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IRENA
International Renewable Energy Agency

REVIEW FOR PARLIAMENTARIANS

A PERIODIC BRIEF ON RENEWABLE ENERGY

IN THIS ISSUE

ENERGY ACCESS AND DECENTRALISED SOLUTIONS

Access to modern energy services is central to achieving development goals, including those related to poverty eradication, ending hunger, improving health, education and gender equality. There have been significant strides in the last two decades increasing global access to modern energy. However, over 1 billion people (17% of the world's population) still lack electricity access, mostly in rural areas of Africa and Asia. Another 1 billion have an unreliable supply. About 2.9 billion people rely on traditional biomass use (e.g. burning wood) for heating and cooking, which hinders advances in health, gender equality and opportunities in developing countries.

To achieve universal electricity access by 2030, the current pace of expansion must almost double. Off-grid solutions (standalone and mini-grids) are expected to supply nearly 60% of the additional generation needed to achieve universal electricity access by 2030. Off-grid renewable energy technologies are well-positioned to supply the majority of this share.

Thanks to steep cost reductions in recent years (see Review for Parliamentarians, issue 3), renewable energy technologies are now the most economical option for off-grid electrification in many rural areas. Renewable power generation is often significantly cheaper than diesel-fired generation or lighting provided by kerosene. At the same time, it avoids their environmental and social drawbacks. The modular nature of off-grid renewables, especially solar energy; allows them to be customised to meet local needs, deployed rapidly and scaled up as needed.

RENEWABLE ENERGY BENEFITS

ENERGY ACCESS AND DEVELOPMENT THROUGH RENEWABLE ENERGY

- Meeting multiple Sustainable Development Goals (SDGs) with renewable energy
- Off-grid power generation and end-use sector solutions for sustainable development
- Creating an ecosystem to accelerate deployment

Access to modern energy is a socio-economic development imperative. Societies cannot develop without reliable, adequate and affordable energy services. Yet access to modern energy is not an end in itself. It is an enabler of increasing productivity, rising incomes, improving food and water security, enhancing access to health and education, and of a wide range of development goals. Unless the issue of access to energy is adequately addressed, meeting the Sustainable Development Goals (SDGs) set by the United Nations will be almost impossible.

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Recent estimates suggest that 1 billion people still lack modern energy access, this number is declining by just 15 million per year. These trends signal an urgent need to rethink electrification plans and identify solutions that can complement traditional electrification options relying on grid extension. The modular, scalable and decentralised nature of renewables means they can be adapted to local conditions and provide a broad range of energy services depending on the needs and purchasing power of end users.

Off-grid renewable energy solutions are no longer a fringe option for expanding access, and their role ought to be recognised in each country's strategy to reach universal access in a time-bound manner.

SDG 7 'Affordable and Clean Energy' - One of the SDGs, adopted by the UN General Assembly in September 2015, propose to achieve universal access to modern energy services by 2030. As a key constituent of SDG 7, renewable energy contributes directly or indirectly to achieving the other SDGs, which are interconnected across the three dimensions of environmental sustainability, human development and sustainable growth.

The objective of universal electricity access is not merely a question of making available a certain number of kilowatt-hours, but access can have an immediate and transformative impact on the quality of life for millions of people. To address this, a paradigm change is needed, with the focus a shift away from capacity or generation metrics (the current supply-side paradigm) towards livelihoods and services (a demand-side paradigm). Access to modern energy services should be at the forefront of the development agenda.

Policy makers should integrate off-grid renewables as a pillar for development in all sectors. For maximum impact, the commitment to renewables must be infused into all dimensions of national planning, along with a streamlined system of energy governance.

Local value creation – The distributed nature of off-grid renewable energy systems means that much of the deployment value chain can be localised, using inputs from rural communities themselves. This enhances the sustainability of energy access efforts and also brings value to rural economies through employment, skills development and, eventually, productive uses enabled by electricity access.

Creating awareness about the viability of renewable energy technologies is also important. Engagement with local communities by demonstrating renewable energy solutions and developing local skills goes a long way in ensuring the sustainability of renewable energy technologies. Training people to install, operate and maintain systems is therefore critical.

Extended benefits in end-use sectors – While ensuring access to reliable and sustainable modern energy services is central for development, it also addresses health and environmental issues. For people in less developed countries, the transition also means replacing traditional, and often unsustainable uses of bioenergy with modern renewable options for cooking and heating.

Traditional use of bioenergy results in high levels of indoor air pollution, with direct impacts on households from fine particles and carbon monoxide. Exposure is particularly high among women and young children, who spend more time near domestic hearths.

Furthermore, traditional use of bioenergy is estimated to account for more than half of the global wood harvest. With almost 300 million rural people living in wood fuel "hotspots", there are on-going risks from wood-fuel-driven degradation and deforestation. The total cost of traditional use of bioenergy on human health and the environment is high, excluding hidden items such as opportunity-cost related to time spent on collecting wood fuels.

Various modern forms of bioenergy and other renewables can be used to further reduce traditional uses. Biogas is the most established. Biogasoline gel can also be produced from various crops and waste and is cost-competitive in regions where feedstock is available. Cooking using electricity is another alternative.

Enabling policies to promote off-grid solutions – Off-grid solutions will play a major part in expanding electricity access, but scaling-up deployment is a challenge. Decentralised electrification is complex. Off-grid markets have varying demand and affordability, based on the remoteness of locations, levels of awareness, access to finance and skills. A market-based approach is necessary, but requires enabling policies and regulations, customised technologies and easier access to capital. Given the large number of stakeholders, addressing these issues often requires co-ordination and collective action.

- **Creating an ecosystem to accelerate renewable energy deployment** hinges on dedicated policies and regulations, customised business and financing models, adapted technology solutions and capacity building.
- **Dedicated policies and regulations** include tariff and incentive structures designed to attract private sector investments and to encourage the participation of local enterprises.
- **Tailored business and financing models** need to be designed to reduce payment collection risk, ensure long-term system management, and operation and maintenance. The rise of pay-as-you-go solar home systems and integration with mobile payment technology is an example. Risk mitigation tools and innovative deployment models can be used to attract private financing.
- **Technology innovation, accompanied by innovation in business models and finance**, could result in a 60% decrease in the cost of producing electricity from renewable mini-grids in the next 20 years.
- **Capacity building** is needed to ensure adequate technical and managerial capacity within financing institutions, communities, governments, utilities, regulators and enterprises.

For further reading: REthinking Energy 2017 and Accelerating Off-grid Renewable Energy: Key findings and recommendations from IOREC 2016

POINT OF VIEW

THE ISSUE OF ACCESS TO ENERGY IS GAINING MOMENTUM

Andries Gryffroy, Member of the Flemish Parliament, Belgium

"Nowadays, about 1.1 billion people lack access to energy powered by the grid. Unhealthy wood stoves, hazardous kerosene lanterns, loud and environmentally unfriendly gas and diesel generators are being used instead. These forms of energy are costly and labour intensive, yet, in remote areas, it is not financially viable to develop high voltage distribution networks. Installing small windmills, or solar systems in a village or individual habitats, represents a sound alternative to more conventional sources of energy.

"Access to finance remains the issue, even though such projects represent a relatively small investment. Investors are less attracted by such projects because they have limited visibility on the financial risks. The cost of assessing an off-grid project's viability is also higher than for larger projects. Therefore, one needs reassurances, such as a clear and long term agreement on price of electricity, for example. Projects can also be facilitated when investors have obtained the expressed support from the local population and/or the government.

"I have recently submitted a proposal to vote a resolution on this issue at the next IPU General Assembly,[1] because I consider it is of crucial importance and parliamentarians should act upon it. Establishing an enabling environment to accelerate the deployment of sustainable off-grid energy solutions, will require a collective effort. Being a member of the Flemish Parliament and of the Senate, I am regularly in contact with all different kinds of stakeholders, which is of crucial importance to undertake any legislative work. The debate within the IPU Committee over this resolution will enable to gather and exchange good practice and reinforce parliamentarians action."

Andries Gryffroy has been an elected member of the Flemish Parliament since mid-2014, and appointed as a member of the Senate since August 2014.

He represents his party on the committee on Economic Affairs and Energy. He is also the focal point for the Inter-Parliamentary Union (IPU) for the Belgian Senate.

Dhamir Mannai, Former member of Parliament from Tunisia adds his voice:

"A country with no access to energy is a country without a future. But universal access to energy must not only include access to lighting or basic electricity needs, it should mean access to energy that can be used to develop industries and various economic activities. Unfortunately, the world's focus has only been placed on those who have no electricity (around 1.2 billion people), but not so much on the equal number of people who have poor to inadequate electricity access. Universal access to minimal energy is not enough; it should be universal access to adequate and affordable energy to develop economic activities in developing countries."

Dr. Dhamir Mannai, former MP is Regional Director of the Middle East and North Africa Climate Parliament.

Together with a group of MPs, Dhamir Mannai drafted a proposal for an independent law dedicated to renewable energy in Tunisia.

1 Andries Gryffroy has submitted a proposal to the IPU Standing Committee on Sustainable Development, Finance and Trade, entitled "Engaging the private sector in implementing the SDG's, especially on renewable energy". The resolution will be debated in St Petersburg in October 2017, before being submitted to a vote at the IPU General Assembly in March 2018.

CASE STUDIES

Bangladesh

Bangladesh hosts one of the most dynamic markets for solar home systems (SHSs) in the world, having deployed more than 4 million systems as of June 2016. The Infrastructure Development Company (IDCOL) SHS Programme has been a tremendous success - providing electricity to more than 18 million people, or 11% of the population. The programme has helped to create a sustainable local industry that has improved the system's long-term operations. Equally important, it has demonstrated that through financial innovation even the poorest households can afford off-grid solutions. Collection efficiency, although decreasing, remains high at over 95% - a figure higher than that of many banks in the developed world.

From an end-user perspective, a key challenge for the SHS is to cope with increasing household use. In the current environment, either the household is constrained by the existing SHS or has to secure another SHS (an inefficient option, with total capacity not necessarily increasing in linear fashion with the addition of each new system). Initiatives are being introduced (e.g. SOLshare in Shariatpur, Bangladesh) to interconnect existing SHSs into a peer-to-peer electricity-trading network. This ingenious micro-grid allows users to both buy and sell electricity, allowing those with a PV system to generate income, while those without one can access affordable electricity. In this manner, households are also able to maintain productive loads that would otherwise be impossible using their SHSs alone.

Colombia

About 60% of Colombia's territory is not connected to the electricity grid, and roughly 1.8 million of its people rely on limited and scattered power services. Recently, the Inter-American Development Bank (IDB) has announced the approval of a loan of USD 9.3 million to promote private investment in the generation of renewable energy in isolated/unconnected areas of Colombia. The project is receiving funding from international donors and is part of IDB's efforts to support Bancoldex, a commercial bank that operates as Colombia's entrepreneurial development and export-import bank. Bancoldex will act as the implementing agency for the programme.

The aim of the investment strategy is to use concessional financing to mobilise investment from the private sector to mainstream renewable energy-based mini-grid projects and engage local financial institutions. The IDB loan aims to support private companies that supply and administer public electricity services, as well as providers of renewable energy technology that have a history with mini-grids. The final objective is to develop a model that can be replicated and scaled up across the region. The programme is one of the innovative mechanisms for public-private financing that the IDB has been promoting to increase private investment in renewable energy. The operation, which will draw on Climate Investment Funds, has a pay-out period of 5-years, with a 10.5-year grace period and an interest rate fixed at 0.75%.

Tanzania

Tanzania has supported the creation of an environment conducive for foreign investments through several measures:

- The One Stop Investment Centre brings all relevant governmental agencies together in one location to streamline the delivery of services to investors;
- Investors are guaranteed free import and convertibility of foreign exchange;
- Investors are guaranteed the unconditional transferability of funds through authorised dealers;
- Investments in Tanzania are guaranteed against nationalisation and expropriation; and
- Tanzania has become a member of the Multilateral Investment Guarantee Agency and the International Centre for Settlement of Investment Disputes.

IN-FOCUS: RENEWABLE ENERGY MINI-GRIDS

SUPPORTING PRIVATE INVESTMENT IN RENEWABLE MINI-GRIDS

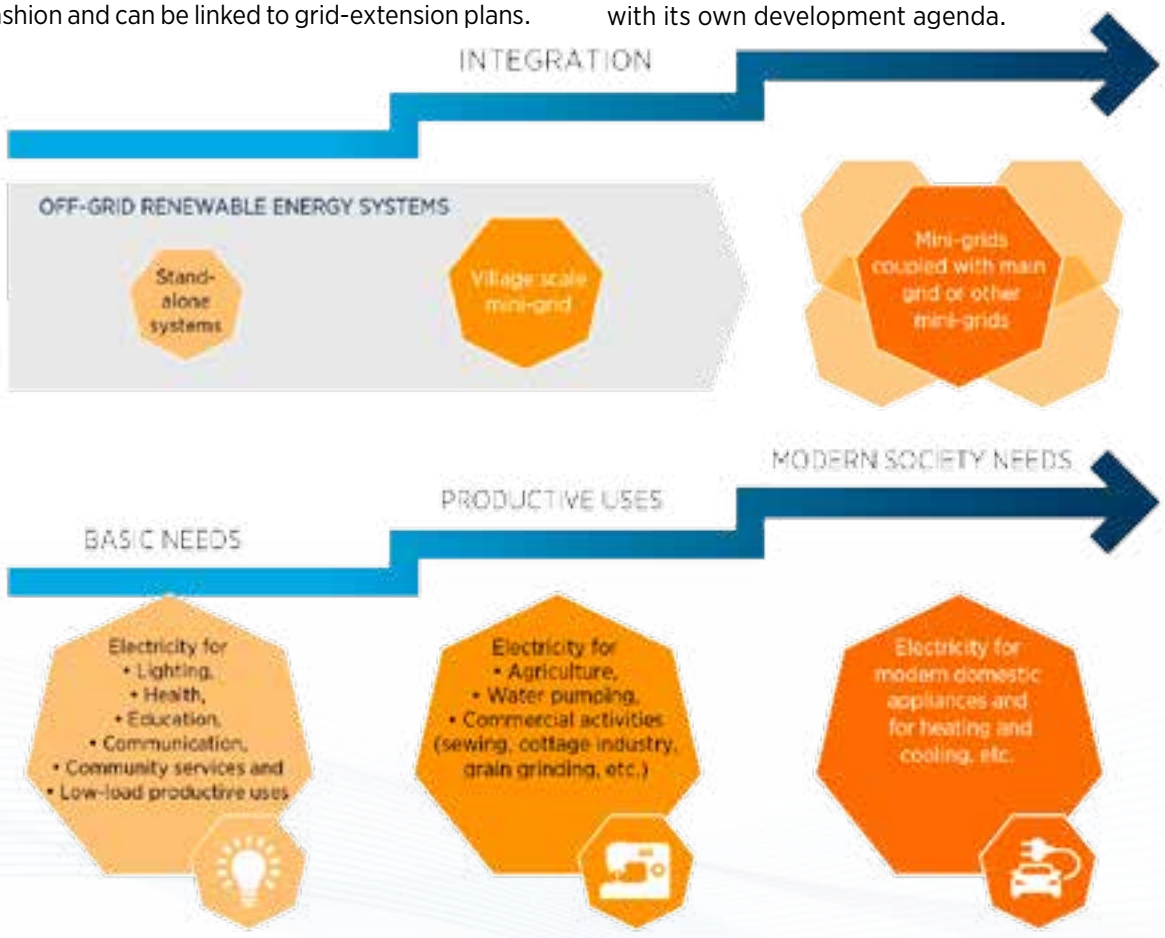
- **From stand-alone to mini-grids**
- **Supporting the private sector to accelerate deployment**
- **Main barriers to deployment of mini-grids by the private sector**

Cost reductions, technology advancements and business model innovation make off-grid renewables a mainstream electrification option for governments to consider. Off-grid solutions are estimated to supply nearly 60% of the additional generation needed to achieve universal access; mini-grids will account for the majority.

Stand-alone and mini-grid solutions powered by renewables already provide electricity to nearly 90 million people, and meet a hierarchy of needs, from basic lighting to productive uses, thereby enabling people to climb the energy ladder. They can be installed in modular fashion and can be linked to grid-extension plans.

Off-grid solutions are estimated to supply nearly 60% of the additional generation needed to achieve universal access; mini-grids will account for the majority

From stand-alone to mini-grids – Stand-alone systems are a dire necessity in many countries to meet basic needs, but they cannot be the starting and end point of energy access efforts. Although solar home systems can provide basic lighting and can power a mobile charger, low-wattage television or radio, they usually cannot power a motor or a sewing machine that can help generate income. At local level, energy aspirations are not limited to households alone, and expand into a multitude of sectors, such as health and education, each with its own development agenda.



National energy access plans should therefore consider off-grid renewable energy options as part of a broader strategy towards universal access. By establishing a basic demand profile for an area, stand-alone systems can prepare the ground and build the economic foundation for larger systems, including mini-grids. Mini-grids may be further integrated into regional mini-grids or the main grid where technically feasible.

Supporting mini-grids deployment – In business terms, the case for either mini-grid or stand-alone systems to supply renewable power to underserved communities has never been stronger. Traditional deployment models led by public utilities, non-governmental organisations and communities, are being complemented with private sector approaches from local entrepreneurs to large international utilities.

Private sector involvement will accelerate growth in min-grid deployment, and there is growing interest from the private sector in the development, financing, operation and management of mini-grids.

Supporting mini-grids requires an adaptation of the power system framework, traditionally based on a centralised model. Mini-grid solutions are diverse, and so are the accompanying business and financing models. In recognition of these specificities, a number of countries have turned to dedicated policies and regulations that cater specifically to mini-grid development (see Policy Compass, p.8).

Removing the main barriers to deployment – Governments have an important role to play in facilitating private sector participation, by enforcing key policy and regulatory measures as well as to successfully adapt to local conditions and address deployment barriers.

For example, obtaining the required licenses and permits can be a lengthy, risky and costly process. Although there is no single 'right way' to design an enabling legal and licensing environment, some general principles apply, such as establishing a single-window clearance facility hosted at a rural electrification agency or similar body to facilitate licensing and other regulatory requirements. Information on processes and procedures should also be easily accessible. Granting provisional licenses and concessions can mitigate project-development risks and avoid two or more developers carrying out preparatory activities on the same site.

Cost-covering tariffs are one way of ensuring economic viability for private sector mini-grids, as they tend to be higher than those for the main-grid. With decreasing costs of renewables, the case for differentiated tariffs has strengthened. Increasingly, small-scale systems are being exempted from tariff approvals, allowing operators to set tariffs in consultation with the communities and to test tariff structures in a light-handed regulatory space.

The unexpected arrival of the main-grid is a major risk faced by mini-grid operators. Rural electrification master plans provide valuable guidance and should detail interconnection and/or compensation mechanisms associated with main grid arrival.

To facilitate access to finance, governments can take several measures with regard to equity, debt and grant financing for mini-grids, such as establishing dedicated funds to leverage private capital, or engaging local commercial banks to make available low-cost, local-currency loans.

Policies can influence not only the pace of rural electrification, but also the level of access, public spending, and to some extent, customer satisfaction. The right policy mix can optimise development of the mini-grid sector, but an understanding of how policies affect different technology-tier combinations is essential, as various mini-grid configurations respond differently to the policy and regulatory environments. Finally, mini-grid policies and regulations need to be continuously adapted to ensure effectiveness.

For further reading:
Policies and Regulations for Private Sector Renewable Energy Mini-grids (IRENA, 2016)

POLICY COMPASS

TRANSLATING RECOMMENDATIONS INTO POLICIES AND REGULATIONS TO SUPPORT PRIVATE SECTOR MINI-GRIDS

Developing the policy and regulatory framework needed to scale up mini-grid deployment would require introducing new, or adapting existing, policies, regulations and other legal structures that govern the functioning of the electricity sector. These measures can be broadly classified as primary, secondary or tertiary:

1. Primary measures

- **National policy on energy, renewable energy and mini-grids:** set country objectives, identify priority areas, and outline the vision for electricity sector development and the role of renewable energy (dedicated mini-grid policies bring further definition and refinement, including capacity, actors and their roles, service requirements, and financial incentives);
- **Rural electrification strategy; master plan:** define timeline, mode and implementation strategy for rural electrification, including financing and grant support;
- **Energy legislation:** provide the legal basis for licenses, permits, and concession contracts and schemes for private generation, distribution, and sale of electricity, establish the legal and institutional framework for the design, implementation, and enforcement of regulations, establish dedicated institutions and define roles and responsibilities within the sector;
- **Mini-grid regulations:** define/establish regulations on tariff guidelines for operators, grid interconnection and procedures, quality-of-service, feed-in tariffs and power purchase agreements, and safety, power quality and service level; and
- **Financial support for mini-grids:** define types of support and their combinations (grants, concessional loans, guarantees, etc.), outline the purpose of financing, set the conditions and processes for securing financing, provide source of financing.

2. Secondary measures

- **Environmental and health protection:** define obligations of mini-grid developers and operators;
- **Taxation and other fiscal measures:** define taxation on mini-grid tariffs, establish tax treaties between countries to avoid double taxation for foreign developers and operators, define tax exemptions, reductions in import taxes and duties, incentive for accelerated depreciation of generation assets;
- **Land rights and use:** for example, land ownership and leasing rules for local and foreign companies;
- **Incorporation, company formation:** including resources needed to establish special purpose vehicles and the right to transfer profits overseas;
- **Building and construction:** define processes during construction and installation; and
- **Banking:** set ability for domestic financing institutions, international financing institutions, insurance providers and non-traditional financing methods (mobile payment, international crowdfunding, etc.).

3. Tertiary measures

- **Technical assistance and capacity building:** knowledge on mini-grids systems, business models, increase administrative and implementation capacity;
- **Statistics and data collection:** to facilitate site selection (inhabitants, average income, renewable resources, etc.), identify institutions responsible for storing and processing data useful for planning; and
- **Synergies with other sectors:** including health, education, micro-industries, telecommunication, agriculture, water, to identify synergies and maximise development impact.

For further reading: Policies and Regulations for Private Sector Renewable Energy Mini-grids (IRENA, 2016)

SELECTED PUBLICATIONS

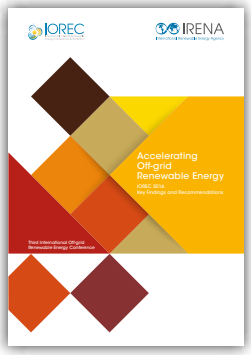
RETHINKING ENERGY 2017: ACCELERATING THE GLOBAL ENERGY TRANSFORMATION

Renewable energy is a fundamental and growing part of the global energy transformation. Increasingly, renewables have become the first choice for expanding, upgrading and modernising power systems around the world.

REthinking Energy, the flagship report from the International Renewable Energy Agency (IRENA), examines trends and developments in the global quest for a sustainable energy future. As this third edition emphasises, accelerated deployment will fuel economic growth, create new employment opportunities, enhance human welfare and contribute to a climate-safe future.

Renewables, consequently, are crucial for sustainable development, including the pursuit of SDG 7, the United Nations-adopted goal of ensuring “affordable, reliable, sustainable and modern energy for all”.

Policies and regulations remain crucial to establish a stable and attractive market for renewable energy. Strong government commitment is needed to reduce risk and lower the cost of financing.



ACCELERATING OFF-GRID RENEWABLE ENERGY: KEY FINDINGS AND RECOMMENDATIONS FROM IOREC 2016

The business case for off-grid renewables as a means to expand rural electricity access keeps growing stronger, thanks to steady cost reductions and technological innovation. Yet further accelerating the growth of either mini-grid or stand-alone solutions will depend also on stable policies and regulations, along with dedicated funds and de-risking instruments for renewables.

Technology and business innovation could cut the costs of renewable power generation for mini-grids by 60% in 20 years, according to this conference report from the International Renewable Energy Agency (IRENA). Yet around 600 million people are still expected to lack electricity access in 2040, despite international goals to ensure sustainable energy for all.

In order to help meet the Sustainable Development Goals adopted by the United Nations in 2015, off-grid solutions must be designed in ways that not just deliver energy, but improve people’s lives

SELECTED PUBLICATIONS

POLICIES AND REGULATIONS FOR PRIVATE SECTOR RENEWABLE ENERGY MINI-GRIDS

Access to electricity is vital for socio-economic development. But power cannot be extended to everyone solely through national electricity grids. Off-grid renewable energy solutions are crucial to achieve universal access —to electricity. Most of these will involve mini-grids — isolated, community-level power grids— which can eventually be absorbed into the main grid or may continue to operate autonomously.

To attract private investment in renewable mini-grids, policy makers need to select the right policies and create an effective regulatory framework. This report examines the key factors influencing investors in mini-grid projects, including licensing, tariff regulation, access to finance and specific project risks related to the eventual arrival of the main grid.

Different combinations of policies work with different power-generation technologies. The report also examines the specificities of mini-grids connected to solar, biomass, wind and small hydropower, or some combination of these with other energy sources. Appropriate policies will not only speed up electrification but also improve the quality of service and enhance the effectiveness of well-targeted public spending.

REVIEW FOR PARLIAMENTARIANS: PREVIOUS ISSUES

ISSUE 3 — DECLINING COSTS AND JOBS CREATION

The renewable energy sector has become a significant employer, with the potential for adding millions of jobs worldwide in the coming years. This dynamism is partly triggered by the unprecedented cost decrease in the sector.

Français Español

ISSUE 4 — SPECIAL EDITION — 2017 IRENA LEGISLATORS FORUM

This special edition gives a full account of the discussions held during the second Legislators Forum held in Abu Dhabi, United Arab Emirates, in conjunction with IRENA's seventh annual Assembly. Parliamentarians from 15 countries and the European Union, gathered together to discuss best practices, opportunities and challenges in promoting renewables, and ways to establish an enabling legal framework.

Français Español

For more: www.irena.org/publications

ANNOUNCEMENT

Join the **IRENA Legislator's Network on Facebook**, a private space for parliamentarians to access up-to-date and reliable information on renewable energy.

Learn, share and discuss best practice and experience with fellow legislators.

Receive regular posts on latest IRENA publications, news articles on renewable energy, infographics, events, webinars, videos.

To join the group

simply click on the link www.facebook.com/IrenaLegislators

or send an email to legislators@irena.org

ANNOUNCEMENT

The Legislators Forum presents a unique opportunity for legislators from all over the world to exchange with experts and each other on renewable energy matters, share best practices, and establish a strong network of parliamentarians with an interest in accelerating the deployment of renewable energy.

The Legislators Forum will be directly followed by the eighth session of IRENA's annual Assembly (13-14 January 2018), a gathering of the over 150 Member States of the Agency, in addition to stakeholders and representatives of international and regional organisations, private sector entities, industrial associations, etc. Attendance may be arranged for participants to the Legislators Forum to attend the Assembly and the World Future Energy Summit (15-18 January 2018), to benefit from the discussions of energy thought leaders on the global developments in renewable energy, the challenges and opportunities on the road ahead and identify joint actions to achieve common goals.

SAVE THE DATE

LEGISLATORS FORUM

2018 IRENA LEGISLATORS FORUM
11-12 JANUARY 2018
ABU DHABI, UNITED ARAB EMIRATES

If you are interested in participating, send an email now to **legislators@irena.org** and join us at the start of next year, for the third edition of the Legislators Forum.