

RENEWABLE ENERGIES: Trends around the world



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Dear Readers,

Where were you today 33 years ago when the first reports about the “disaster” in the Ukrainian nuclear power plant flashed in the news? You are most certainly able to recall the images, the fear of the unknown and the unpleasant feeling of eating fresh food – all these have remained etched in the collective memory of the people in the affected areas.

Today, the question is being asked: nuclear or coal? Plague or cholera? Many scientists and climate protection activists see climate change as the greater threat to people and the environment – but that does not make them cholera advocates. It is high time to change our thinking and to take action because

*„it is not only for what we do that we are held responsible,
but also for what we do not do“*

(Molière)

The Fridays for Future movement has formulated concrete demands for Germany: no more emissions and 100 % renewable energy by 2035, complete phase-out of coal by 2030 and discontinuation of all subsidies for fossil fuels from 2019, the shutdown of 25 % of coal-fired power plants and a tax of EUR 180 per tonne of CO₂. The demands are ambitious, but point the way – if not THE way – to ensuring compliance with the Paris Agreement. This will be no easy feat – but “we will make it” ...we have to.

With this in mind, have fun and feel inspired reading our latest E|News!



MARTIN WAMBACH
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→ In Focus

PPAs

Step by step for the German market

by Kai Imolauer

At the end of 2020, the funding by Feed-in-Tariffs of the first power plants under the EEG¹-program will terminate – yet due to the phase out of nuclear and coal power plants the demand for highly efficient regenerative production capacities will increase substantially. Rising electricity prices in the coming 5-20 years will ensure the profitability of decentralized generation plants without the need of additional funding. Hence, in the following a step-by-step analysis will illustrate a procedure applicable by project operators to examine the relevance of a PPA-commercialization model for their business.

THE PLANT/ PROFITABILITY

- EEG – Termination of funding or profitability without support is foreseeable – Which contract starting date should be chosen? To be able to assess possible conditions of post-EEG sales of power at an early stage, an early initiation of the process is recommended. Contact to industry enterprises, energy utilities, electricity traders or investors needs to be established. A registration on platforms such as from Greenpeace or WPD, etc. should be considered as well.
- LCOE: Furthermore, in terms of profitability sensitivity analyses of the levelized cost of electricity and the integration of diverse tariff structures (see check list below) should be conducted;
- Maintenance contracts & operation costs: Maintenance conducted during operation time under EEG or KWKG² should be evaluated from a technical and economic perspective to determine a long-term offer price of the electricity; in general, operation costs should be analyzed before the conclusion of a PPA by means of a projection on the 3rd decade of the generation plant. Additionally, a clear maintenance or overhaul concept can be attached. Together with insurance and land lease these costs represent the basis for the individual calculation of the electricity price necessary to ensure (the continuation of) a feasible operation.

- Type assessment: (for wind energy plant with post-EEG PPAs) – commonly for older wind energy plants a type analysis is available for 20 years only, thus, after this period an assessment and analysis of wind energy plants is required before operation can be continued. This is necessary to determine the possible operation period after EEG for the commercialization of wind energy. Even if not explicitly demanded by permit authorities, this analysis should be conducted for liability and insurance reasons.
- Proof of statics: shortly on PV: In terms of the continuation of operation, statics will play a role together with the electric testing (not required but common practice). In the case of new projects, it is part of usual technical documentation.
- Project site: Furthermore, in case of the continuation of plant operation, all relevant properties should be secured for the post-EEG period as well.

CONTRACTUAL DESIGN OF THE PPA

The contract texts of the PPA are a crucial part of the project development. Consequently, the contractual design is subject to a continuous development and negotiation process highly dependent on the individual project requirements. The contractual requirements (see Held/Koch, „ER EnergieRecht“ Ausgabe 1/2019, PPA für Erneuerbare Energien und KWK - Typologische Einordnung und rechtliche Rahmenbedingungen marktfähiger Energieerzeugungsanlagen (<https://www.erdigital.de/ce/ppa-fuer-erneuerbare-energien-und-kwk/detail.html>) can be completed step-by-step as minimum required regulation by means of the following contract checklist:

¹ German Renewable Energy Act

² German Combined Heat and Power Act

CHECKLIST – Power Purchase Agreement (PPA)

- ✓ **Determination of the function of the PPA and the roles of the contracting partners (preamble):** Corporate / Merchant / Utility PPA; On-Site / Off -Site PPA; Financial / physical PPA; Post-EEG PPA
- ✓ **Power plant:** Description of the plant, links to plant construction contracts
- ✓ **Scope of supply:** Extent of supply and service; availability; management of power generation; coverage of demand; minimum purchase quantity ("take-or-pay")
- ✓ **(Ecological) Quality of delivery:** Certificates in the context of renewable energy and proof of origin
- ✓ **Obligations of plant operators:** Technical regulations in terms of construction, maintenance and operation; information duties and deadlines; terms of coordination regarding planned or unplanned interruptions; bonus/malus-regulations as an incentive for high availability
- ✓ **Public law permit, obligations in terms of announcements, reporting and information deriving from the energy legislation:** BImSchG, EnWG, REMIT, etc.
- ✓ **Rights of electricity purchasers:** control and inspection rights; market and grid intervention rights; reimbursement claims against third parties
- ✓ **Obligations in terms of commercialization and utilization:** Procurement of reserve power supply and surplus electricity commercialization, place and type of commercialization, profit and risk-sharing, consumption of own generated electricity, prohibition of redirection
- ✓ **Price:** Fixed price; working price and capacity rate; balance payment; market price; securing of quantities; coordination of electricity remuneration – proceeds EEG/KWKG or levies/ tax law privileges (Delivery at customer's site/ Contracting delivery, etc.)
- ✓ **Price adjustment:** one-sided; price adjustment clause; gliding price scale; clauses on taxes and levies; clauses on feasibility
- ✓ **Measuring, clearing and payment conditions:** Grid connection; operation of measuring sites – and concept; installments or prepayments; accounting; maturity; delay
- ✓ **Start of contract/ supply:** Deadlines plan as necessary
- ✓ **Contract duration & cancellation:** Coordination plant construction – external financing – operating duration – refinancing; initial contract period; extension; extraordinary cancellation reasons
- ✓ **Liability/assurance:** Force majeure; disclaiming of liability; extent of assurance; information obligations
- ✓ **Securities:** Warranties; assignment as security; insolvency law (§§ 104, 119 InsO); land charge; subservience
- ✓ **Adjustment of contracts and dispute resolution:** Clauses on performance determination, negotiation, arbitration
- ✓ **Closing provisions:** Legal succession, place of jurisdiction, extent of contract

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→ Around the world

Bifacial PV ... and who is Albedo?

by Michael Rogoll

In addition to the potential for achieving decreased levelised cost of energy (LCOE), bifacial PV modules offer new installation and marketing opportunities. This, in turn, comes with related advantages such as additional yields and higher power densities. In addition, due to their special energy generation profile, vertically mounted bifacial modules offer electricity price advantages in times when electricity has to be marketed without the EEG support and can help unlock new use for otherwise inaccessible areas.

FUNDAMENTAL INFORMATION

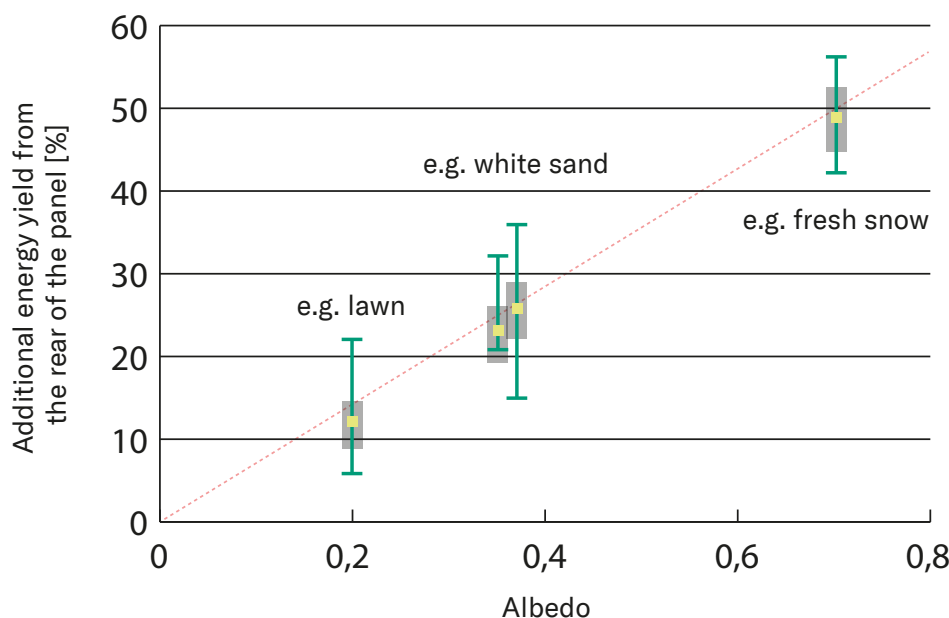
In principle, bifacial photovoltaic (PV) modules are simply PV modules whose full rear contact has been replaced with a fingerprint contact. This means that also the rear of the panel can be exposed to solar radiation and be used to produce power. How much solar radiation will be received by the rear of the panel depends, most of all, on the reflectivity of the surrounding surface and on the

manner of mounting of the modules. The so-called albedo value is the measure of how well a surface reflects solar radiation. For example, the albedo value is approx. 10 % for high sun above deep water, 10 % - 30 % for meadows, and up to 75 % - 95 % for freshly fallen snow.¹ The albedo value of a surrounding surface is a significant factor for the yield gain (see illustration²).

Another factor is the so-called “bifaciality factor” that is a measure of how much energy the rear of the panel will produce compared to the front of the panel. At present, in bifacial modules, bifaciality factors normally range between 70 % and 95 %. For example, a bifaciality factor of 95 % means that, in the same conditions, the rear will produce only 95 % of energy produced by the front. But, in the end, it is the yield gain that matters, and here, if a facility is sited favourably in ideal installation conditions (high albedo value e.g. snow or a bright roof surface, perfect orientation, no shading), the possible values of the yield gain can range between 30 % and 50 % p.a.³ In Germany, however, it should be rather expected that the yield gain will vary between 5 % and 15 % p.a., depending on the system design and the surface underneath the module.

INNOVATIVE SYSTEM DESIGNS

What is special about bifacial modules is that, besides the yield gains generated from the rear side, this type of the module also offers other installation options. Certainly, the most radical change compared to the conventional panels is the vertical installation. Most common is the east/west orientation of the panels. This entails two main differences compared to the conventional layout.



Basic considerations about influence of albedo on yield gain

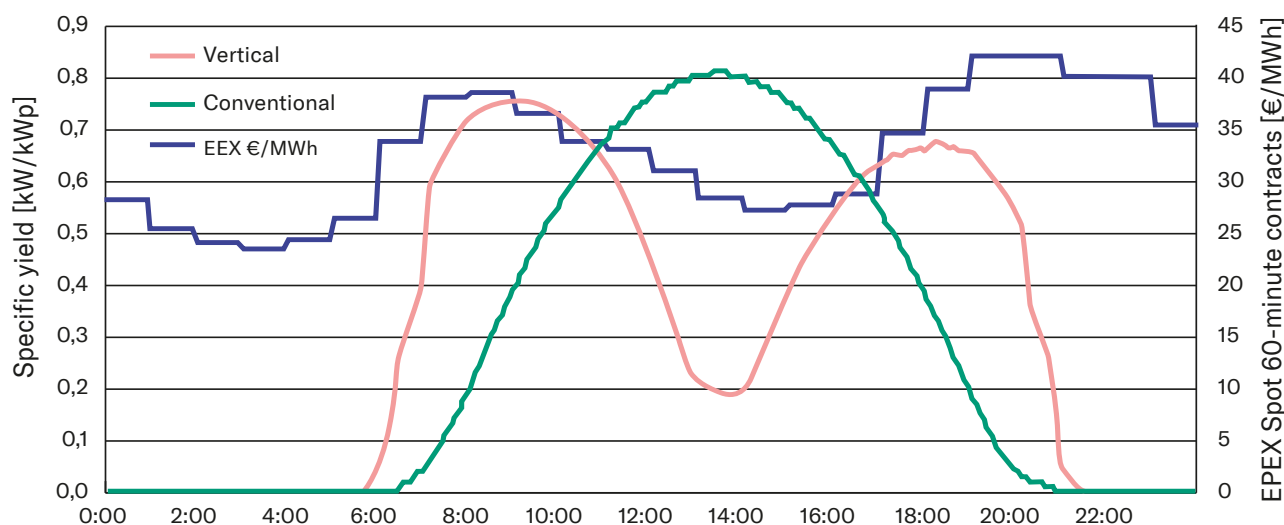
¹Dobos, E. (1996) 'Albedo', Engineering (London), 237(7), p. 21. doi: 10.1081/E-ESS

²Dupeyrat et al., 2014; Investigations on albedo dependency of bifacial PV yield

³Guo, S., Walsh, T. M. and Peters, M. (2013) 'Vertically mounted bifacial photovoltaic modules: A global analysis', Energy, 61, pp. 447-454. doi: 10.1016/j.energy.2013.08.040

Yusufoglu, U. A., Pletzer, T. M., Koduvelikulathu, L. J., Comparotto, C., Kopecek, R. and Kurz, H. (2015a) 'Analysis of the annual performance of bifacial modules and optimization methods', IEEE Journal of Photovoltaics, 5(1), pp. 320-328. doi: 10.1109/JPHOTOV.2014.2364406

Shoukry, I. (2015) Bifacial Modules- Simulation and Experiment. University of Stuttgart



Conventional vs. vertical installation: Energy generation profile and spot market prices as of 26/05/2017; source:/Next2Sun

First of all, the vertical layout involves a changed production profile. Instead of a single midday maximum, two peaks are now produced: one in the morning and one in the afternoon, although production past midday remains comparatively high. In addition to the fact that the few comparable power plants generate yield gains of between 5% and 10%, the real advantage is that more electricity is now generated amid generally increasing spot market prices. In Germany and all over the world, it can be seen that more and more power plants are being planned or built without the EEG support.⁴ In the case of these power plants, the future electricity price quoted on the electricity exchange will be important for the considerations relating to profitability. The ability of avoiding the so-called „cannibalisation effect“ (i.e. the fall in the midday peak price even to the level of negative prices) of PV power plants can become a decisive factor. The analysis of the Spanish electricity market clearly illustrates the controversial nature of the problem of non-subsidised electricity prices.⁵

Another significant difference is the change in the use of land. Compared to conventionally mounted panels, vertically mounted bifacial modules require significantly greater row spacing to avoid excessive self-shading. On the one hand, this leads to lower land utilisation rates and, on the other hand, it is precisely the larger row spacing that helps the land remain usable for agricultural purposes at least with certain restrictions. In the end, maintaining agricultural productivity means the possibility of reducing

land lease costs in comparison to conventional power plants and thus the possibility of countering the increasing problem of land consumption based on an innovative cooperation model. Because project developers normally rather seek to achieve the maximum installed capacity to optimise margins when selling a power plant, this concept will be more interesting to energy suppliers. Thus, the popular doubts about land consumption can be dispelled. Here, interesting is the concept of collaborating with agricultural cooperatives which own vast areas of land, e.g. in Eastern Germany.



⁴ <https://www.pv-magazine.de/2019/03/04/enbw-plant-photovoltaik-anlagen-mit-400-megawatt-ohne-foerderung-in-deutschland/>

⁵ <https://www.pv-magazine.de/2019/03/01/photovoltaik-in-spanien-kurzer-ueberblick-ueber-einspeisetarife-sowie-projektentwicklung-und-finanzierung-von-freiflaechenanlagen/>

Another advantage of the vertical mounting is the minimisation of losses caused by snow depositing on the surface of the modules. Moreover, according to initial studies, the losses caused by pollution are significantly lower (this is relevant in desert areas).⁶

The suitability of bifacial modules for use in certain types of power plants not only depends on the fact that both sides of the panel are used but also on the transparency of the glass-glass module. Thus, they are most suitable for installation in car ports, on noise barriers, as elements of buildings, in Floating PV⁷, and also in the above-mentioned Agri PV.

COST AND REVENUE STRUCTURE

For comparison purposes, the analysis of the cost and revenue structure takes into account the conventional design of optimally tilted, south-facing PV power plants.

The attentive reader will have already concluded at this point that the installation of bifacial modules requires fewer modules due to the higher specific yield. This reduces the installation, BoS and land lease costs.

By contrast, however, the prices of modules are higher, currently by around 10%, which could, however, also converge in the long term. The reason for this is that the production process is very similar to that of conventional modules⁸. Currently, the global production capacities are rather oriented at monofacial modules. Therefore, the price reduction effect arising from economies of scale has not yet had such a strong impact on the bifacial modules.

It should be, however, examined on a case-by-case basis what type of the module and what installation method to select for individual projects. If electricity is sold outside the EEG scheme, it is reasonable –in addition to determining LCOEs– to prepare a long-term electricity price forecast to determine the value of the produced electricity.

In the case of vertically mounted bifacial modules, specific investment costs are approx. 10 % - 20 % higher and the land lease costs are roughly twice as high due to the greater need for land. In the case of land lease costs, cost reductions are possible, depending on whether the piece of land is suitable for agricultural purposes and whether its continued use is possible. By contrast, bifacial modules offer approx. 5 % to 10 % higher yields and higher revenues from the sale of electricity at times of higher electricity prices. In addition, it is expected that the use of glass-glass modules will lead to longer service life.⁹

A POSITIVE FORECAST FOR THE BIFACIAL MARKET SHARE

It is assumed that bifacial modules will increase in importance worldwide. The forecasts range from 20 % in 2026¹⁰ to 40 % in 2025.¹¹ In addition to the price difference, difficulties also arise from the fact that the question of bifacial STC has not been solved yet. Other issues are the cleaning of the rear of the panels and the emergence of hot spots caused by the mounting structure. Positive is that the delivery times for bifacial modules have normalised and yield simulations render reliable values.

Parameter, comparison based on conventional installation ⁸	Same level of installed capacity	Same level of produced energy
Installed capacity (STC, front)	=	↓
Installed modules	=	↓
Module price	↑ ca. 10 %	=
Cost of inverters, electrical protection	↑	=
BoS cost	=	↓
Cost of DC installation	=	↓
Land lease cost	=	↓
Annual yield	↑ ca. 5 % - 15 %	=

⁶ Rabanal-Arabach, J., Mrcarica, M., Schneider, A., Kopecek, R. and Heckmann, M. (2016) 'The Need of Frameless Mounting Structures for Vertical Mounting of Bifacial PV Modules', in 32nd EU PVSEC

⁷ „Floating PV- Schwimmende Photovoltaikanlagen als neuer Trend“ (EnEws: February 2019)

⁸ Based on PV Magazin Webinar held on 25/10/2018; slides can be downloaded from: <https://16iwyl195vfvgoqu3136p2ly-wpengine.netdna-ssl.com/wp-content/uploads/2018/10/2018-10-25-Bifacial-Webinar-SOLTEC.pdf>

⁹ Next2Sun

¹⁰ International Technology Roadmap for Photovoltaic (ITRPV), March 2019 [data for "true bifacial"]

¹¹ <https://www.bloomberg.com/news/articles/2018-05-17/watch-out-for-double-sided-solar-panels-taking-off-in-china>

CONCLUSION: BIFACIAL PV POWER PLANTS WITH NEW SYSTEM DESIGN AND BUSINESS CASES

Bifacial PV modules generate more energy on the same module surface through a solar-active rear of the panel due to the reflectivity of the surrounding surface. With installation and BoS costs being at the same level, this leads to a higher yield that normally exceeds the higher cost of bifacial modules. In addition, bifacial modules are predestined for use in noise barriers, Floating PV power plants and vertically mounted PV systems. Because with vertically mounted power plants, land can continue to be used for agricultural purposes, this eliminates the controversial issue of land consumption¹² and thus increases the chance of obtaining the relevant permits. At the same time, the production profile of this type of power plants promises higher returns on the electricity exchange, which is particularly attractive in the case of power plants operated outside the EEG support scheme. Therefore, it is basically advisable in any case to consider bifacial PV modules and their vertical mounting in future projects.

¹² <https://www.pv-magazine.de/2019/03/04/fdp-politiker-photovoltaik-anlagen-in-unseren-regionen-sind-verbrechen-an-der-menschheit/>

For more informations please contact



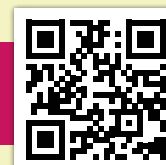
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→ Around the world

Tenders for large-scale solar projects in Malaysia

an overview

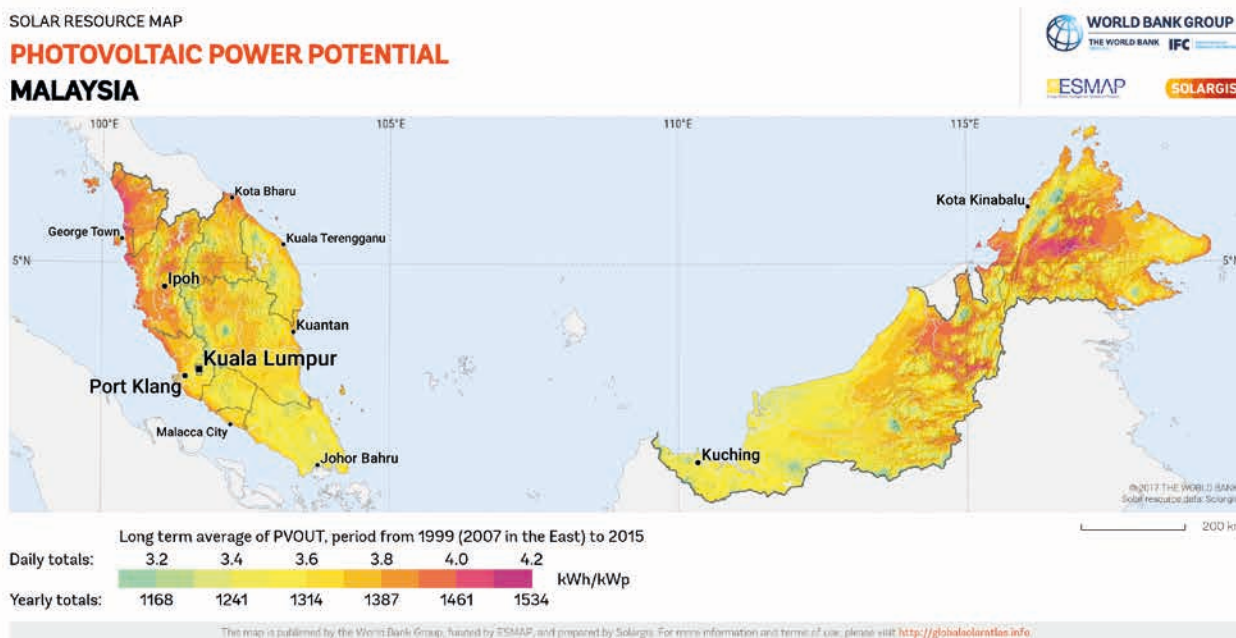
by Michael Wekezer

Although Malaysia is not one of the „typical“ photovoltaic countries, some interesting new developments are visible also here. The government strives to increase the share of renewable energies in the country’s energy mix. In this context, the Large Scale Solar programme will play a major role in the future. Together with tax incentives designed to promote green technology, the Large Scale Solar programme is an interesting alternative to the „long established“ renewable energy markets.

PV IN MALAYSIA

Renewable energy sources are not your first thought when you think of the Malaysian energy mix. The country is still known for offshore oil and gas production. On the one hand, however, the fossil fuel reserves will be exhausted in a few decades, and on the other hand, the country is looking for alternatives to oil and gas in view of its developing economy and growing population. Photovoltaics, which is still rarely used in Malaysia, has increasingly become the focus of attention in this context.

In geographical terms, Malaysia offers favourable framework conditions for the installation of PV systems.



Source: World Bank Group, Solargis, <http://globalsolaratlas.info>

Malaysia is also one of the most popular industrial locations in Southeast Asia. In solar cell production, the country is even the third largest manufacturer of solar cells after China and Taiwan.

LARGE SCALE SOLAR (LSS)

In addition to the existing incentive systems – Enhanced Net Energy Metering, Self Consumption and Feed-in-Tariff (the latter no longer available for photovoltaics) – Malaysia has also launched an LSS programme. The aim of this programme is to enable the development of large-scale solar power plants (1 up to 30 MW). The programme is implemented by the Malaysian Energy Commission Suruhanjaya Tenaga (ST) in cooperation with the Western Malaysian electricity utility Tenaga Nasional. In 2019, the third round of the LSS project, also called „LSS 3“, was launched. The Malaysian Energy Minister Yeo Bee Yin stated that the LSS procedures would be instrumental in increasing the share of renewable energies in Malaysia from currently about 2% to 20% by 2025. The current LSS 3 round has a total volume of 500 MW. The energy prices (RM/kWh) offered in the previous rounds (LSS 1 and 2) ranged from RM 0.34 to RM 0.53.

PROJECT AWARD PROCEDURE

In order to successfully participate in the LSS bidding process, an applicant must first submit a technical qualification application. This must be submitted in response to the Request for Qualification published by ST. The applicant must use this document to describe the technical and financial qualification of his/her company for the implementation of the relevant LSS project.

For foreign applicants, it should be noted that an application must be submitted by a company incorporated in Malaysia in which a Malaysian shareholder holds at least 51% of the shares or by a consortium in which at least one Malaysian company holds [at least] 51% of the shares.

In the second step (reply to the Request for Proposal), the project and also the bidder (i.e. the Malaysian company or the consortium) must be described in detail. Furthermore, a so-called Power System Study (PSS) is required. The PSS contains additional technical information about the project itself, but also a technical assessment of the following issues: capacity of the required grid connection

point and impact of the project on the electricity grid or the analysis of the voltage behaviour in various scenarios.

The bidder offering the best combination of costs of energy and the technical / financial qualification is then awarded the contract. The actual electricity price is then determined using the principle of a reverse auction. Based on these criteria, a short list of successful bidders is prepared.

The applicant whose bid is selected as the winning bid will then sign a Power Purchase Agreement with the relevant utility. The subsequent project stages can be described as follows:

- Financial Closing
- Initial Operation Date; and
- Commercial Operation Date.

As regards the financing of projects, the project developer may, of course, use its own financial resources or, under certain circumstances, seek financing from local banks in combination with the Green Technology Financing Scheme (GTFS). The disadvantage of this programme is the equity requirement (20%) and the capping of the financed volume at RM 100 million.

In connection with green technology projects (such as PV), it should be also noted that in certain circumstances the project developer can benefit from tax incentives.

OPPORTUNITIES FOR COMPANIES

Opportunities for entering the market that arise from the LSS programme are manifold for companies. In addition to project development itself, a whole range of services should also be considered: project management, financing or engineering services. LSS offers also good opportunities in the area of production of solar cells locally in Malaysia.

CLOSING REMARKS

In summary, it can be said that the PV industry in Malaysia is still in its infancy. But precisely this is what creates an opportunity for companies that already have the relevant experience in the PV business. Especially the LSS programme offers well-prepared investors or project developers attractive alternatives to markets that are already well-established or saturated.

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→ Around the world

Highlights of Kenya's Energy Act 2019

by Penninah Munyaka

After about a four-year wait, Kenya's new energy laws have finally been passed into law. President Uhuru Kenyatta assented to the Energy Act, 2019 and the Petroleum Act, 2019 in March, 2019 paving the way for the energy sector to take further steps towards its modernization and development.

The two Acts of Parliament now contain the consolidated and updated laws on the energy sector. The Energy Act, 2019 repeals the Energy Act (the repealed Energy Act), the Geothermal Resources Act and the Kenya Nuclear Electricity Board Order No. 131 of 2012.

The Petroleum Act on its part repeals the Petroleum (Exploration and Production) Act (CAP 308) and absorbs and expands the provisions in the repealed Energy Act concerning upstream petroleum a move that was necessitated by several factors including the need to provide a facilitative legislative framework relating to petroleum products following the discovery of commercially viable oil deposits in Northern Kenya.

This article will be focused on the changes made in the Energy Act, 2019 and the developments expected as a result of its passing. It will also serve as an update to our last article on this subject titled 'Developments in the regulatory framework for renewable energy in Kenya: Energy Bill 2017'.

THE ENERGY ACT, 2019 (THE NEW ACT)

The new Act has several amendments to the repealed Energy Act intended as set out in its preamble, to conso-

lidate the laws relating to energy, to properly delineate the functions of the national and devolved levels of government in relation to energy, to provide for the exploitation of renewable energy sources, to regulate midstream and downstream petroleum and coal activity and for the supply and use of electricity and other forms of electricity.

ENERGY SECTOR ENTITIES

The new Act has established several new 'energy sector entities' that will replace those existing under the repealed laws and has gone further to restate and expand their mandates where this is necessary for them to properly discharge their functions.

ENERGY AND PETROLEUM REGULATORY AUTHORITY (EPRA)

The EPRA is the successor to the Energy Regulatory Commission (ERC), which exercised regulatory control over the energy sector. The objects and functions specified for EPRA will remain fundamentally the same as those of the ERC. It will still retain regulatory control over the energy sector as a whole with the exception of licensing of nuclear facilities and the regulation of downstream petroleum.

THE ENERGY AND PETROLEUM TRIBUNAL (EPT)

The EPT is the successor to the Energy Tribunal. The Energy Tribunal was a quasi-judicial body whose mandate was to hear appeals that may be made to decisions made by the ERC in accordance with the repealed Energy Act. The EPTs jurisdiction is wider; the new Act provi-



des that it may hear and determine disputes and appeals relating to energy and petroleum that may arise under the Energy Act 'and any other written laws'. This means that it may not only hear disputes that may arise from the Petroleum Act, 2019 for instance, but potentially any other law that may refer such matters to it. The new Act also goes further to provide a clearer legislative framework, as this was not provided before, to guide the EPTs conduct of its business especially so far as its procedures are concerned.

RURAL ELECTRIFICATION AND RENEWABLE ENERGY CORPORATION (RREC)/RENEWABLE ENERGY RESOURCE ADVISORY COMMITTEE (RERAC)

The new Act has carried over the proposals in the Bill for the establishment of RREC and RERAC.

RREC is the successor to the Rural Electrification Authority (REA). RREC will, in addition to rural electrification, have an expanded mandate in relation to renewable energy that will put it at the centre of policy formulation, research and development, international cooperation and the promotion of renewable energy use amongst the local population. RERAC on the other hand is an inter-ministerial committee intended to advise the responsible cabinet secretary on matters concerning the allocation of renewable energy resources, the licensing of renewable energy resource areas, the management of water towers and catchment areas, the development of multi-purpose projects such as dams and reservoirs and the management and development of renewable energy resources.

NUCLEAR POWER AND ENERGY AGENCY (NPEA)

The NPEA will be the successor to the Kenya Nuclear Electricity Board a state corporation established pursuant to the Kenya Nuclear Electricity Board Order No. 131 of 2012. The NPEA will continue the Board's mandate to develop and implement Kenya's nuclear energy programme.

VESTING OF RIGHTS OVER RENEWABLE ENERGY RESOURCES

The new Act has adopted the proposal in the Bill to have all renewable and geothermal energy resources vested in the national government. As we had mentioned in our last article, this provision is primarily intended to clarify which level of government has the right to manage these resources. As resources are not evenly distributed across the country, it is considered best to have them vested by the national government who can develop

them for the benefit of all Kenyan people and not just the regional county governments and communities where the resources are located. These county governments and communities are however compensated by receiving a part of the royalties charged by the national government for the development of the resources.

ROYALTIES FOR EXTRACTION OF GEOTHERMAL RESOURCES

Royalties emerged as a hot button issue at the time the Bill was undergoing the legislative process at public participation stage. The tension surrounded the division of the royalties between the three main stakeholders i.e. the communities and county governments from the areas the resources are located and the national government. The local communities and county governments were at the time requesting for up to 45% of the royalties collected.

The Act however adopted the provisions of the Bill despite the protestations relating to the amount of the royalty charged on licensees i.e. between 1% to 2.5% to be paid during the first 10 years of production and between 2% and 5% for the following years. It has also retained the provisions on the division of the royalty by the three stakeholders i.e. the local communities will receive 5%, the county government 20% and the remaining 75% will be taken by the national government.

The Act also adopted the provisions of the Bill permitting the responsible cabinet secretary to vary or waive the amount of the royalty in the interest of promoting investment and development of the resource.

PREPARATION OF RENEWABLE ENERGY RESOURCES INVENTORY AND RESOURCE MAP

The Act has also adopted the provisions relating to the creation of an inventory and resource map for renewable energy resources by the government through the Ministry of Energy & Petroleum. This inventory and map once created will reduce the burden on prospective investors of conducting exploratory and feasibility studies.

NET-METERING

Net-metering did make its way into the new Act as proposed in the Bill. The Act now provides the legislative backing needed to allow consumers to supply any excess capacity they have back to the grid. It is worthwhile to note that the wording in the new Act is to the effect that a licensed distributor or retailer must make available a net metering service to a consumer upon their request. The new Act states at section 162 (2) that:

Each distribution licensee or retailer shall, upon application, make available net metering service to any electricity consumer that the licensee serves as prescribed in regulations.

It remains to be seen how this will work in practice as distributors and retailers will not be too eager to comply with such a mandatory requirement as it may erode their revenues.

THE RENEWABLE ENERGY FEED-IN-TARIFF SYSTEM (FiT)

The Renewable Energy Feed in Tariff System has been anchored in the new Act providing further legislative backing the 'Feed-In-Tariffs Policy on Wind, Biomass, Small-Hydro, Geothermal, Biogas and Solar Resource Generated Electricity' (FiT Policy) developed by the Ministry of Energy in 2008. The FiT is intended to encourage the generation of energy from renewable sources and its supply through localised distribution networks. It is also intended to encourage the uptake and innovation of renewable energy technology and in sum to help reduce

damage to consumers' property, financial losses and even loss of life. This provision was introduced as a response to the challenges most Kenyan consumers face with the currently available power supply such as regular blackouts and brownouts. The general sentiment has been that Kenya's main power supplier, the Kenya Power and Lighting Company (KPLC) has taken its customers for granted due to the monopoly it currently enjoys. KPLC has been taking active steps to address consumers concerns and has made great improvements in the past few years. This provision will nonetheless go further to reassure consumers that the legislature has taken the steps to spur the change they demand, which is to have access to steady and good quality electricity.

OPERATIONALISING THE ACT

Now that the Act is now law, it will now fall to the various government stakeholders to take the necessary steps to make it fully operational.

For a start, the new Energy Sector Entities established under the new Act i.e. the EPRA, the EPT, REREC, RERAC



the greenhouse gas emissions and Kenya's reliance on non-renewable energy sources.

The FiT Policy and the tariff structures set out therein will continue in force under the new Act pending the development of the necessary subsidiary legislation which may adopt or update the current FiT Policy.

POWER SUPPLY

The new Act has introduced under section 166 a system to penalise electricity suppliers and compensate consumers for unwarranted power outages or for their provision of irregular or poor quality electricity which leads to da-

and the NPEA will have to transition and take over from the entities they replace. As the new entities are fundamentally the same as those they replace, the transition will be mostly be a matter of renaming and retitling themselves and fully adopting their new mandates. The transitional provisions contained in section 225 of the new Act and the Fourth Schedule to the Act bear this out. As an example, the leadership of the ERC i.e. the chairpersons and commissioners, will continue in office in their new roles as Chairpersons and Board members of the board of the EPRA for the remainder of their tenure. The employees of the ERC will also continue on as employees of the EPRA. This means that business will continue as usual.

More fundamentally, all (valid) things done under the repealed Acts shall continue to be valid and in force under the new Act, therefore all current licences issued under the repealed Act shall continue to be valid. Tariffs existing at the commencement of the new Act shall continue until they are replaced. As a final example, subsidiary legislation made under the repealed Act, such as the Energy (Electricity Licensing) Regulations, 2012 shall continue in force under the new Act until new regulations are made

New subsidiary legislation will nonetheless have to be created under the new Act to provide the detailed legislative framework to govern and support the implementation of various new provisions of the Act.

As a highlight, regulations will have to be created for the administration and implementation of net-metering, the feed-in-tariff system and the charging, collection and distribution of royalties collected under the new Act. It is not certain how long it will take for these to be developed, but we are aware and we expect that the Ministry of Energy and Petroleum and the ERC has been working on drafts of these regulations during the long wait for the new Act to be passed. We therefore hope and expect that these will be rolled out without much delay.

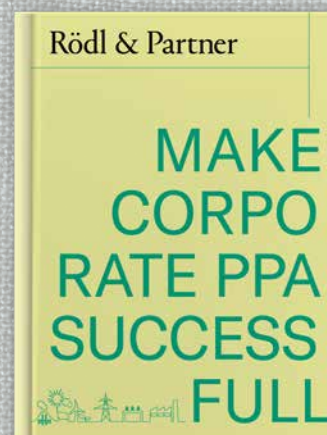
The new Act has set out time limits for the development of some subsidiary legislation. As an example, the responsible Cabinet Secretary is required to develop, within 6 months of the coming into force of the Act, regulations under section 166 on the system to penalise suppliers for failure to provide electricity or for supplying poor quality electricity.

Separately, the new Act has set out a time limit of twelve months for the Cabinet Secretary to commence a countrywide survey and a resource assessment of all renewable energy resources in order to develop the resource maps and renewable energy resources inventory.

CONCLUSION

In sum, the passing of the Energy Act, 2019 represents the passing of the baton from the legislature to the executive arm of government who now bear the responsibility to further develop the energy sector. It is hoped that they will now seize the opportunities it presents to realise the promise it holds. We will give further updates on the process of the implementation of the new Act as the various regulations we have discussed are published.

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→ Around the world

Amendment to the Polish Renewable Energy Sources Act

by Piotr Mrowiec, LL.M.

As early as February, the Polish Ministry of Energy published the draft amendment to the Polish Renewable Energy Sources (RES) Act and submitted it for public consultation. By the time of writing this article, the legislative work did not move forward, although the amendment is necessary to be able to organise the energy auctions this year.

EXISTING POWER PLANTS. CHANGE IN THE RATE OF THE SUBSTITUTION FEE

The government is planning to introduce a significant change to the mechanism of determining the rate of the substitution fee. According to the current wording of the Act, the rate of the substitution fee is 125% of the average price of green certificates quoted on the energy ex-

change in the previous year (in 2018, the value was PLN 103.82). Thus, the 2019 substitution fee amounts to PLN 129.775. The Act also provides for the maximum rate of the substitution fee and this upper limit is PLN 300.03. According to the draft amendment, the formula for determining the rate of the substitution fee will change. The rate of the substitution fee will no longer be linked to the average market price of the traded green certificates of origin, but to the amount of the reference prices (permitted maximum auction prices) and the previous year's average price of electricity. According to the proposed amendment, the maximum amount of the substitution fee should be equal to the difference between the average reference price for all technologies in 2018 (weighted according to the installed nominal capacity as of 30 June 2016) and the previous year's average electricity purchase price.

The proposal of the Ministry has been strongly criticised by the renewable energy industry. It is probable that the Ministry will depart from this idea and will continue to apply the old formula.

PROLONGATION OF THE VALIDITY OF ALREADY CONCLUDED GRID CONNECTION AGREEMENTS

According to the current wording of Article 192 of the Polish RES Act, the contractual deadline for the first supply of electricity generated in (on-shore) wind turbines or PV power plants cannot be longer than 48 months. This deadline has been running since the effective date of the Polish RES Act. The Act came into force 30 days after its promulgation on 3 April 2015. Grid connection agreements should thus expire by 4 May 2019 at the latest. The planned amendment recasts this provision and provides for a “1-month window for connection” for renewable energy projects. The final deadline for the supply of energy cannot be earlier than 1 January 2020 but also not later than 31 January 2020.

It should be noted that irrespective of the above-mentioned prolongation, the validity of grid connection agreements for auction winning projects will be extended for the period which the winner of the auction will be granted to complete a power plant.

VOLUME OF ENERGY OFFERED FOR PURCHASE FROM NEW POWER PLANTS (WIND, PV)

The amendment is also necessary not only because of the acute problem of grid connection. Due to the lack of implementing provisions, no new auction can be organised in 2019 under the current legislation. The amendment to the RES Act aims to make the conduct of auctions possible this year. The Ministry has recently published information about the volumes of energy to be auctioned in the auction rounds planned for 2019. For the wind industry, relevant is the volume of energy offered for purchase from new power plants with a capacity of 1 MW and more – the value here is 91,470,000 MWh (technology basket: wind and solar). Assuming that the power plants participating in the auction will have a capacity of 10 MW and each power plant will produce about 450,000 MWh of electricity in a period of 15 years (30,000 MWh per year), it can be stated that the auction round is designed for a good 200 wind power projects. The Ministry has also published information about volumes of energy to be auctioned in the auction round for power plants of up to 1 MWp, for which PV power plants are a perfect fit. Accordingly, 11,445,000 MWh of energy is to be purchased from smaller wind power or PV power plants.



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→ Around the world

Power outages in South Africa

self-consumption power plants in demand

by Anna-Lena Becker

At present, South Africa is again facing load shedding, i.e. controlled power cuts to relieve the power grid. Due to persistent power outages, demand for self-consumption power plants and battery solutions is growing among companies and private households.

South Africa has been struggling with power shortages for years. The reason for it are 'clapped out' coal-fired power plants, neglected maintenance, years of delays in the completion of new coal-fired power plants and high indebtedness of the state-owned power utility („Eskom“). In order to prevent a total blackout, load shedding was introduced in South Africa. Load shedding is a measure consisting of controlled power cuts across various regions of the country on a rotating basis. More specifically, it means that South Africa has been divided into zones and the power is cut off in the respective zones at different times based on a strict schedule. The frequency of those power cuts depends on the load shedding stage (stage 1 to stage 8). The load shedding stages describe how many MW are shed from the grid. Stage 1 means that 1,000 MW are load shed, stage 2 – 2,000 MW, etc.

In November 2018, load shedding was implemented again after it had been suspended for three years. In December and January, it was initially possible to avoid further power cuts by using diesel. This very costly emergency solution turned out to be unsuccessful in February 2019 as all reserves of diesel fuel were exhausted in the country. As a result, load shedding stage 4 was immediately launched in February. Stage 4 means specifically that the power goes off each time for 2.5 hours three times within 24 hours.

As the national elections are on the doorstep in South Africa, load shedding is also a political issue. Campaign posters of the main opposition party featuring the slogan „Keep the lights on“ are everywhere in the streets. In his annual State of the Nation Address, the South African President announced the splitting up of the state-owned power utility. This means that, in future, Eskom will be split into three separate entities for Generation, Trans-

mission and Distribution under Eskom Holdings. However, privatisation of Eskom is not taken into account as a possible scenario.

A stronger focus on renewable energies and a greater opening-up of the energy market to independent electricity producers would put an end to power shortages. A new round of the public auction programme („Renewable Energy Independent Power Producer Procurement Programme - “), which was launched in 2011 and as part of which 3,776 MW have been fed into the grid so far, is expected to commence in 2020/2021.

Load shedding creates great opportunities for German companies in the area of self-consumption power plants. The number of roof-mounted PV systems is increasingly growing in South Africa. Some municipalities also allow self-consumption power plants of up to 1 MW to feed electricity into the grid through net metering. Due to load shedding, especially battery solutions are in high demand. Both companies and private households want to cut themselves off from Eskom and the uncertainty surrounding power supply.

Entering the South African market is not complicated compared to other African countries. Especially establishing a local company is easy as the whole process takes approx. 2 weeks to complete. The South African financial sector meets the European standards. In addition, South Africa may serve as a springboard for breaking into other African markets in sub-Saharan Africa.

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→ News on international renewable energy incentive programmes

Promoting energy efficiency and process heat from renewable energy sources in the economy – Funding option: competition

The Federal Ministry of Economic Affairs and Energy (BMWi) promotes measures in the area of energy efficiency and process heat in the economy by way of a competitive procedure.

Only the most efficient projects of an application round will be selected for funding, the criterion being the annual CO₂ savings achieved per euro of funding.

The following entities may apply:

- private companies
- municipal companies
- contractors
- members of liberal professions

Measures eligible for funding:

- process and procedural transition as well as optimisation of production processes
- use of waste heat
- supply of heat, cooling and ventilation in the production process
- supply of process heat or cooling
- avoidance of energy losses in the production process
- sensor technology as well as instrumentation and control engineering
- development of an energy saving plan and assistance with implementation

The following requirements must be met to be eligible for funding:

- submission of an energy saving plan
- period of amortisation without funding > 4 years
- period of implementation of up to 3 years
- in the case of planned contracting, conclusion of a separate contractor agreement
- 3 years' compliance with the obligation to use renewable energy

Funding will be granted to finance up to 50% of additional investment costs, including ancillary costs, however, up to the limit of EUR 5 million per project.

Applications can be submitted from 15 April 2019 onwards on an ongoing basis, but projects to be funded will be selected as part of competition rounds held on specific dates. The next such date is 30 June 2019. The application round can be closed earlier if the available budget is exhausted due to the number of submitted projects. Applications should be submitted to the competent project management firm VDI/VDE Innovation + Technik GmbH.

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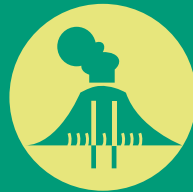
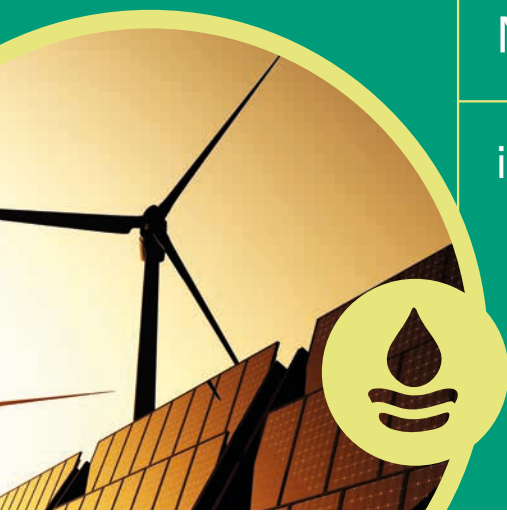
Events

9. BRANCH MEETING RENEWABLE ENERGIES

NOVEMBER, 27th 2019

in Nuremberg

SAVE THE DATE



We are happy to invite you to be our guest in our Nuremberg headquarters on November, 27th 2019. We will provide you with the latest legal, economic and tax aspects for renewable energy projects.

For more informations please contact



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