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# ENCOURAGING RENEWABLE ENERGY DEVELOPMENT:

## A HANDBOOK FOR INTERNATIONAL ENERGY REGULATORS

### EXECUTIVE SUMMARY



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# EXECUTIVE SUMMARY

**R**egulators and policymakers in the energy sector face new and exciting challenges presented by renewable energy (RE). While not new to the energy mix, renewable energy's importance as part of the overall national and international energy supply is a relatively new phenomenon. Countries, their governments, regulators and populations are only just adjusting to this recent change in the energy world. This Handbook seeks to help international regulators as they navigate through it.

RE is gaining ground because it offers the possibility to address energy needs in a sustainable manner. Governments, the public, and local and international organizations are increasingly recognizing the individual, social and environmental harm that conventional energy sources cause as a result of greenhouse gas emissions. Renewable energy offers the promise of continued energy supply without comparable harm.

## A Focus on Regulation

This Handbook places RE in the regulatory context – something that is rarely done. Most often, the focus is on technologies, usually new and advanced ones that offer promise but still require realization, and/or on the economic viability of renewable energy. Identifying what the regulator can do to advance RE efforts can be itself a challenging task. Partly, this is because the RE field is changing rapidly and the break-even point for RE cost is often a moving target and difficult to predict accurately. It is also because RE has associated political and social issues relating to jobs, affordability and access/availability for vulnerable customers and rural populations not present in the conventional energy field. Understanding how to integrate conventional and renewable regulatory approaches is not straightforward.

Certainly renewable energy offers the promise of supplying existing and expanding demand in a clean and sustainable manner, but it can do so only if it is reliably supplied at affordable rates. Quality of supply and price regulation are threshold issues that drive the success of RE. These are also key issues with respect to any energy source; indeed, they are at the center of what regulation is about. But the issues presented by regulation of RE also differ from issues presented by traditional energy regulation (where the mix is mostly from fossil fuels) in numerous ways, some political, operational and technical, such as the following:

- Technologies are relatively new, at least in terms of bringing commercial success, requiring experimentation, research and development, and resulting in lack of certainty and higher cost for many types of RE.
- Most RE comes from variable resources, requiring that operational and technical issues are addressed to ensure continuity of supply and grid security.
- Potential pollutant reduction makes RE highly valued by governments seeking to address harms resulting from emissions (including biodiversity, human health, air

quality), meaning that it increasingly has become a priority of governments and many stakeholders for reasons that are not directly related to energy.

- Value of use of RE resources comes from a longer-term perspective that considers external costs not typically included in traditional and market-driven generation cost-benefit analyses.
- Domestic natural resources utilization gives RE an economic boost in a new industry, making it attractive for financial reasons that are distinct from the actual cost of the product, such as local job creation and development of local technological industries and expertise.
- Additional domestic production means enhanced security of supply to countries that have previously depended on imports, implicating geopolitical concerns.

In sum, any look at the regulation of RE must focus not only on traditional regulatory issues such as price and quality regulation, but also at the larger context in which RE is being developed and promoted.

To this aim, the Handbook addresses:

- Policy, strategy and legislative tools used to promote RE, which regulators need in order to understand and implement and/or design.
- Support schemes or incentives that support RE, what they are and relative advantages and disadvantages.
- Physical and structural advantages and limitations to renewable energy development, including the availability of infrastructure and natural resources in a particular country.

## **Best Practices Combined with Regulatory Experience**

This Handbook is based on a review of best practices and consultation with energy regulators around the world. It focuses on countries for which RE development on a large scale is a relatively new priority, and applies best practices to the context of growth and expansion, taking lessons from countries (mostly in Western Europe and North America) where renewable energy frameworks have undergone years of reform. While the Handbook cannot offer a detailed description as to how each regulatory decision regarding RE is made, it seeks to give an understanding of what those decisions are, the context in which they are chosen and implemented, and the various manifestations and consequences of the choices made.

The Handbook also offers case studies of renewable energy projects that implicated regulatory and policy issues, and case studies of regulatory framework development in countries that have prioritized RE investment and implementation. Different types of RE raise different regulatory issues; this Handbook identifies and describes these differences while noting the common principles that underlie regulatory development in the RE field.

This is a Handbook for regulators by regulators. Directed by the National Association of Regulatory Utility Commissioners (NARUC) and supported by the United States Agency for International Development (USAID), it includes contributions from regulators in Africa, Asia, Central America, Eurasia and the Middle East. The Handbook assists energy regulators in implementing renewable energy policies and facilitating the successful development of renewable energy projects. It draws upon NARUC's relationships with ACERCA (Regional Association of Central American Energy Regulators), AFUR (African Forum for Utility Regulators), ARIAE (Asociación Iberoamericana de Entidades Reguladoras de Energía – Latin America and Spain), EAPIRF (East Asia and Pacific Infrastructure Regulatory Forum), ERRA (Energy Regulators Regional Association – Central, Eastern Europe and Eurasia), SAFIR (South Asia Forum for Infrastructure Regulation) and RERA (Regional Electricity Regulators Association of Southern Africa), with recent additional members from the Middle East, among others. Follow-up work on implementation is a core expectation of this project, with ongoing consultation and information exchange.

## **The Priority of Sustainability**

Sustainable energy means use of resources in a manner that provides ongoing energy to meet the needs of the current population, without compromising conditions for future generations. To achieve this balance, energy must be replenished, environmental harms must be minimized, and costs must be affordable. RE is energy derived from relatively replenishable resources, including solar, wind, hydropower, wave and tidal, biomass and geothermal. Because the political and regulatory focus is on sustainability and not on these resources per se, the way they are harnessed requires thoughtful analysis to ensure that an RE investment is in fact meeting the sustainability objective. This determination is normally not a responsibility of the regulator, but the regulator does require an understanding of why and how this matters in order to address the changing investment landscape, as well as to implement governmental choices in a way that promotes this overarching sustainability objective.

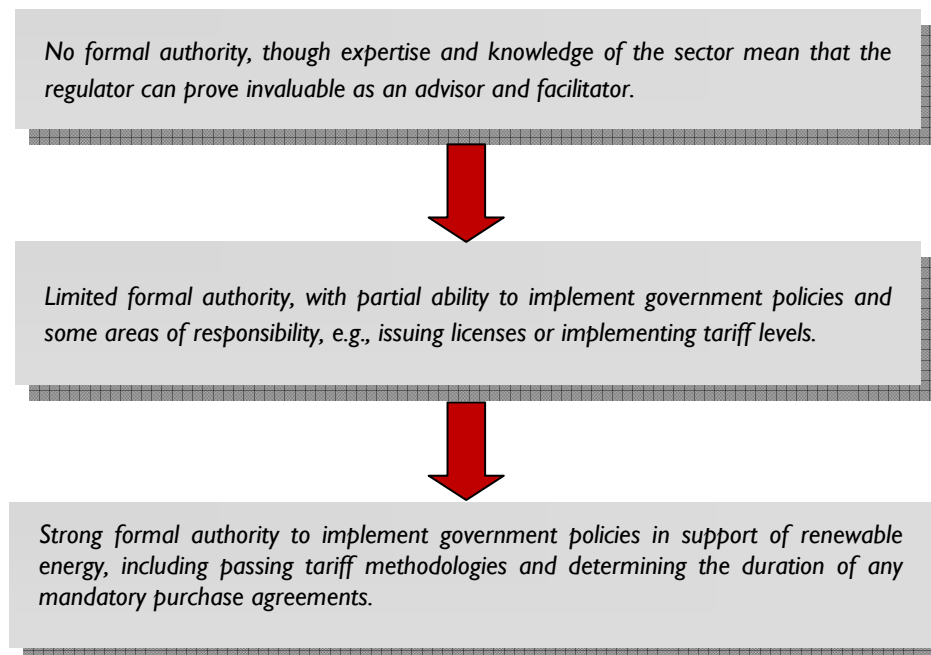
Renewable energy offers numerous benefits in the short, medium and long terms: security of supply, sustainable local industry and job growth and environmental sustainability. However, there are some drawbacks including potentially higher energy prices and the threat to incumbent industries that produce conventional energy derived from fossil fuels. Existing fossil fuel based energy systems can have many negative effects on health and the environment as a consequence of emissions from greenhouse gases, including carbon dioxide, that are released from the burning of fossil fuels. The world's population continues to grow at a rapid pace, bringing marked increases in world energy demand, despite improvements in energy efficiency and clean energy technologies such as carbon capture and sequestration.

Regulators across the world are being increasingly drawn into aspects of RE development, and they need to know how to address the added pressure that comes with this responsibility. RE means more than just new or varied energy sources; it also means a path forward that offers the potential to improve the quality of our lives and the lives of our children.

## Variation in Models of Authority

Unprecedented growth brings growing pains, and one question raised by the increasing importance of RE is its impact on the role of the energy regulator. Models for how to transpose renewable energy strategy into legislation or regulation vary across jurisdictions, and fall on a continuum between significant regulatory authority for adoption and implementation, to minimal or no authority for the same. Variation in incentives to promote RE is matched by the variation in choices by nations and states as to the type of renewable energy to promote, and the regulatory template in which those choices are made.

In some countries, governments handle all regulatory issues and no independent regulatory body exists in the energy sector at all. In these cases, governments may address all energy issues together or address RE and conventional energy separately. The same can be true when independent energy regulators do exist – some regulators have authority in the RE field, others do not. Frequently, the entity in charge of regulation (whether independent or a government department/Ministry) has some but limited authority in the RE sector, making regulatory structure and accompanying authority for renewable energy generally fall somewhere along the continuum of:



Despite this variation of the scope of regulatory authority, some principles are common with respect to regulation of RE:

- Coordination is essential. The interface between governmental and regulatory bodies is always important in the energy context, but particularly acute when the focus is RE. Environmental agencies, non-governmental organizations (NGOs) and environmental standards (relating to, for instance, air pollution, water use

and zoning), international agreements and commitments, tendering and procurement agencies and rules, loan guarantee and financial regulations and national policies and strategies all impact the implementing framework for RE. Knowing what other agencies are doing and understanding the priorities set by governments in international forums are just a few essential coordination issues. The regulator will need to know the implication of such priorities, rules and activities on efforts to bring RE to market. Given how quickly the RE landscape is changing, this is not an easy task.

- There is an acute need to select and commit to one coherent support scheme. Many different incentive structures are used to promote RE around the world. These include: feed-in tariffs (FITs), quota and certificates, grants, tax and fiscal incentives and tendering. They differ in significant ways and it is up to each country to decide what model best fits its situation and the goals it has identified in pursuing the promotion of RE. The difficulty is that the decision must be coherent and designed for the individual circumstances. Regulations must be developed in support of the scheme selected, requiring cohesion of decision-making. Lack of certainty as to the applicable scheme or the failure to make a choice and commit to that choice will impair the success of RE. For growth to take place, selection and certainty are required.
- Any framework selected must have built-in provisions to allow for flexibility in the event of significant market changes or unintended consequences of incentive schemes. To ensure effectiveness for the long term and that the best interests of the implementing country are met, some possibility for change is required, as evidenced by experiences in Spain and France (early leaders in feed-in tariff schemes). At the same time, any such change should be circumscribed within defined parameters that include mechanisms to measure progress toward RE goals, to allow for maximum predictability and minimal investment risk.
- The price of RE is important. If it costs too much and fossil fuel based energy costs less, RE development will stall. Consideration of the price and how this price is integrated into the overall energy mix is an important part of the regulatory equation.
- The return on investment matters. Investors need to know that they will receive a reasonable return on the resources that they devote to an RE project, including their capital. It will not be possible to attract new investment without a tariff regime that offers reliable return over a time period sufficient to cover the investment.
- The energy field contains many interest groups and the push-pull of these interests may affect regulation of RE. For example, traditional economic pricing that fails to account for external costs (such as costs to clean up air pollution and address environmental degradation) may compromise RE development; economic pricing of conventional energy and RE may need some rethinking and are interlinked.



- Rural and vulnerable populations can benefit from RE, particularly in the form of distributed generation, mini grids and small production sites, though affordability and access remain the touchstones for these groups.
- Guiding regulatory principles of transparency, clarity and predictability apply to RE no less than to other energy sources.

## **From Stepping Stones to Project Implementation**

The majority of the world outside of Western Europe and North America are at the early stages of developing their regulatory frameworks for RE. Because the concrete, practical experiences of one country may offer important lessons for another, this Handbook offers case studies each with different examples and in varied stages of RE development. A geothermal binary cycle plant in El Salvador and a distributed generation small hydropower plant in Guatemala are already operational. In Armenia and Jordan, respective hydropower and wind projects have made strides but are not yet online and face challenges ahead. In the Philippines, a feed-in tariff framework has been adopted. In Namibia, a renewable energy program is being implemented, offering the groundwork required for future successful project implementation. In Egypt, the regulator has made adjustments to regulatory framework and worked with other government agencies to encourage use of RE potential. Each case study offers valuable evidence of the strength of RE development, the challenges such development faces, and the need for strong regulatory support to advance RE in a positive – and sustainable – manner. Below is a sample of some of the case studies profiled:

### **Armenia**

This case study profiles efforts to bring a small hydropower investment project to Armenia. The project, led by a Netherlands-based project developer, has proceeded through siting identification, completion of due diligence in 2009, and the securing of partial funding, with the project developer seeking additional funding sources. Efforts to attract additional funding have found support in the country's energy regulatory framework. Amendments to the energy law in 2001, a new energy strategy that promotes RE adopted in 2004, and enactment of a feed-in tariff in 2009 have created a climate for RE investment. With one of the longest standing regulators in the region, Armenia benefits from relative stability and predictability in its regulatory structure, including a record for sound tariff setting and tariff decision-making, and openness to the public. Because of this record, the project developer has been able to identify and discuss with the regulator various issues that concern potential investors, including a mismatch between expected market opening and actual market opening, and the content of the rules to implement that opening. The project developers have met with the regulator to explain that investors require long-term certainty in their contracts. The regulator has been responsive in providing explanations and written letters setting forth the process and the general expectation that the existing structure will be renewed without complication.



## ***El Salvador***

In 2007, a public-private company (with domestic and foreign investment) began operation of a 9.2 MW geothermal binary plant in El Salvador. The project was realized after Superintendencia General de Electricidad y Telecomunicaciones (SIGET), the regulator, granted a concession for the field on which the plant is located. Since that time, the regulator has supervised construction and expansion, including construction of five production wells and four injection wells, and four operational units. The project benefited from reforms in the sector, particularly from 2003-2009, directed at improving the wholesale market to enable new entrants. In particular, SIGET has approved new cost-based transmission system operation and wholesale market regulations. The foreign investors have also been able to capitalize on the Clean Development Mechanism (CDM) opportunities offered by the Kyoto Protocol, having registered a sister geothermal project under the CDM in 2006.

## ***Egypt***

The regulator, EgyptEra, has played a vital role over the last several years in readying the framework and sector for broad integration of renewable energy, even before passage of renewable energy primary legislation, which is making its way, slowly, to adoption. The regulator's leadership in ensuring that capacity is built within its staff and in the sector generally, and its focus on the secondary regulations that will be required for successful implementation are worthy of careful review, offering valuable lessons for how to effect change in the face of political or parliamentary delays.

## ***Guatemala***

The case study on Guatemala profiles the legislative and regulatory reforms that helped bring distributed generation to Guatemala. The Kaplan Chapina project covers small hydropower using distributed generation rather than the central grid to reach rural communities. The project became operational thanks to Guatemala's relatively recently adopted regulatory policies, designed to facilitate development of renewable power plants and distributed generation. These policies enabled the power plant to connect directly to the distribution network, improved quality of electricity services, and offered tax credits to companies that invest in renewable energy projects for a 15-year period.

## ***Jordan***

The Jordan case study reviews a wind project that was tendered and awarded to Greek investors in 2009. More recently, however, the director of the renewables department of the Ministry of Energy and Mineral Resources has indicated that the government is reconsidering the project. The reasons given for reconsideration are noise levels and problems over land regulations, but the project faced obstacles when negotiations between the government and the Greek-Jordanian consortium awarded the contract broke down in 2009 over the amount of the tariff. Jordan's experience with this project and its attempts to encourage the growth of domestic renewable energy and wind in particular provide valuable lessons as to the framework needed for wind power development and potential obstacles along the way.

## **Namibia**

The case study of Namibia looks at the 2005 Namibia Renewable Energy Programme (NAMREP) and efforts to select and implement support incentives, with considerable analysis of the impact of feed-in tariffs. The NAMREP was designed to increase affordability and access to RE services and accelerate market development for renewable energy by reducing institutional, information, human capacity, financial, technical, awareness and other market barriers. The main focus of NAMREP was on solar photovoltaic technology for lighting and water pumping, solar thermal for water heating and to a limited extent, efficient domestic use of biomass. This program has benefited from the power of the regulator over evaluating and monitoring performance of its licensees, and jurisdiction extending beyond conventional electricity.

## **The Philippines**

The case study of the Philippines details the path to regulatory reform in the RE sector, leading to the adoption of a comprehensive renewable energy law in 2008 and a feed-in tariff flowing from that law. The law includes mandatory purchasing of power from renewable energy; preferential feed-in tariffs, and a “green energy option” that allows consumers to choose renewable sources and various incentives. Under the law, the government (the Department of Energy) promulgates rules regarding the mandatory purchase of renewable energy, awards RE service contracts, formulates the National RE Plan, and registers RE participants. Pursuant to its mandate under the 2008 RE law, a primary responsibility for the regulator is establishing feed-in tariffs for wind, solar, ocean, run-of-river hydropower and biomass resources. The regulator posted its draft rules for comment in March 2010. Accompanying the draft rules is a detailed conceptual framework describing the economic principles applied in establishing cost-effective RE tariffs.

While these experiences are varied and the particular challenges faced differ from project to project, some themes and lessons can be drawn. First and foremost, RE development must be tackled from a broad base. Because the technology is new and the cost-benefit analysis untraditional, a multi-faceted approach by a country is needed to reduce investor risk and increase the attractiveness of RE investments. The regulator’s role in this effort includes contributing its knowledge when the government is making policy decisions, and implementing those decisions in a transparent and predictable way that minimizes transaction costs.

## **Recommendations**

Our future and RE expansion are linked. As the RE sector continues to experience rapid growth and change, regulators need to have the tools to facilitate advancements that can be successfully integrated with the existing market, energy needs, operational integrity and affordability. The following recommendations are priorities to realize this objective:

- Identify any international commitments in which the government has entered, and review the targets, priorities and strategies that may be part of such commitments. Review energy policies or national programs for the same. This process will assist regulators in understanding what steps governments are likely

to take in support of the different paths for RE development, and also to understand any constraints.

- Review legal and administrative processes in other sectors that may impact RE advancements, including environmental siting and permitting restrictions, environmental standards, and investment and procurement rules.
- Work closely with other regulators from other countries, particularly those in the region and who work in similar resource, economic and supply conditions, to build knowledge, ideas and strategies to effect change.
- Develop, implement and provide expert advice on incentive schemes for RE (with the scope dependent on legal authority), with a view to sector-wide conditions and needs, and not in isolation.

Establish mechanisms, formal or informal, for coordinating activity with other governmental bodies with responsibilities in the field, and promote methods for “one-stop shopping” by interested RE investors. Ensure operational transparency, predictability and clarity of regulatory processes. The temptation to provide support for one project is significant when targets are international and national priorities. Sector stability requires transparent and non-discriminatory policies that offer oversight and monitoring, informed by economic and social priorities along with sector and economic analysis, but not favoring individual projects in an unpredictable or subjective manner. The important work of regulators in the RE sphere requires dedicated attention and support; the Handbook is one step toward ongoing international collaboration between regulators to effect renewable energy development. The Executive Summary and Handbook are available on NARUC’s website, [www.naruc.org/international](http://www.naruc.org/international).







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