

Renewable Energy

Full Description

For more information, visit the section on [Toolkits](#), see Renewable Energy Projects by Resource ([Solar Power](#), [Wind Power](#), [Hydropower](#), [Biomass](#) and [Geothermal](#)) or see [Water Projects Using Renewable Energy](#).

Renewable Energy Policies, Laws and Regulations

The recent growth of the renewable energy market has been driven to a large extent by policies, laws and regulations that encourage private investment in RE. Often these approaches are combined in order to optimize the benefits of several mechanisms.

Key regulatory and pricing mechanisms to promote the uptake of RE include:

- **National RE targets** - Legal requirement to produce a certain portion of energy from RE sources together with a timeline by which the target has to be reached.
- **Feed-in tariffs (FiT)/feed-in premiums (FiP)** - FiT and FiP guarantee the purchase of generated RE at a fixed price or premium for a defined period in time.
- **Quota Obligations or Renewable Portfolio Standards (RPS)** - Requirements for utilities to source specific percentages from RE sources.
- **Grid Access Provisions** - Provisions that give RE producers facilitated access to the grid, e.g. through mandated grid access or reduced transmission fees.
- **Auction Schemes** - Public competitive bidding for procuring new RE capacity at the lowest possible price.

Global

Reference: [IEA/IRENA Global Renewable Energy Policies and Measures Database](#) - International Renewable Energy Agency (IRENA) maintains a joint database with the International Energy Agency (IEA) for policies and measures pertaining to renewable energy from around the world. The database is searchable by country and sector.

Regional

European Union

Reference: **EBRD** - [Renewable Development Initiative for EBRD](#): Funded by USAID, this website tracks the latest developments of 29 countries located throughout Central and Eastern Europe and the Former Soviet Union and serves as an information resource to project developers, policymakers and researchers.

Reference: [European Commission – Renewable Energy](#): This site on renewable energy by the European Commission contains links to the policy framework of the European Union as well as the Renewable Energy Directive.

Reference: [European Union Renewable Energy Legislation](#): Overview of the secondary EU legislation that falls under the legislative competence of The Directorate-General for Energy (DG ENER) and that is currently in force (split by policy areas).

Reference: [RES Legal Europe – Legal Sources on Renewable Energy](#) - RES LEGAL Europe is a professionally edited and free of charge online database on support schemes, grid issues and policies regarding renewable energy sources in the EU 28 Member States, the EFTA Countries and some EU Accession Countries. The database covers all three energy sectors: electricity, heating & cooling and transport. It provides a quick overview of the different national regulations regarding renewable energy sources in a clear, concise and convenient way and links to the original legal sources in their original language as well as link to a translation of the law if available.

National

Australia

In line with its more market-oriented approach to power sector regulation generally (see [Energy Laws and Regulations](#)), Australia operates a market-based renewable energy target scheme under the [Renewable Energy \(Electricity\) Act 2000](#) (Cth). The scheme aims to incentivize electricity generation from renewable sources.

Under the scheme, large renewable power stations and the owners of small-scale systems can generate renewable energy certificates for every megawatt of electricity they produce. The certificates can then be sold to electricity buyers on the wholesale market, who are required to surrender a certain number of these renewable energy certificates every year (expressed as a percentage of the volume of electricity they purchase in that year) to meet their surrender obligations under the scheme. The sale of renewable energy certificates provides an additional source of revenue for renewable energy projects, which acts as an incentive for investment into this sector. The scheme is regulated by the [Australian Clean Energy Regulator](#).

The Australian Financial Market Association publishes [template documents](#) for the trading of renewable energy certificates under the scheme.

Brazil

Brazil introduced an auction system to procure electricity in 2004 ([Law no. 10.848/2004](#), and [Decree no 5163/2004](#)) for the market regulated by [ANEEL, the Brazilian Electricity Regulatory Agency](#).

In the same year [EPE – Empresa de Pesquisa Energética](#) was created ([Law no. 10.847](#)). The [EPE Web Page on Energy Auctions](#) provides information and updates on the Brazilian energy auctions organized by ANEEL as well as links to [Laws and Regulations in the Brazilian Energy Sector](#).

[Alternative Energy Auction of July 2011 – Regulation Portaria MME 113 of Feb 1, 2011](#) - Authorizes ANEEL to organize alternative energy auctions and provides pre-qualification criteria for developers/investors interested in participating in the auction. The capacity to be awarded and the types of energy sources to be promoted at the auctions are defined by [MME - Ministerio de Minas e Energia](#). All types of auctions are conducted by CCEE – Camara de Comercialização de Energia Elétrica, a regulated non-profit entity formed by agents from the power market, on behalf of ANEEL.

Further to the auction-based scheme, a new FIT-scheme has been introduced by the Brazilian government in December 2015 to promote distributed power generation from renewable sources by consumers ([Executive Order 538/2015](#)).

A draft Bill is currently under discussion in the Brazilian Congress, following two public hearings in July 2017 aimed at reformulating and improving the Brazilian power sector's legal framework. One of the topics discussed in the hearing was specific measures that could positively affect the market. Specifically, the hearings discussed the possibility for the establishment of public auctions specifically for capacity sale (unlike existing auctions, which sell energy produced by power plants).

For more details see [The Brazilian Power Market: An Interesting Investment Regime for Onshore Wind and Solar Power?](#) Fieldfisher LLP, April 2016 and [Energy 2020 / Brazil, Global Legal Insights](#).

Chile

Chile's RE incentive scheme is based on [several different laws](#), including Law 20257 (Ley de Energías Renovables No Convencionales) as amended by Law 20701 (Procedimiento para Otorgar Concesiones Eléctricas) and Law 20018 (Modifica el Marco Normativo del Sector Eléctrico), as amended by Law 20805 (Perfecciona el Sistema de Licitaciones de Suministro Eléctrico para Clientes Sujetos a Regulaciones de Precios). For more details see [Renewable Energy in Latin America: Chile](#), Norton Rose Fulbright, 2017.

Germany

The Renewable Energy Sources Act, also referred to as [Renewable Energy Law \(Erneuerbare Energien Gesetz – EEG\)](#) of 2000 as amended through 2017 and 2023 sets out the main support scheme for electricity generation from wind, hydro, solar, biomass and sewage gas combustion, as well as geothermal energy. It used to be based on a FiT scheme and has recently introduced an auction model for utility-scale projects.

Lao PDR

Lao PDR has implemented a number of policies to reduce greenhouse gas emissions and increase the use of renewable resources in its energy make up. The key policies include:

- [National Strategy on Climate Change](#) – the strategy includes among its priorities: accelerating the development of renewable energy sources such as wind, solar and hydropower, and development of cleaner technology for the use of the Laos' coal resources; and
- [Renewable Energy Development Strategy](#), which among other things:
 1. sets a target to increase the share of the renewable energy to 30% of the aggregate energy consumption by 2025;
 2. sets a target to increase the share of biofuel to 10% of aggregate transportation energy consumption;
 3. outlines a range of financial incentive schemes to encourage investment in the renewable sector; and

4. provides for the set-up of a Renewable Energy Fund to finance various development and research activities in the renewable sector.

See [Sample Energy Laws and Regulations](#) for an overview of Laos' regulatory framework.

Philippines

The [Electric Power Industry Reform Act of 2001 \("EPIRA"\)](#) mandates, among other things, that the [Department of Energy \("DOE"\)](#) shall encourage private sector investment in renewable energy sources (see [Sample Energy Laws and Regulations](#) for a more detailed summary of the EPIRA).

Consequently, the government of the Philippines has enacted a number of laws and policies including:

- the [Renewable Energy Act of 2008](#). Among other things, the Act establishes:
 1. the National Renewable Energy Board ("NREB") to set minimum targets of generation from renewable energy sources;
 2. a [Feed-in Tariff \("FiT"\) system](#) designed to incentivize the development of generation projects from renewable sources;
 3. a Renewable Energy Market ("REM") for the trading of renewable energy certificates to facilitate meeting the minimum renewable generation targets set by the NREB; and
 4. the [Green Energy Option program](#), which provides end-users with the option to choose renewable energy resources as their sources of energy; and
- the [National Renewable Energy Program](#), which seeks to increase the renewable-energy based power capacity of the country by:
 1. implementing a comprehensive approach to address the challenges and gaps that prevent or delay the application of renewable energy technologies; and
 2. outlining action plans necessary to facilitate and encourage greater private sector investments in renewable energy development.

Feed-in Tariffs

The Philippine Feed-in Tariff ("FIT") scheme is an example of how a largely market-oriented approach to incentivizing the development of renewable energy sources can be adopted in less mature electricity markets. The [Renewable Energy Act of 2008](#) established a scheme, which provides emerging independent power producers ("IPPs") with a guaranteed Php per kWh price for electricity generated through renewable energy sources for a period of 20 years. This provides a degree of cushioning for renewable projects against pricing volatilities in the Philippine electricity market (thereby facilitating their finance and development). The

government's role is broadly analogous to that of a private hedge provider for the project's revenue stream, while the economic and commercial structures of the project are largely left to the private sponsors.

The FiT rates are set by the [Energy Regulatory Commission \("ERC"\)](#) with recommendations from the National Renewable Energy Board ("**NREB**"). The FiT rates are also subject to a degression mechanism, to account for the reduced cost of deploying renewable generation technology over time. The degression rate depends on the year in which the relevant renewable energy plant started commercial operation and the type of renewable energy involved.

The FiT system is largely funded through the Fit-Allowance ("FiT-All"), a levy paid by all consumers who are supplied with electricity through the distribution or transmission network. The levy is set annually by the ERC, collected by utility and electricity suppliers, then distributed to renewable energy generators by the [National Transmission Corporation \("TransCo"\)](#), a government owned and controlled agency. The [Guidelines](#) on the collection of the FiT-All and disbursement of the FiT-All Fund were adopted by the ERC in 2013.

Spain

Article 2 of [European Directive 2009/28/EC](#) (repealed by [European Directive \(EU\) 2018/2001](#)) defines "electric energy from renewable sources" as electric energy coming from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogasses. This definition is further developed in Spain through article 2 of [Royal Decree 413/2014](#).

Licensing

As per [Royal Decree 1955/2000](#) the building, operation, modification, temporary or definitive closure and transfer of renewable-electricity generating assets are subject to prior administrative authorizations. They must be granted by the relevant Spanish autonomous community or by the Ministry for Ecological Transition and Demographic Challenge when such actions affect more than one Spanish Autonomous Community or have an installed capacity which exceeds 50 MW, and can be summarized as follows:

- administrative authorization, if appropriate, in conjunction with the environmental impact study;
- approval of the execution project; and
- start-up certificate – the relevant authorities issue the start-up once the project is completed and after having completed the necessary technical inspections and verifications of the project.

Remuneration Regime

The Spanish incentive scheme for renewable generation provides an example of a partially market-oriented policy solution to incentivizing renewable energy developments. In general terms, under the Spanish scheme (mainly regulated in [Law 24/2013](#), [Royal Decree 2019/1997](#) and [Royal Decree 413/2014](#)) renewable power generators sell the electricity they generate:

1. into the Spanish wholesale market ("[OMIE](#)") and receive market price for such sales; or

2. to specific customers by means of bilateral agreements (Power Purchase Agreements or “PPAs”) which can be either:
 - a. physical (long-term PPA) with a specific amount of power sold at a fixed price per MWh; or
 - b. synthetic (financial PPAs) which, in general are structured as a hedging agreement through a contract for differences, with no physical delivery of electricity, consisting of the financial coverage of the price of energy, adjusting the differences between the wholesale market price and the agreed price.

In addition, they may also receive additional state regulated payments during their respective regulatory lives, as an incentive to encourage the use of renewable generation sources.

As set out in [Royal Decree 413/2014](#), the specific remuneration additional to market revenues consists of:

1. a capacity supplement in €/MW to cover investments not recovered in the market; and
2. if applicable, an operation supplement in €/MWh when operating costs cannot be recovered in the market. This specific remuneration is calculated taking into account standard installations throughout the regulatory life of the power plant, and assuming an efficient and well-managed company.

The granting of this specific remuneration scheme will be determined on a competitive basis through state auctions. The result of the auctions will determine the value of the supplement in €/MW.

United States

Reference: [United States: Incentives and Policies for Renewable Energy and Energy Efficiency](#) - The Database of State Incentives for Renewables & Efficiency (“DSIRE”) is a comprehensive source of information on state, federal, local, and utility incentives and policies that support renewable energy and energy efficiency. Established in 1995 and funded by the U.S. Department of Energy, DSIRE is managed by the North Carolina Clean Energy Technology Center.

Vietnam

The Vietnamese Government has implemented a number of incentives to promote the development of renewable energy, which are primarily in the form of tax relief or government grants. The key policies include:

- [Decision No. 2068/QD-TTg](#) dated 25 November 2015 provides the following incentives:
 - zero import duty for assets to form the fixed assets of a renewable energy project, and for materials and semi products which are unavailable in the domestic markets;
 - corporate income tax exemption or reduction;

- land rental exemption or reduction; and
- government funding for research and technology of pilot projects.
- [Decision No. 11/2017/QĐ-TTg](#) dated 4 November 2017, as amended by [Decision No. 02/2019/QĐ-TTg](#) dated 8 January 2019, also provides incentives for solar energy projects, which are entitled to an import duty exemption for:
 - goods imported to form the fixed assets of the projects; and
 - materials, semi-products and fuel that are not available locally.
- [Circular No. 02/2019/TT-BCT](#) introduces notable changes to the regulations on wind power projects and the mandatory terms of wind power purchase agreements.

Renewable Energy Sample Project Documents and Contracts

Renewable energy projects rely on a number of legal contracts. One central contract is the power purchase agreement (PPA), which governs the sale and purchase of power:

See also [Key Features of Power Purchase Agreements](#).

Other important contracts include land use agreements, supply agreements, installation agreements, O&M agreements and implementation agreements.

Below are links to sample project documents that were developed for multiple renewable energy sources. For sample documents that relate to specific resources see the sample project documents under [Solar Power](#), [Wind Power](#), [Hydropower](#), [Biomass](#) and [Geothermal](#).

Regional

Regional Center for Renewable Energy and Energy Efficiency (RCREEE)

The following are sample contracts published by the [Regional Center for Renewable Energy and Energy Efficiency \(RCREEE\)](#), an independent non-profit regional organization which aims to enable and increase the adoption of renewable energy and energy efficiency practices in the Arab region. RCREEE teams with regional governments and global organizations to initiate and lead clean energy policy dialogues, strategies, technologies and capacity development in order to increase Arab states' share of tomorrow's energy.

National

Kenya

Model PPAs for wind, biomass, small hydro, geothermal, biogas and solar projects.

Reference: [Standardized PPA for Large Scale Generators More than 10MW](#)

Reference: [Standardized PPA for Small Scale Generators less than 10MW](#)

Malawi

Reference: [Draft Standard PPA](#) of December 2010 published by the Malawi Energy Regulatory Authority for [hydro/geothermal/gas fired] power generation between IPP (“Seller”) and Purchaser, a company entitled to purchase electricity and to transmit and distribute electricity in the Republic of Malawi; Seller proposes to develop, design, finance, insure, construct and complete, own, operate and maintain a [hydro/geothermal/gas fired] power generation facility and Purchaser wishes to purchase from the Seller the capacity of such power generation facility and all of the net electrical output pursuant to the terms and conditions of the PPA.

See also [Independent Power Producer \(IPP\) Framework for Malawi](#) of 8 March, 2017.

Philippines

Reference: [Sample PPAs](#) - The [Energy Regulatory Commission \(“ERC”\)](#) has published standard documentation for the offtake of electricity from Renewable Energy (“RE”) Plants eligible for the [Philippine Feed-in Tariff \(“FiT”\)](#) system. The principal agreement is the Renewable Energy Payment Agreement (“REPA”) under which TransCo (the FiT Allowance Administrator) pays the owner of the eligible RE Plant (RE Developer) the FiT rate for the plant’s metered energy output. The economic function of the REPA is broadly analogous to a synthetic PPA with private hedge counterparties, which are used in more established electricity markets, to provide revenue stability for the project (see [Synthetic PPAs](#)). Separately, where a RE Plant does not operate in the Philippine Wholesale Electricity Spot Market (“WESM”), the RE Developer and local host distribution utility (“DU”) must enter into a Renewable Energy Supply Agreement (“RESA”) for the offtake of electricity generated by the plant. For key features of sample PPAs, [read more...](#)

Serbia

Reference: [Model Privileged Producer Electric Power Purchase Agreement](#) pursuant to Article 65 of the Law on Energy Republic of Serbia (applicable for wind, solar, small hydro biomass). The [Energy Agency of the Republic of Serbia](#) has published more information on Privileged Power Producers.

Uganda

Reference: Model Implementation Agreement and Standardized PPA published by the [Global Energy Transfer Feed in Tariff \(GETFiT\) Programme](#). The main objective of the GET FiT Program is to assist East African nations in pursuing a climate resilient low-carbon development path resulting in growth, poverty reduction and climate change mitigation. Through the roll-out of phase one of the program, a portfolio of up to 15 small-scale Renewable Energy generation projects promoted by private developers with a total installed capacity of about 125 MW and approximately 780 GWh production / year will be fast tracked. The GETFiT Programm has also published a License Certificate and License Conditions.

Zambia

Reference: Zambia Renewable Energy Feed-in Tariff (REFIT) Program: [REFIT Power Purchase Agreement](#) - Model PPA between state-owned utility and the Seller (draft of February 2016) developed by the United States Agency for International Development (USAID) with the Ministry of Energy and the regulator. The 20-year agreement is applicable for solar, hydro, biomass, geothermal and wind plants and outlines the provisions commonly found in PPAs for private power projects internationally. The PPA is based on the assumption that the developer will finance the project through project finance arrangements. The Seller will also enter into an implementation agreement with the government of Zambia and will obtain a Generation

License from the energy regulator in Zambia. The standardized agreement is based on a REFIT policy to stimulate renewable energy production and to promote private sector participation in energy sector. See also [Model Grid Connection Agreement](#), [REFIT Guidelines](#): Support Mechanisms and Draft Regulations and [REFIT Rules](#).

Other relevant contracts relate to the financing, building and operation of the power plant, e.g. land use agreements, construction and operating contracts, as well as implementation agreements. See [Energy and Power PPPs](#)

Further Reading and Resources: Renewable Energy

[Climate Toolkits: Renewables](#), The renewables toolkit helps government agencies in emerging markets and developing economies (EMDEs) incorporate climate-related risks in the early stages of renewable energy infrastructure projects procured through public-private partnerships (PPPs). See other Sector Specific Climate Toolkits for Infrastructure PPPs [here](#).

[Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers](#), Technical Report of the Energy Sector Management Assistance Program (ESMAP), World Bank 2019

[Mini Grids and the Arrival of the Main Grid: Lessons from Cambodia, Sri Lanka and Indonesia](#), Technical Report of the ESMAP Program, World Bank 2018

[Renewable Energy Policies in a Time of Transition](#), International Renewable Energy Agency (IRENA), International Energy Agency (IEA), and the Renewable Energy Policy Network for the 21st Century (REN21), 2018

[Understanding Power Project Procurement](#), Commercial Law Development Program (CLP) in partnership with the African Legal Support Facility - Fourth handbook in Power Africa's "Understanding" series, Understanding Power Project Financing This handbook is intended to provide the reader with an overview of the mechanisms and strategy behind successful Power Project Procurements. It explores the complexity of procuring privately-owned power projects and describes the approaches that public procuring entities can use to establish and sustain power projects, including the advantages and disadvantages of the alternatives. It also describes how these entities can implement these alternatives. Refers specifically to renewable energy projects and includes a chapter on feed-in tariffs.

[Renewable Infrastructure Investment Handbook](#): A Guide for Institutional Investors, World Economic Forum, December 2016 – Guide for institutional investors interested in climate finance. The Roadmap for Renewable Infrastructure deals with risk allocation.

[South Africa's Renewable Energy IPP Procurement Program: Success Factors and Lessons](#) by Anton Eberhard, Joel Kolker and James Leigland, Public-Private Infrastructure Advisory Facility (PPIAF), May 2014.

[From the Bottom Up : How Small Power Producers and Mini-Grids Can Deliver Electrification and Renewable Energy in Africa](#). Directions in Development--Energy and Mining; Tenenbaum, Bernard; Greacen, Chris; Siyambalapitiya, Tilak; Knuckles, James. 2014. Washington, DC: World Bank.

[Renewable Energy Auctions in Developing Countries](#), IRENA 2013

[Revisiting Public-Private Partnerships in the Power Sector](#) by Maria Vagliasindi, World Bank 2013.

[Power PPPs](#), Handshake, International Finance Corporation's (IFC's) quarterly journal on public-private partnerships, [Issue # 13](#), October 2012.

[Recommendations for the Design of Successful Renewable Energy Auctions or Competitive Tenders in Africa, Lessons from South Africa](#) by Anton Eberhard and Raine Naude. Part B contains recommendations for tender documentation and contracts.

[A Policymaker's Guide to Feed-In-Tariff Policy Design](#), NREL 2010

[Important Features of Bankable Power Purchase Agreements for Renewable Energy Power Projects](#), OPIC, USAID, International Trade Agency, US Trade and Development Agency- Summarizes 10 Important Features to Include or Consider for a Bankable PPA.

See also Power Projects: [Further Reading and Resources](#)

Useful Links

- [ESMAP – Renewable Energy](#)
- [European Commission – Renewable Energy](#)
- [Inter-American Development Bank: Resources related to renewable energy](#)
- [Renewable Energy Policy Network \(REN21\)](#)

Related Content

[Climate-Smart PPPs](#)

[Climate-Smart PPP Legal and Regulatory Framework](#)

[Preparing, Procuring and Implementing Climate-Smart PPPs](#)

[?Sector-Specific Content on Climate-Smart](#)

[Renewable Energy Toolkits](#)

[Climate-Smart PPPs: Further Reading and Resources](#)

[Additional Resources](#)

[Energy and Power PPPs](#)

[Solar Power Energy](#)

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