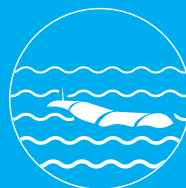
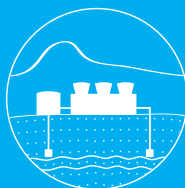
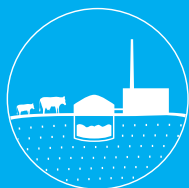


Climate Parliament

Legislators working worldwide to combat climate change



*Empowered lives.
Resilient nations.*



Renewable Energy for Parliamentarians

How-To Guide

The United Nations Development Programme (UNDP)

UNDP is the United Nations' lead agency in providing support to Member States as they consider their long-term development. UNDP believes that enhancing democratic governance is essential for achieving sustainable development and this must include effective parliaments. It provides various forms of technical assistance to more than 60 parliaments around the world (one in three parliaments globally), supporting their efforts to create an autonomous, transparent and inclusive institution.

UNDP also strengthens national capacity to manage the environment in a sustainable manner, including as the leading implementer of programming for the Global Environment Facility (GEF) and a range of other climate-related funds. UNDP offers highly specialized knowledge, technical assistance and funding for eligible countries to build their capacity to create and maintain a sustainable environment.

Climate Parliament

The Climate Parliament is an international cross-party network of legislators, dedicated to preventing climate change and promoting renewable energy. We are the only independent parliamentary network with renewable energy development as its primary focus. Our Secretariat supports parliamentarians to undertake initiatives at national and regional levels to help accelerate the global transition to renewable energy. The Climate Parliament has been working with MPs on renewable energy for over five years, and has established a network of legislators from across Asia, Africa and Europe, all dedicated to effecting the renewables switchover.



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FOREWORD

Renewable energy holds considerable potential for advancing human development. Energy from renewable sources – water, wind, the sun and biomass, among others – can facilitate access to clean and safe energy for millions of people. It can boost social and economic development while contributing to addressing environmental challenges, and plays a crucial role in successfully tackling climate change.

Achieving sustainable energy for all is fundamental to the achievement of the Millennium Development Goals and will be critical to the success of the post-2015 development agenda. With the right support, universal access to sustainable energy will drive inclusive development.

The UN Secretary-General's Sustainable Energy for All (SE4ALL) initiative was established in recognition of the critical importance of energy for development. It sets three goals to be achieved by 2030: ensuring universal access to modern energy services; doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in the global energy mix. Since SE4ALL was launched, over eighty developing countries have officially signed up to the initiative.

UNDP has been engaged in promoting energy access, renewable energy technologies, and energy efficiency for more than two decades. In the process, we have learned valuable lessons and have seen many promising developments. Small Island Developing States, for example, have pledged their commitment to providing universal access to energy, switching to renewable energy, and reducing dependence on fossil fuels. Ethiopia, with its far-sighted Climate-Resilient, Green Economy Strategy, has set out to invest US \$150 billion over the next two decades to become a carbon neutral country by 2025. In Croatia, the Government has dramatically reduced energy costs in public sector buildings. In 2011 and 2012 alone, these interventions have saved the Government more than \$20 million. UNDP is proud to have been associated with all these initiatives.

As these cases illustrate, delivering on the potential of renewable energy requires decisive and concerted political action. Parliamentarians are uniquely positioned to help build the political will required, and to create the momentum needed to promote renewable energy development. They can do so by shaping enabling policies – including long-term fiscal incentives – and transparent regulatory frameworks, pushing for the necessary budget allocations and engaging with constituents to build social traction for such initiatives.

As a leading actor in parliamentary development, UNDP works with more than seventy parliaments worldwide, supporting them as powerful agents of change and crucial development actors. With many of these parliaments, UNDP has been supporting efforts to promote access to sustainable energy for all, including by helping to increase the share of renewables in the energy mix of the countries in question. Building on this work and the many lessons learned, parliamentary action in this field will continue to receive UNDP's sustained support and capacity-building efforts.

UNDP and the Climate Parliament, under the umbrella of their joint 'Parliamentary Action on Renewable Energy' project and with the support of the European Union and the Ministry of Foreign Affairs of Denmark, have collected best practices and case studies on renewable energy initiatives from all corners of the world. Drawing on these examples, this Guide provides an introduction to renewable energy technologies and offers concrete suggestions for parliamentarians to promote renewable energy.

This Guide targets parliamentarians, but also intends to encourage other actors working with parliaments to embrace renewable energy. It is hoped that the material offered in this Guide will give parliamentarians useful information on renewable energy, and on how to employ the tools they have at their disposal to be effective advocates for that.

These are important and exciting times for the energy agenda. Sustainable energy and universal energy access are issues which are capturing global attention. What is needed now is to build on this momentum in order to bring modern and sustainable energy services to all.

We encourage all our partners to join us in these efforts in support of sustainable and inclusive development.

A handwritten signature in black ink, reading "Helen Clark". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Helen Clark

Administrator of the United Nations Development Programme

FOREWORD

Without reliable energy access, no country can expect to enjoy sustained or sustainable economic growth. It cannot have sustainable agriculture. Nor can it provide its people with quality healthcare or a decent education. In short, no energy means no development. The 1.2 billion people worldwide with no access to electricity know that only too well.

That's why the European Union has made the fight against energy poverty central to its development policy for many years now. And it's why we strongly support the Sustainable Energy for All (SE4ALL) objectives. At the EU SE4ALL Summit in Brussels in 2012, President Barroso set us the ambitious target of helping partner countries provide 500 million people with access to sustainable energy services by 2030.

Since then, the European Union has been rolling out an impressive 600 million euro-plus programme to mainstream access to sustainable energy services and to provide renewable energy and energy efficiency solutions.

We have set up an 80 million euro Technical Assistance Facility to assist our partner countries in fine-tuning their policies to attract the necessary private investments. A call for proposals worth more than 100 million euro will select projects focusing on renewable energy and energy efficiency solutions benefiting rural areas.

We have earmarked 400 million euro for much-needed energy generation projects in sub-Saharan Africa. By blending grants with loans, we expect to leverage concrete investments of up to 8 billion euro. And through the Global Energy Efficiency and Renewable Energy Fund we will promote new, scalable business models for sustainable energy investments in rural and off-grid areas.

This is just the beginning. In the years ahead energy will play an increasing role in our bilateral and regional cooperation, alongside our global activities. These include support for the Global Facilitation Team that will play an important role in mainstreaming and promoting renewable energy and energy efficiency measures.

The advocacy work that the Climate Parliament performs in this context, also as part of the EU-funded 'Parliamentary Action for Renewable Energy' project, is very important. Backing from national parliaments is crucial to speed up the policy reforms that will attract massive investments to the energy sector and benefit the energy poor.

We are therefore delighted to support your efforts. They include this guide, which contains useful recommendations for policy-makers on how to harness renewable resources. I trust that it will prove valuable to parliamentarians everywhere as we continue working together for a cleaner, more prosperous and truly sustainable world.

A handwritten signature in black ink, appearing to read 'Andris Piebalgs', with a stylized, cursive script.

Andris Piebalgs

Member of the European Commission in charge of Development

FOREWORD

1.2 billion people around the world still live in energy poverty, without access to the modern energy services that could provide them with reliable lighting, fuel, and energy for development. Women must trek for miles to gather traditional fuels such as wood and dung to run dirty and dangerous cooking stoves that belch poisonous smoke into their homes. Children have no light in the dark evenings for reading or study. Mobile phones cannot be charged; entrepreneurs cannot power their businesses; potentially life-saving medicines cannot be properly refrigerated.

Access to energy could revolutionise these people's lives, but if we rely on carbon-intensive coal and gas to bring electricity to the world's poorest, we risk condemning present and future generations to living in a world scarred by droughts, heat waves, famines, and disease epidemics brought on by climate change.

Renewable energy, however, can bring heat, light and power to millions without relying on polluting, expensive fossil fuels. Wind, solar and other forms of sustainable energy can no longer be dismissed as an expensive luxury. They are essential and affordable tools that will enable countries to transcend the limits of traditional fossil energy systems, and bring clean, reliable power to their people for generations to come.

Although making the transition to renewable energy will not be easy, parliamentarians are in a unique position to take action. Elected legislators are the one group of people in the world who have all the tools we need to solve the climate problem: they vote on laws, taxes and budgets, oversee the operations of government, and have direct access to Ministers, Prime Ministers and Presidents. All that is required is understanding, personal commitment, and political will.

Thus, it gives me great pleasure to introduce this How-To Guide. Be you Minister, MP, or citizen, I hope it will serve as a valuable point of reference, as well as a source of inspiration, to guide your own engagement with the intertwined issues of development, energy, and climate in the years ahead.



Sir Graham Watson, MEP

Chairman, Climate Parliament

ACKNOWLEDGEMENTS

UNDP and Climate Parliament would like to thank the author, **Kevin Deveaux**, for conducting the research and compiling the report. We would also like to thank **Lotte Geunis** and **Ben Martin**, the editors, for their invaluable contributions to this How-To Guide.

We are grateful to UNDP colleagues Benoit Lebot, Julia Keutgen and Robert Kelly and to Climate Parliament colleagues James Corre and Nick Dunlop for their input throughout the development of this Guide.

Feedback and comments were kindly provided by Anna Hovhannesyan, Ansgar Kiene, Butch Gadde, Charles Chauvel, Diane Sheinberg, Donna Bugby-Smith, Drew Corbyn, Holly Brown, Lucy Wanjiru, Olivier Pierre-Louveaux, Rae Ann Peart, Sarwat Chowdhury, Sonia Dunlop, Sumedha Basu and Tarik-ul-Islam.

Finally, it would not have been possible to develop this tool without the dedicated leadership of parliamentarians from the 'Parliamentary Action on Renewable Energy' project, who shared valuable experiences and feedback throughout the process.

This Guide is published in the framework of the Parliamentary Action on Renewable Energy (PARE) project, implemented with the generous support of the European Commission and the Danish Ministry of Foreign Affairs.

ACRONYMS

CEF	Connecting Europe Facility
EU	European Union
FiT	feed-in tariff
GEF	Global Environment Facility
GLCC	General Law on Climate Change (Mexico)
GLOBE	Global Legislators Organisation
GW	gigawatt
HVDC	high voltage direct current
ICT	information and communications technology
IEA	International Energy Agency
IMF	International Monetary Fund
IPP	independent power producer
kWh	kilowatt hour
MEP	Member of the European Parliament
MP	Member of Parliament
MW	megawatt
MWh	megawatt hour
ODA	official development assistance
PPA	standard power purchase agreements
REC	Renewable Energy Certificates (also known as green certificates)

RES	renewable energy sources
RPS	Renewable Portfolio Standards
SE4ALL	Sustainable Energy for All initiative
SHS	solar home system
SREDA	Sustainable and Renewable Energy Development Authority (Bangladesh)
UNDP	United Nations Development Programme



EXECUTIVE SUMMARY

Imagine a world in which every citizen has access to affordable, reliable electricity and fuel without the negative effects of pollution and emission of greenhouse gases. In such a world, children everywhere would have light in their homes to study by, families would have access to medicines requiring refrigeration, mobile telephones would be accessible to all as recharging would be immediate, and communities would have the opportunity to create small businesses to provide incomes for many.

This vision is no longer a distant dream. Many countries have started to implement policies and adopt legislation to harness renewable resources — water, sun, wind, geothermal and biomass — to produce electricity, heat and fuel. As the world moves towards adoption of renewable energy as a key source of energy production, the role of parliamentarians has been and will remain critical in developing legislation required to create and deliver access to energy from renewable sources.

The development of renewable energy provides a range of benefits. It can create significant economic and employment opportunities and help secure new investments in a wide range of industries, both at local and national level. Renewable energy technologies also provide a unique opportunity to curb carbon emissions without compromising access to energy, which has important implications for slowing **climate change**. Thirdly, developing a country's national renewable resources will create access to energy that is inexhaustible, thereby reducing a country's reliance on foreign resources and strengthening its **energy security**. Moreover, whether used on a mass scale to power a city, or on a small scale to run a village mini-grid, renewables bring considerable **health benefits** by providing clean, safe energy without the negative impacts of fossil fuels.

Beyond these broader benefits, renewable energy is an important catalyst for **rural electrification**. Many rural communities in the developing world have access to at least one form of sustainable energy, be it strong sunshine for solar, a river for micro-hydro or reliable wind for a wind turbine. These resources can be harnessed to provide clean electricity even in communities far from the national grid. This illustrates how, in the coming years, renewable energy has the potential to transform economies throughout the world.

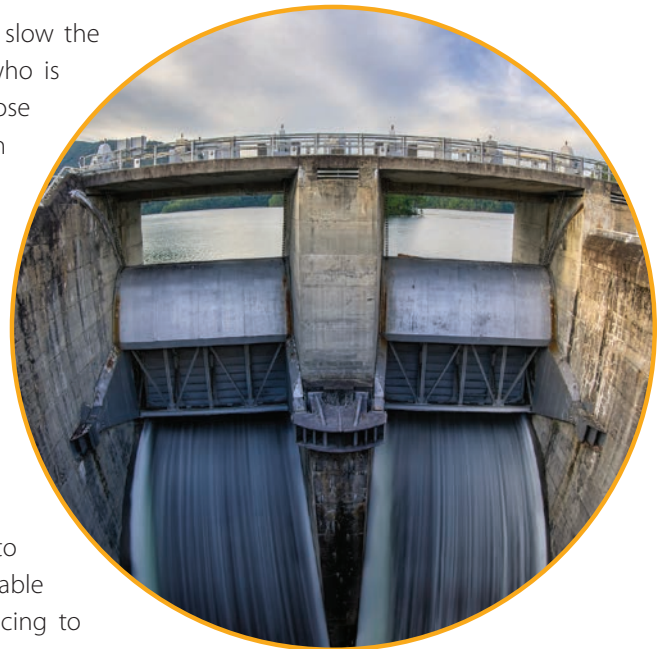


There are important barriers to overcome in the development of renewable energy, however. **Technical barriers**, once a major challenge, are being lowered as considerable breakthroughs continue to be made. Renewable energy technologies are swiftly becoming more efficient, cost-effective and accessible. **Economic barriers** relate mainly to the cost of electricity generation and the persistence of subsidies for fossil fuels. Parliamentarians can act on both issues by ensuring that renewable energy development can compete on a level playing field, allowing it to attract the necessary investments to launch large-scale projects. The cost to produce renewable energy has fallen dramatically in recent years thanks to technological breakthroughs and economies of scale, and continues to do so.

The greatest barrier to renewable energy development in many countries is the **policy framework** that regulates electricity, heating and transport fuel markets. It is common for an electricity market to be operated by a monopoly, often a state-owned utility, which is in full control of generation, distribution and the sale of electricity to consumers. This provides very little incentive for the development of alternative technologies. A related challenge is the bureaucracy that must regulate and approve the development of electricity generation (or heating or transport fuel). The development of on-grid renewable energy can be substantially accelerated by ensuring the policy and legal framework is fully coherent and the decision process transparent.

Another barrier is a lack of **community support**, which may slow the build of renewable energy projects. Even a parliamentarian who is fully committed to the benefits of renewable energy will have those convictions challenged when faced with political opposition from constituents who do not expect to enjoy the benefits of such investments. Finally, **counter-lobbying** remains an issue in many countries. Parliamentarians who decide to push for the adoption of renewable energy policies in their countries will likely encounter significant opposition from fossil fuels interests and their lobbyists.

The building of renewable energy projects involves significant upfront investments. A country will need to make a major investment in generation and transmission infrastructure, the cost of which may run into billions of dollars, if it is to significantly reduce its reliance on energy from non-renewable sources. Governments typically turn to three sources of financing to





fund renewable energy development: private financing, public financing and consumer financing. In order to build renewable energy capacity on a mass scale, **private sector investment** is a necessity. Historically, private financiers have been hesitant to invest in renewable energy projects because they were seen as high risk, meaning they thought there was a strong likelihood that they might not obtain a return (or profit) from their investment. Parliament can help to reduce the risk of such investments by promoting a legal framework that facilitates secure, transparent investments and offers the necessary guarantees to investors. **Public financing** alone will never be sufficient to ensure that renewable energy is developed on the mass scale required to significantly reduce dependence on fossil fuels. If used properly, however, public funds can leverage considerable private investment. Finally, **consumer financing** is an accepted but complex source of financing. As policymakers are directly accountable to consumers, parliamentarians need to find a set of policies that encourage the development of renewable energy while ensuring the burden imposed on the average citizen is minimized.

In addition to securing the required financial investments, **building a robust policy framework** is an important prerequisite for the successful domestic development of renewable energy. Here, too, a wide range of options is available. Governments can choose to employ some immediate policy changes that allow for swift deliveries (short-term actions) such as setting national targets, simplifying regulations and awarding subsidies. This will serve to send clear signals on the government's commitment to renewable energy development, which is an important first step in securing investments and building an overarching regulatory framework. Some of the most prevalent policy options in place today require a more extensive and therefore time-consuming review of the legal framework (long-term actions) such as feed-in tariffs, quota mechanisms and tenders. These options can be adopted to further strengthen the regulatory framework as the renewable energy sector grows.

The development of renewable energy cannot be achieved without **political leadership**. Parliamentarians have all the levers they need in order to act: they vote on laws, impose taxes and approve state budgets; they oversee the operations of government and have direct access to Ministers, Prime Ministers and Presidents; they can influence national policy, build strong legal frameworks, direct spending in new directions, and establish stronger policies and targets for action on renewable energy. In short, the transition to a post-fossil fuels world will benefit considerably from the support of parliamentarians ready to use their political capital for the promotion of renewable energy.

Parliament's three core functions provide many different entry points for parliamentary action. Through **law-making**, parliamentarians can propose or amend legislation that will strengthen the legal framework and the policies pertaining to renewable energy development. Their **oversight** function empowers them to monitor the government's implementation of set policies and targets, and allows them to hold the government to account. Closely linked to this is a parliament's power of the purse. As the **state budget** is considered and approved by the parliament on an annual basis, parliamentarians can push for budgetary provisions dedicated to renewable energy development. Lastly, in their role as **representatives** of the people, parliamentarians play an important role in soliciting constituent feedback and building community support for renewable energy projects. Engaging constituents on the benefits of renewable energy can be instrumental in the successful implementation of a project.

In addition to the specific tools provided by the parliament's Rules of Procedure, parliamentarians also have a less well-defined authority that enables them to **advocate** effectively on an issue that they feel is of particular importance. Such advocacy is best done in cooperation with other political actors. Outside of parliament, parliamentarians can build a coalition of those who support the development of renewable energy, such as community leaders in off-grid regions, industry figures and investors. Such a coalition can create pressure on a government to develop a plan to implement renewables, or identify and advocate for the changes required to make an existing plan more effective.

This *Renewable Energy for Parliamentarians: How-To Guide* was designed by UNDP and the Climate Parliament to provide an introduction to the benefits and challenges of developing renewable energy resources, and to explore the critical role that parliamentarians can and should play as political leaders to facilitate this process.

Part One provides an introduction to renewable energy and outlines how it can make substantial contributions to wider human development goals. This part also examines the barriers that have prevented the development of renewable energy to date.

Part Two explores the technologies behind renewable energy in more detail. The first section outlines the most prevalent types of renewable energy – hydro, solar, wind, geothermal, ocean and bio-energy — and offers case studies and best practices to illustrate their respective applications. The second section explores how different types of grids can encourage the generation and distribution of electricity from renewable sources. Four principal methods for transferring and accessing electricity are reviewed: smart grid, super grid, mini-grid and off-grid.





Part Three looks at available options for securing the required financial investments and for developing medium- and long-term regulatory systems.

Part Four analyses the wide range of tools at the disposal of parliamentarians to advocate for the development of renewable energy capacity and, where political space is available, to institute the framework required to reduce or remove the remaining barriers.

It is hoped that the material offered in this How-To Guide will help parliamentarians to better understand the complex issues surrounding renewable energy and the tools they have at their disposal to be effective advocates for its development.

ENERGY ACCESS FOR ALL

Imagine a world in which every citizen has access to affordable, reliable electricity and fuel without the negative effects of pollution and emission of greenhouse gases. In such a world, children everywhere would have light in their homes to study by, families would have access to medicines requiring refrigeration, mobile telephones would be accessible to all as recharging would be immediate, and communities would have the opportunity to create small businesses to provide incomes for many.

This vision is no longer a distant dream. Many countries have started to implement policies and adopt legislation to harness renewable resources— water, sun, wind, geothermal and biomass — to produce electricity, heat and fuel. As the world moves towards adoption of renewable energy as a key source of energy production, the role of parliamentarians has been and will remain critical in developing legislation required to create and deliver access to energy from renewable sources.

Parliamentarians are important political leaders in their countries. Being elected to a national parliament (or federal, provincial or state parliament) comes with responsibilities. Parliamentarians are expected to solve everyday problems while also considering long-term development. They play a key role in facilitating long-term development goals; they have the authority to monitor implementation of laws and policies that ensure access to sustainable energy for all.

Development of renewable energy resources can address many short-term challenges faced by the citizens of developing countries, while guaranteeing that society is set on the right track to energy security and greater prosperity. But these resources cannot be tapped without establishing the right incentives and legal frameworks. Recognizing the vital importance of parliamentarians in this process, UNDP and the Climate Parliament have partnered to provide this How-Two Guide for parliamentarians who wish to promote the development of renewable energy.¹



¹ This How-To Guide provides a broad overview of renewable energy. The corresponding online toolkit (www.agora-parl.org) will provide more detailed information and will be updated regularly.

A. Why renewable energy?

Facilitating access to renewable energy is one of the most critical long-term policy decisions a country can make. In addition, there are benefits in the short term such as job creation and energy access. Here are four key reasons why renewable energy should be at the heart of every government's energy strategy:

- 1. Economic development:** Access to renewable energy creates jobs. From component manufacturing and electricity grid expansion to the installation and maintenance of generation systems, harnessing local sources of renewable energy has a significant economic impact. This is particularly important in places with limited or no access to energy, and where unemployment is a significant issue. Renewable energy can generate four times as many jobs per dollar invested than fossil fuels industries – and those jobs tend to be more highly skilled and better paid.²

Box 1

Women and the renewable energy sector: Creating opportunities

When establishing a framework to promote renewable energy sources, it is important to create a policy environment that enhances equal economic opportunities for women. This includes supporting government efforts to remove the legal, administrative and financial constraints on women's economic advancement as well as providing incentives for women's employment in the energy sector.

Measures can take the form of flexible policy options informed by local experience and consultation. This includes anti-discrimination laws, carefully designed quota-systems and targeted investments that help reduce wage gaps and gender-based job segmentation in the energy sector.

Women and men play very different gender-defined roles in energy production, distribution and utilization in households, communities and the market. Incorporating the contributions and concerns of women and men should help inform the appropriate policy reforms and should increase access to grid and off-grid electricity.

Source: *Gender and Energy*, 2012, United Nations Development Programme.

2 *Green Prosperity: How Clean-Energy Policies Can Fight Poverty and Raise Living Standards in the United States*, 2009, Pollin, R, Wicks-Lin, J. and Garrett-Peltier H., Department of Economics and Political Economy Research Institute (PERI), University of Massachusetts, Amherst, USA. Prepared under commission from the Natural Resources Defense Council and Green For All. <http://www.greenbiz.com/sites/default/files/document/Green-Prosperity.pdf>

The creation of an electricity grid with stable sources of energy is crucial for the confidence of local and foreign investors, who often view a stable energy supply as a minimum requirement for investment. For those living in rural areas beyond the current electricity grid, creating access to electricity will spur economic development and, in turn, further employment opportunities.

Some of the world's richest renewable energy resources lie in the developing world. Harnessing these resources – national energy assets comparable to reserves of oil, coal or gas – would provide investment, jobs and electricity for towns, cities and industries, and act as an important engine of growth for developing economies.



2. **Climate:** Scientific consensus holds that man-made carbon emissions are already changing the climate of the Earth in dangerous and unpredictable ways. According to the latest research, on current trends global temperatures will increase by at least 4°C during this century, an increase which the World Bank has described as 'catastrophic'.³ In its latest report, the International Panel on Climate Change (IPCC) stated that it is extremely likely that human influence has been the dominant cause of this observed rise in temperature.⁴ The International Energy Agency has calculated that, to keep global temperatures below the 2°C danger threshold, at least two thirds of currently proven reserves of coal, gas and oil must be left in the ground.⁵ Renewable energy development can make substantial contributions towards reducing carbon emissions without compromising access to energy.
3. **Energy security:** Countries without indigenous energy supplies are forced to import foreign oil, gas and coal, leaving them vulnerable to price shocks and dependent on the political goodwill of trading partners. This can result in budget deficits, public borrowing and fuel shortages when the supply is disrupted. Since reserves of fossil fuels are finite, their price will inevitably rise over the long term. By developing their country's domestic renewable resources, parliamentarians can build a long-term plan for access to inexhaustible energy, ensuring their country is less reliant on foreign sources of energy.

3 *Turn Down The Heat: Why a 4° C Warmer World Must be Avoided*, 2012, World Bank, Washington, DC, USA

4 *Climate Change 2013: The Physical Science Basis*, International Panel on Climate Change

5 *World Energy Outlook 2012*, International Energy Agency <http://www.iea.org/publications/freepublications/publication/English.pdf>

The projected impacts of climate change

On current trends, the planet will warm by around 4°C by the end of the century. Although the exact local effects of such an increase cannot be predicted with certainty, there is strong scientific consensus on the broad impacts.

Water shortages: Some regions will see a decline of over half of their water availability. Extreme droughts will increase in frequency by a factor of three, from once every 25 years to once every 8 years. Deserts will expand and agricultural land will become increasingly arid.

Food scarcity: Increased global temperatures and changing weather patterns will significantly change crop yields from agriculture. This could drive up food prices on global markets, resulting in severe shortages and the possibility of widespread famine.

Extreme weather: Periods of extreme heat, such as the 2010 Russian heat wave that killed an estimated 55,000 people, are projected to increase substantially. Tropical storms will become more frequent and more intense, like the 2007 cyclone in Bangladesh or the 2013 typhoon in the Philippines with death tolls in the tens of thousands.

Sea level rise: Sea levels will rise by around one metre, and possibly far more, by the end of the century. Coastal population centres such as Mumbai, New York, Shanghai, Kolkata and Ho Chi Minh City will be exposed to severe flooding; low-lying agricultural land will be threatened; and the national integrity of island nations and low-lying coastal states such as Bangladesh will be placed in serious jeopardy.

Disease: The epidemic potential of malaria will increase by a factor of four and its seasonal duration will increase significantly. Similar impacts can be expected for other insect- and water-borne diseases such as dengue fever, cholera and diarrhea.

Mass migration: Millions of people will be displaced, as some regions will be rendered effectively uninhabitable. Resettlement of such large numbers of people will place unprecedented social and economic strain on affected states; mass migration across borders could seriously destabilize international relations.

Climate change impacts will have a disproportionate effect on developing countries for a number of reasons, including geographical location, lack of capital to invest in adaptive measures, population size, over-stressed agricultural and water resources, and reduced access to healthcare, education and other social goods.

Source: *Turn Down the Heat: Why a 4°C Warmer World Must be Avoided*, 2012, World Bank, Washington, DC, USA

- 4. Health:** Developing renewable energy sources creates health benefits beyond the economic, security and environmental benefits. Six million people die annually from indoor and outdoor air pollution caused by burning fossil fuels and traditional biomass – more than from AIDS and malaria combined.⁶ Pollution from coal power plants cost the European Union (EU) five million lost working days in 2012, and shortened the lives of EU citizens by 240,000 lost life-years.⁷

Renewable energy, whether used on a mass scale to power whole cities or on a small scale to run a village mini-grid, can provide clean and safe energy without the considerable health impacts of fossil fuels. Even something as simple as providing access to a small amount of electricity to light homes can avoid the safety and health concerns of using kerosene.

B. Benefits of rural electrification

Electricity has had a profound impact on all areas of human existence. It can light and heat homes, facilitate cooking, power medical and manufacturing equipment, enable long distance communications, and forms an essential prerequisite of all modern trade and industry. Yet over 1.5 billion people still do not have access to the innumerable benefits that electricity brings.⁸ People without access to electricity are deprived of the benefits of potential economic and human development.

Communities without electricity often depend upon agriculture, subsistence farming, fishing and forestry for their livelihoods. Children in these communities have limited access to modern medical services, or light in the evenings to help them study. Women are often forced to travel many miles to gather firewood or dung for cooking fuel – fuel that, when burned indoors, creates toxic air pollution.



6 *A comparative risk assessment of burden of disease: A systematic analysis for the Global Burden of Disease Study 2010*, World Health Organisation, 2013: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(12\)61766-8/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)61766-8/fulltext)

7 *Silent Killers: Why Europe must replace coal power with green energy*, Greenpeace International, 2013: <http://www.greenpeace.org/international/Global/international/publications/climate/2013/Silent-Killers.pdf>

8 See www.sustainableenergyforall.org

Gender, climate and energy: The impact of sustainable energy on the lives of women in the developing world

Gender is closely interconnected with the challenges of climate change and energy usage. Recognition of the gendered face of energy poverty is growing. Women in most developing countries experience energy poverty differently and more severely than men: unequal gender relations curtail women's access to energy services and control over benefits, and limit women's ability to voice their energy concerns and participate in energy related agenda-setting and decision-making. Inadequate access to energy has profound effects for all, but especially so for women, often the main managers of household energy usage. In many parts of the developing world, a combination of traditional gender roles and lack of modern energy services mean that women, and sometimes children, must travel considerable distances to gather fuel and water for cooking. For households without access to electricity, household chores are limited to daylight hours, as is reading for schoolwork. In colder regions, fuel must also be collected for heating. Finally, the continued burning of traditional fuels in unventilated homes has serious health implications, the brunt of which is borne by women and girls.

Mainstreaming gender in energy policies and programming is good social policy and would enhance the efficiency of energy policies. Incorporating gender perspectives in energy projects, policy and planning is critical in ensuring the effectiveness not just of energy programmes and policies, but of all development activities that involve energy use. Low-carbon, renewable and energy-efficient technologies can make a dramatic improvement to women's lives, while simultaneously reducing greenhouse gas emissions. Off-grid renewable energy can be used to provide electricity in rural communities, for agricultural production and processing machinery, water pumps, communications technologies, and other equipment. This frees up women's time, expands their access to information and provides new employment and business opportunities. Examples of these technologies include solar photovoltaic panels, small hydro systems, small-scale wind turbines, and biogas digesters fuelled by local animal wastes.

Source: Gender and Environment and Energy, UNDP website, http://www.undp.org/content/undp/en/home/ourwork/womenempowerment/focus_areas/women_and_environmentalchange/

The lives of those living in these communities could be transformed by enabling access to electricity. This electricity can be generated from either fossil fuels or renewable energy. It is important to consider the costs and benefits of both forms of energy to ensure a community has access to a reliable source of energy.

Many rural communities in the developing world have access to at least one form of sustainable energy, be it strong sunshine for solar, a river for micro-hydro or reliable wind for a wind turbine. These resources can be harnessed to provide clean electricity, even in communities far from the national grid. Small-scale renewables can be deployed in 'mini-grids' which connect buildings, whole villages or even a group of villages into an efficient community-scale electricity network. Another major benefit of electricity generated from renewables is that the fuel for renewables is free, which can end the reliance on pollution-creating diesel generators that are expensive and leave villagers at the mercy of fluctuations in the price of fossil fuels.

C. Need for political leadership

In the coming years, renewable energy will transform economies the world over. Countries and communities that embrace the potential of new technology to bring the benefits of electricity to their citizens, while simultaneously reducing carbon emissions, will see their economies grow.

These goals cannot be achieved without political leadership. Making the transition will not be easy, but parliamentarians are in a unique position to take action. Ultimately, almost every law and every state budget must be approved by a parliament. Parliamentarians are the one group of people who have all the levers needed to act on the climate problem: they vote on laws, impose taxes and approve state budgets; they oversee the operations of government and have direct access to Ministers, Prime Ministers and Presidents; they can influence national policy, build strong legal frameworks, direct spending in new directions, and establish stronger policies and targets for action on climate change and renewable energy. In short, the transition to a post-fossil fuels world will benefit considerably from the support of parliamentarians ready to use their political capital for the promotion of renewable energy.



Sustainable Energy for All

World governments have set access to energy, particularly renewable energy, as a prominent goal to be achieved by 2030. The Sustainable Energy for All initiative (SE4ALL) has been endorsed by governments around the world, many of which are currently developing plans to provide sustainable energy to their citizens. Parliamentarians can use their role as political leaders to ensure these policies are implemented to benefit their constituents.

The Sustainable Energy for All initiative, led by an Advisory Board co-chaired by UN Secretary-General Ban Ki-moon and World Bank Group President Jim Yong Kim, is mobilizing action from all sectors of society in support of three interlinked objectives to be achieved by 2030: providing universal access to modern energy services; doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in the global energy mix.

The High Level Group on Sustainable Energy for All will mobilize commitments from governments, the private sector and civil society partners to take actions that will make sustainable energy a reality for all over the next two decades. As national political leaders, parliamentarians should not only be aware of this initiative, but also ensure their governments are accessing the technical advice and resources made available through SE4ALL.

For more information about this initiative, see www.sustainableenergyforall.org



Renewable Energy Recap: Why Renewable Energy?

Renewable energy technologies promote human development by stimulating economic development, mitigating climate change, contributing to energy security and providing important health benefits.

Why is energy so important, and how much energy do we use? To understand the numbers and measurements used in this How-To Guide, the following might help:

- Charging a mobile phone takes about 0.003 kWh.
- Powering an energy-efficient light bulb for one hour takes about 0.01 kWh; an old-fashioned filament bulb requires about 0.06 kWh per hour.
- Powering a small refrigerator for 24 hours takes about 1 kWh.
- The average household in Germany consumes about 3500 kWh every year.
- The average Indian household consumes around 900 kWh per year.

Watts (W) is a measure of the **rate** of electricity produced or consumed every hour. For the large numbers often involved in utility-scale electricity production, **kilowatts (kW)**, **megawatts (MW)** or **gigawatts (GW)** are used.

1 kW = 1000 W

1 MW = 1,000,000 W

1 GW = 1,000,000,000 W

Watt-hours (Wh) measure the **amount** of electricity produced or consumed over a specific period of time. To illustrate, some examples:

- Upon its completion in 2019, the Ouazazate Concentrated Solar Power project in Morocco will be the world's largest solar generator. It is rated at 500 MW, which means that every hour it will produce 500,000,000,000W or 500MW of power.
- The London Array – the world's largest off-shore wind farm – has a capacity of about 1000MW, enough to power half a million UK homes.

PARLIAMENTARY ACTION POINTS

Is your country currently meeting people's energy needs? To what extent has rural electrification been achieved, and is intermittency – the occurrence of regular power cuts – an issue?

To assist in understanding how your country is performing on these key indicators, parliamentarians can ask parliamentary questions and engage NGOs and other advocates that are promoting secure electrification. Research should help contextualize these questions to account for national or regional specifics, but the following 'model questions' may help:

- To what extent are we meeting the population's energy needs? What percentage of the population remains without secure energy access?
- Is intermittency an issue? If so, on what scale, and to what extent is this deterring economic development and investments?
- To what extent has rural electrification been achieved? In what region(s) do problems persist, and what solutions have been (or are being) proposed?
- What do projections indicate with regards to future energy demands? Will we be able to meet growing energy needs with our current generation capacity? How much added capacity do we expect to need, and what strategies are in place to secure this?

For more action points, consult the AGORA Climate Portal at www.agora-parl.org/climate.



D. Barriers

Energy created from renewable resources has considerable long-term economic and environmental benefits, and awareness is increasing regarding the short-term advantages of adopting renewable technologies. However, there are still barriers that have prevented deployment of renewable technologies from reaching the speed and scale required. Policymakers, including parliamentarians, must understand the challenges that have inhibited sustainable development, and use their positions and capacity to overcome these problems if their countries are to reap the benefits of sustainable energy.

Five key barriers have prevented full development of renewable energy as an alternative to energy derived from fossil fuels:

- 1. Economic barriers:** Electricity generation is measured in cost per kilowatt hour (kWh) or megawatt hour (MWh). Electricity from fossil fuels has historically been generated more cheaply than electricity from renewable sources.⁹ There are several reasons for this (some of which are discussed elsewhere in this How-To Guide). One key reason is that the upfront costs of constructing infrastructure and facilities to generate renewable electricity have been, until recently, significantly higher than the construction of generators that burn fossil fuels. Barring intervention in the market, an electrical utility will naturally commit to production methods that offer the lowest price per kilowatt hour, regardless of potential long-term price trends.

However, the cost to produce renewable energy has fallen dramatically in recent years thanks to technological breakthroughs and economies of scale, and continues to do so. Fossil fuels, on the other hand, are a finite resource, and their cost can only increase over the long term. If the negative external costs of burning fossil fuels, such as local environmental damage, health impacts and adaptation to climate change, could be taken into account as 'externalities', the apparent competitive advantage of conventional energies would largely vanish.

A second economic barrier is created by governmental subsidies for the extraction and use of fossil fuels.¹⁰ According to the International Monetary Fund, in 2012 subsidies for fossil fuels globally were worth \$1.9 trillion, which is equivalent to 2 percent of global GDP and dwarfing the \$88 billion of subsidies in support of

⁹ The noted exception is large-scale hydroelectric projects.

¹⁰ For more information on fossil fuel subsidy reform, see: *A guidebook to fossil-fuel subsidy reform for policy-makers in Southeast Asia*, by IISD, <http://www.iisd.org/gsi/fossil-fuel-subsidies/guidebook>

renewable energy.¹¹ These subsidies included reduced duties and royalties on the extraction of fossil fuels, price controls on the cost of petrol and electricity, and direct investment by governments in infrastructure used to extract and deliver fossil fuels for production.¹²

Six key ingredients for fossil fuels subsidy reforms:

- Comprehensive reform plan
- Far-reaching communications strategy
- Appropriately phased and sequenced price increases
- Improvements in efficiency of state owned enterprises (SOE) to reduce their fiscal burden
- Targeted mitigating measures to protect the poor
- Depoliticize price settings

Source: Stefania Fabrizio, PARE hearing, Morocco <http://learn.agora-parl.org/>.

See also: Energy subsidies in the European Union, http://www.eea.europa.eu/publications/technical_report_2004_1/

2. **Technical barriers:** Despite decades of research and development, technical barriers have prevented renewable energy sources from competing in the energy market.

One major technical issue has been the fact that some sources of renewable energy, particularly wind and solar, have variable rates of generation (given the variable access to wind and sun), thus preventing the delivery of a guaranteed and consistent rate of electricity. This phenomenon is known in the industry as intermittency. Output from these sources cannot easily be adjusted according to demand, unlike some fossil-fired power stations which can respond quickly to changes in the grid by simply burning more or less fuel or choosing how

11 *Energy Subsidy Reform: Lessons and Implications*, 2013, International Monetary Fund, <http://www.imf.org/external/np/pp/eng/2013/012813.pdf>

12 See also *Energy Subsidies in the European Union: A brief overview*, Technical Paper No 1/2004.



many power stations to operate. However, most intermittent energy sources such as wind and solar can be forecast 24 hours in advance. An extended network across a territory is the most appropriate response to absorb and manage the intermittent but predictable nature of renewable energy.

Another technical issue is known as ‘dispersal’, meaning that the best sources of renewable energy are often located far from urban population centres, where demand for energy is highest. For example, most technically feasible hydropower is located in mountain ranges. Since a generator’s distance from the end-user will increase the amount of energy lost to the system and the cost of grid infrastructure, there is a disincentive to develop renewable energy sources located in distant regions.

Recently, technical solutions to the problems of intermittency and dispersal have been developing rapidly. Electricity can now be efficiently transmitted over long distances using high-voltage direct current (HVDC) cables, with energy losses of only around 3 percent of power every 1,000km and less than 1¢ per kWh in additional distribution costs. These cables have already been deployed in China and India to link population centres with distant hydropower sources.

HVDC cables can also be used to consolidate renewable energy sources into regional ‘supergrids’ that use smart-metering technology¹³ to control and adjust grid power. For example, desert solar power could be linked with offshore wind turbines and hydropower from mountain regions. By integrating different sources of renewable energy from across a wide area into a single extended smart grid, variations in supply can be balanced out. HVDC cables allow renewable energy to be scaled up to power industries, cities or even whole countries.

3. **Policy barriers:** In many countries, legislation and policies regulating the electricity, heating and transport fuel markets have been the greatest barrier to development of renewable energy. Electricity markets are commonly operated by a monopoly, often a state-owned utility, that is in full control of generation, distribution and the sale of electricity to consumers. Studies have shown that where the electricity market is monopolized, the utility has little or no incentive to encourage development of electricity generated from renewable resources.

13 Smart metering technology involves installing ‘smart meters’ to measure, in real time or close to real time, the consumer’s electricity usage. Smart metering measures the amount of electricity used to inform the supplier exactly how much is used at what time(s); this then allows for the introduction of appropriate peak time tariffs and for the scaling up or down of electricity generation to maximize efficiency and minimize costs.

A related challenge is the bureaucracy that must regulate and approve development of electricity generation (or heating or transport fuel). Where there are numerous approval points in several government departments (and, in federal and decentralized states, more than one level of government), the cost of developing renewable energy increases substantially and the time involved is often a significant disincentive to its development. Development of on-grid renewable energy can be accelerated by ensuring that the policy and legal framework is fully coherent and the decision process is transparent.

4. **Community support:** Local political challenges must be addressed even where a government has fully endorsed the need to encourage development of renewable energy sources and has addressed economic and policy barriers to its development. As renewable energy development projects have proliferated in the past decade, some have encountered public opposition. It is important to ensure community 'buy-in' and, where possible, legal ownership of the development of renewable energy as a means of reducing opposition. Even a parliamentarian fully committed to the benefits of renewable energy will have those convictions challenged when faced with political opposition from constituents who do not expect to enjoy the benefits of such investments.
5. **Counter-lobbying:** Parliamentarians who push for adoption of renewable energy policies in their countries will likely encounter significant opposition from fossil fuel interests and their lobbyists, who are mostly well funded, well connected and powerful and are active in almost every parliament and government in the world. The future profitability of fossil fuel companies is threatened by climate change and the widespread development of renewable energy, and they spend considerable sums to protect their interests.



Energy efficiency: The other side of the coin

To avoid the worst impacts of climate change, carbon emissions must be reduced as quickly as possible. Replacing fossil fuels technologies with clean and efficient renewable energy is one way to do this. Energy efficiency comprises all the techniques and solutions to deliver the same amount of energy service with less resource. Energy efficiency is the indispensable, complementary tool to renewable energy. In the fight against carbon emissions, renewable energy and energy efficiency have been described as two sides of the same coin.

At the production level, for every 100 units of energy generated by a thermal power station, only one is typically put to use. The rest are lost as waste heat, light and noise. Using energy more efficiently would mean that we would not need to generate so much, which would in turn reduce the cost of renewables. According to the IEA, improved efficiency in buildings, transport and industry could reduce global energy needs by up to one third by 2050, thus helping to reduce emissions of greenhouse gases.

At the consumption level, numerous technologies contribute to energy efficiency, including more efficient light bulbs and appliances, thermal insulation, building design and waste recycling. A comprehensive overview of the various technologies and policies for saving energy is beyond the scope of this How-To Guide.

To learn more about energy efficiency, visit UN-Energy at www.un-energy.org



Renewable Energy Recap: Key barriers to renewable energy development

To successfully promote development of renewable energy, policy-makers must tackle some or all of the following key barriers:

Economic

- costs of production
- fossil fuel subsidies

Technical

- variable generation rates
- dispersed nature of renewable energy sources

Policy

- monopolized electricity markets
- bureaucracy

Lack of community support

Counter-lobbying

AN INTRODUCTION TO RENEWABLE ENERGY TECHNOLOGY

Renewable energy is a form of energy produced from a source that is naturally and constantly replenished. It is primarily used in one of three forms:

- **Generation of electricity:** Renewable resources are harnessed to generate electricity that is distributed for residential, commercial and industrial purposes;
- **Heating:** Whether created centrally or in a decentralized manner (in individual buildings), renewable resources, such as solar-heated water, can be used to directly heat buildings; and
- **Transportation:** Fuel for private vehicles, public transportation and industrial and commercial use, such as freight trains, ships and airplanes, can be generated from renewable resources.¹⁴

In the past decade, increased use of renewable energy has largely stemmed from electricity generation and traditional use of biomass. This How-To Guide attempts to capture 'best practices' in the field of renewable energy and primarily focuses on how governments have created a sound legal and regulatory space for the use of renewable energy sources to generate electricity. Heating and transportation are noted where appropriate, but these areas have been less a focus of government policy to date. If the world is to slow climate change by reducing carbon dioxide emissions, efforts also must be made to use sustainable sources of energy for heating and transportation.



¹⁴ Transportation can also be placed under the broader heading of 'mechanical energy'. In addition to transportation, pumping water is an important activity that demands mechanical energy.

A. Types of renewable energy

1. Hydro

Water is by far the most common and mature renewable source of energy. It has been used for centuries to generate power. More than 150 countries (77 percent) generate some amount of electricity from hydro, and it accounts for 16 percent of all electricity generated globally.¹⁵ Hydro produces a minimum of carbon dioxide emissions and, with an adequate source of water, can ensure a continuous source of electricity generation. If not developed in an environmentally sensitive way, however, hydro-generated electricity can lead to significant environmental disruption and socio-economic costs through construction and displacement from reservoirs, in particular when such projects are not well planned.¹⁶



There are different forms of hydro-generated electricity:

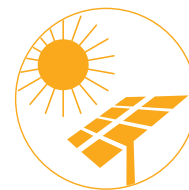
- **Run-of-river:** Power is generated by having water from an adequately flowing river turn turbines that generate electricity, without damming;
- **Dams:** Water from a river or other source is dammed and the electricity is generated when the water from the dam is used to propel turbines;
- **Small-scale and micro-scale hydro:** The technology traditionally used for large-scale electricity generation can also be used on a much smaller scale. 'Micro-hydro' can often be used to provide electricity to communities that are not close to the electricity grid.



¹⁵ As of 2010 in *Key World Energy Statistics 2012*, IEA, Paris <http://www.iea.org/publications/freepublications/publication/kwes.pdf>

¹⁶ World Commission on Dams: <http://www.internationalrivers.org/human-impacts-of-dams>. For a good review of the technical and political challenges of hydroelectricity, see the article in the 4 May 2013 edition of *The Economist* on the Brazil Belo Monte hydroelectric project: <http://www.economist.com/news/americas/21577073-having-spent-heavily-make-worlds-third-biggest-hydroelectric-project-greener-brazil>

2. Solar



Since ancient times, people have used the radiant heat of the sun to heat their homes and other buildings. In the past few decades, technology has been developed to actively convert energy from the sun into electricity and heat, and this technology is now being used on a much larger scale to generate significant amounts of useful energy. Currently, only a small percentage of electricity is generated using solar energy, but the installed photovoltaic (PV) generation capacity has grown from less than 1,000 MW in 2000 to over 70,000 MW in 2012.¹⁷

Solar energy can be deployed on a utility scale, with arrays of thousands of solar panels or mirrors feeding electricity into the grid, or on a small scale, with small roof-top installations providing electricity and hot water to an individual home. These home-based solar energy systems can provide enough energy to run household lighting, operate a refrigerator or other electrical goods, and recharge mobile phones.¹⁸

There are different methods of harnessing solar energy:

- **Solar heating:** The use of solar heat to warm water or the use of specific materials to heat or cool buildings. This process can also be used to desalinate salt water and treat wastewater. Solar energy can also be used to power cookers and stoves in homes.
- **Solar power:** The conversion of solar energy into electricity by one of two means:
 - **Concentrated solar power** (CSP) where mirrors are used to concentrate solar energy in order to generate heat to boil water and drive a steam turbine, generating electricity;
 - **Photovoltaic** (PV) where cells or panels convert light directly into electricity. This type of solar energy is also common in small-scale electricity development, for mini-grids and individual homes.

Traditionally there have been two challenges preventing expansion of solar energy. First, early off-the-shelf PV units were sensitive to local climatic factors, such as extreme temperatures, humidity level and sand, which could reduce their output of energy. Recent technical progress in designing more resilient solar panels means units can remain efficient even in difficult conditions.

¹⁷ European Photovoltaic Industry Association, <http://www.epia.org>

¹⁸ For example, see this UNEP programme in India: <http://www.unep.org/unite/30ways/story.aspx?storyID=17> or the use of solar for homes in rural Bangladesh: <http://www.reuters.com/article/2011/05/16/us-bangladesh-solar-idUSTRE74F3GR20110516>

Second, during the early stages of solar development, the cost of creating electricity from solar panels was significantly higher than other forms of energy. Over the past decade technical improvements have reduced the cost significantly¹⁹, to the point where the development of mass-scale PV solar generating plants is viable and being carried out. Utility-scale wind and solar are already outcompeting fossil fuels on price in some countries and, by 2020, utility-scale solar could be cheaper than gas-fired power in all the key markets around the world, including China, Germany, India, Russia, the United Kingdom and the United States.²⁰

3. Wind

Wind has been used as a source of energy for centuries, whether to power sailboats or turn traditional windmills in farming. By the end of 2012 there were over 200,000 wind turbines operating globally, with a total installed capacity of 282.5 gigawatts (GW).²¹ While this is only a small percentage of all electricity generated, it makes electricity generated by wind energy one of the leading sources of new electricity generating capacity. Some countries have invested heavily in the use of wind. Denmark, for example, now produces 35 percent of its electricity from wind turbines.



One challenge with wind power is that it is not a stable source of electricity generation, as the rate varies depending on the strength of wind moving the turbine at any given time. Wind can be a valuable component in a broader plan for electricity generation and is often paired with other renewable energy sources.

Another recent challenge for wind energy has been concerns raised by residents who reside near wind turbines. However, offshore wind power generation has grown rapidly, with the United Kingdom being at the forefront, eliminating some of the political challenges faced by land-based turbines and allowing access to the stronger wind resource that is available offshore.

As with photovoltaic cells and solar energy, the cost of wind power technology has decreased significantly in the past decade, making wind energy cost-competitive (or close to cost-competitive).²²

19 See <http://phys.org/news/2013-04-german-bank-solar-power-india.html>

20 "A longer-term global energy investment strategy driven by changes to the energy mix", CitiGroup Research, 2013: <https://ir.citi.com/586mD+JRxpXd2OOZC6jt0ZhjqcxXiPTw4Ha0Q9dAjUW0gFnCIUTTA==>

21 2012 Global Wind Report http://www.gwec.net/wp-content/uploads/2012/06/Annual_report_2012_LowRes.pdf

22 See "Wind Turbine Prices fall to the Lowest in Recent Years", 7 February 2011, Bloomberg New Energy Finance, <http://bnef.com/PressReleases/view/139>

Darling Wind Farm: Opening the door for wind energy in South Africa

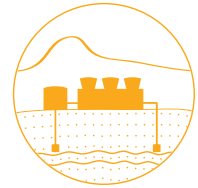
The South Africa Wind Energy Programme (SAWEP), launched in 2007 to promote wind power and reduce carbon emissions, illustrates how a small programme can open the door for continued renewable energy development.

With the support of UNDP-GEF, SAWEP facilitated the establishment of the Darling Wind Farm at a time when wind energy was new to South Africa and institutional arrangements were not yet in place for independent power producers to feed energy into the grid. Following successful completion of phase 1 in 2010, South Africa moved beyond the programme's initial objectives and issued a tender for 2000 MW of wind energy to be generated by independent power producers over a five year period. If these projects develop according to plan, the amount of electricity generated will be 40-fold the original project target.

For more information, see http://www.energy.gov.za/files/sawep_frame.html

4. Geothermal

The core of the earth is much warmer than its surface. The heat in the core is conducted through rock and minerals, heating underground water reserves and turning that water into steam that can drive turbines to generate electricity. In some locations, steam from underground water naturally reaches the surface of the earth to create geysers, allowing for a fairly inexpensive and non-invasive process of harnessing the energy.



Where heated water does not naturally reach the surface of the earth, it may still be close enough to the surface to allow access through drilling. Even where there is no hot underground water, geothermal energy can be created by drilling a hole for input of water into the heated rock, which is then turned into steam and released through a second output hole to allow for electricity generation.



Strategic partnership for advancing geothermal energy generation in Chile

Chile, with its long volcanic chain in the Andes Mountains, is considered one of the world's most promising locations for geothermal energy generation, and the country was among the pioneers in studying this energy source. The University of Chile estimates that nearly the entire national capacity for electricity production could be covered by geothermal sources. Since Chile currently imports fossil fuels to meet approximately 70 percent of its energy needs, developing geothermal energy would strengthen national energy security. Yet, a lack of incentives for generating investment in this sector has hindered the development of renewable energy.

In order to overcome financial hurdles, Chile has established a strategic partnership with New Zealand, a country that already generates 15 percent of its electricity from geothermal sources and has strong technological and scientific geothermal expertise. On 14 October 2013, President Pinera signed a new bill committing Chile to reach a renewable energy share of 20 percent by 2024, moving decisively beyond the original 10 percent target.

Source: *Chile Looks to Volcanoes and Geysers for Energy*, Inter Press News Agency, May 8, 2013 http://www.ipsnews.net/2013/05/chile-looks-to-volcanoes-and-geysers-for-energy/?utm_source=dlvr.it&utm_medium=twitter

Source: *Chile doubles renewable energy goal to 20 to spark new projects*, Bloomberg, October 13, 2013 <http://www.bloomberg.com/news/2013-10-14/chile-doubles-renewable-energy-goal-to-20-to-spark-new-projects.html>

5. Ocean

For decades it has been recognized that in theory, kinetic energy created from the movement of the ocean can be harnessed to create electricity. This form of renewable energy is still largely in the experimental stage, but does hold potential. There are two principal methods of generating electricity from the ocean:

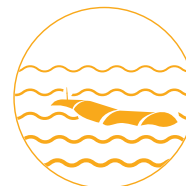
■ Tidal power:

- **Tidal stream** technologies are similar to run-of-the-river hydropower but use ocean water. Turbines are placed in a location where the tide will naturally flow through them to generate electricity.
- **Tidal impoundment** is similar to conventional hydro dams. Incoming tidal seawater is impounded and electricity is generated when this water enters and/or is released from the impoundment. Though recognized as a potential source of energy and power generation in the



early part of the 20th century, tidal power has been limited by the high cost of production and limited locales where there is sufficient tidal range and velocity. Newer methods are being piloted to expand the viability of this method.

- **Wave energy:** Waves contain considerable amounts of untapped energy; however, harnessing that energy has been a technical challenge. There are a number of ways of turning wave energy into electricity, including the use of pistons that are placed perpendicular to the waves, and oscillating systems that use waves to push water through turbines to generate electricity.



6. Bio-energy

In general, the term 'bio-energy' refers to using organic materials – plants or animal waste – as an energy source. However, the field is subject to ongoing confusion and controversy, and care should be taken to distinguish the different sources and techniques used to create biomass energy.



- **Traditional biomass:** Accounting for around 10 percent of all energy consumed on the planet, traditional biomass is the burning of wood, plant matter or animal waste in order to heat homes and cook food. If the biomass is obtained from sustainable sources – such as a well-managed forest or bagasse from sugar cane production – it can be considered a renewable form of energy. However, most traditional biomass fuel is not sustainably sourced and thus contributes to the degradation of local ecosystems. Burning traditional biomass for cooking and heating generates considerable amounts of indoor air pollution, with serious negative health impacts, particularly on women and children, who spend the most time near the domestic hearth.
- **Biogas:** Biogas is produced by fermenting biodegradable materials such as animal manure or plant waste. Biogas can be used to heat homes and fuel cook stoves just like natural gas. The technology needed to produce biogas is simple, long lasting and cheap, and can be deployed with relative ease in small rural communities to turn organic wastes into a clean, renewable fuel source. However, it should be noted that this technology requires considerable maintenance and has not yielded positive results in all countries. Provided that the biogas produced from landfill waste is fed into the gas grid, or in China, where biogas digesters have been promoted as much for public health benefits (removal of waste) as for energy.



- **Biofuels:** The term 'biofuels' refers to the practice of growing crops solely to be used in the production of energy, usually for transportation fuel. For example, corn or sugarcane can be used to make bioethanol, while biodiesel can be made from vegetable oils and animal fats.

Biofuels have several advantages. Unlike other renewable energy sources, organic matter can produce fuels that can be mixed with petrol to power road transport. In recent years, however, growing crops for biofuels has generated significant controversy as it can divert agricultural land away from food production, thus contributing to crop shortages, driving up food prices and exacerbating global hunger. Several studies question whether biofuels, especially corn-to-ethanol production, are less carbon-intensive than fossil fuels, as they contribute to indirect land-use change, deforestation and slash-and-burn agriculture, which are all significant sources of greenhouse gases.²³ Despite the many current issues with biofuel production and use, recent developments have started to address some of these first generation biofuels challenges. Second generation biofuels with cellulosic materials and development of new biofuel crops offer much less antagonism with food production.



- **Electricity from agricultural waste:** Unlike biofuels, which often compete for land and resources with food production, a wide range of agricultural waste products which are otherwise usually discarded can be burned to generate electricity.²⁴ A leading pioneer in this field has been Mauritius, which introduced a strong policy framework to encourage farmers to use bagasse (waste organic matter from sugarcane production) to power generators that feed electricity into the country's national grid. In off-grid areas, some plants previously considered weeds such as *Jatropha* can be used to make alternative fuels to power diesel generators, though when they are cultivated expressly for this purpose they can present some of the same drawbacks as biofuels.

23 **Indirect land-use** changes can overcome carbon savings from biofuels in Brazil, David M Lapola et al, Proceedings of the National Academy of Sciences, February 2010, 107(8): <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2840431/>

24 Agricultural wastes are not without potential issues. While many agricultural wastes are burned, many wastes are used as soil conditioner and fertilizer; diversion of these wastes to generate electricity can lead to soil deterioration and/or a greater dependence on (energy-intensive) artificial fertilizers.

Renewable Energy Recap: What is renewable energy?

Renewable energy is a form of energy produced from a source that is naturally and constantly replenished. The various sources of renewable energy discussed in this How-To Guide include:

Hydro

- dams
- run-of-river / small hydro

Solar

- solar heating
- concentrated solar power (CSP)
- photovoltaic (PV) panels

Wind

Geothermal

Ocean

- tidal energy
- wave energy

Bio-energy

- traditional bio-energy
- biogas
- biofuel

PARLIAMENTARY ACTION POINTS

Has your country taken steps towards renewable energy development, or does it continue to rely primarily on traditional fossil fuels? Does it have a strategy or action plan in place for development of its renewable energy potential?

To assess where a country stands with regards to such indicators, parliamentarians can ask parliamentary questions. The following 'model questions', contextualized to account for local needs and circumstances, may help:

- What percentage of the current energy creation is generated through renewable energy technologies?
- What research has been done to explore the potential of renewable energy development? What does this research project in terms of potential generation capacity, costs and so on?
- Is an action plan in place for development of renewable energy technologies?
- Have official renewable energy targets been adopted? Can these targets be reached in the timeframe set?

The potential for renewable energy development often differs from region to region within a single country; as a consequence, support for such initiatives may be localized.

Parliamentarians, as representatives of the people, can engage citizens on the issue of renewable development by:

- **Consulting constituents.** Explore where your constituents stand on this issue, and what kind of local support exists. Are people aware of the potential of renewable energy development for their region? If not, what can be done to educate them with regard to the benefits of renewable energy? Is there a preference for a certain type of technology? Do people feel it could make a tangible difference to their daily lives and economic opportunities?
- **Learning.** The more familiar you are with the subject, the better you will be able to promote it in your constituency and in parliament. You can review government and committee reports on energy, liaise with energy specialists, including those within your parliament and within the relevant government departments, and consult experts who could offer you the necessary technical support.
- **Engaging civil society organizations.** CSOs working on renewable energy development, energy access and so on may, through their own research and advocacy on the subject, have already done a lot of legwork. You could take on their suggestions with regard to pilot projects or potential developments, and use their invaluable help to build local support.

For more action points, consult the AGORA Climate Portal at www.agora-parl.org/climate.

B. Developing electricity grids

Moving beyond the different types of renewable energy, the choice of electricity grid can go a long way towards facilitating generation and distribution of electricity from renewable sources. The four options described below each come with particular characteristics and benefits, pertaining mainly although not exclusively to geographical reach. While some can be implemented locally, others will be more suitable for development at national or multi-national level.

1. Smart grids

The term 'smart grid' refers to an electricity distribution system (a grid) in which modern information communication technology (ICT) is applied to maximize the efficient generation, distribution and usage of electricity. This includes use of data and information collected from users and generators to ensure a reliable and consistent flow of electricity.

Smart grids have many potential advantages. First, smart grids allow for decentralization of power generation. This may include net metering²⁵, where individual consumers of electricity can allow for the two-way flow of electricity so that the excess energy they generate flows back into the grid. Second, a smart grid can ensure that the national grid is making the most efficient use of its energy resources. Where different types of renewable energy are integrated into the same grid, smart metering can manage intermittencies of supply, and ensure that the cheapest and most efficient form of energy is being used at any one time. Third, through modern appliances and devices in buildings and homes, a smart grid can intermediate between the distribution system and the end-users to curtail usage during peak electricity use.



2. Supergrids

A supergrid is an electricity distribution grid that covers a very large geographical area, such as a multi-national grid (e.g. European Super Grid) or national grid (for larger countries such as China, India or Russia). It may even include countries on different continents. A key feature of a supergrid is that it enables the entry of numerous and

²⁵ Net metering is an electricity policy for consumers who own renewable energy facilities (such as wind power and solar power), and allows them to use generation whenever needed, instead of just when generated. It can also be applied on 'non-smart' grids.

geographically dispersed sources of electricity that can be fed into the grid to provide electricity to consumers. The larger the spatial area covered by the grid, the greater the diversity of sources of renewable energy that can be integrated, thereby smoothing out intermittencies and dispersed nature issues associated with any one source. It also allows surplus electricity (e.g. from wind farms) to be exported to neighbouring countries rather than simply switching off the supply.

Systems used to distribute electricity over such distances require considerable investment in infrastructure, and the use of recent technologies such as HVDC interconnectors. However, the energy security and stability that comes from having numerous sources of electricity fed into the same system is a powerful advantage.

Campaigning for supergrid funding at the European Parliament

In June 2013, Members of Parliament (MEPs) from the Climate Parliament group in the European Parliament succeeded in their campaign to guarantee EU funding for regional electricity interconnectors to link up Europe's renewable resources into a supergrid. The MEPs proposed amending the budget in the new Connecting Europe Facility (CEF) to devote the budget strand primarily to electricity highways rather than gas pipelines. Earmarked funding such as this is crucial to ensure adequate investment in the electricity infrastructure needed to support development of European renewable energy resources.

As a result of their efforts, at least €2.5 billion of the €5.1 billion is to be devoted to energy connections and will go to electricity links, not gas pipelines. This guarantees significant investment for electricity interconnectors that could link up European wind, sun and hydro energy into a regional supergrid – but there is still considerable investment needed in grid infrastructure if Europe is to complete the transition to a clean energy supply.

For more information on the work of the Climate Parliament, see <http://www.climateparl.net/cp/361&lang=en>.

3. Off-grid

Off-grid systems are those that produce electricity for one or more buildings within a small geographical area. This option is particularly relevant for those living in remote communities where extension of the electricity grid would not be cost-effective.

There are two principal methods of generating electricity off-grid: (a) individual homes and buildings can generate electricity for their own use; and (b) a mini-grid can be developed, based on small-scale renewable energy resources such as a small hydroelectric plant or a small-scale solar farm, which feeds electricity to the households of a village or other localized community.

Governments can promote the use of renewable energy appliances, such as home power systems that can generate electricity, light or heat for use in the home. Standalone solar photovoltaic technology in particular is becoming increasingly accessible due to the rapidly-falling price of PV panels. They may be placed on rooftops or other sunny places and used to charge batteries to which a range of appliances can later be connected, or small PV panels may be directly integrated into appliances such as lamps, radios or mobile phone chargers. This enables low-income households to reap the benefits of electricity access even where there is no immediate prospect of any kind of grid connection.

Solar lamps in particular have a large impact on human development as they lessen pollution from kerosene lamps, enable students to study after dark, and usually reduce costs to families by eliminating the purchase of expensive kerosene oil. Solar energy systems can heat water, meet cooling energy demands and generate power for lighting.



Off-grid solar home systems in Bangladesh prove a successful and sustainable business model

The case of Grameen Shakti in Bangladesh shows that providing off-grid renewable energy technologies in the developing world can be a booming success. The company has installed over one million solar home systems (SHS) in the rural areas of Bangladesh. In addition to bringing access to energy and improving standards of living for over 8 million people, the SHS system has replaced kerosene lamps and thus reduced CO₂ emissions substantially. The company provides a financial package based on installment payments, reducing the high upfront costs of the renewable technologies. The company seeks to employ female engineers and technicians and is focused on local production, providing jobs and generating income in rural areas.

For more information about Grameen Shakti, visit the website www.gshakti.org

4. Mini-grid systems

Mini-grids²⁶ connect a cluster of buildings, a small community or, in some cases, a group of communities over a small geographical area to a sufficient renewable resource such as a river²⁷, significant wind, biofuel²⁸ or solar²⁹. This allows for building a small-scale generation plant that can provide electricity to consumers.

A mini-grid is an isolated distribution network, usually operating only at a low voltage and providing electricity supply to a target community, village or town. This may involve private companies, cooperatives or membership groups that supply electricity or electric services at the village or regional level. In this arrangement, the private investor or group of investors (in some cases this is the government) finance and own the mini-grid system. Depending on the terms of the business transaction or group membership, the owner or manager of the mini-grid invoices the customer either on the basis of the volume of the power consumed (e.g. kilowatt hour) or through a lump-sum payment calculated according to the estimated load of the service provided (e.g. the number of lamps or outlets).

26 For a review of mini-grids and the policy challenges in their development, see Parliamentarians' *Toolkit for Mini Grids*, 2010, UNDP and Climate Parliament <http://www.climateparl.net/cpcontent/pdfs/Mini-Grid%20Pack%20-%20Parliamentarians'%20Toolkit.pdf>

27 For examples of micro-hydro mini grids, see the *Mini Grid Toolkit Field Study Report*, UNDP and Climate Parliament, 2010, Nairobi, Kenya <http://www.climateparl.net/cpcontent/pdfs/Mini-Grid%20Pack%20-%20Fieldwork%20Report.pdf>

28 See an example from Fiji on page 15 of *Pacific Island Experiences with Mini Grid Systems: A Toolkit for Legislators*, 2009, SOPAC, Suva, Fiji http://ict.sopac.org/VirLib/TR0427_Mario.pdf

29 See the Samoa Mini Solar Grid developed on Apolima Island at Ibid, page 11

Mini-grids change lives in remote Indian villages

In the village of Udmaroo in the Ladakh region of Jammu and Kashmir State, the community organized itself to install a micro-hydro electric generation system. The community is virtually cut off from the rest of the country, with limited opportunities for employment and low accessibility to markets. The system provides electricity for the village for eight months a year (when the river is not frozen) and the local residents have been trained on its operation. This access to electricity has also resulted in a small industry of oil extraction that is managed and operated by women in the village, offering them an opportunity for economic and, in turn, political empowerment from this new role.

The village of Durbuk, also in the Ladakh region, installed 1360 PV solar panels to create a mini-grid for the village. Development and maintenance of the mini-grid came from a community-owned non-profit company that was established to build the system, which replaces the much more costly diesel generator that had caused health concerns from the pollution. The community's 347 homes receive continuous access to electricity. As a result of the success in this project, the community-owned company has expanded to provide micro-credit to local small businesses as well.

Source: Boyle & Krishnamurthy, *Taking Charge: Case Studies of Decentralised Renewable Energy Projects in India*, Greenpeace, 2011 <http://www.greenpeace.org/india/Global/india/report/2011/Taking%20Charge.pdf>

Mini-grids offer a number of advantages:

- They provide an opportunity for a relatively low-cost, community and/or private-sector driven approach to rural electrification;
- They allow a combination of different sources of electricity – such as wind, solar PV, micro-hydro and biomass electricity – to feed into the same network, achieving high security of energy supply;
- Since energy is generated and used locally, losses associated with transmission over long distances are minimised, making the mini-grid a more efficient option for remote areas;
- Mini-grids can easily address operational, maintenance and administrative challenges that usually hinder the extension of the central grid;
- Renewable energy based mini-grid projects often keep money in the local area, boosting the local economy. They support community regeneration by providing social-economic benefits such as jobs for the local

population and opportunities for productive uses of energy in local micro-enterprises (e.g. agro-processing, carpentry, welding, tailoring, etc.), thus supporting income-generating activities;

- By supplying electricity to local institutions such as health centres and schools, mini-grids enable rural communities located far away from the national grid access to improved health and education services.

Renewable Energy Recap: Developing electricity grids

As development of electricity distribution systems or 'grids' improves access to electricity from renewable sources, it serves to encourage generation and distribution of energy from those sources. Four types of electricity grids can be developed:

- **Smart grids** apply ICT to maximize the efficient generation, distribution and usage of electricity.
- **Supergrids** cover a very large geographical area, enabling the entry of numerous and geographically dispersed sources of electricity to provide electricity to consumers.
- **Off-grids** produce electricity for one or more buildings within a small geographical area not on the national grid.
- **Mini-grids** connect a small geographical area to a renewable energy resource such as a river, significant wind, biofuel or solar.

PARLIAMENTARY ACTION POINTS

What type of grid could best meet the electricity needs of a country, region or community? Is the technology required to build smart grids available and affordable? Are mini-grids a more efficient and reliable solution for certain remote areas than a (costly) expansion of the national grid? Is there national and international support for a supergrid?

Such decisions require technical expertise beyond the scope of your work as a parliamentarian, but parliamentarians can push forward this process by taking a number of actions:

- **Commissioning research and impact studies.** Research and impact studies can go a long way towards convincing your fellow parliamentarians, and relevant government officials, of the potential of renewable energy development. Such studies should always be gender-sensitive and should carefully assess the impact on vulnerable groups such as minorities, indigenous peoples and youth.
- **Considering best practices.** With renewable energy development significantly on the rise, countless examples exist for governments to draw on. With the assistance of CSOs, experts and parliamentary networks, parliamentarians can collect pilot projects and best practices that might be replicated in their own countries and constituencies.
- **Employing Constituency Development Funds.** Several parliaments offer individual parliamentarians a 'Constituency Development Fund' to use at their own discretion. Where such funding is available, parliamentarians could launch pilot projects to meet local energy needs and launch discussion debate on renewable energy development.
- **Initiating cross-party cooperation.** Parliamentarians achieve more when working together than when working independently. Beyond working on a dedicated Energy or Development Committee, you could join forces with like-minded peers to facilitate parliamentary support for renewable energy development.

For more action points, consult the AGORA Climate Portal at www.agora-parl.org/climate.

THE REGULATORY FRAMEWORK

Renewable investment is best catalysed through implementation of well-designed policies that create robust and transparent regulatory frameworks, deploy incentives for investment, and entrench long-term targets for renewable energy generation. The design of such a framework is largely in the hands of the government, which works to identify the principal targets, outline key policies and put in place the required technical, regulatory and financial regulations.

Parliamentarians have many tools at their disposal to help shape these frameworks and oversee their implementation. In addition to reviewing and approving the proposed policies, parliamentarians can advocate for conducive measures that will facilitate and encourage renewable energy development, ensure citizens' needs and demands are heard and reflected, and call on the relevant departments or ministers to account for execution of measures parliament has approved.

For more detailed information and tips on parliamentary action, please turn to Part Four of this How-To Guide.

A. Financing renewable energy projects

This section explores the most prevalent sources of funding governments can turn to for financing renewable energy projects. Implementing renewable energy projects requires significant upfront costs, as discussed earlier in this How-To Guide. Given that the cost of the energy itself (wind, sun, water) is minimal in most cases, the vast majority of long-term costs related to accessing energy, and generating electricity and heating from that energy, is front-loaded. If a country is to significantly reduce its reliance on energy from non-renewable sources, major investments in generation and transmission infrastructure will have to be made, the cost of which may run into billions of dollars.³⁰

30 A further major barrier for investment in many countries is the absence of an independent court system that can enforce clear, predictable rules and protect investor's interests if necessary. While beyond the scope of this How-To Guide, policy makers should consider the important role of the judiciary in the successful promotion of renewable energy development, especially where large-scale (and therefore high-investment) development are being considered.

1. Private finance

In order to build renewable energy capacity on a mass scale, private sector investment is necessary as most governments are unable or unwilling to cover the costs of construction of generation and distribution infrastructure. Historically, private financiers have been hesitant to invest in renewable energy projects because they were seen as high risk (meaning they thought there was a strong likelihood that they might not obtain a return or profit from their investment).

There are several reasons why private investors have traditionally seen renewable energy as risky. First, renewable energy is a relatively new proposition, and is not yet considered a 'mature' technology (with the exception of hydropower). Since investors like to base their decisions on past performance, the relatively short history of renewables means there are less data to assess, and thus a higher perception of risk.

Second, given the large upfront capital costs of building renewable infrastructure, investors need to have some assurance that the electricity generated will find a buyer willing to pay an appropriate price. They want to have some legal assurances that electricity utilities, which are often monopolized and owned by the state, will be required to buy electricity generated by independent power producers (IPPs).

Third, private investors need to be confident that the regulations and policies governing the renewable energy industry are stable and unlikely to change over the short to medium term. Investors want to see laws passed by parliament that entrench policies and incentives that encourage and support renewable energy. They also want to know that policymakers are fully committed to this new industry. Ideally, investors want guarantees that, even with a change of government, the commitment to renewable energy will not waiver. Policy stability is crucial. For example, Spain recently saw a dramatic collapse in renewable investment after tinkering with its national incentive schemes.

Finally, private funding is more likely where investors have some confidence that the regulatory approval process has been streamlined or simplified, reducing the number of potential approval points that could result in the delay or even the rejection of a project.



Spanish government sued for withdrawing national incentives

Following significant changes in Spain's renewable energy regulatory framework, several companies have filed lawsuits against the Spanish Government. The new framework, in place since January 2013, establishes feed-in tariffs and taxation provisions that are in sharp contrast with the original (much more investment-friendly) regulations. As a result, investors now face a significant decrease in revenues from the renewable energy sector.

Source: Abengoa and Acciona file lawsuits against Spain's government changes in renewable energy regulatory framework, May 30, 2013 <http://www.csp-world.com/news/20130530/00966/abengoa-and-acciona-file-lawsuits-against-spain-s-government-changes-renewable>

Private funding can be provided in a number of formats. Chief amongst these are equity and loans. **Equity** is the direct investment in a project or company that is developing a renewable energy project with the anticipation that investment will be returned in full with, in addition, a share of any profit or excess return made from the project or company.

Loans are offered in various forms. The simplest one takes the form of a structured loan from a financial institution. Alternatively, a company can seek to raise funds through **bonds**, which are debt securities in which the debt issuer (i.e. a company or group that wishes to develop a renewable energy project) guarantees to pay the bondholder (i.e. the person providing the funds) the full value of the bond on a future date plus interest that is accrued. In recent years, in response to demand, special climate bonds have been developed specifically for investment in renewable energy projects.³¹ These are investor-grade bonds that provide a sense of security to investors while ensuring the funds are directed to renewable projects.



31 See this summary of Climate Bonds for more details: http://climatebonds.net/wp-content/uploads/2009/12/ClimateBonds_4pp_Sept2012.pdf

2. Public finance

Public financing alone will never be sufficient to ensure that renewable energy is developed on the mass scale required to significantly reduce dependence on fossil fuels. However, if used properly, public funds can leverage considerable private investment, sometimes up to twenty times the value of the initial public investment.³² Many different financing mechanisms have been deployed to catalyse private investment in renewables, but there is a need for further innovation in this area.

There are several key sources of public finance:

Grants: Governments, through the annual state budget passed by parliament, can choose to directly fund renewable energy projects. This is particularly beneficial where a specific source of renewable energy has not yet been developed in a country and the costs of its development may otherwise be prohibitive. Grants allow private investors to see commitment from the government while at the same time have data upon which to measure their potential costs with regard to an investment.

Loans: Where private investment is hard to find at a cost that makes a project viable, a government can provide a loan to a renewable energy developer. Such a loan would most likely be at a much lower interest rate than those from commercial lenders, as the government can set the rate at which it loans funds. If necessary, it can borrow funds from the private bond market at significantly less cost than those incurred by a private company.

Loan guarantees: Rather than directly lending money to a developer, a government can agree to act as a guarantor on a loan made by a private institution, such as a bank. If the borrower defaults, the government will then repay the debt to the bank. A loan guarantee does not leave the government out of pocket, unless the developer defaults on the private sector loan, but the guarantee does allow the developer to borrow required funds at a much lower rate of interest.

Tax incentives: If a government is committed to development of renewable energy it may be willing to use its tax laws to waive certain levies for parts and services that are used to develop the infrastructure required. For example, the government may lower or waive construction tax for large-scale renewable energy projects, thereby significantly reducing the upfront costs of the developers.

32 *Improving the Effectiveness of climate financing: a survey of leveraging methodologies*, Overseas Development Institute et al, 2011, <http://climatepolicyinitiative.org/wp-content/uploads/2011/11/Effectiveness-of-Climate-Finance-Methodology.pdf>



International assistance: In addition to any funding provided by a government, a plethora of grants and low-cost loans is available from bilateral donors³³, multilateral organizations³⁴ and development banks³⁵. Such funding can be used to build small-scale projects, to provide technical assistance to governments or can be a component of a larger project in conjunction with private financing, leveraging private finance in the same manner as government spending. The provision of such funding can help provide some assurance to private investors as they consider investing in such projects.^{36, 37}

3. Consumer financing

Consumer cost implications must also be considered with regard to funding the development of renewable energy. Many policy options discussed in this How-To Guide may involve the transfer of extra costs to consumers. Parliamentarians must be aware of this fact, for they will hear from their constituents if and when their electricity bills increase. As a policymaker who is directly accountable to consumers, a parliamentarian needs to find a set of policies that encourage the development of renewable energy while ensuring the burden imposed on the average citizen is minimized.

However, energy will inevitably become increasingly expensive in the future. Over the medium to long term, only renewable energy is likely to see a reduction in costs.

33 For example, USAID, DfID, SIDA and JICA

34 For example, UNDP and GEF. A list of potential programmes and funds managed by UN agencies is available on the website for this How-To Guide at <http://www.agora-parl.org/>

35 For example, the World Bank, Asia Development Bank or the African Development Bank

36 See analysis of the impact of ODA on catalyzing the development of renewable energy in *Derisking Renewable Energy Investment*, UNDP, New York, USA, 2013. http://www.undp.org/content/undp/en/home/librarypage/environment-energy/low_emission_climateresilientdevelopment/derisking-renewable-energy-investment/

37 For a recent summary of private investment in renewable energy, see *Renewables 2013 Global Status Report*, REN21, <http://www.ren21.net/gsr>

Renewable Energy Recap: Financing renewable energy projects

Policy-makers can finance renewable energy projects, whether small-scale or large-scale, through a combination of the following mechanisms:

- private finance: equity, loans, bonds
- public finance: grants, loans, loan guarantees, tax incentives, international assistance
- consumer financing

For more information on how to drive renewable energy investments, take a look at the following UNDP/GEF publications:

Transforming On-Grid Renewable Energy Markets (2012) provides an overview of UNDP-GEF's extensive work supporting the development of national renewable energy regimes based around feed-in tariffs. In these activities UNDP-GEF assists developing countries to assess key barriers and risks to technology diffusion, and then to identify a mix of derisking instruments and incentives to remove these barriers and to drive investment. http://www.undp.org/content/undp/en/home/librarypage/environment-energy/low_emission_climateresilientdevelopment/transforming-on-grid-renewable-energy-markets/

Derisking Renewable Energy Investment (2013) introduces an innovative framework to assist policymakers to quantitatively compare the impacts of different public instruments to promote renewable energy. The report identifies the need to reduce the high financing costs for renewable energy in developing countries as an important task for policymakers acting today. The framework is structured in four stages: risk environment, public instruments, levelized cost evaluation. http://www.undp.org/content/undp/en/home/librarypage/environment-energy/low_emission_climateresilientdevelopment/derisking-renewable-energy-investment/

B. Creating a policy framework for renewable energy

The challenges in financing and developing renewable energy systems have been known for some time, and many countries have developed policies and laws that attempt to overcome them. If renewable energy is to be developed on a mass scale, private sector financing will be required. Such financing can be encouraged through use of financial instruments such as loan guarantees or bonds, and through use of public derisking instruments.³⁸

In addition to securing the required financial investments, building a robust policy framework is an important prerequisite for development of renewable energy. Here, too, a wide range of options is available. Governments can choose to employ immediate policy changes that allow for swift deliveries (short-term actions). This sends a clear signal on the government's commitment to renewable energy development, which is an important first step in securing investments and building an overarching regulatory framework. Beyond this, some of the most prevalent policy options in place today require more extensive and time-consuming review of the legal infrastructure (long-term actions). These can be adopted to further strengthen the regulatory framework as the renewable energy sector grows.

Building a policy framework is, in most cases, carried out by experts in the relevant government departments. Parliamentarians can advocate, review, comment, approve, amend and reject, and should fully employ the different tools at their disposal to ensure the framework is as sound and robust as possible.³⁹

1. Short-term policy action

In establishing a policy framework to promote development of renewable energy sources, a government can consider certain immediate policy changes that can be achieved without having to amend the key laws regulating the electricity market:

Simple targets: Without getting into complex target-setting and quotas, a government can set a goal for a certain percentage of its electricity or energy to be produced from renewable sources. This, as a minimum, sends a clear message regarding the government's commitment to move towards sustainable energy. As of early 2013,

38 For a list of such instruments, please consult *Derisking Renewable Energy Investment*, UNDP, New York, USA, 2013, http://www.undp.org/content/undp/en/home/librarypage/environment-energy/low_emission_climateresilientdevelopment/derisking-renewable-energy-investment/

39 For more information on entry points for parliamentary action, please consult the 'parliamentary action points' in Part Four.

138 countries have adopted targets for the increased deployment of renewable energy technologies.⁴⁰

Standard Power Purchase Agreements (PPAs): To encourage electricity producers, short standardized agreements can be designed to eliminate potentially complicated negotiations between the state or dominant electricity distributor and other entrepreneurs.

Long-term generation licenses: To ensure a proper return on investment, or to enable small-scale electricity producers to secure funding to build the required infrastructure, governments can guarantee the purchase of electricity from generators for an extended period of time – perhaps 15 to 30 years – thus providing the security required to inspire large up-front capital investment.

Strengthening conducive regulations: Regulations are most conducive to facilitating rapid development when they are streamlined to reduce complexity. This pertains to land development, environmental standards or foreign investment rules for smaller generating plants. Where burdensome regulations can be removed or improved relatively easily, this should be prioritized to avoid deterring potential developments.

Subsidies: Through the annual state budget, subsidies are most effective when they are designed to support specific policy objectives that may not otherwise be achieved. For example, if policy-makers prioritize rural electrification, whether through the expansion of the national grid or through off-grid or mini-grid development, the government can use subsidies to reduce some of the costs associated with such an expansion.



40 *Renewables 2013 Global Status Report*, REN21, <http://www.ren21.net/gsr>

European Union sets targets for use of renewable energy sources: The RES Directive

Targets are paving the way for renewable energy in Europe, and Members of Parliament are playing key roles in setting those targets. Ambitious targets can be an important mechanism for increasing the use of renewables in a country. Countries of the European Union agreed to set a binding target to reach a 20 percent share of energy from renewable sources by 2020 (including biomass, hydro, wind and solar) and a 10 percent share of renewable energy specifically in the transport sector. This is implemented through Directive 2009/28/EC on the promotion and use of energy from renewable energy sources (RES).

This legislative framework sets individual targets for each Member State. It sets a number of rules with regard to integration of RES in buildings, certification of installers, access to the electricity grid for RES, infrastructure development, sustainability criteria for biofuels and 'cooperation mechanisms' allowing member states to achieve a proportion of the target abroad.

For more information about the Directive and setting targets, see the EU website: http://ec.europa.eu/energy/renewables/targets_en.htm

2. Long-term policy action

As a country's electricity market becomes more sophisticated, new laws will need to be introduced, or existing laws amended, to create a robust legislative and regulatory framework that boosts investor confidence and accelerates construction of renewable energy infrastructure. The policy options discussed below have been tried and tested in many countries. Though no two policy frameworks are the same, there are similarities that can be drawn upon.

a. Feed-in tariffs

As of early 2013, over 70 countries and 28 states/provinces had adopted some form of feed-in tariff (FIT) policy.⁴¹ The feed-in tariff is a policy mechanism that encourages investment in renewables by guaranteeing to producers

41 Renewables 2013 Global Status Report, REN21, <http://www.ren21.net/gsr>

The World Future Council: Resources for policy makers

The World Future Council (WFC) is an international forum made up of 50 eminent personalities from around the world. They come from governments, parliaments, academia, civil society, the arts and business. The World Future Council provides the following resources for policy makers:

- An online manual guiding policy makers through the drafting process of their national FIT law is provided by the World Future Council at <http://www.futurepolicy.org/renewableenergy.html>. This site aims to help users around the world to introduce or improve feed-in tariff (FiT) laws in their country or region. Parliamentarians can access the features of a good FIT law and draft their own proposed law. Find country- and region-specific information on existing FIT laws in over 70 jurisdictions worldwide, and consult the expert roster for additional information.
- An evaluation of feed-in tariff policies in 13 African countries can be downloaded in English and French at: http://www.worldfuturecouncil.org/refit_africa_study.html
- Read the policy paper 'Fit for Renewables? Design options for the Green Climate Fund to support renewable energy feed-in tariffs in developing countries' at: http://www.worldfuturecouncil.org/fileadmin/user_upload/PDF/PolicyPaper_GCF_A4_H.pdf

that electricity they generate will be bought at a pre-determined price and 'fed in' to the grid. Renewable electricity producers can plan projects in the knowledge that they will receive a predictable and satisfactory return on their investment. FiTs have to be set with great care, at a level that is attractive enough to investors but that avoids market distortions and does not impose excessive costs on government finances or consumers' bills.

The rate at which a FiT should be set depends on many variables, and must be developed based on the national context. Such variables typically include:

- the need to encourage the development of renewable energy sources;
- the type of renewable energy source, given that the cost of generation will vary for each source;
- the avoided cost of having to build new generation capacity;

- balancing of the costs transferred to consumers or tax payers;
- regular revision of rates to account for reductions in costs (e.g. reductions due to changes or improvements in the technology used);
- the need to have a guaranteed rate for a sufficiently long period to allow for a return on investment.

One key aspect of FiTs is that there is no requirement for a set target as to how much electricity is purchased from the generators (though some systems do combine targets with FiTs, while others ensure the prioritization of the purchase of such electricity). Instead, the establishment of a sufficient rate will encourage the market to develop renewable energy capacity.

A FiT must be combined with other regulatory changes to ensure its success. Independent power producers must be allowed to connect to the electricity grid ('grid access') so that they can generate electricity at the rate set by the feed-in tariff. The grid operator may need to upgrade and expand the electricity grid, so that the grid can absorb the added capacity and connect to the renewable electricity generation facility. Limits placed on capacity additions may need to be removed or reduced, as many grid operators will connect larger projects instead of working with many smaller generators. Finally, planning and approval processes must be streamlined to ensure such developments are not unduly delayed.

Get FiT Uganda: New programme to bolster renewable energy investment

A feed-in tariff programme called GET FiT was recently launched in Uganda, in order to encourage more private investment in renewable energy. More than €300 million will be directed towards speeding up about 15 renewable energy projects in the country, possibly generating about 125 MW of renewable energy within the next 3 to 5 years. The idea is that private investment in renewable energy projects will be encouraged through giving a financial incentive and offering a guarantee mechanism for banks and financiers.

The programme has been supported by several donors, including the governments of Norway, Germany and the UK and the World Bank. More information can be found on the GET FiT website <http://www.getfit-uganda.org/>

b. Quota mechanisms

An alternative to feed-in tariffs is the use of quotas or Renewable Portfolio Standards (RPSs). As of 2011, 18 countries had adopted some variation on this approach to mandating renewable energy development.⁴² An RPS is a policy that mandates that an electricity utility must generate a set amount of its electricity using renewable energy sources.

Generally speaking (as each country has a slightly different policy framework), the government sets a quota and a penalty for any utility that does not meet the quota. It then allows the market to regulate the price to be paid for the electricity and the sources of the electricity, thus resulting in the development of the cheapest and most abundant sources of renewable energy. The quota may rise each year, enabling the policy to gradually increase renewables' share of the market.

This type of policy is often connected with the use of Renewable Energy Certificates (RECs, also known as 'green certificates'). These are issued to generators of electricity from renewable energy and can be sold and traded amongst purchasers of the electricity, separate from the purchase of the actual electricity generated. This serves to reduce the overall cost of the quota system.

c. Tenders

A third option is the use of tenders by the government. Under this scheme, the government initiates a call for proposals for the development of electricity from renewable energy sources and receives bids from potential generators. In most cases the bidders must suggest the price at which they can generate the electricity. A key to this scheme is that the winning bid(s) must be provided with a guarantee that the electricity generated will be purchased for an extended period of time to enable a return on investment. However, past experience has shown that if not properly and carefully constructed, this approach may be less successful; even though a bidder may have won a tender competition, there are many other hurdles that can delay the development of generation capacity for many years.

Another difficulty is that the tender process places pressure on applicants to fix price offers at artificially low levels, in order to out-bid competitors and win potentially lucrative government contracts. All too often, these artificially low prices have



meant that the winning firms find it impossible to obtain sufficient returns on their investments, and thus have reduced capital to spend on expanding or maintaining existing capacity. In some cases, the race to bid the lowest price leaves companies unable to deliver on their promises at all, and the project is never constructed. Tender processes must therefore be thoughtfully designed to avoid these pitfalls.

Renewable Energy Recap: Creating a regulatory framework for the renewable energy sector

To build a regulatory framework more conducive to renewable energy development, governments can employ a wide range of policy changes:

- Short-term policy action measures are immediate policy changes that can be implemented relatively easily, and that have the potential to deliver quick results. These may include:
 - simple targets for renewable energy production
 - standard Power Purchase Agreements (PPAs)
 - long-term generation licenses
 - strengthening conducive regulations
 - Subsidies
- Long-term policy action measures require a more thorough revision of the legal and regulatory framework, but are necessary to boost investor confidence and accelerate infrastructure development. Long-term action measures may include:
 - feed-in tariffs
 - quota mechanisms
 - tenders

PARLIAMENTARY ACTION POINTS

What type of grid could best meet the electricity needs of a country, region or community? Is the technology required to build smart grids available and affordable? Are mini-grids a more efficient and reliable solution for certain remote areas than a (costly) expansion of the national grid? Is there national and international support for a supergrid?

- Encouraging your governments to set new or improved targets for renewable energy development. Ideally this is not done by individuals but by a cross-party group of like-minded Members of Parliament or, where possible, the relevant committee. Parliamentarians can propose a set of policy recommendations for government review and response.⁴³ You might also put questions to the relevant Minister or Secretary during question time.
- Organizing committee hearings. If you sit on the Energy or Development committee, consider organizing a hearing that allows for experts, civil society organizations and citizens to speak to the potential of developing renewable energy sources.
- Directly introducing draft legislation that promotes a clear set of policy recommendations. This may or may not result in the adoption of the proposed law, but it will, at the very least, present a concrete option that will spur debate and discussion on the issue of renewable energy.
- Organizing field visits. This offers parliamentarians a unique opportunity to see how renewable energy development can impact communities and transform lives. In addition to seeing the technology in action, parliamentarians can explore the impacts on the ground and take home ideas and inspiration for further projects. Field visits are also an excellent oversight tool, allowing parliamentarians to witness first hand if and how approved projects are being managed and implemented.

For more action points, consult the AGORA Climate Portal at www.agora-parl.org/climate.

43 See the example of the Climate Parliament group in India in Box 17.

PARLIAMENTARY ACTION ON RENEWABLE ENERGY

Parliamentarians have a wide range of tools at their disposal to advocate for development of renewable energy capacity and, where political space is available, institute the framework required to reduce or remove the remaining barriers. A quick recap of parliament's three core functions highlights the different entry points for parliamentary action:

- **Law making:** Parliamentarians review draft laws and amendments introduced to parliament for passage. In some parliamentary systems, parliamentarians also actively engage in drafting new laws for consideration.
- **Oversight:** Oversight is the process through which parliamentarians monitor the activities and spending of the executive branch of government. This is crucial to ensure accountability and effective implementation of laws passed by parliament.
- **Representation:** As elected officials, parliamentarians are accountable to citizens. It is incumbent upon them to engage in a dialogue with those citizens to ensure the work they do in parliament reflects the concerns and perspectives of the people they represent.

The next section will review these functions and the various means by which a parliamentarian can push forward policy changes to promote renewable energy development.

A. Law making and legislation

The historic and perhaps primary role of a parliament is to pass the laws of a nation (or in a federal state, the laws of a province or state). Next to the constitution of a country, the laws passed by a parliament are the most important statement of the rules and principles governing a country and under which it will direct its future development.

A major barrier to the further deployment of renewable energy resources is the lack of a stable and transparent regulatory framework in which such development will occur. Investors need to be confident of a secure, long-term commitment on the part of the country (or province or state) to develop and promote renewable energy; entrenching the ground rules in legislation is one of the best means of signaling this commitment.

1. Adopting laws

The specific process and procedure by which parliaments adopt laws differ in each jurisdiction. However, there are some generally accepted principles that are recognized as international standards:

- **Introduction:** The primary source for the development and writing of draft laws is the executive branch. However, many parliaments also provide opportunities for parliamentarians to introduce draft laws or amendments for consideration.⁴⁴ In a few parliaments, standing committees have the authority to develop and introduce draft laws for consideration by the parliament.
- **Stages of review:** No draft law is passed after one debate or one vote, but will be considered, in most cases, three times in the plenary sessions.
- **Committee review:** At some point in the review process at least one committee will be tasked with conducting a detailed, clause-by-clause review of the draft law. The committee may have the authority to directly amend the law or, alternatively, to produce a report with recommendations for amendment.
- **Consultation:** It is good practice to ensure ample opportunity for citizens and experts (i.e. civil society, academics, industry experts) to comment on a draft law before it is finally approved. This most often occurs during the committee stage of review.



2. Drafting and amending laws

The parliament's Rules of Procedure identify the opportunities to develop or amend proposed legislation or amend existing legislation. The following is a brief summary of the possible entry points for promoting and passing new laws with regard to a framework for the development of renewable energy.⁴⁵

- **New legislation:** Where parliamentary procedure provides for the introduction of draft laws by individual parliamentarians, this option should be considered. It may be useful to work with other political actors (both within parliament and in civil society) to develop the content and build a consensus for legislation that will encourage the development of renewables.

⁴⁴ Depending on the parliament, a draft law introduced by a member will have more or less chance of passage. In presidential systems the chances are much higher. In Westminster systems, the chances are lower and vary greatly between countries.

⁴⁵ For a more detailed review of the entry points and analysis of each point, please see the online version of this How-To Guide at <http://www.agora-parl.org/>

This approach may not have much of an immediate effect, as many private Member draft laws are never passed, but it makes a statement as to their policy position (and, perhaps, that of their parliamentary group) regarding renewable energy development. In particular, if the draft law is based on consultations and input from those that are active in the promotion of renewable energy, it can garner media and political attention that can drive change in policies and laws.

- **Amending draft legislation:** Given the time involved in consultation, negotiation and drafting in order to propose a new draft law, it is often more efficient to suggest amendments to a draft law that is already being introduced by the government. Even when this draft law is not directly related to renewable energy (perhaps it is a law related to the electricity market or energy in general), offering an amendment can create an excellent opportunity to influence the draft's content and raise awareness of renewable energy resource options.

Again, consultations and inputs from the relevant actors will give parliamentarians more political clout, but if the amendment is seen as reasonable and there is a consensus amongst stakeholders, the government's supporters in the parliament may be open to the proposed changes.

Flagship legislation: Mexico's General Law on Climate Change

Mexico was lauded by the international community in 2012 when new laws on Climate Change were passed by its Congress. The General Law on Climate Change (GLCC) was supported by all major political parties in the country.

Mexico's GLCC, the second climate change legislation in the world, sets an ambitious path towards a low-emission future. It establishes a holistic framework for climate change policy, improved institutional structures, legal frameworks and financing. It commits to reducing emissions by 30 percent by 2020, enforcing Mexico's commitment through the Copenhagen Accord. The law has a strong emphasis on climate change adaptation mechanisms, but also lays out the foundation for a national mitigation policy: strengthening national capacity and focusing on cost-effective mitigation strategies for energy production, transport, agriculture, forests, waste and industrial processes. The new law also creates a new climate change fund, channeling funding for both adaptation and mitigation activities.

For more information, visit the homepage of Globe Mexico: <http://globemexico.org.mx/> or read more on the new bill here: <http://www.globeinternational.org/images/climate-study/Mexico.pdf>

- **Amending current legislation:** If legislation pertaining to the electricity market or energy development is already in place, parliamentarians may want to consider introducing amendments to existing laws. Instead of having to develop an entire legal framework, parliamentarians then only have to draft changes to those select parts of the law that would improve the current framework for renewable energy development.

By actively consulting stakeholders in renewable energy markets, parliamentarians are likely to learn what specific issues exist within the existing regulatory framework. These stakeholders may be able to offer sound suggestions as to how such issues could be addressed. This should allow the parliamentarian to pinpoint amendments to the law(s) with a view to improving the existing policies.

- **State budget funding:** In addition to the laws required to encourage renewable development, fiscal issues can be addressed through budgeting that can reduce limiting barriers. As the annual state budget is considered, parliamentarians may have opportunities to promote fiscal policies or suggest budgetary amendments that could create direct sources of funding for developers of renewable energy or indirect incentives, such as tax breaks.



B. Monitoring government commitment to renewable energy

Where a government has adopted a policy or legal framework meant to encourage the development and generation of energy from renewable sources, parliamentarians are tasked to constantly scrutinize the actions of government to ensure the framework is as effective as possible.

There are two aspects to effective oversight of government's actions:

- **Implementation of laws:** Is the government properly implementing the laws passed by parliament? This should include a review of whether or not adequate human resources and detailed policies have been provided to the government departments tasked with implementing the law.
- **Allocation of funds:** If funding has been allocated in the state budget (or tax incentives have been created), is the government allocating the funds as specified in the budget passed by the parliament? Are the funds allocated in the budget sufficient to achieve the goal of promoting the development of renewable energy?

The task of a parliamentarian is to gather information and data to assess if and how the government is implementing the law(s) and allocating the funds required. Parliamentarians have several key tools at their disposal:

- **Consultation:** Parliamentarians can convene stakeholders engaged in the renewable energy industry to learn their perspectives on the implementation of law(s) and funding by the government. These are the people who are directly impacted by the government's actions and who will know what is happening 'on the ground'. Parliamentarians can consult with them, either as a multilateral group or bilaterally, on a regular basis.
- **Question time:** In many parliaments, parliamentarians can ask questions of government ministers responsible for electricity, energy, development, finance and so on. Based on information gathered from consultations or research conducted by the parliamentarians or their staff, a question (or, if allowed, a series of questions) can be developed in writing or orally, that will require the minister to state the government's position for the record. If the question is timely or the answer is politically controversial, the parliamentarian may garner media attention that can further promote reforms to current laws, funding, or issues of implementation.
- **Interpellation:** In some parliaments, parliamentarians can request an interpellation. This is a designated time for a debate about a topic that requires the responsible minister to answer detailed questions from parliamentarians. In some parliaments, an interpellation must result in a confidence vote for that minister; in such cases, this tool should only be used where there is a serious political issue related to the electricity sector or energy development.
- **Parliamentary committee hearings:** One of the core functions of a parliamentary committee is to monitor the actions of the government and to hold it accountable. Many parliaments provide specific rules for a committee to request and receive documentation, or to require a minister or senior government official to testify and answer questions. A parliamentarian who is a member of a committee with jurisdiction over a subject related to renewable energy (e.g. economic development, environment, rural development, natural resources) should encourage that committee to hold hearings and conduct regular investigations into the actions of the government. This provides important insights into the government's ability to effectively implement current law(s) and properly allocate funding from the state budget.⁴⁶

46 For a detailed example of how a parliamentary committee conducts oversight, including a hearing, see the UK House of Commons Select Committee on Energy and Climate Change investigation into incentives for creating renewable heat: <http://www.parliament.uk/business/committees/committees-a-z/commons-select/energy-and-climate-change-committee/inquiries/parliament-2010/renewable-heat-incentive/>

C. State budgets and funding

Some specific focus must be given to the annual state budget and the funding of renewable energy projects by the state. As briefly noted above, the state budget is considered and approved by the parliament on an annual basis. Once approved, the parliament must monitor its implementation.

Depending on the specific rules in effect, a parliamentarian may have the ability to directly or indirectly influence the content of the state budget to encourage more resources and incentives for development of renewable resources. If parliament allows individual members to move amendments to the state budget⁴⁷, this is an excellent opportunity to, at the very least, spur debate about the need for more investment in renewables to meet the country's renewable energy target for instance. This may include an increase in the budget allocation for project development or the creation of tax incentives to encourage greater private investment in renewables, for example.

Where parliament does not allow members to move amendments to the state budget⁴⁸, individual parliamentarians can still influence the content of the budget, albeit indirectly. By working with their parliamentary group, a parliamentary committee or civil society, they can build political pressure for allocation of state funds or revisions to the tax code to encourage development of renewable resources. Such revisions should form part of a wider 'value for money' strategy that parliaments and parliamentarians pursue in maximizing the use of public funds. Through public consultations and hearings, it is possible to garner enough media and public attention to encourage the executive to respond to a parliamentarian's points with adequate budget allocations.

The role of parliament shifts once the budget passes. A parliamentarian can then work with those parliamentary committees that have a mandate to scrutinize government expenditures, such as a Public Accounts Committee or Budget and Finance Committee, to ensure the allocated funds are properly spent. This can be done by organizing public hearings that explore whether the government is delivering on its commitments made when the budget was passed.



47 This is more common in presidential and other systems where the executive's mandate is not contingent upon the confidence of the parliament.

48 This is more common in Westminster and other systems where the approval of the state budget is automatically a confidence vote on the mandate of the executive.

Where greater detail as to the costs and expenditures is required, it may be advisable to engage the independent state auditor (also known as the auditor-general) to conduct a detailed investigation of the government's actions in the development of renewable resources.

D. Representation

Parliamentarians, in their role as representatives of the people, act as the bridge between their constituents and the government. This How-To Guide has explored how parliamentarians can solicit feedback and concerns from their constituents and pass this knowledge on to the relevant bodies within the parliament and beyond. With respect to the development of renewable energy sources, such needs and concerns relate primarily to energy access, economic opportunities and health issues. Parliamentarians also play an important role in building community support for renewable energy projects. Adequately informing constituents of the many benefits and advantages of renewable energy can be instrumental in the successful implementation of a project.

In addition to the specific tools provided by the parliament's Rules of Procedure, parliamentarians have a less well-defined authority enabling them to advocate effectively on an issue they feel is of particular importance.

Such advocacy is best done in cooperation with other political actors, both inside and outside of parliament. Outside of parliament, parliamentarians can build a coalition of those who support development of renewable energy, such as community leaders in off-grid regions, industry figures and investors. Such a coalition can create pressure on a government to develop a plan to implement renewables, or identify and advocate the changes required to make an existing plan more effective.

In parliament, when parliamentarians advocate in unison they will almost certainly have a greater impact. This is where a multi-party group committed to development of renewable energy can have a critical impact with regards to achieving the stated objectives. Establishment of such a group, even if only informally, allows parliamentarians from across the political spectrum to present a consistent message encouraging their colleagues to help push for adoption of plans, targets and measures required to achieve access to sustainable energy for all citizens.

Success story: Climate Parliament group increases renewables in India

The case of Climate Parliament and UNDP's work in India illustrates just how effective parliamentary action on renewable energy can be, given the right conditions. Within a few years, this cross-party group of parliamentarians has achieved significant results, including increasing India's renewable energy target from 6 to 15 percent, and convincing India's Estimates Committee to recommend allocating 1 percent of the budget towards support for the development of renewable energy.

Climate Parliament India has active groups in both houses of the Indian Parliament, the Lok Sabha and the Rajya Sabha, with members from all major parliamentary groups. Since 2010, the group has constantly advocated for renewables through diverse mechanisms, including:

- In 2010 the Climate Parliament group wrote several letters to central ministers (including the Prime Minister, the Minister of Energy and the Minister of Planning), urging them to support a target of 15 percent renewable energy and to improve the grid infrastructure. The issue was also raised and discussed in parliamentary debates following the letters.
- In 2011, Members of Parliament from 11 different parties wrote to the Prime Minister on the same topic, and followed up with questions in parliamentary debates. By the end of 2011 the Government had raised the target to 15 percent by 2020 and supported a fresh assessment of India's renewable energy potential.
- In December 2011, the Climate Parliament worked closely with the Estimates Committee, advocating for 1 percent of the national budget to be spent on renewables. The Committee later produced a report endorsing this goal and, following a face-to-face meeting with the Climate Parliament group, by 2012, India's Prime Minister had flagged that he would generate a plan for implementing this recommendation.
- The Climate Parliament successfully advocated for the initiation of a joint research programme on solar energy between India and the United States, which was signed by the President of each country in 2011.
- The group lobbied for an increase in the use of biomass energy from farm waste and forest weeds in India, and its proposals are now being explored by the Minister of New and Renewable Energy.
- The Climate Parliament campaigned for a risk guarantee scheme to compensate renewable energy producers, something that the Government later adopted through the Jawaharlal Nehru National Solar Mission.

The success of the group has not deterred it from setting even more ambitious goals, such as monitoring the government's commitment to reaching the 15 percent renewable energy target by 2020, pressing for better grid infrastructure, energy access and improved financing mechanisms, and opening up electricity markets for regional renewable energy trading.

For news on Climate Parliament India, see <http://www.climateparl.net/home.do>

Finally, developing a strong media presence enables the group(s) to get their message to the public and other policy makers. This may include development of a communication strategy to define how and with whom the parliamentary group's message will be projected.

Parliamentarians have the authority and the tools to draw attention to an issue like few others can. If they use this power appropriately, the media will turn to parliamentarians for comment when the government's energy policies are in the news.





PARLIAMENTARY ACTION POINTS

Cross-party collaboration for the promotion of renewable energy

As a parliamentarian looking to promote renewable energy development in parliament, whether through legislative proposals, recommendations, budget provisions or other means, you are likely to be more successful if other MPs support your views.

Cross-party collaboration can take many forms:

- **Committees and parliamentary groups.** Working with a parliamentary committee or parliamentary group to gather broad-based support for the draft law or amendment will amplify its impact and increase its chances of success.
- **Cross-party groups or multi-party caucuses.** Recently, it has become more common to create a group, or caucus, that includes like-minded MPs from different political parties who agree on one issue or policy. Such a group could promote development of renewable energy in parliament⁴⁹ and provide added confidence for investors, as proposals with support from across the political spectrum are less likely to be altered following a change of ruling party. In some countries these groups have had significant impact in achieving changes to the legal framework under which renewables are developed.⁵⁰
 - Once coalitions and multi-party groups are established, it is important to develop a clear set of objectives, with a strategy for how these can be achieved. This will vary depending on the current state of a government's plan for renewable energy. Regardless of the current state of such a policy, objectives presented by parliamentarians should be realistic and presented in a manner that allows the government to adopt them in the near future.
- **Non-binding resolution.** Where the space for introducing draft laws and amendments is limited, parliamentarians may want to look at the introduction and adoption of a motion or resolution by the parliament that endorses the development of renewable energy sources. These are non-binding and do not have the legal effect of a law, but can send a statement to the government that the parliament considers this issue important and is encouraging the government to act.

For more action points, consult the AGORA Climate Portal at www.agora-parl.org/climate.

49 For more details, see the ongoing work of Climate Parliament and its network of national parliamentary caucuses on renewable energy at www.climateparl.net

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<http://www.area-net.org> <http://area-network.ning.com>

Africa Sustainable Energy Association

www.afsea.org

Basel Agency for Sustainable Energy (BASE)

www.energy-base.org

Biomass Thermal Energy Council

www.biomassthermal.org

Clean Energy Solutions Center

<https://cleanenergysolutions.org>

Climate Parliament

www.climateparl.net

ECOWAS Centre for Renewable Energy and Energy Efficiency

www.ecreee.org

Energy and Environment Partnership (Southern and Eastern Africa)

www.eepafrica.org

European Commission (Renewable Energy)

http://ec.europa.eu/energy/renewables/index_en.htm

European Investment Bank

www.eib.org/projects/priorities/energy/index.htm

European Renewable Energy Council

www.erec.org/organisation.html

Geothermal Energy Association

www.geo-energy.org

Global Sustainable Energy Islands Initiative
www.gseii.org/index.html

Global Wind Energy Council
www.gwec.net

International Energy Agency
www.iea.org

International Hydropower Association
www.hydropower.org

International Renewable Energy Agency
www.irena.org

International Renewable Energy Organization
www.ireoigo.org/About#IREO-Treaty-Signatures

International Solar Energy Society
www.ises.org

Latin American and Caribbean Council on Renewable Energy
www.lac-core.org

National Renewable Energy Laboratory
www.nrel.gov

Organization of American States (Renewable Energy in the Americas Initiative)
www.oas.org/dsd/reia/

Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) (Arab States)
www.rcreee.org

Renewable Energy Network for the 21st Century
www.ren21.net

Renewable World
www.renewable-world.org

SAARC Energy Centre (South Asia)
www.saarcenergy.org

Secretariat of the Pacific Community (SOPAC)
www.sopac.org

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www.solarcookers.org

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United Nations Sustainable Energy for All Initiative
www.sustainableenergyforall.org

World Bank (Climate Change)
www.worldbank.org/en/topic/climatechange

World Bank (Climate Investment Funds)
www.climateinvestmentfunds.org/cif/

World Council for Renewable Energy
www.wcre.de/

World Future Council
www.worldfuturecouncil.org

World Wildlife Fund (WWF)
<http://wwf.panda.org/>

Online resources

Commonwealth Parliamentary Association (UK Branch) Essentials of Climate Change online courses
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www.direkt-project.eu

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www.sef-directory.net

Sustainable Energy for All
www.sustainableenergyforall.org

UNEP – Solar and Wind Energy Resource Assessment
<http://en.openei.org/apps/SWERA/>

University of Colorado – Advanced Energy Legislation Tracker (USA)
www.aeltracker.org

World Bank & NTFSP – Private Participation in Renewable Energy Database
<http://ppi-re.worldbank.org>

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www.leg.state.nv.us/nac/NAC-704.html#NAC704Sec8831

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Solar Water Heater Regulations – Kenya

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Tax Credit Scheme for Renewable Energy – Jamaica

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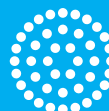
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