Center for Energy Efficiency - XXI (CENEf -XXI)

CBAM: Implications for the Russian economy

Slow carbon | Low carbon | No carbon

Moscow, August 2021

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INTRODUCTION

The EU's intention to introduce a carbon border regulation spurred a discussion about what implications could be expected for Russia. The very first estimates of the potential losses were very high, and therefore, under the pressure of the businesses concerned, Russian climate policies suddenly became much more proactive. However, ***those estimates were made for the CBAM regulations as anticipated by the analysts and researchers, rather than for the actually announced by the EU Carbon Border Adjustment Mechanism (CBAM).*** On July 14, 2021, draft CBAM regulation titled "Fit for 55" was disclosed as part of the EU regulation package. This paper aims to estimate the potential implications of the EU's CBAM construct for the Russian economy.

The key findings of the paper are briefly formulated below. The complete analysis (in Russian only) can be downloaded from: https://cenef-xxi.ru/uploads/Cz_ENEF_XXI_CBAM_4c0a2fb4a3.pdf.

CBAM primarily aims to prevent 'carbon leakage', i.e. the driven by carbon pricing transfer of production to countries with less stringent carbon regulation ("pollution havens"). Whether or not the carbon leakage exists, is not clear yet, and the carbon leakage problem was clearly overestimated in the past. However, high carbon prices along with cuts in free allowances in the ETS might cause carbon leakage to manifest in the future, even if it was not detected in the past.

From the entire 'menu of instruments' to combat carbon leakage the EU has chosen Carbon Border Adjustment Mechanism (CBAM), which does not require public or tariff financing. None of the earlier proposals for CBAM-like mechanisms were supported; this highlights a political resistance and problems related to CBAM launch scheduled for 2023.

Average Russia's exports covered by CBAM were nearly USD 8 billion in 2016-2020, or 5% of total Russia's exports to the EU, or 2% of total Russia's product exports. If CBAM is launched, Russian exporters will not have a sufficient profitability margin to offset the growing carbon component in the prices of products. Therefore, the carbon intensity of Russian exports will become an important parameter in the competition for EU markets.

EU's low carbon transformation drives aluminium and electricity demand up. Steel and fertilizers markets will not show any substantial growth. No substantial loss can be expected from a CBAM for Russian cement and clinker. **The role of a *CBAM* is to launch the carbon intensity reduction race for industrial products**. To be successful in this race, it is important to learn how to record the performance indicators, i.e. to meter and compare carbon intensities. This is where benchmarking comes to the fore. By 2050, the industrial sector of the EU and some other countries will need to reach carbon neutrality. This means, that specific GHG emissions and benchmarks (with an account of carbon capture, use and storage) should be practically brought down to zero. This also means, that one should not be guided by a static analysis of CBAM implications; it is important to estimate how these implications will be developing over time, as the relative positions of the race participants change.

The CBAM scheme, as announced by the EU, requires that ***Russian exporters*** provide carbon intensity information for their exports, but they ***are not expected to pay to the EU for their carbon emissions***. ***The price of CBAM-products in the EU market will grow for both EU and external suppliers, and this increment will be equal to the carbon markup,*** which is determined by the carbon intensity of a particular product. Other things equal, higher carbon intensities will result in export revenue losses through shrinking market niches.

Both early analyses of possible implications of various carbon regulation schemes and those published after the EU's "Fit for 55" package of regulations was announced erroneously treated these payments as charges to be imposed on the Russian exporters. In fact, however, ***estimates provided by many authors are not directly related to the potential losses of Russian exporters*.**

As the CBAM scheme became clearer, the big turned into the small, and the estimates of potential "losses of Russian exporters" at the CBAM early stage dropped 25-100 times.

The CBAM-RUS model was used as the analysis tool in this paper. The first version of CBAM-RUS model developed by CENEf-XXI works with the 32 product groups specified in the EU CBAM. The model includes a special calculation block for each product group. CBAM-RUS helps imitate CBAM payments minimization strategies based on the reduction of GHG specific emissions by deploying low carbon technologies and implementing institutional measures, to estimate the effects of carbon pricing introduction in Russia and (in the future) the effects of reshaping the geographical structure of Russia's foreign trade.

10 scenarios were developed to estimate the CBAM implications for Russian exports. Net export revenue loss in 2026 does not exceed USD 200 mln. However, ***if the carbon intensity remains high, then Russian CBAM exports will be going down, and the initially small export revenue losses will eventually grow big.*** It is shown in the paper, that with a likely combination of various conditions CBAM-associated losses of the Russian companies will not exceed USD 1-2 billion by 2050. ***Proactive GHG emissions reduction policies in the industrial sector might help not only avoid export revenue losses, but also obtain additional export revenues.*** The paper also shows, that estimated by many authors CBAM payments are no indication of Russian companies' losses. Finally, the paper answers the perennial Russian question: "What is to be done?"

The analysis was accomplished by CENEf-XXI under the *"Climate change: Russia's action and the global science"* project, which is implemented in cooperation with the European Climate Foundation and 2050 Pathways Platform. Under this project, on July 26, 2021, CENEf-XXI and EIPC held a workshop *"Carbon Border Adjustment Mechanism (CBAM): what are the possible effects for Russia's economy?"*, the presentations from which were used for the analysis described here.

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1 RETROSPECTIVELY: 'CARBON LEAKAGE', OR 'MUCH ADO ABOUT NOTHING'

'Carbon leakage' is a term used to describe the driven by carbon pricing transfer of production to countries with no or less stringent carbon regulation, or the substitution of domestic products (produced with lower GHG emissions) with imports from such countries.

'Carbon leakage' manifests in the capacity utilization rate reduction or in the decommissioning of existing capacities driven by the growing imports from, and/or investment in new production plants in, countries with less stringent carbon regulation.

The 'carbon leakage' risk:

- is estimated based on the carbon intensity of products and the intensity of foreign trade;
- is the highest for carbon-intense basic materials with a potential for more than 20% carbon cost in the product price;
- declines as these materials move up the value chain: the share of carbon cost goes down to less than 1% of the ultimate product price.

The issue of whether or not the very phenomenon of carbon leakage exists, has not been theoretically proved, and a literature review does not provide an unambiguous answer.

Two hypotheses are put forward:

1) first, about the likely transfer of business to the pollution havens;
2) second, Porter's hypothesis about the possible opposite effect of introducing more stringent environmental regulation, namely, spurring innovation and the development of low carbon products and thereby improving the competitiveness of companies and incentivizing the economic growth.

The problem of 'carbon leakage' was clearly overestimated in the past. The large amounts of free GHG allowances in the ETS did not facilitate the decarbonization in the key sectors, and these free allowances were mostly allocated with an account of the sectors' ability to cover their carbon costs.

- The carbon price component in the ETS was 0.65% or lower in the materials costs for 95% of European industries.
- During the fourth stage of ETS (2021-2030), industries that are responsible for 94% of industrial emissions, still get a large part of the allowances, or all of them, free of charge.
- For a number of CBAM-products, ETS allocated more than 100 percent of allowances in 2020 for free, in other words, the amount of free allowances exceeded the amount of emissions verified.
- The effect of 'carbon leakage' is hard to identify against other factors that affect the competitiveness, such as the prices for feedstock, semi-processed materials, energy, labour; the cost of capital; the stringency of environmental regulation; trade and customs agreements and duties; proximity to the markets; etc.

Until 2020, the 'carbon leakage' hypothesis did not find any empirical support:

- The price of carbon per se is determined by multiple factors, including the cyclical evolution of energy prices;
- Unlike theoretical calculations based on general and partial equilibrium model runs, which promised a tangible 'carbon leakage', empirical tests of the 'carbon leakage' hypothesis using the econometric analysis methods did not reveal any

statistically significant impact of carbon prices on the competitiveness parameters, such as net imports, direct foreign investments, output, value added, rate of employment, profits, productivity, and innovations in the industrial sector.

Failure to reveal the 'carbon leakage' phenomenon in the past does not mean that it cannot be revealed in the future.

- Revised ETS operation rules and more proactive climate policies led to a substantial increase in carbon prices, which exceeded 50 euros/tCO_2 in July 2021. And this is why the 'carbon leakage' problem has become so very urgent.
- The EU believes that the 'carbon leakage' risk is highest for petroleum products, chemistry, iron and steel, non-ferrous metals, and pulp and paper.
- The risks are highest for 'carbon leakage' from the EU to Russia, China, USA, and Turkey.

Introduction of high carbon prices for raw materials coupled with the reduction in the share of free allowances requires protection of the EU businesses with the CBAM mechanism, yet involves a threat of losing part of foreign markets:

- If carbon price is noticeably increased and the assumptions on climate policies pursued by countries beyond the EU are realistic, the reduction in the output of CBAM-products in the EU can be estimated at 1-3%;
- The EU expects that measures to combat 'carbon leakage' through the introduction of CBAM will lead to increased output in the EU sectors covered by CBAM;
- This positive effect is partially offset by a potential production decline resulting from higher prices for feedstock and products manufactured in the EU and the relevant reduction in exports by 1%;
- CBAM will have almost no effect on the EU's GDP evolution, because increased production in some sectors will offset reduced output in others.

2 METHODS TO COMBAT 'CARBON LEAKAGE' AND THE CARBON BORDER ADJUSTMENT CONCEPT: MUCH PAIN, LITTLE GAIN?

From the entire 'menu of instruments' to combat 'carbon leakage' the EU has chosen Carbon Border Adjustment Mechanism (CBAM), which does not require public or tariff financing.

- There is no convincing evidence, that CBAM is the most effective tool to resolve the 'carbon leakage' problem.
- Apart from CBAM, other mechanisms could be applied, such as:
  - cross-border carbon tax;
  - integration of carbon-intense imports in the ETS with free GHG allowances and expansion of the emissions trading system to importers;
  - providing subsidies to manufacturers of low carbon products within the EU;
  - the use of international trade agreements (*The European Producers Club*) and requirement for the development of low carbon standards for products;
  - introduction of tax for the consumption of carbon intense products.

None of the earlier proposals for CBAM-like mechanisms were supported, which highlights a political resistance. For the EU, CBAM brings along:

- risks of 'cascade protectionism';
- problems with WTO compliance, because CBAM is obviously of a protectionist nature and is designed to protect the EU's domestic market from carbon-intense products;
- losing some of the low carbon transformation allies, including both developed and developing states;
- discontent on the part of the EU businesses with the lack of reliable assessments of CBAM implications and with the eventual elimination of free allowances, which are viewed as an effective mechanism to prevent 'carbon leakage';
- risks of less effective use of capital and workforce.

3 RUSSIA'S EXPORTS OF CBAM-PRODUCTS TO THE EU WERE USD 8 BILLION IN 2016-2020

On average, Russia's exports to the EU of products covered by CBAM equaled USD 7.9 billion in 2016-2020. This is 5% of total Russia's exports to the EU and 2% of total Russia's product exports, which was USD 373 billion on average in 2016-2020.

- The EU has developed a list of export items covered by CBAM. It includes 5 product groups, which aggregate 35 four-digit, 1 six-digit, and 8 eight-digit subpositions of Foreign Economic Activity Commodity Nomenclature (FEACN). For some of these subpositions, Russia has no or very little exports;
- Russian CBAM-covered exports are dominated by iron and steel products, aluminium, fertilizers, ammonia, and electricity;
- For key CBAM-products, the EU market is highly important to the Russian exporters – between 20 and 70 percent;

- Potentially, Russia may become the largest loser in the EU markets, where it occupied the first three positions for CBAM-covered imports (iron and steel, fertilizers, and aluminium[1]) in 2019;
- In 2016-2020, Russian exports (in physical units) to the EU of the key CBAM-products were subject to substantial cyclical fluctuations;
- Only for some product groups (aliminium and ammonia) an increasing trend for exported volumes was observed, while for many CBAM-products, there is a steady downward trend in exports to the EU.

Export prices for CBAM-products in the EU are highly volatile.

- In 2016-2020, for a variety of factors, maximum prices for the key CBAM-products were 28-167% higher, than minimum prices;
- The difference between the upper and lower prices in this range for CBAM-products is equivalent to the introduction of an effective carbon price of 20-65 USD/tCO_2.

If the CBAM is launched, Russian exporters will not have a sufficient profitability margin to offset the growing carbon component in the prices of products. Therefore, the carbon intensity of Russian exports will become an important parameter in the competition for EU markets.

- Some flexibility, albeit not much, can be attained through reducing the profitability for some iron and steel products and fertilizers.
- From August 1, 2021, this flexibility has additionally dropped resulting from the Russian government's decision to impose export duties for steel and aluminium, which are equivalent to the current carbon price in the ETS and many times higher than the effective carbon price which is paid by the European competitors in the ETS (with an account of free allowances).
- For a large list of CBAM-products, the EU has set customs duties of up to 7% of the products costs.

4 EU MARKETS DEVELOPMENT PROJECTIONS FOR PRODUCTS COVERED BY CBAM

The evolution of materials consumption is closely related to the stages of economic growth.

For many materials, the EU has already entered the saturation phase. This results in:

- the stabilization of consumption and production volumes and a complete decoupling of materials demand and economic growth;
- a substantial growth in the fraction of secondary resources used for materials production.

Low carbon transformation drives aluminium demand up. There is a potential for maintaining or even increasing Russian aluminium exports to the EU by 10 to 20 percent.

- After a peak in 2007, aluminium production in the EU was declining, basically due to the decrease in primary aluminium production.
- Total accumulated in the EU aluminium will keep slowly growing.
- Available projections show growing aluminium demand, which will be largely covered through increasing production

[1] This is not to count Norway for aluminium. Norway is included in Annex I of draft CBAM regulation.

of secondary aluminium against the reduction, stabilization, or increase in the production of primary aluminium. The larger the production, the smaller the imports.

The carbon intensity of primary aluminium production (Scope 1, 2, and 3) in the EU is 6.7 kg CO_{2eq}./kg.

- This is much below the global average, yet higher, than in Russia.
- There are technical opportunities to bring specific GHG emissions down to zero by 2050 through energy efficiency improvement; increased use of secondary aluminium; improved efficiency of aluminium use; transition to low carbon electricity generation; inert anodes technology uptake; and carbon capture, storage and use technologies.

Steel production and demand will be slowly growing in the EU to 2050 or stay at the 2019 level; this will keep steel exports approximately at the current level, with just minor upward and downward fluctuations.

- The EU has already reached the income levels sufficient to proceed to the saturation stage and stabilization of demand for iron and steel.
- Steel production in the EU was growing until 2006-2007 and exceeded 200 million tons, then dropped in 2008 and was never back to the peak levels.
- The evolution of steel demand is pretty similar to that of steel production.
- If a CBAM helps increase the supply of domestic steel to the EU markets, the effect will be partially offset by the loss of foreign markets due to the fact that after a CBAM is introduced, the EU steel will become more costly to produce, and so the exports will drop.

Transition of the European iron and steel sector to the low carbon pathways will reduce CO_2 emissions by 95%.

- So far it is impossible to accurately determine the combination of technologies to address this problem.
- With current prices, the potential for emissions reduction is there, even if limited.
- Increased low carbon technologies uptake will initially result in 10-50% higher steel production costs (10-320 euros per ton increase), yet as these technologies uptake progresses, the price gap with conventional processes will be shrinking via technology learning.
- The carbon price able to ensure the economic competitiveness of such technologies varies between 6 and 48 euros/t$CO_{2eq.}$

No substantial loss can be expected for Russia from a CBAM for cement and clinker.

- The EU cement production peaked at 280 million tons in 2007 and was staying at 169-182 million tons in the recent years.
- It is not expected to show any noticeable growth in the future, because many of the EU countries have already entered the saturation stage for cement stock and per capita demand.
- New low carbon technologies and materials uptake in cement production makes the production process 70-115% more costly, and the carbon price to ensure the competitiveness of these technologies varies between 60

and 83 euros/tCO_{2eq}.

The EU fertilizer imports will not show any substantial growth.

- After 2010, ammonia, nitric acid, and nitrogen fertilizers production and demand showed just minor fluctuations around quite stable levels.
- Projections show, that demand for nitrogen, phosphate, and potash fertilizers will remain close to the current levels until 2030, with possible different and opposite trends in the EU domestic production, on the one hand, and in the imports, on the other.

Decarbonization technologies for ammonia and fertilizers production are there.

- They include a complete replacement of natural gas used as feedstock with electrolysis-based hydrogen, or carbon capture in methane reforming, but…
- A carbon price of 7-190 euros/tCO2 is required to ensure that these technologies pay back, and this will result in 15-50% ammonia price growth.

The EU electricity market will be showing a dynamic growth.

- After 2008, electricity demand in the EU showed a downward trend, but…
- On the time horizon to 2050 electricity consumption may double through an intense electrification, which is one major decarbonization option for the European economy.

The EU electricity sector will be decarbonized before 2050. This is an attainable goal. In Sweden, specific emissions were 13 gCO_2/kWh in 2020.

- In 2020, renewable energy was responsible for 38% of the EU's total electricity generation and for the first time beat fossil fuel-based generation. The share of coal dropped to 13%.
- Subsidies for renewable energy sources were the main driver behind the growing share of renewable energy generation, while the ETS mechanisms contributed just slightly.
- Specific emissions from electricity generation in the EU declined from 317 gCO_2/kWh in 2015 to 226 gCO_2/kWh in 2020 and is expected to further decline to 210 gCO_2/kWh in 2021.

5 GHG EMISSIONS BENCHMARKS: COMPARING *«THE LIKE WITH THE LIKE»*

Benchmarking is a process used to estimate actual performance against some references to reveal the possibilities to improve your own performance.

- Benchmarking requires: benchmarks; data and methodology to estimate specific indicators; comparability of indicators.
- Two key factors can ensure the comparability: similar boundaries of a production system and similar emissions scope.
- Obtaining benchmarks for specific GHG emissions is an information-intense and difficult task even for any one product.
- There are few international and European benchmarking systems for specific GHG emissions from the production

	of basic materials. • So far, in Russia there are no benchmarking systems for specific GHG emissions from industrial plants.
The industrial sector of the EU and some other countries should attain carbon neutrality by 2050.	• As the technological modernization progresses, specific GHG benchmarking curves eventually shift downwards, followed by the benchmarks as used for carbon regulation purposes.
This means that specific GHG emissions and benchmarks (with an account of carbon capture, storage and use technologies uptake) should be practically brought down to zero.	• CBAM documents directly indicate that benchmarks will be regularly revised. • As the CBAM scheme develops, the benchmarks will be going down to zero in 2050. This perspective is an important factor for the estimation of CBAM effects over time. • If specific emissions in the EU go down to almost zero and the carbon price is high, European producers will have competitive advantages over external suppliers of similar products with a relatively large carbon footprint and so will win additional market niches.
The EU's draft CBAM regulation covers an unusual combination of GHG emissions production systems boundaries: Scope 1 and 3 (for Scope 2, only information is required). It is not at all clear, which methods of emissions estimation for CBAM will be used. The methodology is to be approved by an EU's special regulatory act.	• Leaving out Scope 2 will remove many barriers for electricity-intense products from China and India (they might have lobbied for it), but… • Will create problems for Russian exporters of aluminium and EAF. • Scope 2 is a matter of the future. Such approach contradicts the EU's declarations of the organic link between ETS and CBAM. ETS mostly uses Scope 1, but also Scope 1 and 2 for aluminium and EAF. • If Scope 2 is left out, Russia will benefit for some products, which are manufactured with large-scale use of district heat. • Russia will need to develop a position for the negotiations with the EU about CBAM Scopes.
Estimating Russia's carbon intensity against the EU's levels both for Scope 1 and 3 and Scope 1, 2, and 3 shows that the current gap is not large (Figure 1). However, this may substantially change as the decarbonization of the EU's industrial sector progresses.	• Specific GHG emissions for the EU were collected from the analysis of data from European industry-wide benchmarking systems. • Estimating the carbon intensity of industrial products is a challenge for Russia. Reliable estimates of specific GHG emissions can hardly be obtained by using the Rosstat data for calculations. • It is important to develop Russian systems to estimate the carbon intensity of CBAM-products and other industrial products. • It is important to be able to unbiasedly compare the obtained results with the EU benchmarks under CBAM and with other international benchmarks. • The most challenging and information-intense process is estimation of embedded emissions from the feedstocks, materials, and process gases.

Figure 1. Specific GHG emissions from the production of individual products (different Scopes)

Source: CENEf-XXI.

6 THE EU'S CBAM SCHEME

While Russian exporters will be required to provide information, they are not expected to pay to the EU for their carbon emissions.

- The owners of EU plants purchase allowances under the ETS.
- Importers of CBAM-products will purchase CBAM certificates from the EU.
- Russian exporters will report the carbon intensity of their goods to the importers or to the central database.

The price of CBAM-products in the EU market will grow for <u>all</u> suppliers, and this

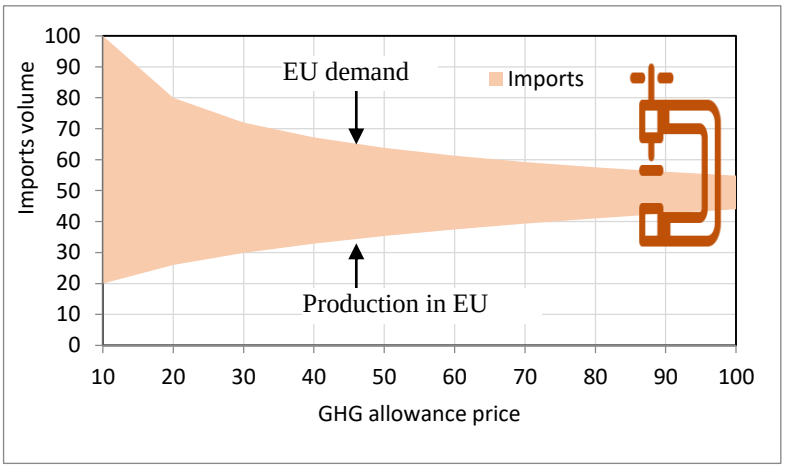
- For EU producers, the price will grow as follows: $CarbonInt_{eu} * (1-d) * CPriceETS * CPT$, where d (the fraction of free allowances) = 90% in 2026 and goes down to 0% in 2035;

increment will be equal to the carbon markup, which is determined by the carbon intensity of a particular product.	CPT (*cost pass through*) = 53-123%, depending on the product. • For the EU importers of CBAM-products the price will grow as follows: $CarbonInt_{exp}$ * *(1-d)* * *(CPriceETS-CPricerus* purchase of certificates*)* + *Cpriceexp*CPT*, where *Cpriceexp* is the price paid by exporters in their respective countries. • What matters, is relative (compared to the competitors), rather than absolute, product price increase driven by the carbon markup.
Carbon payments are made by:	• the owners of EU plants – for the allowances in ETS; • importers of CBAM-products to the EU – for carbon certificates to the EU-member countries less carbon payments made in Russia; • Russian exporters – to the Russian government or under the Russian ETS, providing Russia has launched carbon price mechanisms and the EU has recognized them.
The "low carbon vice" (see Figure 2) and the changing market niches:	• Depending on the price elasticity of demand, demand for CBAM-products in the EU market will go down, as the carbon component price grows up; • Production in the EU will be growing, if the carbon intensity of CBAM-products manufactured in the EU is lower, than that of products manufactured by the competitors; • Demand for some imports from individual countries may go down driven by the declining consumption and growing supply by competitors with a low carbon footprint.
Russian exporters' income losses incurred by shrinking market niches:	• Only results from their higher carbon intensity compared to the EU and other competitors and eventually grows as the market adjusts to the new prices. • If Russian exporters aspire to offset their high carbon intensity with a reduced profitability, the income losses can be estimated as a balance of effects from a slowdown in the market niche reduction and a fall in the profitability. • Where the Russian exporters can benefit from a lower carbon intensity compared to their competitors, a CBAM might help them increase their profit.
Market niches beyond the EU:	• Due to the growing prices in the EU markets, including along the value chain, EU producers will be losing part of the foreign markets; • If a fiscal-neutral carbon price is introduced for the Russian exports, the exporters will not lose any of the other markets.
The major risk for the suppliers is rapid reduction in the carbon intensity by the competitors. **In order to get a competitive advantage or to minimize the potential losses from the introduction of a CBAM it is important to:**	• Develop a transparent and comparable with the EU reporting system for GHG emissions and absorption. Russia will have to simultaneously develop the reporting and estimate GHG specific emissions; • Develop a benchmarking system for the carbon intensity of the key industrial exports; • Develop *Decarbonization plans and roadmaps*, coordinate them with the government and industry-wide associations, and use them to reduce the carbon intensity of industrial

products. Some Russian companies have already developed their decarbonization strategies to 2050;

- Reduce the carbon intensity of CBAM-products;
- Introduce carbon price mechanisms.

Figure 2. *"Low carbon vice"*



Source: CENEf-XXI.

7 ANALYSIS OF THE AVAILABLE ESTIMATES OF CBAM PAYMENTS

The big has turned into the small. As the situation with the CBAM becomes clearer, estimates of the potential *"losses incurred by Russian exporters"* have dropped 25-100 times.

- Attempts to quantify the effects of a carbon border regulation on Russia's economy had been launched long before the very CBAM concept was announced.
- Depending on the anticipated transborder regulation model, the estimates varied widely: from 80-100 million to 5-8 billion euros per year with a possible increase to 24 billion euros in 2050.
- With 57 euros/$tCO_{2eq.}$ carbon price, the maximum possible payment for CBAM certificates by the EU importers of all Russian products (the upper threshold) is 9.7 billion euros/year. However, the expansion of the CBAM scheme to all of the products is feasible only in a very distant future, if at all.
- Payments for CBAM certificates for some of Russia's competitors in the EU market and the corresponding price growth for their products are comparable to the estimates made for Russia.

Way off the mark: the estimates provided by many experts are not directly related to the potential losses of Russian exporters.

- Most of the estimates were made for the *"costs to Russian exporters of CBAM payments"* or for *"carbon tax payments"*.
- In the actually announced by the EU CBAM scheme, these values relate to the costs to EU importers of Russian products as determined by the purchase of CBAM certificates and show how much more expensive Russian products will become in the EU markets.
- These estimates are not related to the potential losses of

Russian companies, which are determined by the 'low carbon vice' that results in shrinking market niches for Russian products in the EU markets (Figure 2).

8 CBAM-RUS MODEL DESCRIPTION

The first version of CBAM-RUS model developed by CENEf-XXI works with the 32 product groups specified in the EU CBAM. The model includes a special calculation block for each product group. All of the calculation blocks have the same design. CBAM-RUS helps imitate CBAM payments minimization strategies based on the reduction of GHG specific emissions by deploying low carbon technologies and implementing institutional measures, to estimate the effects of carbon pricing introduction in Russia and (in the future) the effects of reshaping the geographical structure of Russia's foreign trade.

- In the future, it would be possible to expand both the list of product groups (the model can cover 73 products) and the geographical coverage.
- The model relies on the national customs service for the information on Russia's 2016-2020 exports to all foreign countries.
- The projection horizon is 2023-2050.
- The key endogenous variables include:
  - Payments by EU importers for CBAM certificates to purchase Russian products;
  - Carbon payments in Russia;
  - Export volumes adjusted for CBAM-determined change in the market niches;
  - Prices of exported products including the CBAM component and the carbon price in Russia;
  - The export value, both including and excluding CBAM payments and carbon prices in Russia;
  - The change in the export value driven by CBAM.
- The major scenario variables include:
  - Major pathways of CBAM-covered export volumes to the EU;
  - Carbon prices in the EU and Russia;
  - Fractions of free allowances allocated in Russia and EU;
  - Price elasticity coefficients of Russian exports to the EU;
  - Specific carbon intensity of products in Russia and EU;
  - The fiscal-neutrality parameter for introducing the carbon price in Russia.

The estimates of imports reduction, as well as of other CBAM effects, are largely determined by the price elasticity of EU imports. Other things equal, suppliers with the lowest carbon intensity will have the largest revenues.

- The growth in the relative prices of Russian exports, which is determined by a higher carbon intensity, results in the reduction (against the baseline) in the Russian export volumes to the EU.
- Price elasticity of imports reflects the pressure in the 'low carbon vice' through two effects:
  - Reduction in demand in the EU market resulting from the price increase by all of the suppliers;
  - Increased product supply to the EU market by the competitors with a lower carbon component in their price through a lower carbon intensity.

It may seem that there exists a carbon payment level in Russia, which guarantees the least total carbon payments by Russian exporters to all of the jurisdictions.

- Introduction of carbon price in Russia only for CBAM products exported to the EU could reallocate potential CBAM payments to Russia, but will provide just limited incentives for Russia's low carbon transition and, as the CBAM coverage expands to include new products and geographical regions, will not remove the risks for Russia's development.
- Introduction of carbon price for all CBAM products manufactured in Russia would incentivize the carbon intensity reduction and reduce the risks of losing out current market niches in the future, when the potential CBAM-determined losses grow manifold.

9 CBAM IMPLICATIONS FOR RUSSIAN EXPORTS

10 scenarios were developed to estimate the CBAM implications for Russian exports.

- All of the scenarios are based on the assumption that baseline CBAM exports from Russia will be maintained at the 2016-2019 average level.
- Another assumption is that carbon price in the ETS will be growing to 77-100 euros/$tCO_{2eq.}$ by 2050 to allow for the carbon neutrality in the EU industrial sector.
- The assumptions for Russia include no carbon price until 2050 or introduction of an effective carbon price equal to 50% of that in the ETS.

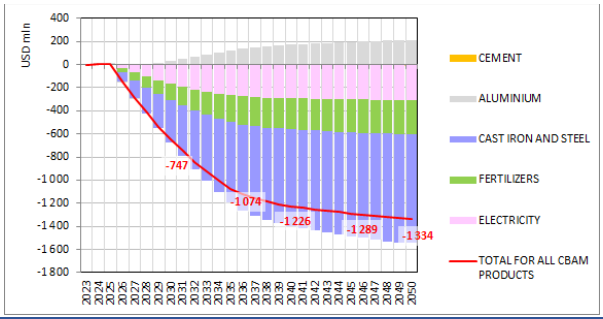
The big turns into the small. Net export revenue losses are no more than USD 200 million in 2026 (Figure 3a).

- These estimates are many times lower, than the previously estimated losses.
- In fact, the previous estimates were made for the payments due from the European importers of Russian CBAM-products, yet were called the 'carbon payments of the Russian exporters'.
- The price increase for the Russian CBAM-products in the EU market as driven by the payments due from the European importers will be equal or below USD 400 million in 2026.

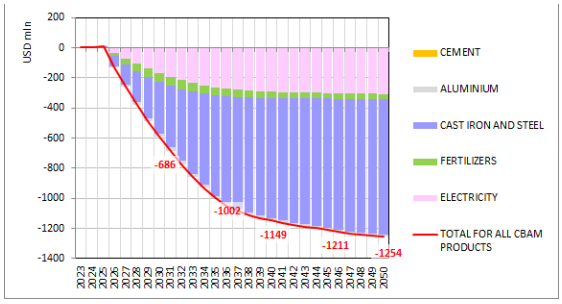
If the carbon intensity remains high, then growing carbon prices will eventually bring Russian CBAM exports down, and the small will turn into the big again.

- The loss of export revenues will be eventually growing to USD 0.7-1.2 billion in 2030 and USD 1.3-2 billion in 2050.
- CBAM payments by the European importers of Russian goods will grow up to USD 1.4 billion in 2030 and to USD 3.5 billion in 2050.
- With a most likely combination of various conditions, CBAM-associated losses of the Russian companies will not exceed USD 1-2 billion by 2050.

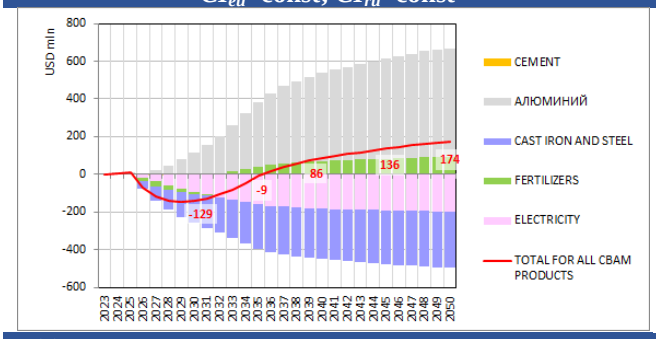
Figure 3 Change in Russia's revenues from CBAM exports to the EU



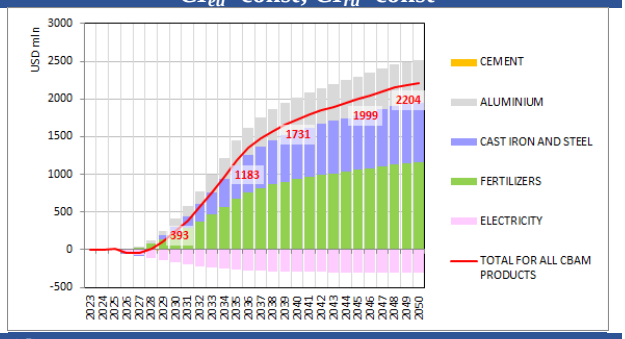
(a) Scope 1+2+3; CP_{eu}=100 euros/tCO$_2$; CP_{ru}=0; CI_{eu}=const; CI_{ru}=const



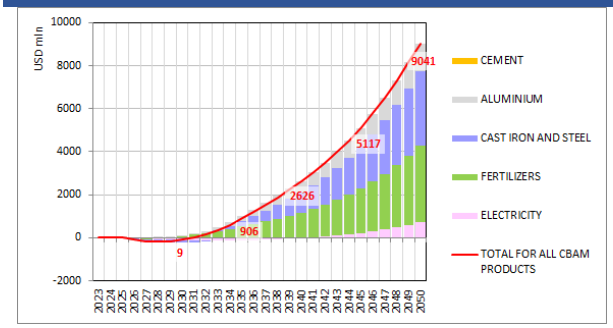
(b) Scope 1+3; CP_{eu}=100 euros/tCO$_2$; CP_{ru}=0; CI_{eu}=const; CI_{ru}=const



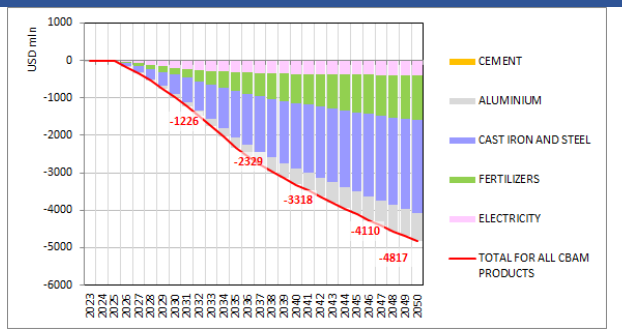
(c) Scope 1+3; CP_{eu}=100 euros/tCO$_2$; CP_{ru}=0.5* CP_{eu} and is introduced to ensure the fiscal neutrality CI_{eu}=const; CI_{ru}=const, but a value some 20-30% below average is used for the exporters



(d) Scope 1+3; CP_{eu}=100 euros/tCO$_2$; CP_{ru}=0.5* CP_{eu} and is introduced to ensure the fiscal neutrality CI_{eu}=const, CI_{ru}=const



(e) Scope 1+3; CP_{eu}=100 euros/tCO$_2$; CP_{ru}=0.5* CP_{eu} CI_{eu}→0, CI_{ru}=const



(f) Scope 1+3; CP_{eu}=100 euros/tCO$_2$; CP_{ru}=0.5* CP_{eu} CI_{eu}=const, CI_{ru}=→0

*CI is carbon intensity; $CPeu$ and $CPru$ are carbon prices in the ETS and in Russia.

Source: CENEf-XXI.

In Scope 1+3:

- The chance of expanding the niche for aluminium is missed, because Russia loses out to the EU in the carbon intensity level (see Figure 1.3b).
- If the cost pass through coefficient is 50%, then export revenue losses will drop to USD 0.39-0.75 billion in 2030 and to USD 0.96-1.67 billion in 2050; in addition, the share of profit in export revenues may decline too.

If Russia introduces carbon pricing:

- Export revenue losses will still be there, yet…
- Part of the CBAM payments will be made to Russia and could be used to finance industrial decarbonization.

Exports from low carbon

- Will help bring net export revenue losses down to nearly

plants and installations: zero and, given high price elasticity of imports, to additionally earn USD 0.7 billion by 2050 (see Figure 3c).

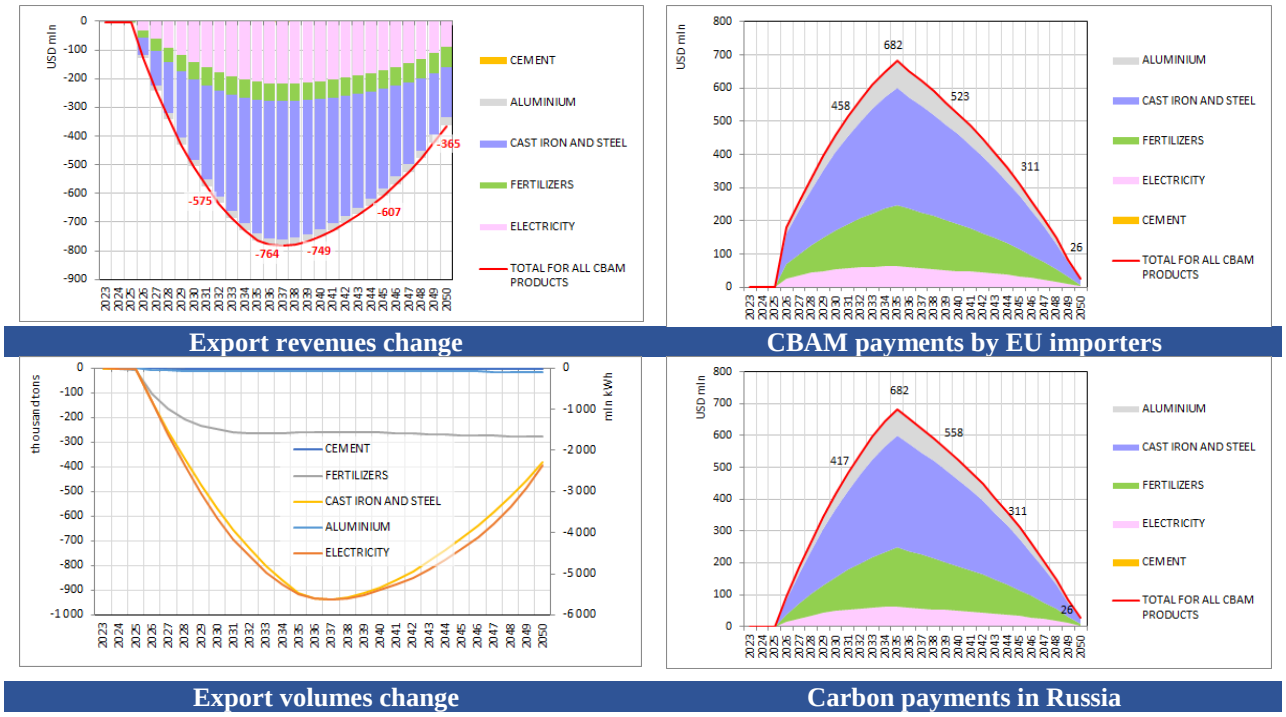
Fiscal-neutral carbon pricing in Russia:

- Will generate USD 2.2-5.8 in additional export revenues (depending on the elasticity coefficients) by limiting the Russian exporters' price increments for CBAM-products (see Figure 3d).

Proactive GHG emissions reduction policies in the industrial sector might help avoid export revenue losses.
The potential EU benefits from CBAM regulation for the Russian exporters can be described as "Much pain, little gain".

- Only proactive reduction in the carbon intensity of Russian CBAM-products or the introduction of fiscal-neutral carbon payments will help reduce the losses or even obtain additional export revenues (see Figure 5).
- Complete inaction of the Russian exporters and conservation of the present carbon intensities of their products bears the risk of USD 4.8-6.7 billion loss by 2050.
- In this case, the initially small losses eventually scale up to become quite big.
- On the contrary, Russia's leap to the carbon neutrality finish line combined with the EU's passivity may yield USD 9-31 billion in additional export revenues.
- If Russia and the EU race in parallel, Russia's export revenue losses will peak in 2036 at USD 0.8 billion.

Figure 9.1 ***Exports and export revenues change and CBAM payments by EU importers of Russian CBAM products for the complete CBAM-products decarbonization scenario in Russia and EU***

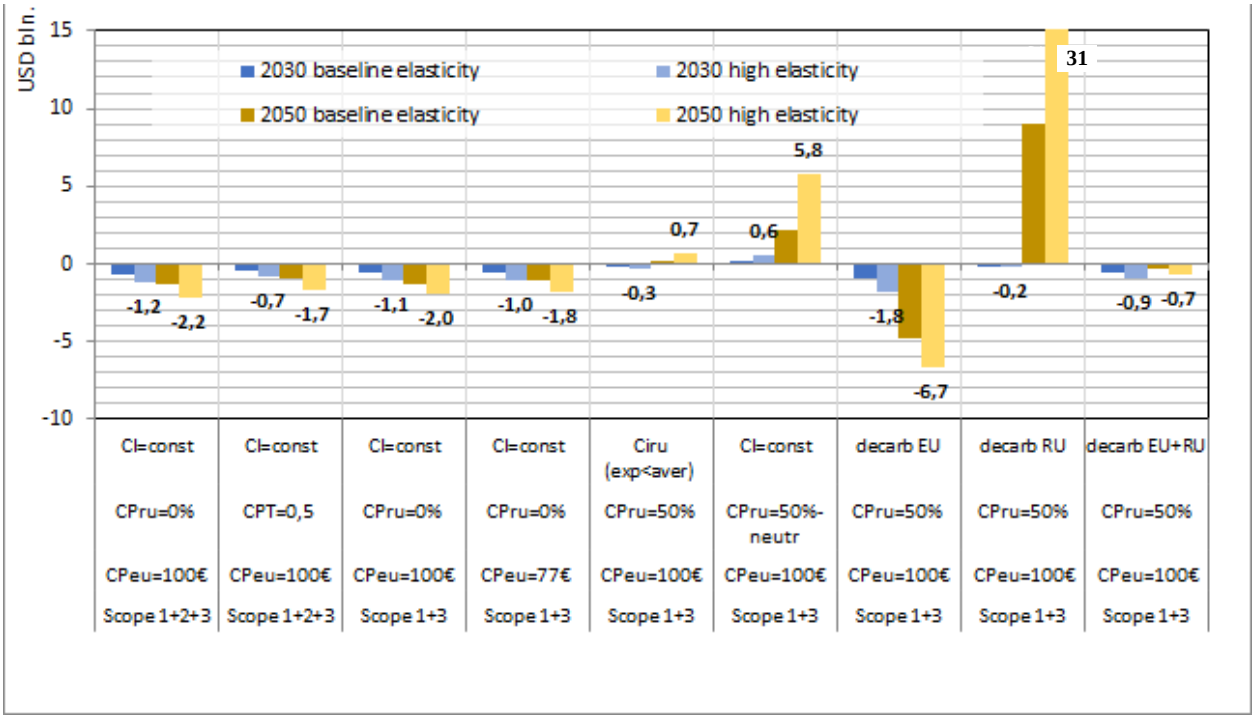


Source: CENEf-XXI.

With the decarbonization of CBAM-products by 2050:

- In the EU alone – Russia's export revenue losses will increase to USD 4.8 billion. CBAM carbon payments by EU importers will be declining since 2035 due to the reduction in exports volumes (see Figure 3e);
- In Russia alone – export revenues will grow up by USD 9 billion (see Figure 3f);
- Both in Russia and EU – revenue losses will increase to USD 0.8 billion by 2035 and drop down to USD 0.4 billion thereafter (Figure 4).

Figure 1.2 Export revenues evolution scenarios

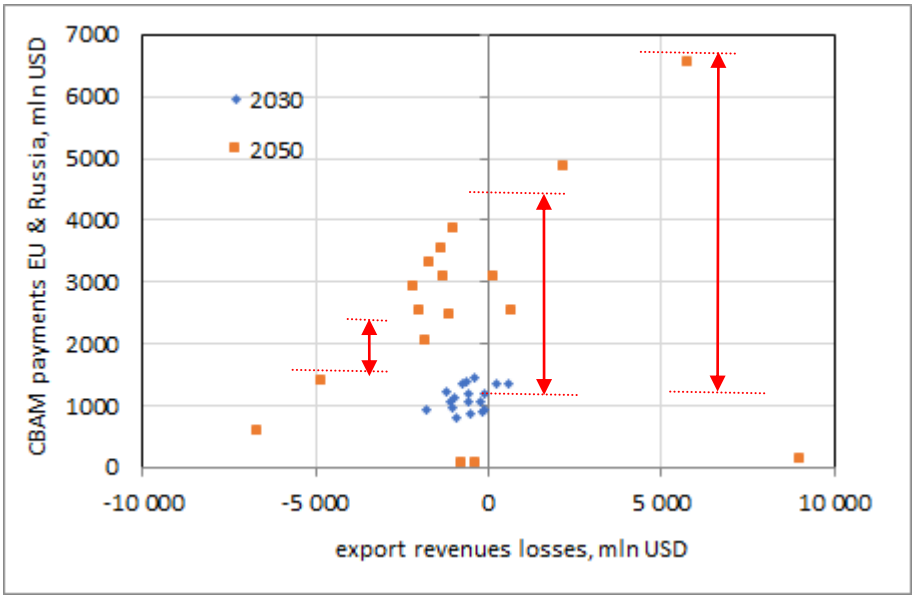


CI is the carbon intensity; CPeu and Cpru are carbon prices in the ETS and in Russia; CPT is the cost pass through coefficient.

Source: CENEf-XXI.

CBAM payments are no indication of Russian companies' losses:	• The smaller the losses or the greater the advantages of Russian companies, the higher the CBAM payments due from European importers (given the same levels of carbon intensity) (see Figure 6), yet… • These payments could be taken down to zero through the decarbonization of Russian exports.
There still is time to respond. If it is wasted, the big could become even bigger.	• According to the "domino theory", the CBAM scheme can geographically expand. • If, moreover, it eventually covers more products, then, given that the carbon intensity of Russian exports persists at the same level, the losses may increase to USD 25-126 billion by 2050.

Figure 9.3 Evolution of Russian export revenue losses (-) or increase (+) and CBAM payments by EU importers of Russian products



Source: CENEf-XXI.

10 WHAT CAN WE DO?

Develop a position and negotiate the CBAM scheme with the EU, including:

- Scopes and methods of estimating specific GHG emissions, including for electricity exports;
- Comparability of product parameters under the specified classification and taking account of the specific features of secondary production (products made of scrap or waste);
- Estimation of imputed emissions and taking account of the variety of CBAM-products manufacture technologies;
- How free allowances will be accounted for in the ETS;
- Recognition of the carbon price in the mechanisms to be deployed in Russia;
- Taking account of the effects of project mechanisms, including offset projects to increase absorption, while estimating specific GHG emissions;
- Compliance of CBAM regulation with WTO rules.

Establish a system of mandatory data collection to estimate the carbon intensity of Russian products; specify the responsibility for the data quality and data submission; and develop Russian benchmarking systems.

- Include plant-level data into the data collection system.
- Introduce carbon intensity indicators into BAT reference books and use the BAT indicators for the development of taxonomy systems and 'green' financial instruments.
- Develop Russian benchmarking systems for specific GHG emissions to be in line with the CBAM and other international benchmarking systems.

Approve an ambitious *Low Carbon Development Strategy*

- The government, business associations, and Russia's largest exporters should develop *Decarbonization Plans or*

to 2050.	*industry-wide Strategies (roadmaps),* primarily for sectors covered by CBAM. These Plans or Strategies should set carbon intensity reduction targets and include support to the low carbon transformation of Russian companies; development of the required infrastructure and expertise for large-scale use of low carbon technologies; and responsibility for a failure to attain the low carbon goals.
	• It is important to incentivize the creation, or separation, of low carbon plants and units from the carbon intense business of Russian exporters.
	• It is also important to provide support for the development and dynamic penetration of low carbon industrial technologies in Russia.
Provide incentives for the production of low carbon materials and high added value products using:	• *the fiscal neutral carbon tax.* It is essential to explore the importance of introducing a carbon tax for the exports to the EU alone or for Russia's entire exports and analyze the pros and cons, including a possibility to use this carbon tax to offset the EU CBAM payments, and to look at the compliance with the WTO rules;
	• *emissions trading schemes with some allowances provided at the initial stage for free (allocated based on benchmarks);*
	• *contracts for difference* to support new low carbon facilities along with other measures of support;
	• *the establishment of funds to support low carbon projects* through carbon price mechanisms.
Win new markets, including low carbon markets.	• Look for other markets and oust the EU from external markets.
	• Shift to selling CBAM-products (from basic materials to prefabricated products) with a higher added value.
	• Win and expand product niches in the exponentially growing global low carbon markets.[2]

Lagging behind in a technology race means losing even the current market niches, leave alone market expansion. The scenario "The world goes to the 'green' future, while Russia mills around in the 'red' present sadly looking after" is not appropriate for us!

[2] Low carbon technologies are huge new market niches, which will be trillions of dollars-worth by the middle of the century. Russia has some experience, even if not vast, in using all of the low carbon technologies (see Center for Energy Efficiency – XXI (CENEf-XXI) and University College London, Institute for Sustainable Resources. 2019. Tracking low carbon technologies deployment in Russia: opportunities for acceleration and risks of delay.