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Renewable Energy Law and Auctions in Vietnam

Minh Ha-Duong, Ngo To Nhien^a

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Summary: This policy note examines the rationale for enacting a Renewable Energy Law in Vietnam, and to use an Auction mechanism to replace the Feed In Tariff as the main instrument to develop renewable energy sources electricity production.

1 Rationale for a renewable energy law in Vietnam

1.1 INTRODUCTION: MANY COUNTRIES HAVE A RENEWABLE ENERGY LAW OR SIMILAR POLICY

Multiple developing and emerging countries have adopted renewable energy laws to set the proper legal framework for RE investment and operation, which is necessary to set stable, transparent and effective conditions. Even in the absence of specific Law –which is an Act promulgated by the Legislative branch of the government– similar Policies have been adopted at the executive branch.

The present systematic survey of other ASEAN countries (Table 1) shows that by mid 2017 only Malaysia and Philippines had a renewable energy act, issued in 2011 and 2008 respectively. Indonesia has renewable energy regulations 12 and 50 (2017). Thailand has an series of Alternative Energy Development Plan integrated in a Power Development Plan, both issued in 2015. Cambodia issued a Renewable Energy Development Strategy in 2011. Brunei's Energy White Paper (2013) and Singapore's Climate Action Plan (2016) contain provisions to renewable energy but are not specific. We did not find renewable energy law or policy for Laos and Myanmar.

The European Union updated its Directive on the promotion of the use of energy from renewable sources¹ in December 2018, to establish a new binding renewable energy target for the European Union for 2030 of at least 32%. It needs to be transposed into national law by Member States by 30 June 2021. Under the previous 2009 directive, all Member States submitted and enacted a 2020 National Renewable Energy Action Plan. They are now required to submit National Energy & Climate Plans for 2021-2030, by the end of 2019.

According to Liu² China has a comprehensive renewable energy legal system essentially based on the Renewable Energy Law that came into being in 2005 and was amended in 2009, supplemented by other related laws and policies, particularly a series of five-year, medium and long-term plans that set out guidelines and objectives. Liu's comparison of the China renewable energy law with those of Germany, Australia, Japan and France reveal venues for improvement. They can be summarized as follows: timely formulation and adjustment of laws, complete and concrete law provisions, a high standard of renewable energy utilization proportion, promotion of market competition, proper financial subsidies, and avoidance of over-exploitation of

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renewable energy.

Vietnam has no Renewable Energy Law³ but a series of strategic and planning documents, translated in a comprehensive suite of sectoral decisions and circulars. The legal situation compares to Thailand, although Thai's renewable and power plans are better integrated.

1.2 WHAT IS IN RENEWABLE ENERGY LAWS: TYPICAL SECTIONS IN THE TABLE OF CONTENTS

Renewable energy laws aim to set stable, transparent and effective conditions for renewable energy investment and operation. They typically deal with the following matters: to establish renewable energy targets; to effect structural changes in the energy sector to level the playing field; and to define incitative regulatory policies as well as financial instruments^{4,5}.

- Markets restructuring can include removal of fossil fuels subsidies; and provisions to make intermittent generation sources easier to integrate in the system.
- Regulatory policies can include Feed-in tariff (FiT) / premium payment; Electric utility quota obligation / renewable portfolio standards (RPS); Net metering/billing; Transport obligation/mandate; Heat obligation/mandate; Tradable Renewable Energy Certificates; and Tendering / Auctions.
- Fiscal incentives and public financing can include investment or production tax credits; reductions in sales, energy, carbon dioxide, Value Added Tax or other taxes; energy production payment; and public investment, loans, grants, capital subsidies or rebates.

Table 2 defines these instruments in more detail and displays their international adoption rates. It shows that two instruments are not enacted in Vietnam Law: RPS and Tendering / Auctions.

- A Renewable Portfolio Standards (RPS) typically places a requirement upon covered retail electric suppliers to supply a designated portion of their retail load with eligible sources of renewable energy. The requirement typically increases over time until it reaches a specified level. The instrument also often includes a market-based system of tradable renewable energy credits as a compliance mechanism. According to Kennedy⁶, they are typically developed by legislation, and experience with them thus far have demonstrated a high degree of success.
- Tendering / Auctions relies on public competitive bidding to identify low-cost suppliers with whom the State enter into long term contracts with set prices. They are typically used to procure large amounts of renewable energy, several hundred MW capacity at the same time, when another instrument like FiT risks being excessively costly. Historically, eighty four countries have held tenders, including twenty nine countries in 2017 only⁵.

Tables 3 to 7 provide the outline of Renewable Energy Laws for various countries. It shows a diversity of enacted policies, which can be explained by factors such as natural resources endowment, technology cost and efficiencies, or market development. Turkey's first Law on utilization of renewable energy sources⁷ was all about defining a FiT, no Auctions or RPS. Malaysia's 2011 Renewable Energy Act also relies on a FiT⁸. The Renewable Energy Act in Korea^{9,10} initially defined a FiT, but was amended in 2012 to rely on RPS. The Philippines' Renewable Energy Act of 2008¹¹ is comprehensive with FiT, RPS, net metering, market restructuring measures, financial incentives, and a trust fund.

To sum up, there is no ready made Renewable Energy Law table of contents. They are tailored to

the national priorities at the time they are written, and subsequently revised as the conditions change.

1.3 WHY VIETNAM NEED A RENEWABLE ENERGY LAW: AUCTIONS AND PORTFOLIO STANDARDS

A specific renewable energy law appears as a powerful tool for Vietnam to continue to attract and to secure private investment on renewable energy. The law can enact a shift in the way the State drives the sector, from using FIT to using Renewable Portfolio Standard and Auctions.

- Vietnam's Renewable Energy Development Strategy¹² provides that Power generation / distribution entities shall be required to meet Renewable Portfolio Standard conditions. For power generation entities that have their installed capacity larger than 1 000 MW (excluding Build-Operate-Transfer-invested sources), the share of electricity generated from renewable energy sources (excluding hydro power sources of greater-than-30 MW capacity) shall not be less than 3%, 10% and 20% in 2020, 2030 and 2050 respectively. The distribution companies must buy electricity from renewable energy projects with shares not lower than: 3% by 2020; 10% by 2030 and 20% by 2050. To date these provisions have still not been implemented.
- Decision 11/2017/QĐ-TTg tasked MOIT to study the bidding process on solar power¹³, and accordingly, it is conducting a solar auction pilot program with support of the World Bank. Decision 39/2018/QĐ-TTg mandates¹⁴ MOIT to send a proposal for a mechanism of auction for wind power development and wind power purchase price applied from November 01, 2021 to the Prime Minister for consideration and ratification purpose. Section 2 of this Policy Note discusses the reasons and expected benefits of this move from FIT to Auctions.

An overarching law can harmonize renewable energy targets dispersed in various international declarations; national strategies; and national plans about climate; electricity; renewable energy; and growth. It is also an opportunity amend other Laws dispositions that slow the deployment of renewable energy sources. For example, there is a need to:

- Amend the public procurement mechanisms to allow for Auctions;
- Clarify the functioning of the electricity market to: Allow corporations to source electricity from renewable sources – the Direct Power Purchase Agreement; and close the debates on net-metering / billing for rooftop photovoltaic electricity;
- Improve transparency in determining electricity prices and fees; reinforce the effectiveness of the electricity regulation authorities; and ensure the role of State management in the electricity sector is coherent with the policy goals;
- Improve the energy data and statistics information system. For example, knowing present and projected load of electricity network substations is necessary to sit new plants away from congested grid areas, and to conduct forecasting for operation activities;
- Ensure that planning processes are adequate for the integrated development of the power grid and decentralized renewable energy resources, with special attention to rural, high mountain and islands in Vietnam.

Funding mechanisms to budget for the measures included in the Law are essential, but discussing them is out of scope of this policy note.

A comprehensive Renewable Energy Law would consider the long term innovation needs to facilitate the integration of intermittent generation sources, and lay the stones to better inform decisions about flexibility, storage, smart grid, virtual power plant and demand side management.

Finally, a Renewable Energy Law is an opportunity to think about the leading role of the public sector in producing decentralized renewable energy – the solar panels on the National Assembly’s building roof show the way.

2 Auctions

2.1 AUCTION PRICES FOR RENEWABLE ENERGY OF MOST PROJECTS/COUNTRIES

Electricity from wind onshore and solar auctions costs 20 to 50 USD/MWh for projects to be commissioned in 2023, according to the International Energy Agency¹⁵. By mid-2016, at least 67 countries¹⁶ had held renewable energy auctions, compared to 6 countries in 2005. As Figure 1 shows the trend is towards lower costs. This is due to technology maturity, market size and widespread use of auction mechanisms. While the median price declines in all continents, auction results in each country do vary with natural resource potential, capacity factors, financial conditions, auction design framework and long-term government policies.

2.2 EVALUATION OF THE EFFECTIVENESS BETWEEN POWER'S AUCTIONING AND NORMAL INVESTMENT.

International auction prices are much cheaper than current FITs in Vietnam which are over 90 USD/MWh.

Text 1 in the supplementary material reviews the success and the limits of the FIT use in Vietnam. In summary, the FIT policy was very effective to kick-start the renewable energy sector in Vietnam. This historical mission is completed. FIT is still relevant for small scale projects, where administration costs would be comparably high. Such distributed systems can still represent a significant fraction of the new renewable energy capacity. But for centralized power supply at large scale, switching towards auction mechanisms could provide¹⁷ (i) More control over new installation capacity; (ii) Discovery of true market price; (iii) Lower financial risks, facilitating the mobilization of domestic and international capital; (iv) A more competitive and transparent power market.

2.3 WHAT IS THE MECHANISM FOR AUCTIONING?

Renewable energy auction are usually based on reverse bidding: the winner is the qualified producer who offers to sell electricity at the lowest cost. Text 2 in supplementary material proposes recommendations to design a pilot solar power auction in Vietnam. Implementing a bidding mechanism requires to define¹⁷ : (i) Bidding Process; (ii) Qualification Criteria; (iii) Price Discovery Mechanism; (iv) Winner Selection.

- Bidding process requires two steps: the qualification of buyers and the price discovery. The qualification of buyers can be divided in (i) prequalification through Expression of Interest; and (ii) selection through Request for Proposal;

- The considerations for qualification is a combination of technical and financial capabilities of the bidders to evaluate their experience, readiness etc.;
- The price discovery mechanism is at the heart of competitive bidding. The simplest process relies on paper-based single offers. More sophisticated iterative processes are typically done in real time via the internet. These are efficient in finding the lowest price, but require higher market maturity, preparation and competition to work well;
- Winner selection: The winner may be selected based solely on the lowest price bid. Alternatively, the bid price can be aggregated with other characteristics of the bid to account for multiple objectives, such as localization priority or local content requirements.

2.4 RESPONSIBILITIES OF ALL STAKEHOLDERS INVOLVED IN THE AUCTION.

All stakeholders at the province level (DPI, DOIT, DONRE) and at the national level (MOIT, MPI, MONRE and EVN) will have a role to play in tendering renewable energy.

At the national level, the bidding procedure is not specifically provided under Vietnamese electricity laws, so the MOIT and MPI may consider applying either of the following three legal frameworks:

- Investment legal frameworks (i.e., the Investment Law and Decree No. 118/2015/ND-CP)
- Bidding legal framework for selection of contractor to provide goods and services (i.e., Bidding Law and Decree No. 63/2014/ND-CP)
- Regulations for project using land (i.e. Bidding Law, Decree No. 30/2015/ND-CP and Circular No. 16/2016/TT-BKHDT):

The Government may consider authorizing a relevant central state authority (e.g., the MOIT or its Electricity & Renewable Energy Authority department) to organize the bids, provided that such an arrangement is detailed out in a Government notification.

At the province level, DOIT and DPI will identify potential sites and submit a renewable energy development plan to MOIT for approval. Following the approval for specific sites, which consider availability of transmission capacity in the province, DOIT will prepare the bidding invitation dossiers and organize the bids at provincial level, evaluate responses and finalize the list of selected bidders and projects for approval of the provincial-level People's Committees, and upon its approval, negotiate the contract to be signed with the winning bidders.

DONRE will provide inputs on suitability of the identified land for development of a site, based on the existing Land Use Plan and the environmental and social impact norms. It would approve the impacts assessment study for the identified renewable energy parks.

People's Committee will approve specific projects based on the provincial power development master plan, the province's auction plan and the government national master plan.

2.5 WHY VIETNAM NEEDS AN AUCTION MECHANISM TO REPLACE FIT FOR POWER, AND HOW?

Like FIT, Auctions leave the private sector to finance the investment in generation capacity investment. Because auction mechanisms discover the lowest market price, it will save a lot of

money to the electricity consumers compared to FIT. Integration costs to upgrade the transmission network remain, but they can be reduced as auctions allow more control on where and when new projects go online. The key steps forward are:

Revise the legal framework. The Government may need to have the law revised and/or issue decisions or other documents guiding the existing laws, under which the competitive bidding framework will be implemented. MOIT and MPI will preside over the drafting process, collect opinions from relevant stakeholders and submit the draft to Government for adoption/issuance prior to launching the competitive bidding program;

Issue a Prime Minister Decision on the pilot competitive bidding program. Prior to the adoption of all revisions to the legal framework (if required) and issuance of the legal document guiding on competitive bidding process, the pilot competitive bidding program could be implemented under a Decision of the Prime Minister;

Adopt a bidding mechanism that ensures participation of credible developers who can offer competitive prices. Robust qualification criteria attract serious investors and experienced developers, which ensures timely materialization of awarded projects. Such bidders are able to draw upon international experience, use modern technology, are able to get lower cost financing and offer better tariffs to the procurers;

Adopt a lower risk Power Purchase Agreement that allows investors to attract lower cost financing. Capital-intensive projects require adequate risk mitigation mechanisms to make them attractive to the investors. The costs of risk is included into the bids. The Government may need to issue a legal document or circular to revise the Power Purchase Agreement.

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4 Supplementary data

Table 1: Renewable energy laws, policies and targets in ASEAN countries

| Countries | Renewable energy Laws | Renewable energy Policies | Quantified energy targets in NDC | Quantified energy targets in Laws & Policies |
|--------------------|--|--|---|--|
| Brunei | None found | Energy White Paper (2013) | Increase the share of renewables so that 10% of the total power generation is sourced from renewable energy by 2035 | Increase the share of renewable energy in the total power generation mix by 2.7 percent or 124,000 MWh by 2017 and by 10 percent or 954,000 MWh by 2035 |
| Cambodia | None found | Renewable Energy Development Strategy 2011 | 30% of energy consumption from renewable energy by 2025 | 30% renewable of total energy consumption by 2025 |
| Indonesia | Law 21/2014 New Geothermal Law Law 30/2007 Regarding Energy | Regulations 12 and 50 on the utilisation of Renewable Energy for the Provision of Power (2017) Ministerial Regulation 216/2012 Accelerating Development of Geothermal Energy Supply (revised Ministerial Regulation 15/2010) Presidential Decree 61/2011, National Action Plan to reduce GHG emissions (RAN-GRK) Ministerial Regulation 15/2010 Re. 10,000 MW Crash Programme Presidential Instruction 1/2006 on Biofuel Development Presidential Regulation 5/2006 concerning National Energy Policy | None found | National Medium Term development plan 2015-2019: 10-16% renewable energy by 2019 compared with a 2019 scenario Presidential regulation 5/2006: Primary energy mix consists of greater than 5% biofuel, greater than 5% geothermal, and greater than 5% other new and renewable energies by 2025 |
| Laos | None found | None found | -16% emissions compared to BAU by 2030 / 1.8 MtCO ₂ e emission reduction | None found |
| Malaysia | Renewable Energy Act (2011) Sustainable Energy Development Authority Act 2011 (2011) Malaysia Biofuels Industry Act 2007 | 11th Malaysia plan 2016-2020 (2015) | None found (| 11th Malaysian Plan: 2,080 MW in installed renewable energy capacity by 2020 |
| Myanmar | None found | None found | 30% renewables in rural electrification (mini-hydro, biomass, solar, wind and solar mini-grid technologies) | None found |
| Philippines | Renewable Energy Act (RA9513) (2008) Biofuels Act (RA 9367) (2007) Mini-hydroelectric Power Incentive Act (RA 7156) (1991) | None found | None found | Framework Strategy on Climate Change: Double renewable energy capacity to 9000 MW by 2022 against a 2010 baseline National Climate Change Action Plan: <ul style="list-style-type: none"> • 1.75 MW solar capacity installed by 2015, then 85 MW by 2030, • 4,434 MW hydropower capacity installed in 2015, then 7,534MW by 2030, • 93.9 MW solar capacity installed by 2030, • 1,018 MW wind capacity installed by 2030, • 3,447MW geothermal capacity (double 2010 baseline) by 2030 |
| Singapore | None found | Climate Action Plan (2016) | None found | Biofuels Act: 5% bioethanol in total gasoline fuel sold by 2009 Climate Action Plan: Raise the adoption of solar energy to 350 MWp (peak capacity) by 2020, compared to 60 MWp today |

| Countries | Renewable energy Laws | Renewable energy Policies | Quantified energy targets in NDC | Quantified energy targets in Laws & Policies |
|------------------|--------------------------------------|---|--|---|
| Thailand | Energy Industry Act B.E. 2550 (2007) | Alternative Energy Development Plan 2015-2036 (2015) Thailand Power Development Plan 2015-2036 (2015) Climate Change Master Plan (2015) | 20% share of power generation from renewable energy by 2036 30% share of renewable energy in end use energy by 2036 | CCMP: supply at least 25% of energy consumed from renewable sources by 2021 AEDP: increase RE from current 7,300 MW to almost 20,000 MW by 2036, supply 20% of net national electrical energy demand by renewable energy sources by 2036: <ul style="list-style-type: none"> Waste-to-energy: 550 MW (current ~65 MW) Biomass: 5,570 MW (current ~2,500 MW) Biogas from waste /wastewater: 600 MW (current ~300 MW) Biogas from plants: 680 MW Wind energy: 3,002 MW (current ~225 MW) Solar energy: 6,000 MW (current 1,300 MW) Hydropower (small): 376 MW (current 142 MW) Hydropower (large): unchanged (current ~3,000 MW) <p>Thailand PDP 2015-2036 carbon intensity from power sector:</p> <ul style="list-style-type: none"> kg CO₂ / kWh : 2021 – 0.399; 2026 – 0.370; 2030 – 0.342; 2036 – 0.319 ktons CO₂ / yr : 2021 – 93,689; 2026 – 98,950; 2030 – 99,822; 2036 – 104,075 <p>Target shares of energy consumption for individual energy sources in power sector:</p> <ul style="list-style-type: none"> Imported hydro power: 7% (2014), 10-15% (2026), 15-20% (2036) Clean coal including lignite: 20% (2014), 20-25% (2026), 20-25% (2036) Renewable energy including hydro: 8% (2014), 10-20% (2026), 15-20% (2036) Natural gas: 64% (2014), 45-50% (2026), 30-40% (2036) Nuclear: 0% (2014), 0% (2026), 0-5% (2036) Diesel/Fuel: 1% (2014), 0% (2026), 0% (2036) |

| Countries | Renewable energy Laws | Renewable energy Policies | Quantified energy targets in NDC | Quantified energy targets in Laws & Policies |
|-----------|-----------------------|---|----------------------------------|---|
| Vietnam | None found | <p>Decision 177/2007/QĐ-TTg Scheme on Development of Biofuels up to 2015, with a Vision to 2025</p> <p>Decision No. 1855/2007/QĐ-TTg: National Energy Development Strategy of Vietnam for the period up to 2020 with outlook to 2050</p> <p>Decision 2139/2011/QĐ-TTg: National Climate Change Strategy</p> <p>Decision 1393/2012/QĐ-TTg: Vietnam Green Growth Strategy</p> <p>Resolution 24/2013/NQ-TW: Active response to climate change, improvement of natural resource management and environmental protection</p> <p>Decision 31/2014/QĐ-TTg and Circular 32/2015/TT-BCT on solid-waste power</p> <p>Decision 24/2014/QĐ-TTg by Prime Minister and Circular 44/2015/TT-BCT on the mechanism for support development of biomass energy project in Vietnam.</p> <p>Decision 2068/2015/QĐ-TTg: Vietnam's Renewable Energy Development Strategy until 2030 with a vision to 2050</p> <p>Circular 06/2016/TT-BCT and 32/2014/TT-BCT regulating procedures on establishment and application of avoidable cost tariff schedule and promulgation of specimen PPA to small hydropower plants.</p> <p>Decision 428/2016/QĐ-TTg: Revised National Power Development Plan in 2011-2020 with vision to 2030</p> <p>Decision 11/2017/QĐ-TTg by Prime Minister and Circular No. 16/2017/TT-BCT on mechanism on encouragement of solar power development of Vietnam.</p> <p>Decision 39/2018/QĐ-TTg by Prime Minister amending Decision 37/2011/QĐ-TTg and Circular 32/2012/TT-BCT on provision of assistance in development of wind power projects in Vietnam.</p> | None found | <p>Decision 177/2007: Ethanol and vegetable oil output will reach 1.8 million tons, satisfying some 5% of the whole country's gasoline and oil demand by 2025</p> <p>Decision 1855/2007 on National Energy Development Strategy up to 2020: Increase the proportion of new and renewable energies to about 3% of the total amount of commercial primary energy by 2010; about 5% by 2020 and 11% by 2050.</p> <p>National Climate Change Strategy (2011): Hydropower plants' capacity reaches 20,000–22,000 MW ; Increase the share of new and renewable energies to 5% of the total commercial primary energies (increase to 11% by 2050)</p> <p>Decision 1939 (2012) Green Growth Strategy: Reduce GHG emissions from energy activities by 10% to 20% compared to the business as usual case by 2020 against a 2010 baseline. Reduce GHG emissions in energy activities by 20 to 30% compared to business as usual by 2030 against a 2010 baseline</p> <p>Resolution 24 (2013): Transform the structure of energy use towards increasing the proportion of renewable energy, new energy to 5% of total primary commercial energy</p> <p>Decision 2068 (2015) Renewable Energy Development Strategy:</p> <ul style="list-style-type: none"> Reduce GHG emission in energy activities by 5% in 2020, 25% in 2030 and 45% in 2050 compared to BAU. Raise RE share in total primary energy consumption to 31% in 2020, 32.2% in 2030 and 44% in 2050. Raise RE share in power generation to 38% in 2020, 32% in 2030 and 43% in 2050. Other quantified goals for solar water heating, biogas, advanced cookstove, biofuel, wind power and solar power. Renewable Portfolio Standard minimum 3% in 2020, 10% in 2030 and 20% in 2050 for both generation companies and distribution company. <p>Power Development Plan 7 revised (2016) increases the share of electricity produced from renewable sources (excluding large- and medium-scale and pumped-storage hydropower) to 6.5% in 2020, 6.9% in 2025, and 10.7% in 2030</p> <ul style="list-style-type: none"> Wind 800MW installed in 2020, 2 000MW in 2025, 6 000MW in 2030 producing 2.1% of total generation Solar 850MW installed in 2020, 4 000MW in 2025, 12 000MW in 2030 producing 3.3% of total generation Biomass producing 1% in 2020, 1.2% in 2025, 2.1% in 2030 of total generation Hydro (large, medium and pumped storage) producing 25.2% in 2020, 21,1% in 2025, 16,9% in 2030 of total generation |

Source: Authors, with data from <http://www.lse.ac.uk/GranthamInstitute/countries/> (updated 2017-08-21).

Table 2: Renewable energy support policies in middle & high income countries, 2017

| Renewable energy in INDC or NDC | VIET NAM | | 56 Higher income countries | | 108 middle income countries | |
|-----------------------------------|----------|----|----------------------------|----|-----------------------------|--|
| | Yes | | | | | |
| REGULATORY POLICIES | Yes | 20 | 36% | 58 | 54% | |
| Feed-in tariff / premium payment. | Yes | 32 | 57% | 50 | 46% | |

| | VIET NAM | 56 Higher income countries | 108 middle income countries | | |
|--|----------------------------|----------------------------|-----------------------------|----|-----|
| A policy that typically guarantees renewable generators specified payments per unit (e.g., USD per kWh) over a fixed period. Feed-in tariff (FiT) policies also may establish regulations by which generators can interconnect and sell power to the grid. Numerous options exist for defining the level of incentive, such as whether the payment is structured as a guaranteed minimum price (e.g., a FiT), or whether the payment floats on top of the wholesale electricity price (e.g., a feed-in premium). | (new in 2017) | | | | |
| Electric utility quota obligation / Renewable Portfolio Standard | Yes | 16 | 29% | 17 | 16% |
| An obligation placed by a government on a utility company, group of companies or consumers to provide or use a predetermined minimum targeted renewable share of installed capacity, or of electricity or heat generated or sold. A penalty may or may not exist for non-compliance. These policies also are known as “renewable electricity standards”, “renewable obligations” and “mandated market shares”, depending on the jurisdiction. | (in REDS, not implemented) | | | | |
| Net metering/billing | Yes | 24 | 43% | 37 | 34% |
| A regulated arrangement in which utility customers with on-site electricity generators can receive credits for excess generation, which can be applied to offset consumption in other billing periods. Under net metering, customers typically receive credit at the level of the retail electricity price. Under net billing, customers typically receive credit for excess power at a rate that is lower than the retail electricity price. Different jurisdictions may apply these terms in different ways, however. | (new in 2017) | | | | |
| Transport obligation/mandate | Yes | 33 | 59% | 42 | 39% |
| A measure that requires designated parties (consumers, suppliers, generators) to meet a minimum – and often gradually increasing – standard for renewable energy (or energy efficiency), such as a percentage of total supply, a stated amount of capacity, or the required use of a specified renewable technology. Costs generally are borne by consumers. Mandates include requirements for blending specified shares of biofuels (biodiesel or ethanol) into transport fuel. | | | | | |
| Heat obligation/mandate | No | 14 | 25% | 14 | 13% |
| A measure that requires designated parties (consumers, suppliers, generators) to meet a minimum – and often gradually increasing – standard for renewable energy (or energy efficiency), such as a percentage of total supply, a stated amount of capacity, or the required use of a specified renewable technology. Costs generally are borne by consumers. Mandates include building codes or obligations that require the installation of renewable heat or power technologies (often in combination with energy efficiency investments); renewable heat purchase requirements. | | | | | |
| Tradable Renewable Energy Certificates | Yes | 24 | 43% | 15 | 14% |
| A certificate awarded to certify the generation of one unit of renewable energy (typically 1 MWh of electricity but also less commonly of heat). In systems based on RECs, certificates can be accumulated to meet renewable energy obligations and also provide a tool for trading among consumers and/or producers. They also are a means of enabling purchases of voluntary green energy. | | | | | |
| Tendering / Auctions | No | 29 | 52% | 49 | 45% |
| A procurement mechanism by which renewable energy supply or capacity is competitively solicited from sellers, who offer bids at the lowest price that they would be willing to accept. Bids may be evaluated on both price and non-price factors. | | | | | |
| Tenders have been held | No | 14 | 25% | 15 | 14% |
| | | | | | |
| FISCAL INCENTIVES AND PUBLIC FINANCING | | | | | |
| Fiscal incentive: An incentive that provides individuals, households or companies with a reduction in their contribution to the public treasury via income or other taxes. | | | | | |
| Public financing: A type of financial support mechanism whereby governments provide assistance, often in the form of grants or loans, to support the development or deployment of renewable energy technologies. | | | | | |
| Investment or production tax credits | Yes | 18 | 32% | 28 | 26% |
| Investment tax credits is a fiscal incentive that allows investments in renewable energy to be fully or partially credited against the tax obligations or income of a project developer, industry, building owner, etc | | | | | |
| Production tax credit is a tax incentive that provides the investor or owner of a qualifying property or facility with a tax credit based on the amount of renewable energy (electricity, heat or biofuel) generated by that facility. | | | | | |
| Reductions in sales, energy, CO2, VAT or other taxes | Yes | 30 | 54% | 54 | 50% |
| Energy production payment | No | 9 | 16% | 16 | 15% |
| Public investment, loans, grants, capital subsidies or rebates | Yes | 39 | 70% | 60 | 56% |

Source: Authors. Data from REN21 2018 report data pack, Table 2 Renewable Energy Support Policies.

Notes: Observations are for end of 2017. Counts include sub-national policies even where no national policy exists. Counts include policies in renewable heating and cooling technologies. Support policies include both legislative and executive levels. Lower and upper middle income country groups have similar percentages and are therefore merged.

Table 3: Table of contents of Turkey renewable energy law

Government of Turkey, 2005. Act No. 5346 on Utilization of Renewable Energy Sources for the Purposes of Generating Electrical Energy¹⁸.

SECTION ONE. Purpose, Scope, Definitions and Abbreviations

Article 1. Purpose

Article 2. Scope

Article 3. Definitions and Abbreviations

SECTION TWO. Identification, Conservation and Utilization of Renewable Energy Resource Areas and Certification of the Electrical Energy Generated from Renewable Energy Resources

Article 4. Identification, conservation and utilization of the resource areas

Article 5. Renewable Energy Resource Certificate

SECTION THREE. The Implementation of Procedures and Principles in the Electrical Energy Generation from Renewable Energy Resources

MADDE 6. RES Support Mechanism

Article 6/A. Exempted production

Article 6/B. Use of domestic products

Article 6/C. Other applications

SECTION FOUR. Principles of Implementation Regarding Investment Period

Article 7. Investment Period Implementations

Article 8. Implementations related to Acquisition of Land

SECTION FIVE. Various Provisions *FIT for onshore wind energy is 8.5 US cents/kWh and FIT for offshore wind energy is 9.8 US cents/kWh. (2018)*

Article 9. Coordination of the Implementations

Article 10. Sanctions

Article 11. Regulations

Article 12: Amending the Law on DSI's Organization and duties numbered 6200.

Article 13: Amending the Law numbered 4.12.1984

Article 14. Effectiveness

Article 15. Enforcement

Schedule I: Prices applicable

Schedule II: Domestic contribution

Table 4: Table of contents of renewable energy laws of Malaysia

Government of Malaysia, 2011. Act No. 725 on Renewable Energy Act.¹⁹

PART I. Preliminary

Section 1. Short Title and Commencement

Section 2. Interpretation

PART II. Feed-in Tariff System

Section 3. Establishment of feed-in tariff system

Section 4. Eligibility for participation in feed-in-tariff system

Section 5. Application for feed-in approval

Section 6. Additional information or documents

Section 7. Grant or refusal of feed-in approval

Section 8. Conditions of feed-in approval
Section 9. Power to impose additional conditions and to vary or revoke conditions
Section 10. Revocation of feed-in approval
Section 11. Appeal

PART III. Connection, Purchase and Distribution of Renewable Energy

Section 12. Renewable energy power purchase agreement
Section 13. Connection to supply line
Section 14. Priority of purchase and distribution
Section 15. Technical and operational requirements

PART IV. Feed-in Tariff

Section 16. Payment and duration of feed-in tariff
Section 17. Degression of feed-in tariff
Section 18. Review and adjustment of degression rates
Section 19. Recovery of moneys from Renewable Energy Fund
Section 20. Administrative fees
Section 21. Grid parity
Section 22. Dishonest use of resources to generate electricity

PART V. Renewable Energy Fund

Section 23. The Renewable Energy Fund
Section 24. Allocation from electricity tariffs
Section 25. Expenditure to be charged on Renewable Energy Fund
Section 26. Investment
Section 27. Accounts

PART VI. Information Gathering Powers

Section 28. Performance audit
Section 29. Provision of information
Section 30. Proof of compliance
Section 31. The Authority may retain documents
Section 32. Access to records
Section 33. Record of information
Section 34. Publication of information
Section 35. Offence for non-compliance

PART VII. Enforcement

Section 36. Authorized officer
Section 37. Authority card
Section 38. Power of investigation
Section 39. Search and seizure with warrant
Section 40. Search and seizure without warrant
Section 41. Access to computerized data
Section 42. Warrant admissible notwithstanding defects
Section 43. List of things seized
Section 44. Release of things seized
Section 45. Power to require attendance of person acquainted with case
Section 46. Examination of person acquainted with case
Section 47. Admissibility of statements in evidence
Section 48. Authorized officer to complete investigation and hand over to police
Section 49. Cost of holding equipment, etc., seized

Section 50. No cost or damages arising from seizure to be recoverable
Section 51. Obstruction
Section 52. Additional powers
Section 53. Compounding of offences
Section 54. Prosecution
Section 55. Offences by body corporate

PART VIII. General

Section 56. Report on implementation and performance of feed-in tariff system
Section 57. Compliance with all other laws
Section 58. Directions by the Authority
Section 59. Register
Section 60. Power of Minister to make regulations
Section 61. Power of Authority to make rules
Section 62. Penalties for subsidiary legislation
Section 63. Power of Minister to amend Schedule
Section 64. Existing renewable energy generators
Section 65. Existing licenses

SCHEDULE (Section 2) - Renewable Resources, Feed-in Tariff Rates, Effective Period And Annual Degression Rates

Table 5: Table of contents of renewable energy laws of Philippines

Source: Government of Philippines, 2008. Act No. 9513 on Promoting the Development, Utilization and Commercialization of Renewable Energy Resources and for Other Purposes.¹¹

CHAPTER I. Title and Declaration of Policies

Section 1. Short Title
Section 2. Declaration of Policies
Section 3. Scope
Section 4. Definition of Terms

CHAPTER II. Organization

Section 5. Lead Agency

CHAPTER III. On-grid Renewable Energy Development

Section 6. Renewable Portfolio Standard (RPS)
Section 7. Feed-In Tariff System
Section 8. Renewable Energy Market (REM)
Section 9. Green Energy Option
Section 10. Net-metering for Renewable Energy
Section 11. Transmission and Distribution System Development

CHAPTER IV. Off-grid Renewable Energy Development

Section 12. Off-Grid Areas

CHAPTER V. Government Share

Section 13. Government Share

CHAPTER VI. Environmental Compliance

Section 14. Compliance with Environmental Regulations

CHAPTER VII. General Incentives

Section 15. Incentives for Renewable Energy Projects and Activities
Section 16. Environmental Compliance Certificate (ECC)
Section 17. Exemption from the Universal Charge

Table 6: Table of contents of renewable energy laws of Korea

Source: Republic of Korea, 2004. Act on the promotion of the development, use and diffusion of new and renewable energy. With ToC of selected addendum.⁹

Article 1. Purpose
Article 2. Definitions
Article 3 Deleted
Article 4. Policies and Encouragement, etc.
Article 6. Annual Implementation Plans
Article 7. Prior Consultations on Plans concerning Technological Development, etc. of New and Renewable Energy
Article 8. New and Renewable Energy Policy Council
Article 9. Project Funding for Technological Development, Use, and Distribution of New and Renewable Energy
Article 10. Use of Project Funds Created
Article 11. Execution of Projects
Article 12. Investment Recommendation and Mandatory Use, etc. of New and Renewable Energy
Articles 12-2 through 12-4 Deleted
Article 12-5. Mandatory Supply, etc. of New and Renewable Energy
Article 12-6. Penalty Surcharges for Failure to Perform Duty to Supply New and Renewable Energy
Article 12-7. New and Renewable Supply Certificates, etc.
Article 12-8. Designation, etc. of Supply Certification Institutions
Article 12-9. Affairs, etc. of Supply Certification Institutions
Article 12-10. Revocation, etc. of Designation of Supply Certification Institutions
Article 12-11. Quality Standards for New and Renewable Energy Fuels
Article 12-12. Quality Tests of New and Renewable Energy Fuels
Article 13. Certification, etc. of New and Renewable Energy Facilities
Article 13-2. Subscription to Insurance or Joining Mutual Aid
Articles 14 and 15 Deleted
Article 16. Fees
Article 17. Public Notice of Standard Price for New and Renewable Energy Power Generation and Subsidization of Differences
Article 17. Public Notice of Standard Price for New and Renewable Energy Power Generation and Subsidization of Differences
Article 19 Deleted.
Article 20. Support for International Standardization of New and Renewable Energy Technologies
Article 21. Common Use of New and Renewable Energy Facilities and their Components
Articles 22 and 22-2 Deleted.
Article 23 Deleted.
Article 23-2. Obligation to Blend, etc. New and Renewable Energy Fuels
Article 23-3. Penalty Surcharges for Failure to Fulfill Obligation
Article 23-4. Designation of Management Agencies
Article 23-5. Duties of Management Agencies
Article 23-6. Revocation, etc. of Designation of Management Agencies
Article 24. Hearings
Article 25. Compilation, etc. of Related Statistics
Article 26. Leases, etc. of State or Public Property
Article 27. Distribution Projects
Article 28. Commercialization of New and Renewable Energy Technology
Article 29. Financial Measures, etc.
Article 30. Education and Publicity on New and Renewable Energy, and Fostering of Experts
Article 30-2. Joining, etc. in Mutual Aid Association by Entities Engaged in New and Renewable Energy Business
Article 30-3. Defect Repair
Article 31. New and Renewable Energy Center

Article 32. Delegation and Entrustment of Authority
Article 33. Legal Fiction as Public Officials in Applying Penalty Provisions
Article 34. Penalty Provisions
Article 35. Administrative Fines

ADDENDA

Article 1. Enforcement Date
Article 2. Transitional Measures concerning Basic Plan, etc.
Article 3. Transitional Measures concerning Disposition, etc.
Article 4 Omitted
Article 5. Relation with other Acts

ADDENDA <Act No. 10253, Apr. 12, 2010>

Article 1. Enforcement Date
Article 2. Term of Validity, etc. concerning Subsidization of Power Generation Price Difference
Article 3. Applicability
Article 4. Transitional Measures concerning Enterprises Specializing in New and Renewable Energy
Article 5 Omitted

ADDENDA <Act No. 11965, Jul. 30, 2013>

Article 1. Enforcement Date
Article 2. Transitional Measures concerning Obligation to Blend New and Renewable Energy Fuels
Article 3 Omitted
Article 4. Relationship to other Acts

ADDENDA <Act No. 13087, Jan. 28, 2015>

Article 1. Enforcement Date
Article 2. Applicability concerning Repair of Defects
Article 3. Transitional Measures concerning Facility Certification

Table 7: Table of contents of the renewable energy law of China

Source: Government of China, 2005. Act on Renewable Energy Law.²⁰

Note: the original text did not provide article titles.

CHAPTER I. General Provisions

Article 1. The purpose
Article 2. Definition of Renewable Energy
Article 3. The territory and other sea areas under the jurisdiction of the People's Republic of China.
Article 4. Priority and Encourage from the State
Article 5. The administrative responsible

CHAPTER II. Resources Investigation and Development Planning

Article 6. Organize and coordinate the investigation of the administrative department of energy of the State Council
Article 7. National long- and medium-term total target for the development and utilization of renewable energies
Article 8. National plan for the development and utilization of renewable energy resources
Article 9. Content of the development and utilization of renewable energies

CHAPTER III. Industrial Guidance and Technical Support

Article 10. Formulate and publish a renewable energy resource industry development guidance catalogue
Article 11. National standards for other techniques and products relating to renewable energy
Article 12. Priority to the scientific and technological research in, and the industrialization of, the development and utilization of renewable resources

CHAPTER IV. Popularization and Application

Article 13. Encourage and support grid synchronization of power generated by using renewable energy

Article 14. Applies the system of guaranteeing the purchasing of electricity generated by using renewable energy resources in full amount

Article 15. The state shall support the construction, in areas not covered by any grid, of independent systems of electricity generated by using renewable energies for providing electricity service to the local production and people's daily life

Article 16. The state shall encourage the clean and highly efficient development and utilization of biomass fuels and the development of energy crops

Article 17. Encourage entities and individuals to install and use solar systems for daily needs

Article 18. Encourage the development and utilization of renewable energies in rural areas

CHAPTER V. Price Control and Cost Compensation

Article 19. The on-grid electricity prices for projects of electricity generation by using renewable energies shall be determined

Article 20. The cost arising from the purchase by a power grid enterprise of electricity generated by using renewable energy resources

Article 21. Access cost and other relevant expenses

Article 22. The selling price of electricity for the public independent power system of electricity generated by using renewable energy resources

Article 23. The price of heat or gas produced by using renewable energy

CHAPTER VI. Economic Incentives and Supervisory Measures

Article 24. A renewable energy development fund

Article 25. A financial institution

Article 26. Adopt a tax preferential policy for projects that are listed in the renewable energy industry development guidance catalogue

Article 27. Power enterprise

CHAPTER VII. Legal Responsibilities

Article 28. Ordered to make rectifications by the relevant department of the people's government at the corresponding or next higher level

Article 29. Failing to purchase the quantity of the electricity generated

Article 30. Operating a gas or heat pipe network

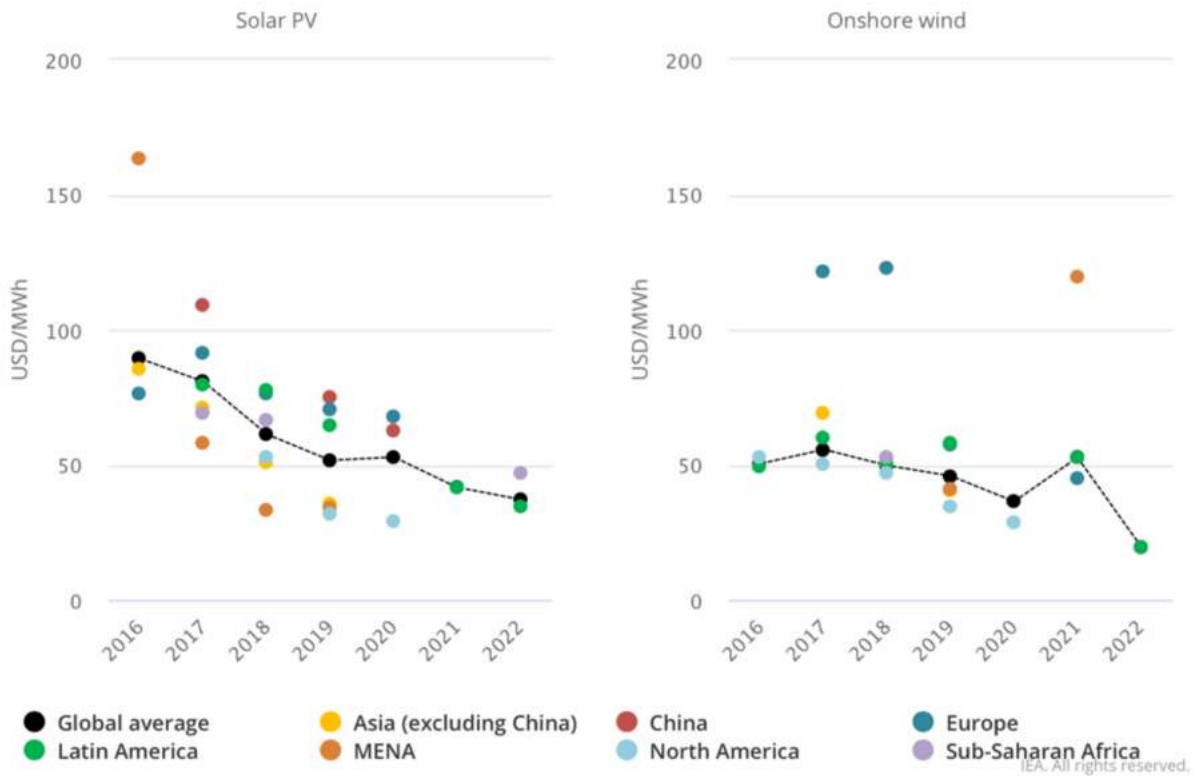
Article 31. Petrol selling enterprise

CHAPTER VIII. Supplementary Provisions

Article 32. Glossary

Article 33. This Law shall come into force as of January 1, 2006

Figure 1: Average auction prices for solar PV and wind, by region and commissioning date



Source: IEA Have the prices from competitive auctions become the “new normal” prices for renewables? Analysis from Renewables 2018¹⁵.

Notes: Prices are nominal; higher values for onshore wind in 2017-18 result from the United Kingdom’s contracts for difference (CfD) auction, and in 2021 are associated with a delayed project from the Jordanian auction held in 2014.

Text 1: The Vietnam FiT story: success and limits

Source: Authors.

Currently, Vietnam applies feed-in-tariff (FiT) policy for wind²¹, solar energy¹³ and avoided cost mechanism for biomass²², small hydropower²³. These are typical cases that clearly show the impact of the policy on the renewable energy investment environment.

Decision 24/2014/QĐ-TTg specified the support regime for projects of Combined Heat Power Technology at the price of 1 220 VND/kWh (not including VAT, equivalent to 5.8 US cent/kWh) and avoided cost tariff for other technologies. In May 2019, about 300 MW of bagasse biomass power generation was installed. The tariff was not effective outside sugar plants. Most rice husks projects initially announced have been canceled or suspended.

Decision 37/2011/QĐ-TTg introduced the FiT mechanism for wind energy at 7.8 US cent/kWh. By the end of 2018, there were about 200 MW of wind power installed, including 99.2 MW of the Bac Lieu project which had a special FiT rate of 9.8 US cent/kWh and other wind projects which also got support in kind from Government. While investor initially applied for approval of planning, most did not invest within 8 years. Decision 39/2018/QĐ-TTg revised up the FiT for onshore wind energy to 8.5 US cents/kWh and FiT for offshore wind energy at 9.8 US cents/kWh. In the context of declining technology costs, this has been attractive. By May 2019, the pipeline counted 264 MWp operational, 305 MWp under construction, and 693 MWp groundbreaking.

The solar FiT was introduced in 2017 at a level that attracted investors in droves. Decision 11/2017/QĐ-TTg laid out how independent power producers could apply for the FiT and set a tariff of 2 086 VND/kWh (fixed at 9.35 US cent/kWh) for 20-years power purchase agreements. After only 2 years, the number of registered solar projects increased rapidly. By May 2019, a number of 132 solar power projects have been added to the electricity development plan till 2025, with a total capacity of about 8 GW. There are also more than 200 solar power projects with a total capacity of 17 GW being registered. Most solar power projects were invested in three central provinces of Vietnam, where the demand for electricity is low but the insolation is high, creating a big challenge to balance the power grid and bring the power capacity to the consumers.

In line with global experience, the FiT policy has been effective to push new renewable energy markets. However, in the long term the FiT policy also has some limitations as follows:

- FiT prices are decided administratively, they do not offer a timely market-based image of costs.
- FiT policy accelerates investment in RE, but lacks tools to manage the market size for long-term planning.
- Under a nationally uniform FiT, projects will be concentrated in high potential areas (high radiation or good wind) rather than areas with high load demand and convenient access to the transmission system. The transmission grid system will face difficulties to develop on time to meet the requirement of releasing power from renewable energy hotspots, requiring extra time and resources to upgrade the power grid as well as the flexibility of the system.
- When new tools are used without State guarantees, accountability issues between the Purchaser and the Seller may create difficulties in mobilizing capital resources and increase loan costs.

Technically, wind and solar are intermittent resources in that their availability, while predictable, cannot be completely controlled. In the Vietnam context, the renewable energy projects implementing high density in the great potential's regions such as the Central, South Central, Southwest and Central Highlands. Large-scale of renewable energy, construction progress goes into operation quickly, while existing grid capacity and power grid developed under electricity planning do not consider the large penetration of these renewable power sources. It's leading to the power grid does not guarantee to absorb all of the generation output of renewable energy sources in the future, potentially causing local grid overload, power loss and affecting supply reliability.

Text 2: Recommendations towards a solar auction pilot in Vietnam

Source: Authors.

Based on discussions within the ad hoc national working group, the authors recommend to organize the pilot solar power auction in Vietnam as follows:

- Adopt a one-stage, two-envelopes bidding process.
- For the qualification stage, based on Vietnam's legal perspectives, the authorities need to consider: Conformity of the project with the overall socio-economic development master plan, the power development plan (e.g., PDP), land use master plan; Socio-economic impacts and efficiency of the project; and legal basis of the investor's right to use the proposed location. The authorities will conduct an appraisal on the investor's proposed land use demand and satisfaction of conditions to lease/allocated with land or conversion of land use purposes.
- For the initial pilot, a sealed envelope bidding is recommended. Real time auctions for iterative price discovery process could be organized later, after gauging the interest and market maturity of the bidders.