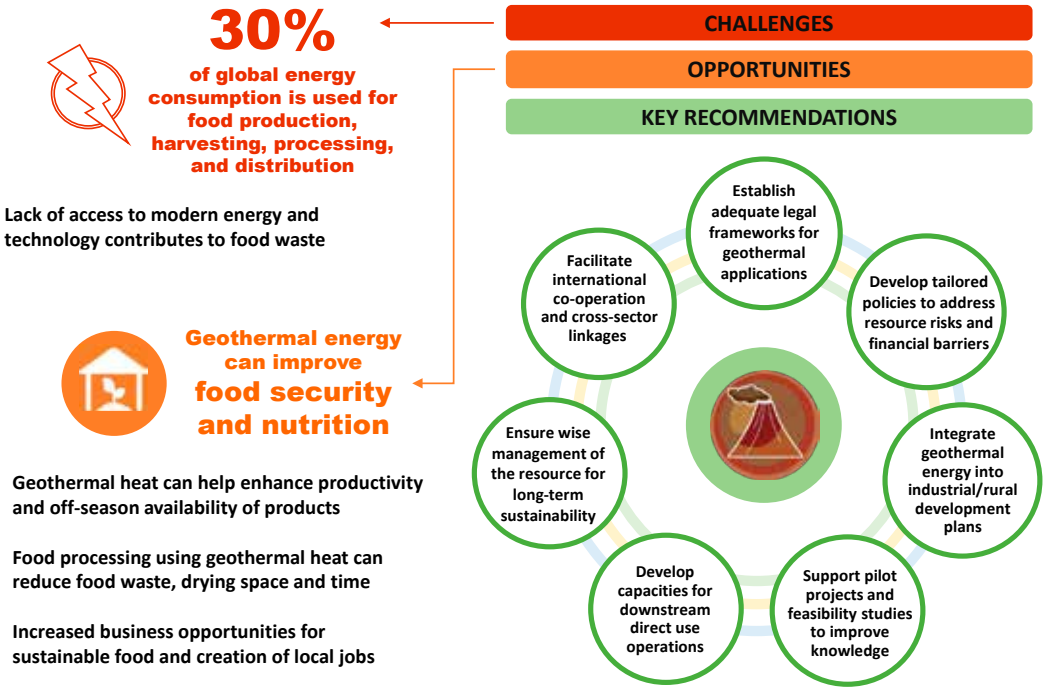
Fish-drying factory in Iceland

Food harvesting, processing and distribution accounts for almost a third of the world's energy consumption. Heavy reliance on fossil fuels in the food value chain, therefore, adds significantly to harmful emissions. For countries relying on fuel imports, it can also increase food costs.

But in many parts of the world, geothermal energy offers another way to heat greenhouses or to dry and process food. Direct geothermal heat use can reduce dependence on fossil fuels, protect against price volatility, limit the environmental footprint of food production, and help increase food variety.

Wherever the resource potential exists, geothermal heat can reduce food waste, boost economic development and help to reduce greenhouse gas emissions. Iceland's renowned hot springs, for example, have dramatically enhanced its food security and nutrition while enabling large-scale exports of dried fish. Mexico, another potentially large market, has prepared a roadmap to step up geothermal heat use.

Geothermal energy can support agriculture and food processing even in areas with low-temperature resources.



Horticulture in the Netherlands relies increasingly on such geothermal heat, promoted through national targets and plans, a private-public insurance scheme addressing resource risk, and market-based assistance open to all renewable energy producers, including renewable heat operators.

Other countries are also looking at geothermal heat deployment to improve their food security and boost economic development.

Even low-temperature geothermal heat supports agriculture and food processing

Governments in emerging markets are trying to gain experience and put in place the necessary enabling frameworks. Kenya, for example, with a long tradition of geothermal power generation, has started its first geothermal heat projects.

Following the success of a large commercial greenhouse project, Kenya has begun pilot projects offering greenhouse heating, milk pasteurisation, aquaculture-pond heating and a laundry, while a project featuring a grain dryer is under development. Further potential has been identified for meat, milk and honey processing, and for post-harvest crop preservation and storage.

In both developed and emerging geothermal markets, public policy can be crucial to address barriers and attract investment.

See **Accelerating geothermal heat adoption in the agri-food sector**

Renewables create opportunities for women

1 517 RESPONDENTS

142 COUNTRIES

1 192 INDIVIVDUALS

288 ORGANISATIONS

IRENA Gender Survey 2018

Globalisation and technology are rewriting the rules of the global economy and changing the contours of the future. Today, women account for an estimated 35% of the workforce in renewables – more than in the energy sector as a whole. Still, the sector stands to gain from greater gender balance.

Women can provide additional talent and insights in decision-making and technical roles. A recent global survey of companies and individuals highlights current patterns and suggests ways to keep improving the balance.

See more on the survey's implications in **Renewable energy: A gender perspective**

New Director-General calls for more action on the ground

At the Berlin Energy Transition Dialogue in April, the new Director-General of the International Renewable Energy Agency (IRENA), Francesco La Camera, called for intensified engagement with countries and partners worldwide. Along with delivering key findings from a new *Global Energy Transformation* report, Mr. La Camera outlined his vision for active support to countries on the ground.

"The global energy transformation is entering a new phase," he said. "We must do everything we can to accelerate the pace and scope of change if we are to meet climate objectives, while ensuring that the new energy paradigm is fair and inclusive. This is also a unique opportunity to spur economic growth in a sustainable manner and close the energy-access gap by creating a world where energy is abundant and available to all."

The new Director-General begins his tenure amid rapid change in the global energy landscape. In a step to broaden collaboration, he signed a Memorandum of Understanding with the Executive Director of the International Energy Agency (IEA), Dr. Fatih Birol.

Mr. La Camera promises to work with IRENA's members, stakeholders and partners to tackle the world's "energy trilemma", whereby equity, security and sustainability challenges intersect. He also met officials from IRENA's host country, the United Arab Emirates, Permanent Representatives to IRENA, and Ambassadors.

With membership encompassing 159 countries and the European Union, IRENA is uniquely positioned to extend support worldwide. Elected in January, Mr. La Camera took office on 4 April. He previously spearheaded co-operation on climate issues for Italy's Ministry of Environment, Land and Sea.

> "We must do everything we can to accelerate the pace and scope of change"

Key decisions of the 9th IRENA Assembly:

- **Indicative IRENA Scale of Contributions for 2019** A/9/DC/1
- **IRENA Council membership for 2019-2020** A/9/DC/2
- **Appointment of the Director-General of IRENA** A/9/DC/3

The annual gathering of IRENA's membership took place on 11-13 January 2019 in Abu Dhabi, UAE.

Recent publications

Global energy transformation: A roadmap to 2050 (2019 edition)

This study highlights immediately deployable, cost-effective options for countries to fulfil climate commitments and limit the rise of global temperatures. The envisaged energy transformation would also reduce net costs and bring significant socio-economic benefits.

Renewable Capacity Statistics 2019

This publication presents renewable power generation capacity statistics, measured as the maximum net generating capacity of power plants and other installations that use renewable energy sources to produce electricity, in trilingual tables for the last decade.

Innovation Outlook: Smart charging for electric vehicles

Electric vehicles (EVs) hold the key to unleash synergies between clean transport and low-carbon electricity. Through smart charging, EV batteries can help to integrate high shares of solar and wind power, as battery storage capacity helps to even out their variability.

Innovation landscape for a renewable-powered future

Solar and wind power pose specific challenges as system operators pursue low-carbon investments and long-term energy sustainability. This report looks at promising innovations to integrate these variable renewable energy sources.

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 co-operation, 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.