



Renewables in Ukraine

KPMG in Ukraine

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Foreword

Ukraine's Renewables Investment Boom

The Ukrainian government has committed to increase renewables from around 4 per cent of the energy mix today, to 25 per cent by 2035.

While hydropower dominates the country's renewable capacity, averaging 4.6GWp over the last decade, installed wind, solar and bio energy capacity increased by 54 per cent to 2.1GWp in 2018 alone, with a further 4.6GWp of capacity in the pipeline.

Much of this growth and pipeline, particularly in wind and solar, has been fuelled by a rush to secure the Green Tariff, which will be replaced by an auction-based regime from 2020.

Introduced in 2008, the Green Tariff provides highly attractive and guaranteed Euro-denominated rates until the end of 2029. Investors can

still secure the Green Tariff provided that projects have obtained land use rights, a grid connection agreement, a construction permit and a power purchase agreement (PPA) in the new format by 31 December 2019.

Passing of Ukraine's Auction Law for alternative energy sources in April 2019 follows a well-trodden path. Use of auctions to manage supply to a national grid has become commonplace in recent years.

According to research by the International Renewable Energy Agency (IRENA) the number of countries that have adopted renewable energy auctions increased from six in 2005 to more than 67 by early 2017, and continues to rise.

Although the auction regime will undoubtedly lower returns on investment, compared to those offered by the Green Tariff, any reductions

should be manageable, subject to the capacity offered at each auction, as advances in technology continue to reduce generating costs.

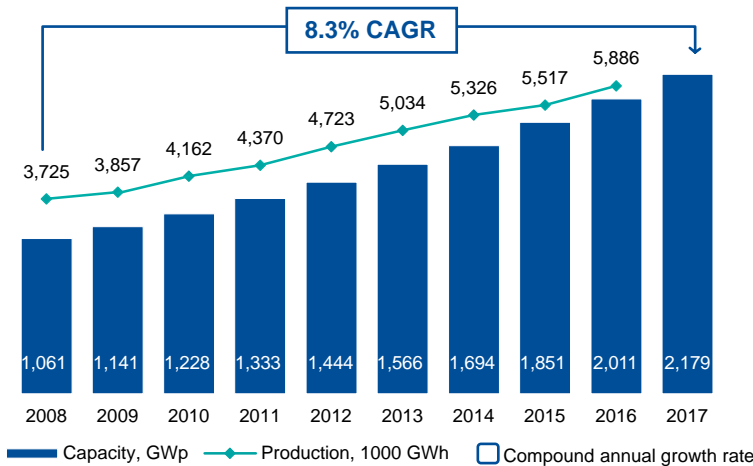
We expect the investment climate for Ukrainian renewables to remain favourable. Indeed, the government's 2035 energy mix target will require significant, and sustained investment in new renewable capacity, storage and transmission networks.

Overall, the outlook for the renewables sector in Ukraine looks bright. Development of the sector has been rapid in recent years, and will continue in the years ahead, although investors should carefully assess the impact of the new auction regime.



A Global Perspective

Worldwide growth in renewables in 2008-2017



Since the adoption of the Kyoto Protocol, in 1997, which committed 37 developed nations and the EU-15 to reduce emissions, the international community has set ever more onerous targets for reductions in emissions of key greenhouse gases. And, despite the USA's planned withdrawal from the Paris Agreement, measures to reduce emissions seem unstoppable.

While hydropower remains the dominant source of renewable energy, with the development of solar and wind energy, its share has dropped significantly and it currently accounts for 53 per cent of global renewable capacity and 69 per cent of power generation. The share of solar and wind has increased to 18 per cent and 24 per cent of total generating capacity respectively, and we expect these numbers to continue to grow.

Plans recently announced by the European Commission will impose a range of reforms on the electricity market from 2025, including an end to coal generation subsidies, and legislative initiatives aimed at increasing the share of renewable energy to 50 per cent of the generation mix by 2030.

Globally, the picture is just as positive. A forecast by the International Energy Agency¹, which takes into account prevailing market conditions and

Global renewable power capacity

	Hydro	53%
	Wind	24%
	Solar	18%
	Bio	6%
Total, GWp		2,179

Global renewable power generation

	Hydro	69%
	Wind	16%
	Solar	6%
	Bio	9%
Total, 1,000GWh		5,886

Note: The difference between renewable capacity and power generation is explained by the different utilisation ratios applicable to each source (approx. 40 per cent for hydropower, between 20 per cent and 25 per cent for wind, approx. 10 per cent for solar). Source: IRENA



¹ International Energy Agency, 2018

policy frameworks, expects capacity to grow by over one Terawatt (46 per cent) between 2018 and 2023. Solar energy accounts for more than half of this expansion, driven by supportive government policies, market and technological improvements and declining capital costs.

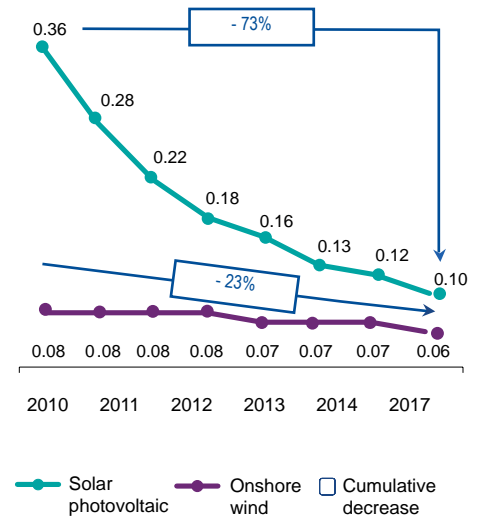
Long seen as a sector in need of subsidy, now, however, those technological innovations, enabling policies and economies of scale mean that power generation from renewable sources is increasingly competitive with, and in many cases, less costly than fossil based or nuclear power.²

Solar photovoltaic (PV) modules declined in price by more than 80 per cent between 2010 and 2017 and with it, the average cost per kWh generated has tumbled by 73 per cent to USD0.10

(LCOE), with the potential to drop to USD0.03 given the right operating conditions. Onshore wind too, has seen significant improvement in cost per kWh to a global weighted average of USD0.06 (LCOE), 23 per cent lower than 2010, with some projects regularly delivering electricity for USD0.04 per kWh³

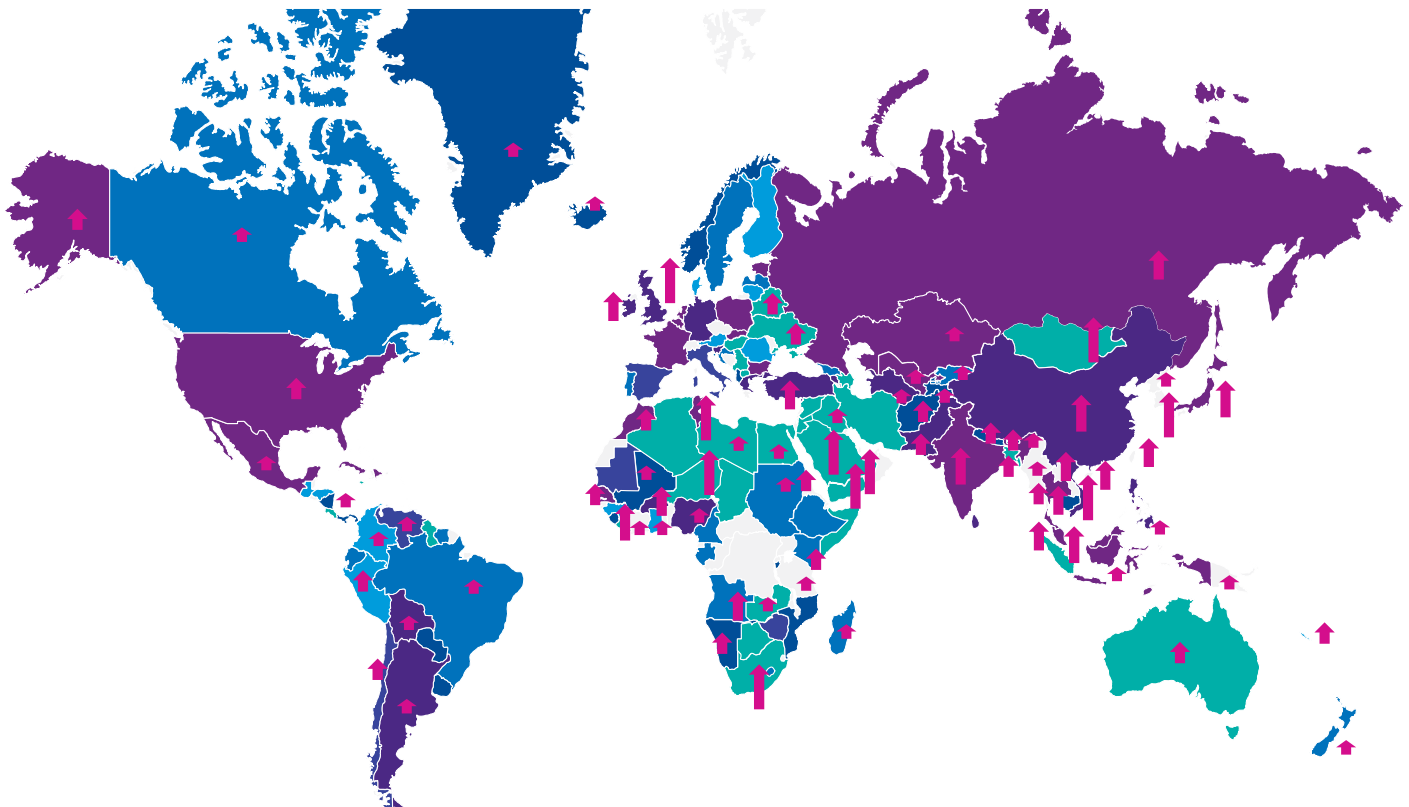
Against this background, worldwide investment in renewables has shown strong growth of 9 per cent CAGR from 2010-2017, spurred on in many territories by a generous range of subsidies and tariffs, and welcoming regulatory environments. While developed and industrialised countries have led the way, emerging economies have also been active. Investors expect to see valuations grow across all sectors but particularly in solar and wind.

Global levelised cost of electricity (LCOE) generation (USD/kWh)



Source: IRENA

Renewable energy penetration (2017) and growth (2010-2017)



Renewable power capacity, GWp

	Asia	Europe	North America	South America	Eurasia	Other	World
Capacity in 2010	389	323	232	149	70	66	1,228
Change	528	189	116	54	27	36	951
Capacity in 2017	917	512	348	203	96	102	2,179

0% 10% 20% 30% 40% 50% 70% 100%

Share of renewable energy production in 2017, % of total energy production

0% 4% 8% 12% 16% over

CAGR in renewable energy capacity in 2010-2017

² IRENA (2018) Renewable power: Climate-safe energy competes on cost alone.

³ IRENA (2018) Renewable power: Climate-safe energy competes on cost alone.

Global M&A in the renewables sector has focused on Europe and North America, which attracted 37 per cent and 30 per cent respectively of all deal-making activity between 2010 and 2017, despite their significantly lower share of installed renewable capacity (23 per cent and 16 per cent), perhaps reflecting the higher cost base in these developed markets. The sector attracts interest from both private and public sector investors, who accounted for 70 per cent and 30 per cent of M&A activities respectively. Over 68 per cent of investments were cross-border.

A 2017 KPMG Survey⁴ predicted that the EMEA region would attract up to half of all investment in the renewable sector in 2018 and indeed approximately 40 per cent of M&A activities in the renewable sector in 2018 were in this region. Among the largest deals were the acquisition by Global Infrastructure Partners (GIP), the US-based private equity firm, of a 50 per cent stake in Hornsea 1, the UK-

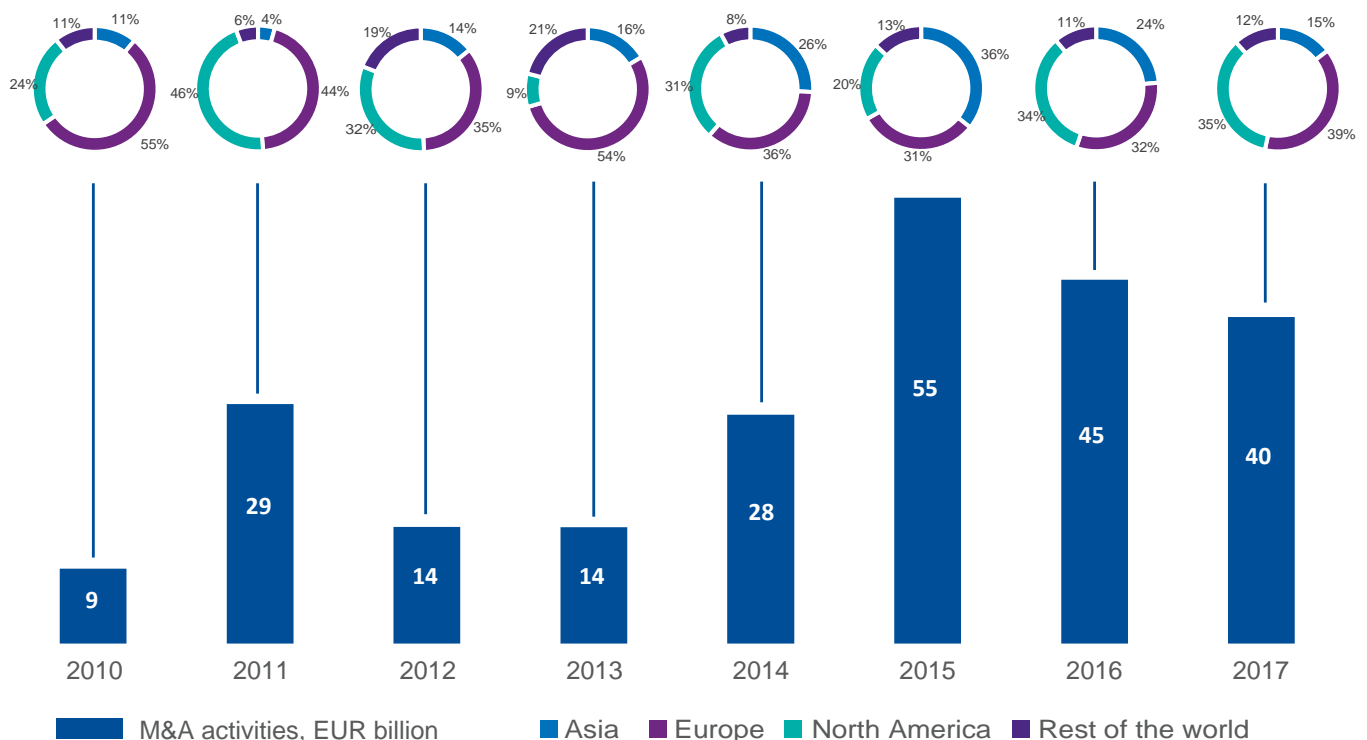
based 1,218-megawatt (MWp) offshore wind farm, from Orsted A/S (Denmark) for GBP4.46 billion; Canadian group, Brookfield Asset Management's purchase of Saeta Yield, the Spanish listed renewable energy company; the acquisition of an undisclosed majority stake in Spanish wind farms to solar photovoltaic plant development and construction business, Eolia Renovables de Inversiones, S.C.R. S.A. by Alberta Investment Management Corporation (AIMCo), for EUR600 million and the acquisition of RTR Rete Rinnovabile S.r.l. an Italian solar generator and distributor, by F2i SGR SpA, an Italian private equity and venture capital firm for EUR1.3 billion.

By comparison, deals in Ukraine were significantly more modest. Interest in the power and utilities sector has however has been predominantly focused on renewables. A number of pre-construction projects secured foreign investment through M&A, activity but the majority fell below

USD5 million, the deal value threshold for our database. In 2018 the only large deal of the year saw Syvashenergoprom, which is due to construct a wind plant with a capacity of between 250 and 330MWp, acquired by Norwegian renewable energy company NBT AS. Post-acquisition activity has, however, been strong across the sector and we have seen debt raising and capital investment measured in hundreds of millions of US dollars, and as the sector grows we expect to see increased activity as local and international operators compete for dominance.

However, among the positives, a 2017 KPMG survey⁵ of 200 senior level investors in renewable energy did identify some potential problems, noting that the switch from feed-in tariffs to an auction-based system was, occasionally, an uncomfortable transition and that valuations were creeping up as more and more focus was placed on the industry.

M&A activities, EURm



Source: Mergermarket, KPMG analysis

⁴ KPMG, Great Expectations: deal making in the renewable energy sector 2017
⁵ KPMG, Great Expectations: deal making in the renewable energy sector 2017

Ukraine Overview

At present, Ukraine generates just 4 per cent of its electricity from renewable sources other than hydroelectric power, and the market opportunities for investors are in practical terms, limitless, given the country's stated desire in the National Energy Strategy, to increase the renewables mix to 25 per cent by 2035. This ambitious strategy will require significant investment in the development of power storage capacity to reduce losses to the grid and imbalances between supply and demand, but we expect this to be largely resolved upon liberalisation of the market. Currently, power storage facilities in Ukraine are limited to approximately 1,500MWp of pumped-storage hydroelectricity.

DTEK Wind Power, the renewables arm of the local energy giant, and Wind Parks of Ukraine, which additionally builds equipment under licence from German supplier, Fuhrlander

Windtechnology, dominate the Ukrainian wind power market. In the solar renewables sector, CNBM New Energy Engineering, and Rengy Development are the largest suppliers, controlling almost one third of the market.

In both wind and particularly solar, outside of the key players, whose growth plans have thus far been largely organic, the market is fragmented and characterised by smaller operators and start-ups, many of whom have yet to generate their first megawatt.

During 2018, installed solar power capacity increased by 646MWp (87 per cent). Wind power capacity increased by 68MWp (15 per cent) and biofuel by 13MWp (33 per cent), driven mainly by the Green Tariff mechanism, increased interest from foreign investors, debt financing and insurance cover provided by international financial institutions.

Elsewhere, the Solar Chornobyl project should be revered for both its ambition and symbolism. The 1986 Chornobyl disaster was the world's worst nuclear accident, leaving thousands of square kilometres of Ukraine and Belarus uninhabitable, leading to one of the largest forced mass-migrations in Europe since the Second World War. In a sign of things to come, in early 2018, Solar Chornobyl, a joint venture between Ukraine's Rodina and Germany's Enerparc AG, brought a small solar plant (1MWp) into operation in the Chornobyl exclusion zone and later that year signed an agreement to increase its capacity to 100MWp. Once completed, the project will see Chornobyl restored to the power mix of Ukraine, and Solar Chornobyl become one of the largest solar power plants in the country.



A Greener Future for Ukraine

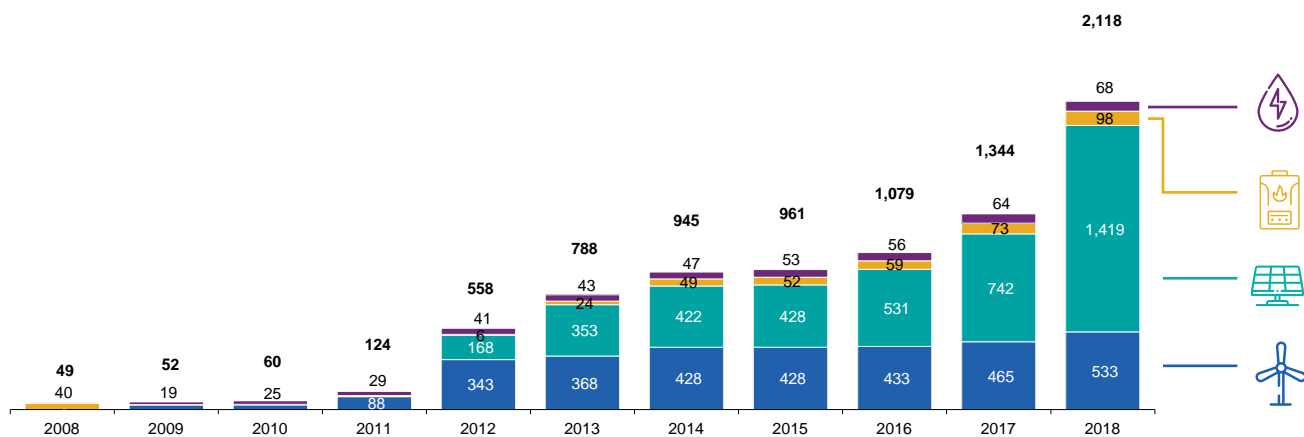
In Ukraine, with its dated infrastructure and reliance on fossil fuel generation, the ecological case for renewables could not be clearer. Coal fired heating and electricity generating plants, and diesel engines, emit tiny particulates that lodge in the lungs and can lead to serious respiratory illness. In Ukraine, levels of these PM2.5 particulates, so-called as they are 2.5 microns or smaller in size, are, on average, almost twice World Health Organisation (WHO) limits⁶. Ukraine has pledged to cut its greenhouse gas emissions by at least 40 per cent from 1990 levels by 2030, under the 2015 Paris Agreement.⁷

The government stopped importing gas from the Russian Federation in November 2015 and has since relied on local production, supplies from Europe and other fuel sources for power and heat generation. As early as 2008, the government started to stimulate development of wind, solar, biofuel and small hydro energy projects, introducing a special Green Tariff, tax and customs reliefs, and incentives for purchasing locally made equipment.

Driven both by the necessity to seek alternative energy supplies and by a

desire to capitalise on its undoubted natural advantages, Ukraine is carving out a niche as a destination for investment in renewable energy, and in particular, wind and solar power. While the nation's published energy strategy assumes significant development of new facilities, there is already much opportunity for more risk adverse investors to take a stake in projects currently in planning or in operation, in order to take advantages of the government-backed Green Tariff, which sets Euro-linked tariffs through to the end of 2029.

Ukraine's growth in renewable power capacity in 2008-2017



Source: IRENA, NERC (National Commission for State Regulation of Energy and Public Utilities)

Notes: (a) Hydropower capacity includes only capacity from small hydro plants (98MWp) which receive Green Tariff payments, and excludes large scale hydro generation plants (4,571MWp) and hydro pumped-storage capacity (circa 1,500MW) which are owned and operated by Ukrhydroenergo, a government-owned generator.

(b) Capacities of renewable energy plants exclude wind and solar plants located on the Crimean peninsula (circa 500MWp), but include the wind farms, which are not currently operating, in the territories in Eastern Ukraine, currently outside the government's control.

⁶ World Bank, DataBank Micro Data Catalog (2015 data).

⁷ Reuters, Ukraine cities gear up to run on local clean energy by 2050

From the outset, local operators were keen to start developing renewable projects to take advantage of the Green Tariff, and once the benefits became clear, from around 2014, international operators have seized the opportunity to invest in this fast growing sector in Ukraine.

By the end of 2018, some 2,117MWp of renewable capacity had been installed and further facilities with a combined capacity of over 3,000MWp are either at the pre-development or construction stage, with the aim of capitalising on the Green Tariff.

In the first quarter of 2019, Ukraine added 861MWp of renewable capacity, five times more than during the same period in 2018⁸, of which almost 700MWp was solar. Investors worldwide, from Norway's Scatec, to China's CNBM Engineering are recognising the opportunities. They are being helped with funding and

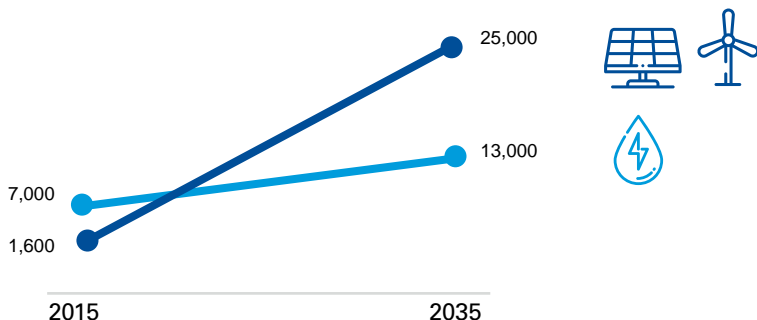
guarantees provided by organisations such as the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the US-based Overseas Private Investment Corporation (OPIC), the International Finance Corporation (IFC), and other smaller lenders and investors, including German banks, who together have contributed over USD1.4 billion since 2009.

The recently introduced law, On Amendments to Some Laws of Ukraine on Ensuring Competitive Conditions for Production of Electricity from Alternative Energy Sources, No. 8449-d (the Auction Law), looks set to continue to keep the momentum up, providing for new auction-based tariffs, a coherent market and a clear strategy for integrating renewables into the overall energy mix. A planned integration with the European grid also raises the prospect of international energy sales. The market will however require

further investment in storage capacity to ensure that both investors and the government can reap the benefits.

Alongside Ukraine's clear natural advantages, particularly for solar and wind generation, the government is committed to generating 25 per cent of the nation's power from renewable sources by 2035. The country also has a fast-maturing regulatory environment, access to international finance and a workforce with the necessary skills and experience to implement complex projects. Output from wind and solar is expected to grow at 15 per cent (CAGR) to reach 25,000GWh in 2035, up from 1,600GWh in 2015. Growth in hydroelectric power will be more modest but should still reach 13,000GWh by the same date, following overhaul of existing equipment and construction of new generating units at existing government-owned plants.

Ukraine's power generation in GWh



Investment from donors (2009-2018)

European Bank for Reconstruction and Development	USD639 million
OPIC	USD392 million
European Investment Bank	USD203 million
IFC International Finance Corporation	USD73 million
Other donors	USD118 million
Total	USD1,425 million



⁸ Ukraine Business News

International Investment

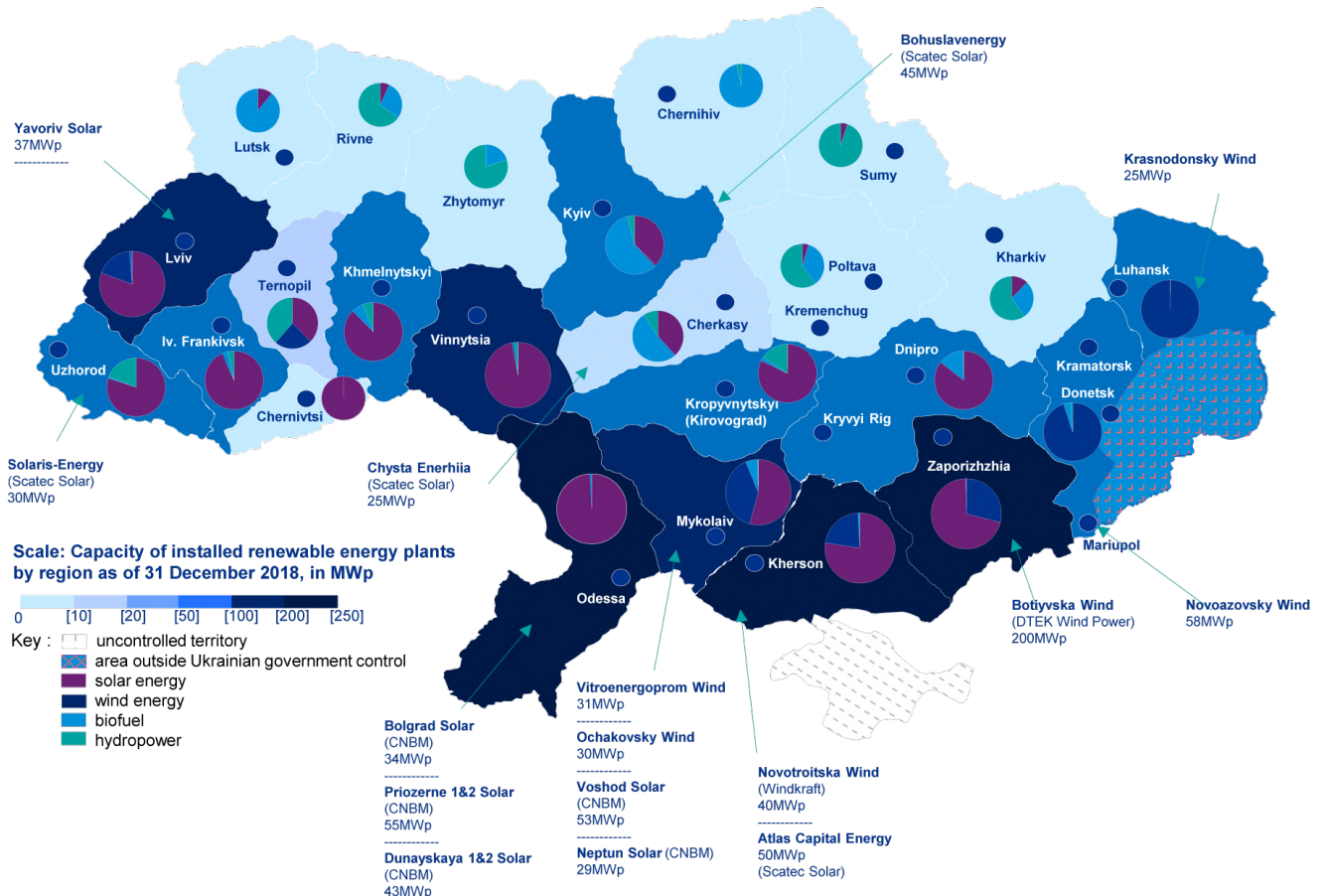
International investors are already key players in the renewables market, chief amongst them are CNBM Engineering with an estimated 22 per cent share of the solar market in Ukraine (excluding plants in Crimea) and Rengy Development, a multinational working in Kazakhstan, Armenia and Ukraine, which has a 10 per cent share.

Norway-based NBT has signed an agreement with the Unit Venture Investment Fund to develop a EUR1 billion, 742MWp wind power plant along the northern shore of the Sea of Azov, in Yakymivka district. This development, with the working name

of Zophia, will be the largest onshore wind power plant in Europe. A further 4.6GWp of renewable capacity is currently planned or under construction with the aim of coming on stream in the coming years in order to secure the highly advantageous Green Tariff. Additionally, NBT, French group, Total Eren SA and China Power have agreed to invest USD450 Million in construction of a 250MWp wind farm in Kherson Region, Norway's Scatec will shortly bring on line an 83MWp solar facility, and other local and international investors will bring on line as much as 500MWp of wind power in the coming years⁹.

One of the largest domestic renewables operators in the Ukrainian market is vertically-integrated energy giant DTEK which, alongside its fast developing wind and solar interests is also the nation's largest coal miner, fossil fuel electricity generator and the largest private gas producer. DTEK Wind Power has approximately 40 per cent share of the Ukrainian wind energy market¹⁰. DTEK plans to invest EUR750 Million in 2018 and 2019 in construction of solar and wind power plans, with total generating capacity of 740MWp¹¹.

Installed capacity and key projects



Source: NEURC

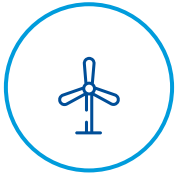
⁹ Business News Europe, Ukraine's Renewable Rush

¹⁰ Biowatt, Alternative energy, who is interested, where are they investing?

¹¹ Na chasi, Renewable Energy

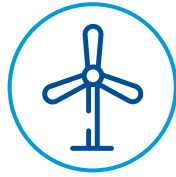
Wind energy

Installed capacity



DTEK	200
Windkraft Ukraine	75
Ochakivskiy Wind Park	49
Prychornomorskiy Wind Park	23
Other	186
Total (MWp)	533

Pipeline



Zophia	742
Eurocapewind farm	600
Sivashenergoprom	250
Prychornomorskiy Wind Park	500
Other	1,360
Total (MWp)	3,452

Small hydro

Installed capacity



Energiya-1	9
Voda Donbassu	4
Other	56
Total (MWp)	68

Pipeline

None

Solar energy

Installed capacity



CNBM	301
Rengy Development	130
Euroimex	21
Leader	20
Other	946
Total (MWp)	1,419

Pipeline



DTEK and CMEC solar plant	200
Scatec solar plant	200
Pokrovsk solar power plant	200
Prychornomorskiy Wind Park	100
Other	403
Total (MWp)	1,103

Bioenergy

Installed capacity



Biogasenergo	18
Smilaenergopromtrans	9
Oriel-Leader	6
Singa Energis	5
Other	60
Total (MWp)	98

Pipeline



Synelnykove bioenergy plant	76
Total (MWp)	76



Sources: information in the public domain, NEURC

Plans for Growth

In June 2017, backed by assistance from the governments of Germany, Switzerland and Slovenia, Zhytomyr became the first Ukrainian city to adopt a target of using 100 per cent renewable energy by 2050, with plans for a solar plant generating up to 30MWp. Three other Ukrainian cities, Kamianets-Podilskyi, Chortkiv and Lviv have since come on board¹².

Ukraine plans to increase energy from renewable sources from 4 per cent in 2015 to 12 per cent by 2025 and to 25 per cent by 2035. This growth is dependent on necessary developments to the regulatory environment and access to international finance. Growth so far has been driven in large part by the adoption of a Green Tariff, introduced in 2008, which guarantees prices until the end of 2029 for electricity from renewable sources, brought online before the end of 2019. Thereafter, the recently introduced Auction Law will drive further

development without significantly affecting domestic bills. Pilot auctions are due to be held by 31 December 2019. Regular biannual auctions are planned from 2020.

In a further boost for the sector, other recently introduced changes to the Tax Code of Ukraine additionally grant VAT exemption on imports of certain wind and solar equipment (wind power units, PV cells, certain liquid dielectric transformers and static convertors).

There are also changes to land zoning, such that until 31 December 2022, developers of solar and wind projects will no longer have to seek change of use designation for land previously designated as industrial, transport, telecommunications or military. Further, construction of wind plants has been given an SS1 classification, meaning that work can be undertaken without a specific construction permit and works undertaken are not liable for inspection

or approval by state bodies¹³. According to some estimates, this legislation will result in UAH5-10 billion in cost savings for renewable energy providers.

Work is already in hand to synchronise the Ukrainian power grid with Europe's ENTSO-E¹⁴ which alongside providing much needed redundancy in the system, will also allow effective competition in the domestic electricity market, with inflows from international providers, while providing access to EU markets for Ukraine's nuclear power plants and renewable generators. Completion of these works would enable Ukraine to disconnect power links with the Russian Federation.

This internationalisation of the market will increase the investment attractiveness of Ukraine's power sector and hence encourage investors to commit to new renewable energy operations.

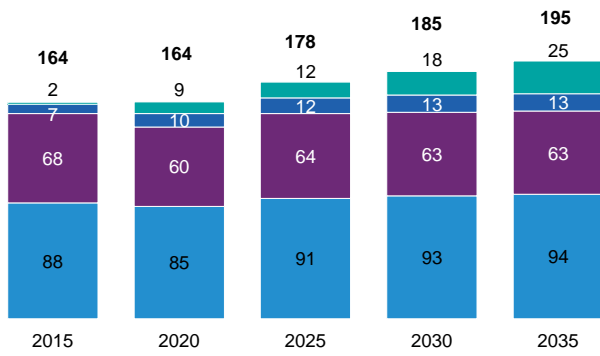


¹² Reuters, Ukraine cities gear up to run on local clean energy by 2050

¹³ EBA, VAT exemption for import of certain wind and solar

¹⁴ Ukrenergo, Integration to ENTSOE

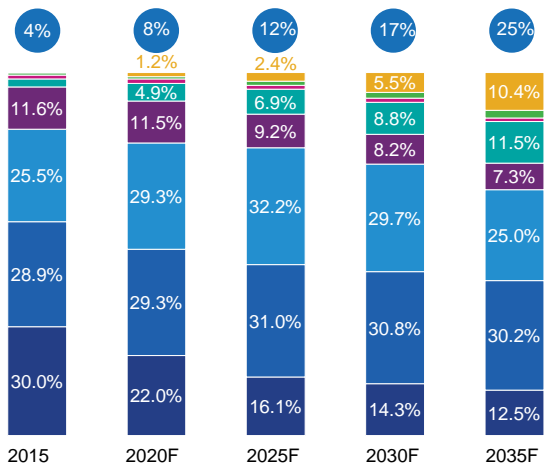
Forecast power generation (billion kWh)



- Nuclear
- Coal thermal
- Hydro
- Solar and Wind



Forecast structure of Ukraine's energy supply



- Solar and Wind
- Heat and Geothermal
- Hydro
- Biofuels and waste
- Oil products
- Nuclear
- Natural Gas
- Coal
- Total renewable energy sources



Source: Energy Strategy of Ukraine through to 2035

Investment Opportunities

Investors looking to enter the Ukrainian market have two options: either invest into existing projects benefitting from the Green Tariff, or invest into projects that will operate under the new Auction Law.

Green Tariff

Introduction of the Green Tariff in 2008 kick-started Ukraine's alternative energy market, by providing guaranteed Euro denominated prices per kWh until the end of 2029.

However, in order to secure the attractive Green Tariff (currently EUR0.15 per kWh for ground solar plants, EUR0.16 for rooftop solar plants, and EUR0.10 per kWh for wind farms of more than 2MWp) investors must ensure that power plants are commissioned by 31 December 2019.

Even if commissioned after 31 December 2019, certain large solar and wind projects can still benefit from the Green Tariff, albeit at reduced rates. Large solar and wind projects are not required to participate in auctions, under the grandfathering rule, provided they have secured rights to land plots, a grid connection agreement, a construction permit and a PPA in the new format in place by 31 December 2019. Such developments have two years (solar) and three years (wind) to complete construction in order to benefit from the Green Tariff.

Auction Law

Use of auctions to manage supply to a national grid have become commonplace in recent years. According to research by the International Renewable Energy Agency (IRENA) the number of countries that have adopted renewable

energy auctions increased from six in 2005 to more than 67 by early 2017, and the process continues.

The Auction Law, introduced in April 2019, has the following key features:

- Regular biannual auctions are planned from 2020. Pilot auctions are due to be held by 31 December 2019. Quotas will be set annually for the following five years and will be split into wind, solar and other RES. In the meantime, the government may conduct technology neutral auctions or introduce special quotas for particular projects.
- From 2020, solar power plants with a generating capacity exceeding 1MWp and wind plants exceeding 5MWp (unless operating three or fewer turbines) must take part in auctions. Those plants subject to the grandfathering rule (see left) are excluded from these requirements.
- Auctions will use the ProZorro platform. Bidders will submit closed bids which contain a technical bid (noting the capacity bid for) and bid price (per kWh) with the key criteria being price. Auction prices may never exceed those paid on the Green Tariff. These prices will be valid for 20 years from the date of commissioning of the power plant.
- Bidders must provide a bank guarantee equivalent to EUR5,000 for every 1MWp bid for, before the start of the auction and a further EUR15,000 for every 1MWp as a performance bond, if they win the auction.
- The introduction of wind and solar power into the system is likely to create imbalances, as output is dependent on weather conditions. Nevertheless, winning bidders will bear limited or no liability for imbalances between 2020 and 2030 if their projects are commissioned prior to the introduction of a liquid intra-day market or 2024, whichever is sooner.
- There will be no retrospective legislative changes for power plants commissioned before 2020.
- The Green Tariff will be reduced by 25 per cent for solar plants in 2020 and a further 2.5 per cent annually between 2021 and 2023. For wind plants the reduction will be 10 per cent in 2020 with no further annual reduction. The Green Tariff will be further reduced for solar and wind projects commissioned from 1 January 2024.

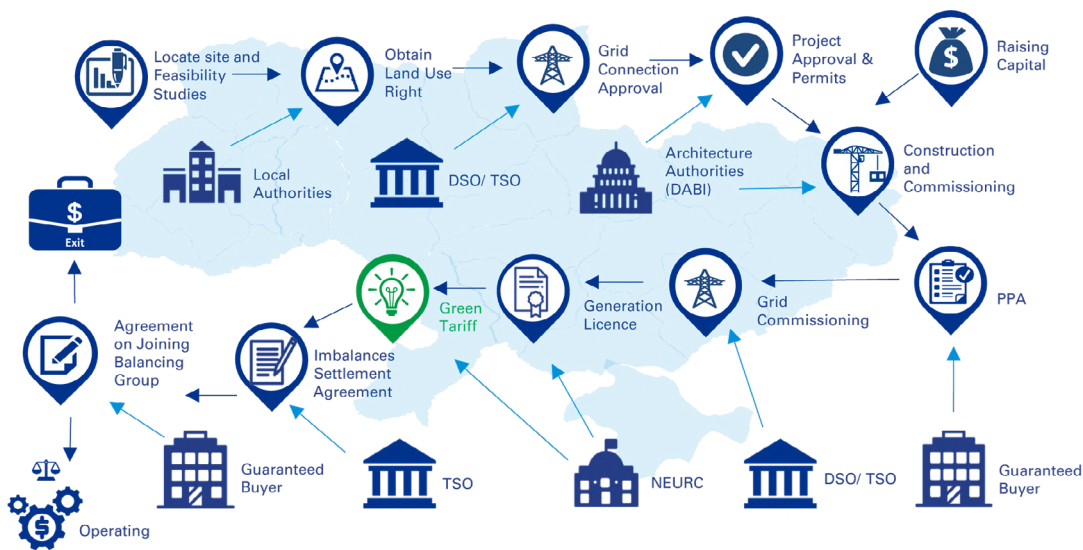
Annual power production quotas for renewables will be set by the Cabinet of Ministers, based on proposals from the Ministry of Energy and the Coal Industry, which will themselves be founded on consultations with Ukrenergo, the electricity Transmission System Operator (TSO), and the State Agency on Energy Efficiency and Energy Saving of Ukraine. The new system should ensure that the TSO is better able to manage the already discernable constraints related to the integration of renewable supplies with the power system. Ukrenergo has outlined three scenarios for the amount of solar and wind energy the system could absorb and which balancing power generating capacities would be needed in the system.

Power Production Quotas

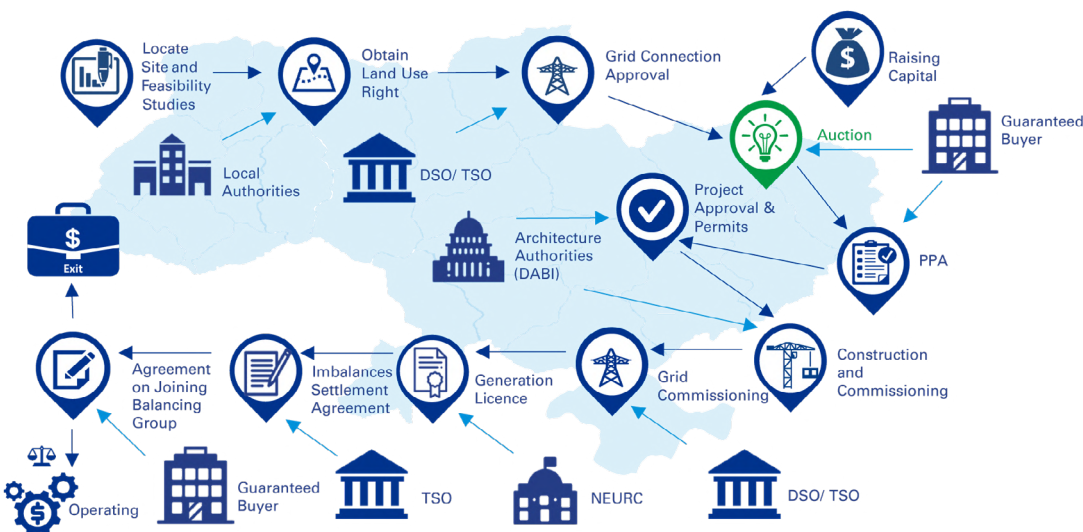
Scenario A	Scenario B	Scenario C
<p>In this scenario, electricity generation by wind and solar power plants would be constrained, whilst additional balancing capacities are installed. The ability of the system to forecast and manage variability in power generation would remain unchanged.</p>	<p>The share of nuclear power plants in total power generation would be limited and the growth of balancing power generation capacity would be ensured by means of coal-fired power plants. The development of 'green' generating capacity would be not limited.</p>	<p>Forecasting and management systems and 2.5GWp of balancing capacities (gas piston plants and batteries) would be installed, giving unhindered development of renewable energy. Nuclear generation would increase and coal power plants reduce output.</p>

Ukrenergo favours Scenario C, which they believe will meet the needs of both consumers and suppliers, and restrain electricity tariffs for domestic and industrial consumers. Ukrenergo estimate the investment required to put this scenario into operation is UAH55 billion (USD2 billion), with a 6-year payback period.

Project development map under the Green Tariff



Project development map under the Auction Law



Source: KPMG analysis

The EMEA region is expected to show the biggest increase in M&A in the worldwide renewables industry in 2019. Research commissioned by KPMG¹⁶, exploring the views of business leaders and industry experts showed that fully 47 per cent saw Europe as the focus of worldwide growth, and we expect Ukraine to play its part in that growth.

During 2018 Ukraine's renewable sector (excluding hydropower) saw 54 per cent growth in terms of installed power capacity, from 1,375MWp as at 1 January to 2,117MWp at 31 December. This capital investment and the introduction of further capacity in 2019 is sure to generate increasing interest in M&A activities in the sector.

The market is complex but at KPMG we have the skills and experience to guide you smoothly through the acquisition process, providing you with comprehensive advice at all stages of the process, including identification and evaluation of investment opportunities, conducting legal, financial and tax due diligence of selected opportunities, pricing analysis, support in negotiation of the deal and related transaction documents (e.g. sale and purchase agreement) and post-acquisition support.

A joint venture or investment in an existing licenced solar or wind operator, even one not yet generating (as long as the project has an agreed pre-PPA) is a viable option for an investor looking to secure access to Green Tariff advantages. Those looking to develop a greenfield operation should take a longer term view of the market and be aware of the administrative and legislative hurdles.

An investment in a ready-to-build pre-approved solar project, could see power generation inside six months, at a cost of around USD750,000 or less per megawatt installed.

Without doubt, however, wind projects must be planned on a longer timescale. By their very nature, many of the prime locations for wind energy are often remote and difficult to access, presenting the operator with logistical challenges unlike those for a solar project. Additionally, lead times for feasibility studies and fabrication of towers and turbines can be lengthy and delivery to site may require changes to local transport infrastructure.

Both wind and solar plants however, are guaranteed a connection to the electricity grid and under both the

Green Tariff and Auction Law, the grid is obliged to take every MWh generated.

The government's stated aim that by 2035, 25 per cent of all electricity will be generated from renewables should ensure that auctions, whilst competitive should not be too onerous, although this will of course depend on the capacity put out for tender at each auction, and whilst return on capital employed is currently exceptional for Green Tariff operators, auctions would deliver tougher competition to the market. Ukraine's recently introduced Auction Law is a continuation of the global trend, following significant experience from other countries such as Mexico, Argentina, Chile, Brazil, Peru, Germany, UAE, Zambia, India, China, and the Russian Federation, that have made the switch to auctions, to ensure that the system runs smoothly.

However, as renewables make up an increased share of power generation, significant investment will be required into the grid and power storage projects, and if growth is to remain unconstrained by technical bottlenecks, the government will need to approve storage and balancing plans, such as those favoured by Ukrenergo.



¹⁶ Great Expectations: Deal making in the renewable energy sector

Investing in any market is a complex decision, irrespective of existing international footprint and risk appetite a business may have. Before entering the Ukrainian market, an investor should develop a clear investment strategy, based on a thorough assessment of not only country risks but also the commercial, financial and project risks specific to each opportunity. All investment strategies have their own set of specific risks and rewards, and it is important that all stakeholders, including the board and shareholders, are aligned.

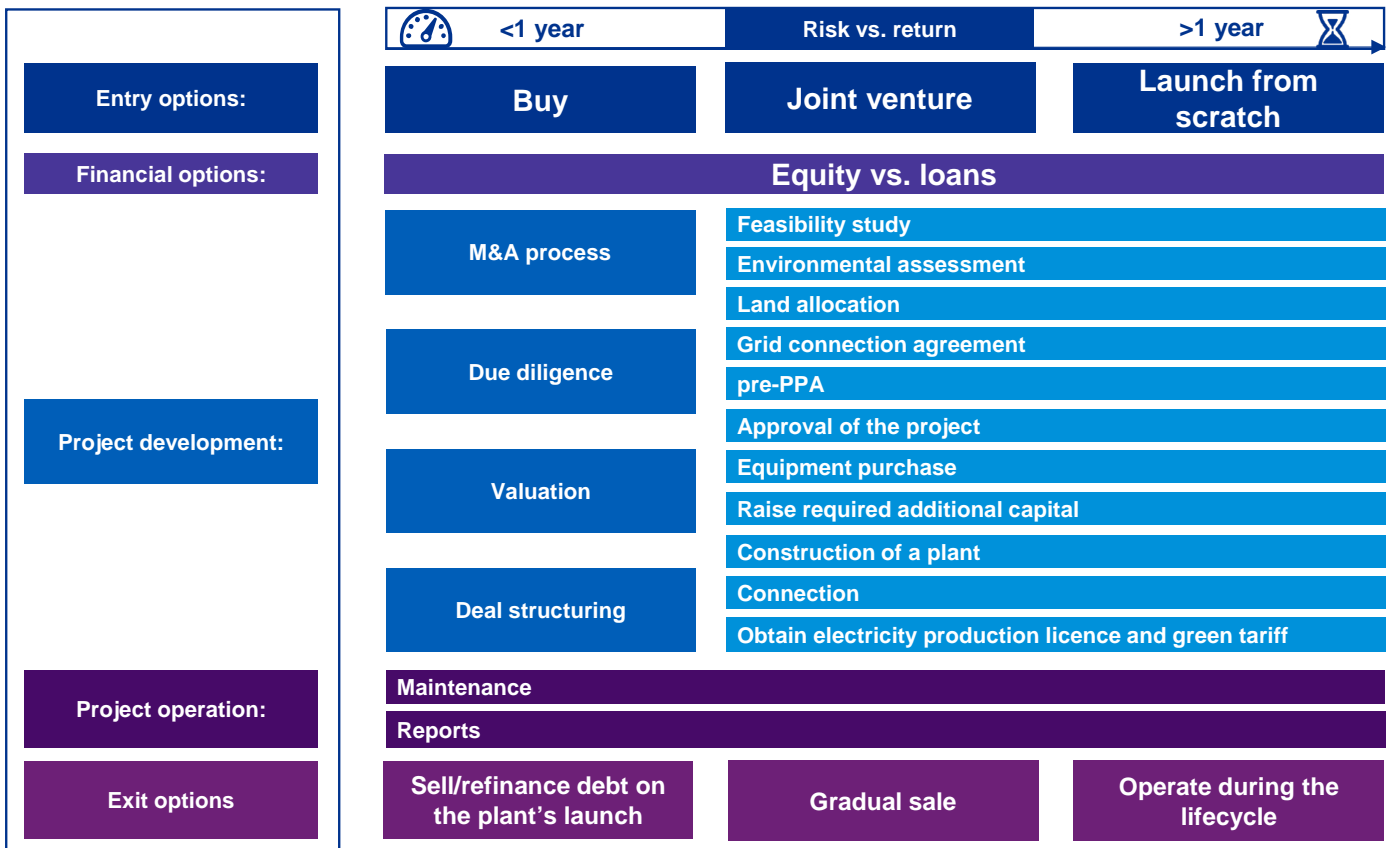
In the Ukrainian renewable energy market, investors should be particularly aware of the timing of their investment, given the change from the Green Tariff and its associated guarantees and incentives, to the new Auction Law.

Potential entry options



Whichever route you decide to take, it is essential to engage suitably qualified professional advisors to navigate you through the investment process. Legal, financial and tax advisors with a deep understanding of the local business environment and extensive experience in the renewables sector are a prerequisite to ensure that investors mitigate risks and avoid common pitfalls, and maximise opportunities during the investment process and throughout the entire lifecycle of their investment.

Different investment options are associated with different risks and rewards for an investor



KPMG in Ukraine

Local Knowledge, International Experience

KPMG has been present in Ukraine since 1992, and works closely with both project owners and investors in the renewables sector.

Whether you are considering investment into a greenfield or existing project, KPMG in Ukraine has the experience and expertise to advise

you throughout the process. We can support you, from market entry strategy and identification of suitable targets, through to legal, financial and tax due diligence, as well as preparation and negotiation of transaction documents.

Our teams of specialists combine local experience with deep sector

knowledge, while our international network of member firms provides access to the latest developments and insights from the global renewables sector.

At KPMG we focus on helping our clients to maximise the value of their investment, both on entry and exit.

Credentials

Scatec Solar Financial due diligence on five solar power generating plants in Ukraine 2018	European Investor Financial, tax and legal due diligence on seven solar power generating plants in Ukraine. M&A support 2018	Chinese Investor Financial, tax and legal due diligence on a wind power generating plant in Ukraine 2018	Czech investor Due diligence on two solar power generating plants in Ukraine 2018	Turkish industrial group Pre-investment legal due diligence on construction projects for solar power generating plants in Ukraine 2018
IB Vogt Legal and tax support for the acquisition and development of a solar power plant in Ukraine 2018	Wind Power LLC DTEK Legal, financial and tax pre-investment due diligence for a construction projects for a wind power plant with expected capacity 300MWp 2015	Confidential Full-scope tax due diligence on companies operating wind and solar power plants 2018	DTEK Comprehensive tax diagnostics on selected companies belonging to the largest Ukrainian energy holding 2017-2018	DTEK Analysis of, and comments on, tax assumptions in a financial model for debt raising purposes 2017-2018
Primorskaya Wind Electric Plant Valuation services provided to Primorskaya Wind Electric Plant LLC 2017	Confidential Financial, tax, legal and customs due diligence on three solar power generating plants in Russia 2017	DTEK Assistance in connection with debt financing for the purposes of construction of a wind park 2017	Mainstream Valuation services 2018	Confidential Financial and tax due diligence on three solar power generating plants in Ukraine 2016



Appendix

Macroeconomic Indicators

Ukraine's macroeconomic indicators ¹	2016	2017	2018	2019	2020	2021	2022
Real GDP growth, per cent y.o.y.	2.4	2.5	3.3	2.8	2.1	2.6	2.7
Nominal GDP, USD billion	93.4	112.2	127.9	138.2	157.6	178.0	199.9
UAH/USD exchange rate (end-period)	27.2	28.1	27.7	28.8	29.3	29.5	29.7
Consumer price index, per cent y.o.y.	12.4	13.7	10.3	7.8	8.0	7.5	6.8
Population, million residents	42.5	42.4	42.2	42.0	41.8	41.7	41.5
Net direct investments, USD billion	3.3	2.6	2.8	3.2	3.7	4.6	5.6
FDI stock, USD billion	69.0	59.9	54.9	53.4	49.3	46.5	44.4
Total foreign debt, USD billion	114.7	113.3	116.8	119.1	122.2	124.9	128.5
Doing Business Index ²	83 rd	80 th	76 th	71 st			
Global Competitiveness Index ³	85 th	89 th	83 rd	n/a			
Moody's Sovereign Debt Rating ⁴	Caa3	Caa2	Caa1	Caa1			
EBA Investment Attractiveness Index ⁵	2.85	3.03	3.07				

Sources:

¹ Economist intelligence unit

² The World Bank - Ease of doing business index

³ WEF - Global Competitiveness Report

⁴ Moody's Sovereign Debt Rating

⁵ EBA Investment Attractiveness Index

Glossary



Wind energy



Solar energy



Hydro energy



Bioenergy

CAGR – Compound annual growth rate

GWh, MWh, kWh – Units measuring power generation output: Gigawatt hours, Megawatt hours, Kilowatt hours

GWp, MWp – Units measuring power generation capacity: Gigawatt Peak, MegaWatt Peak.

LCOE – Levelised cost of electricity is the ratio of lifetime costs to lifetime electricity generation, both of which are discounted back to a common year using a discount rate that reflects the average cost of capital (according to IRENA data)

IRENA – The International Renewable Energy Agency, an intergovernmental organisation

M&A – Mergers and acquisitions

PPA – Power Purchase Agreement

pre-PPA – Preliminary Power Purchase Agreement

RES – Renewable Energy Sources

TSO – Transmission System Operator

DSO – Distribution System Operator

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