Net Zero Steel

Russia Country Profile - Netzero Steel Project

www.netzerosteel.org/countries-results/

The Netzero Steel Project considers the geo-spatial evolution of production of 21 existing facilities in Russia described in the GEM database that account for 83% of Russia's 2019 production, as well as 6 smaller additional archetype plants that were added to account for missing production. All scenarios achieve >90% reduction in emissions by 2050, see the full report for the methodology and background to the study.

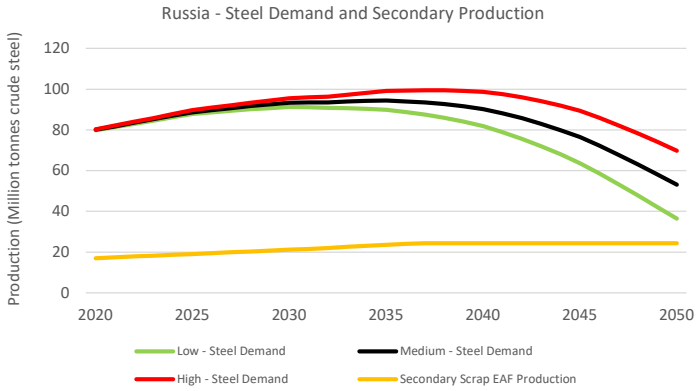
All the nine modelled scenarios (3 demand scenarios) and (3 CCS pipeline length scenarios) reduce overall emission intensities from an estimated existing emission intensity of 1.42 tCO2e/tonne of steel in 2019 to 0.13 tCO2e/tonne of steel in 2050. This compares to a global average of 1.58 in 2019 and 0.14 tCO2e/tonne of steel in 2050. Note that the study boundary includes all direct energy and process emissions that occur at integrated iron and steel mills, but does not include GHG Protocol Scope 2 or Scope 3 class emissions that occur off-site, or allow for the crediting of exported energy products (See report for more details).

Demand Transition

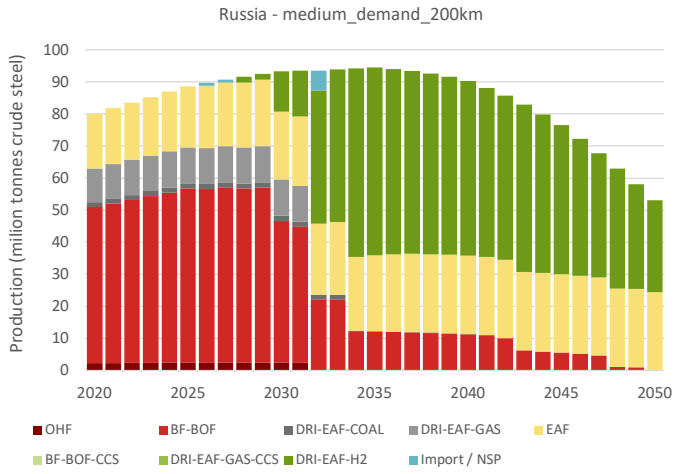
• In the medium demand scenarios Russia's steel demand decreases 34% between 2020 and 2050.

• low/medium/high scenarios in 2050 correspond to 285/414/543 tonnes crude steel per capita. This compares to a global average of 206/236/267 tonnes crude steel per capita.

• Secondary production from scrap in EAF rises from 26% in 2020 to 46% in 2050 in our central scenario. This compares to the projected global average of 46%.



Technology Transition



• By 2032 more than half of Russia's production is projected to be low carbon in the central scenario.

• DRI-EAF-H2 rises in market share from zero in 2027 to 54% in 2050 in our central scenario (range of scenarios is 33% to 65%).

• Steel production with CCS retrofit does not appear in any modelled scenarios.

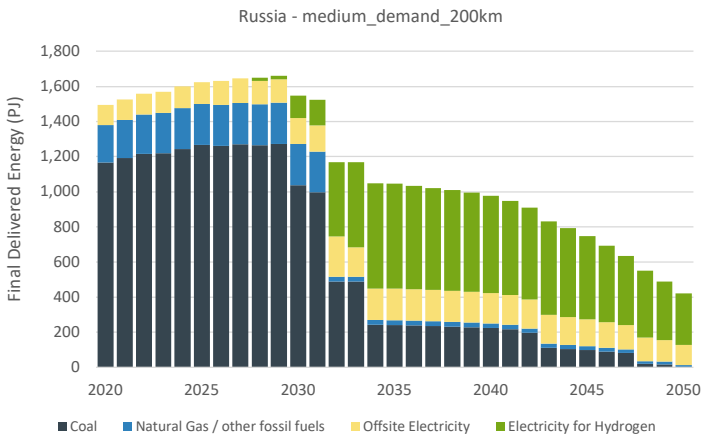
• The modelled pathways do not show significant imports of green steel for Russia. Global demand for imports in other countries and regions suggests that Russia could compete for exports to supply 175 megatonnes of demand by 2050 for green steel that is non-spatially allocated in the model.

Energy Transition

• Facility energy demand for fossil fuels falls by 99% by 2050 in all modelled scenarios.

• Electricity demand rises to 113 TWh in 2050, a rise from current levels of 3.6x by 2050 in the central scenario (range of scenarios is 1.8x to 5.3x). For comparison, electricity demand in 2050 represents 11% of current total electricity demand in Russia.

• Electricity demand for hydrogen rises to 81 TWh by 2050 in the central scenario (range of scenarios is 34 to 128 TWh).



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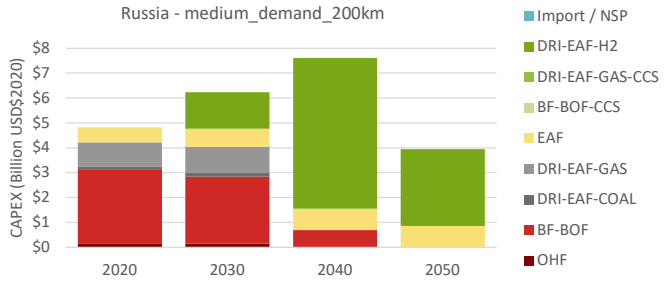
Investment Transition



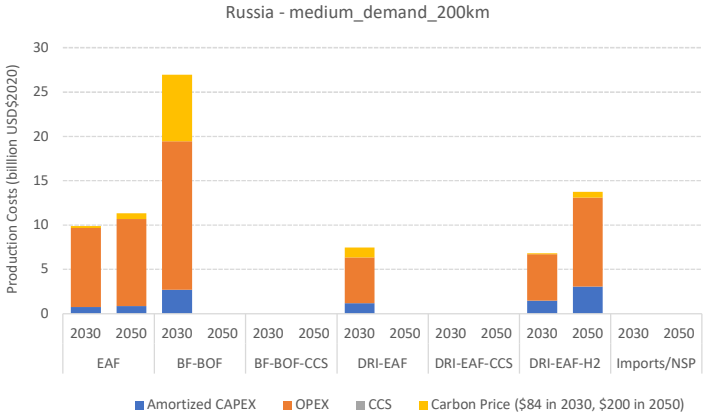
• CAPEX investment decreases by 18% from 2020 to 2050 in the central scenario.

• DRI-EAF-H2 contributes to the largest share of CAPEX investment, 78% in 2050 in the central scenario.

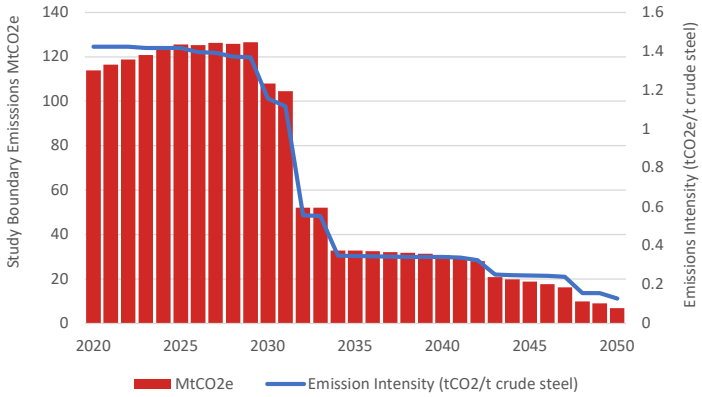
• Total production costs in 2020 $USD are estimated to be $51 billion in 2030 and $25 billion in 2050 for the central scenario.

• Amortized CAPEX costs are projected to be 16% of overall production costs in 2050 for the central scenario.

• This doesn't include potential investment for green steel exports that Russia could compete for to supply 175 megatonnes of global demand by 2050 for green steel that is non-spatially allocated in the model.



Emissions Transition



• Cumulative emissions between 2030 and 2050 are 1,940 MtCO2e (Range for scenarios is 1,894 to 2,053 MtCO2e.)

• Emission intensity of production falls from 1.42 tCO2e/tonne of crude steel in 2020 to 0.13 tCO2e/tonne of crude steel in 2050.