

THE OPPORTUNITIES FOR UKRAINE IN A LOW-CARBON FUTURE

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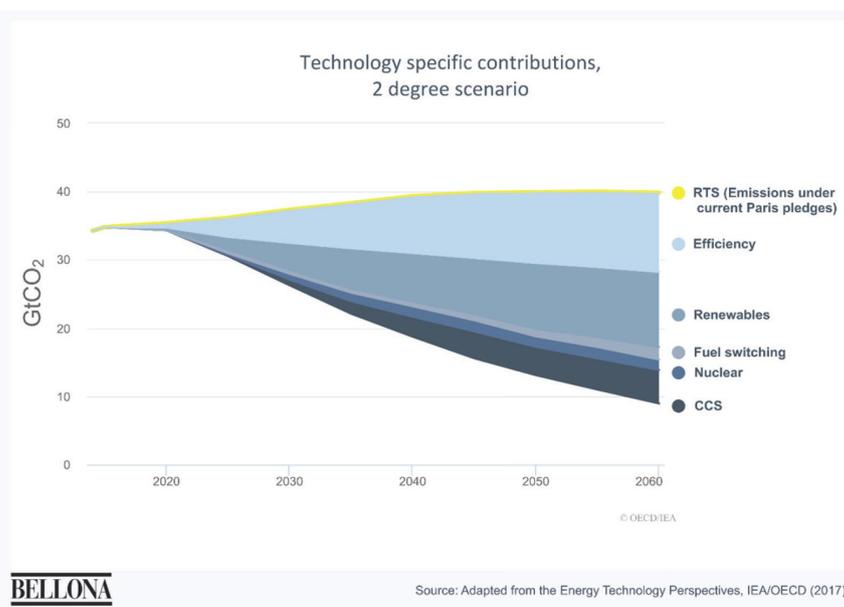
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THE EMERGING GLOBAL LOW CARBON SUPPLY CHAIN

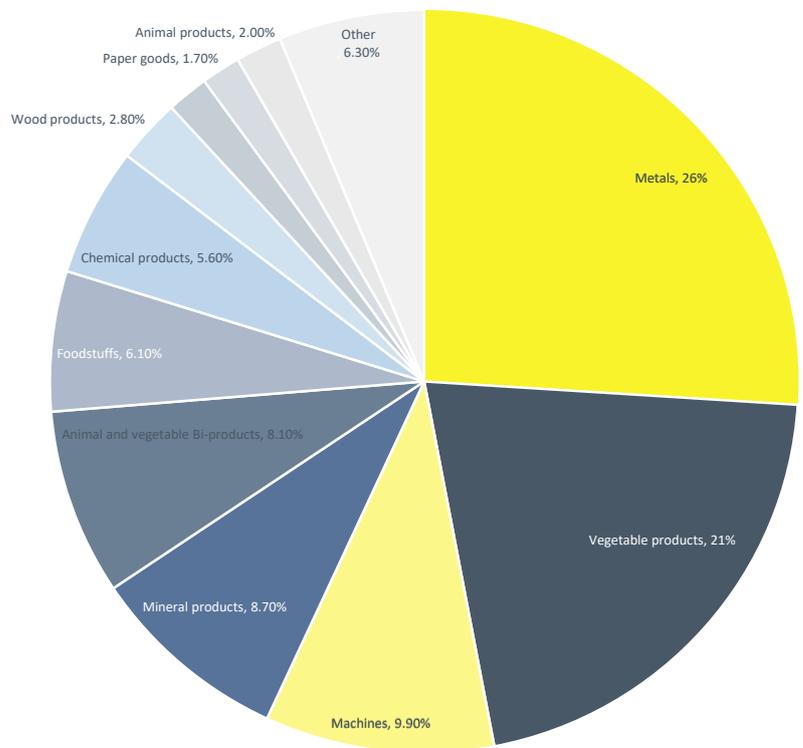


The transition to a low carbon economy opens new commercial niches, disrupts the entrenchment of global players in business and leads to increasing digitisation, new ownership models and state supported markets

Two major categories of drivers: market signals and political target.

UKRAINE'S EXPORT

%, PER SECTOR



WIND



By 2040, wind power is projected to increase from the current 4% to 17% of total electricity generation worldwide.

With an **annual investment between 146-170 billion USD** for global additions. As growth in European wind market shifts eastward, Ukraine will be able to use its existing industrial ecosystem to meet export demand for wind power infrastructure

WIND UKRAINE

With the existing industrial ecosystem, proximity to the European market and cost competitiveness, the wind power manufacturing industry bears great potential for Ukraine.

Ukraine is already exporting products essential to the wind power industry. Be it companies that produce all parts required for a wind-mill set up, like Wind World, or companies that just produce wind engines, like Fuhrlander Windtechnology, or yet again those that are producing parts for wind towers, like Metinvest

- Additional opportunities for local metallurgical industry
- Facilitation of local production requires specialists, like engineers and IT-experts, investments in the sector can contribute to decreasing the brain drain issue of Ukraine.

SOLAR



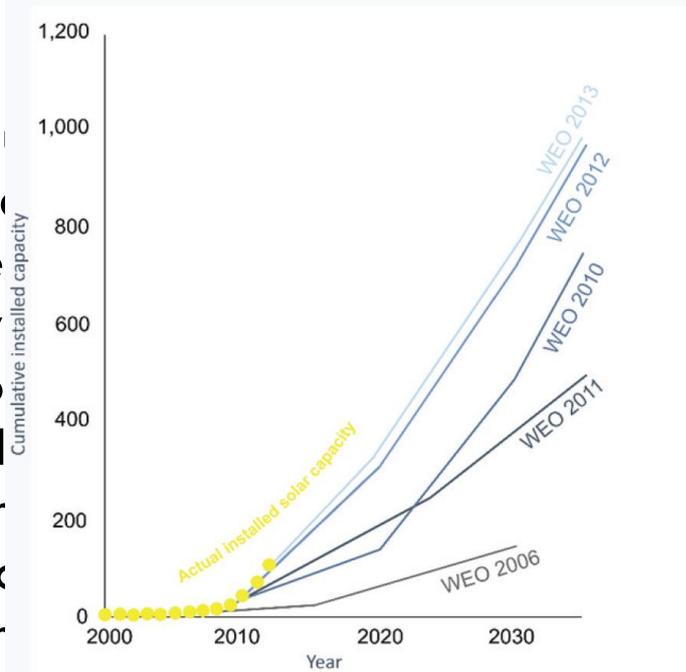
Just as wind generation capacities, the solar market has exceeded its projected growth year after year. With the exports of solar component from China dropping, Ukraine will be able to make use of the drop-in supply for the ever-demanding European market.

SOLAR



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Solar: 450ppm scenario projections versus actual installed capacity



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Source: Adapted from Ecofys 2014

SOLAR UKRAINE

As with wind power, the EU has set specific strategic objectives when it comes to photovoltaic energy, that is, solar power.

Ukraine does not have the same inherent advantages as the above mentioned, but still benefits from proximity to market

Worldwide, the drop in solar energy costs will be steeper in comparison to wind generation

A growing issue with solar panels from low-cost Asian markets is a doubtful quality. Ukraine could balance this trend by being closely integrated with the EU

Ukraine could become a trusted supplier of solar cells to the EU. Companies like [SolarGaps](#) and [Prolog Semicor](#) represent the start of such an effort.

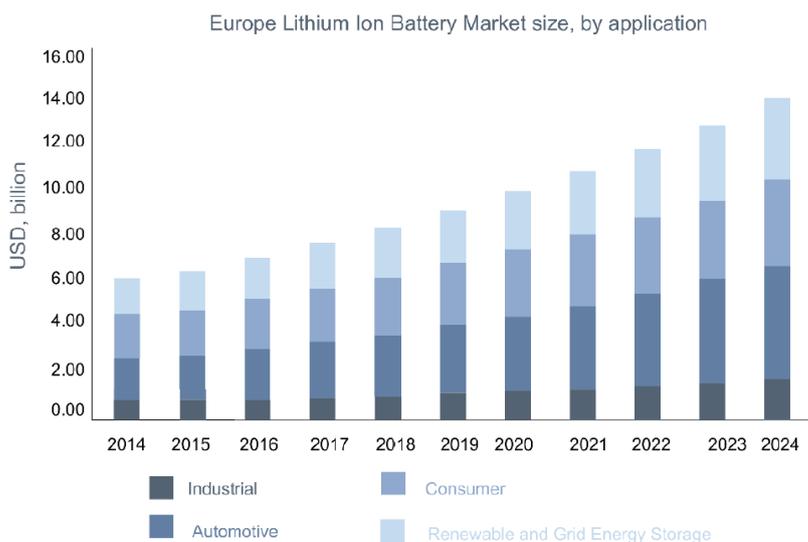
The main obstacle to this turn of events is a lacking efficiency of domestic incentives for solar cell production within Ukraine, and for companies producing renewable infrastructure in general. Many companies have a hard time making it past their initial incubation phase and need government support to ensure that their business is sustainable from the get go.

TRANSPORT BATTERIES AND ENERGY STORAGE



The investment required for further **electricity storage** technologies worldwide will range from **380-590 billion USD**. The growth of the lithium-ion battery market will be particularly noticeable in Europe. With abundant natural resources and a highly qualified population, Ukraine has large potential to tap into the expanding energy storage market.

TRANSPORT BATTERIES AND ENERGY STORAGE



Apart from the role of integrating renewables into the grid, batteries will have a key role to play in the automotive sector

By 2040, the number of electric vehicles on the road is anticipated to represent 35% of all the new cars on the market

In such a rapidly expanding market, there is a potential for Ukraine to grab a piece of the energy-storage pie

TRANSPORT BATTERIES AND ENERGY STORAGE

If batteries were to be produced in Ukraine, the geographical proximity to Europe would constitute a significant competitive advantage

Ukraine possesses some of the largest lithium deposits in all of Europe and has an established graphene extraction industry, the country is excellently positioned to benefit from this growing market.

The market for electric cars is not yet mature, but emerging, and has been exceeding expectations so far

Ukraine has a competitive advantage when it comes to entering the market for electric vehicles production

TRANSPORT BATTERIES AND ENERGY STORAGE

The lack of a domestic, European cell manufacturing base jeopardises the position of EU industrial customers because of the security of the supply chain, increased costs due to transportation, time delays, weaker quality control or limitations on the design - Maroš Šefčovic, EU Commission Vice-President (EURACTIV, 2017)

EFFICIENCY



Energy efficiency measures are key to both enable the future growth of renewables and complement their CO₂-emissions-reduction potential. **Only the renovation of buildings in the European Union will require average annual investments of approximately 130 billion EUR.** By developing the production of products such as heat pumps, Ukraine can contribute to this developing market both domestically and in Europe.

EFFICIENCY



All around the world, there is a huge potential for energy savings, and one of the big markets is that of energy efficiency in households and for industry, which often revolves around saving energy when heating up infrastructure.

- ❑ Important future market both for solutions and products abroad and increasing energy efficiency at home
- ❑ Heat pumps and heat exchangers will be in huge demand in the coming years
- ❑ The production of industrial components for increasing energy efficiency, such as heat pumps, presents an untapped potential for Ukraine

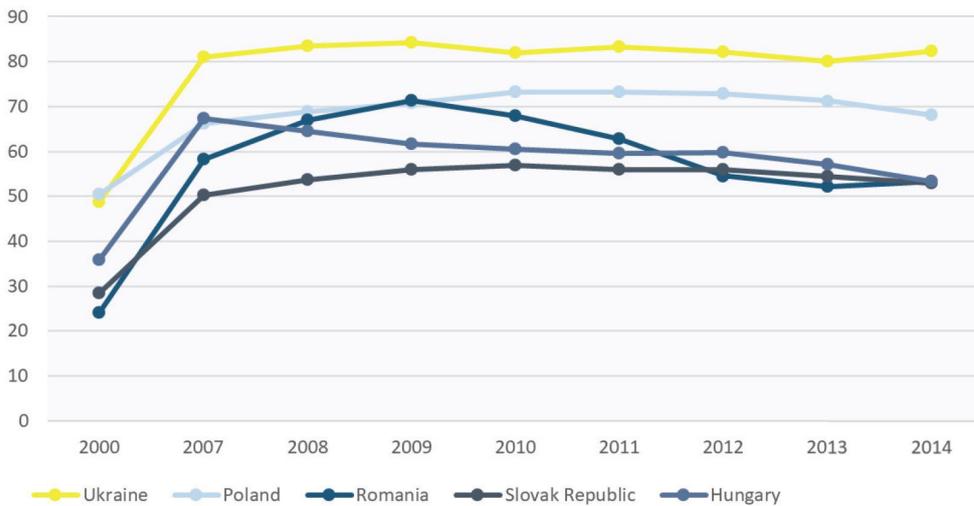
LOW CARBON INFRASTRUCTURE



Technologies such as Carbon Capture and Storage will be crucial to achieving deep emission reductions in energy intensive industries in Europe. Only capturing the CO₂ from the cement industry will require additional yearly investments of 6 billion USD. With its natural resources and experience in producing metal products, Ukraine could contribute to building a CO₂ transport and storage network in Europe necessary for reaching the 2-degree goal.

EDUCATION

Gross % of total population enrolled in tertiary education: Ukraine and neighbouring EU member states



Ukraine scores well in education of its populace:

Ukraine also has one of the highest rates of engineering, manufacturing and construction graduates in the world

There are 130,000 engineering graduates in Ukraine annually, the most in Europe.

Ukraine has several competitive advantages that are primed for such a transition, the most important of which is a highly educated, low cost workforce.

INCREASING REQUIREMENTS FOR GLOBAL PRODUCTS

Product standards – counting entrained CO2 at the border

Carbon leakage concerns in the EU

- Manufacturing processes that are unduly CO₂-emissions-intensive could be penalised through increased border trade taxes or failure to meet stricter environmental standards.
- In early 2017, Lakshmi Mittal, CEO of Europe's largest steel manufacture, ArcelorMittal, called for carbon levy's to be applied to steel imported to Europe
- European Parliament has already deliberated on the implantation of a form of border carbon tax called

Shifting markets and requirements for Bioenergy

- Food based energy crops becoming increasingly disadvantage in EU legislation

NEW INDUSTRIES IN A NEW NARRATIVE

- ❑ **Ukraine cannot build its economy solely on its traditional industries, such as agriculture and the IT sector, and it cannot expect to thrive by only producing raw materials.**
- ❑ Where many say that agriculture and the IT-sector will be the country's saving grace, can be greatly supplemented by the potential that lies in the market for low-carbon products
- ❑ Investing in the energy transition to move from the two thirds of global emissions that come from fossil fuels today to a cleaner and more affordable energy future will boost the economy over the next 30 years by as much as US\$19 trillion,



The world is going green, with or without Ukraine as an industrial hub. The question is; can Ukraine afford not to grab this opportunity?

Ukraine should be an active participant in the future global economy, and having industries that contribute to the low-carbon shift is as good a thing as any to focus on.

