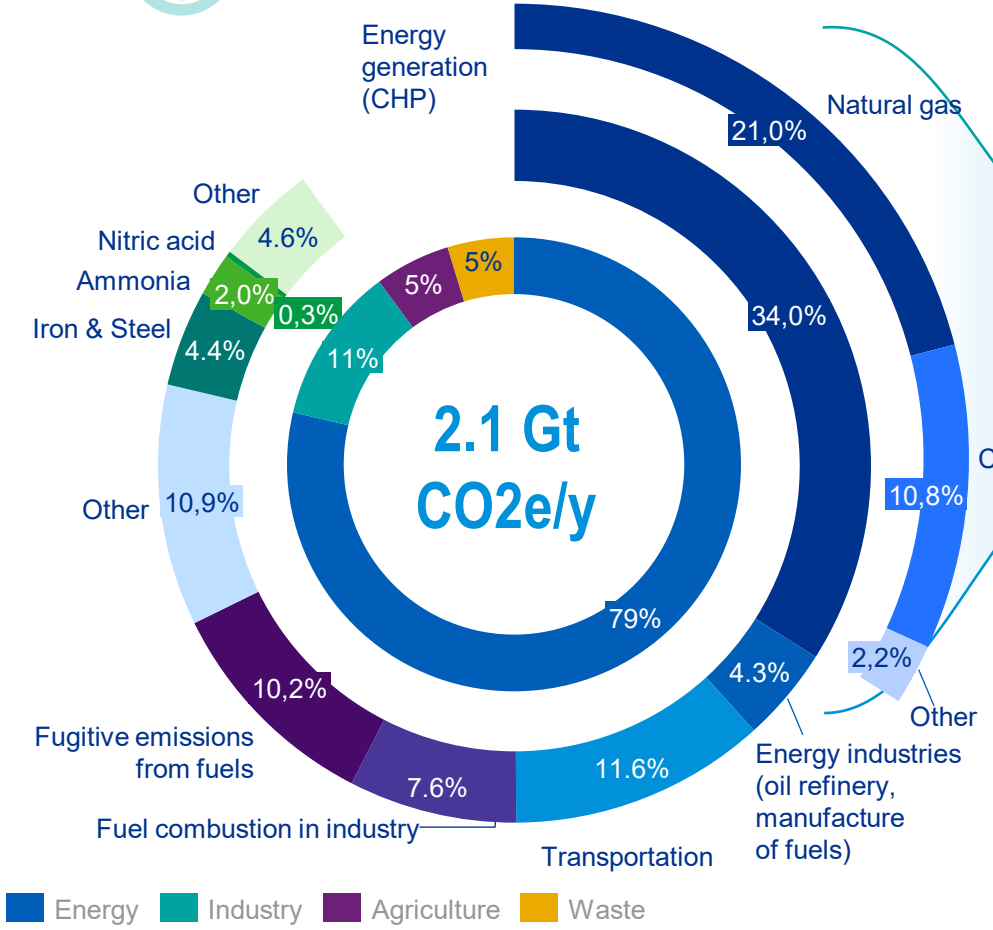
KPMG

Analysis of GHG emission reduction potential of Russian Federation

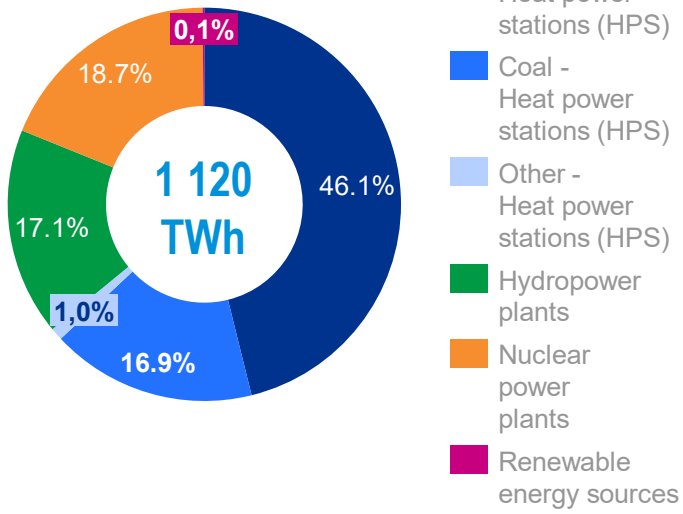
November 2021

Current greenhouse gas emissions in Russian Federation

GHG emissions breakdown



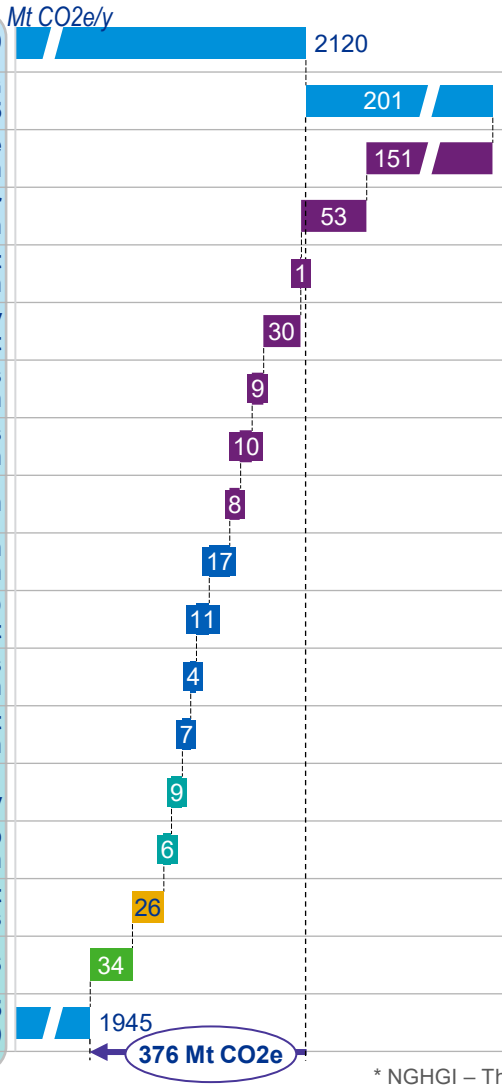
Electricity generation by source



- Heat and power generation is the greatest contributor to the GHG emissions (720 t CO2e) due to the prevalence of power generation from fossil fuels (mainly natural gas).
- Russia electricity generation mix differs from the world mix in a higher share of carbon-free generation and the predominance of gas generation over coal generation for heat power stations

Sources: KPMG analysis, Russian National Greenhouse Gas Inventory 2021, IEA (https://www.iea.org/fuels-and-technologies/electricity)

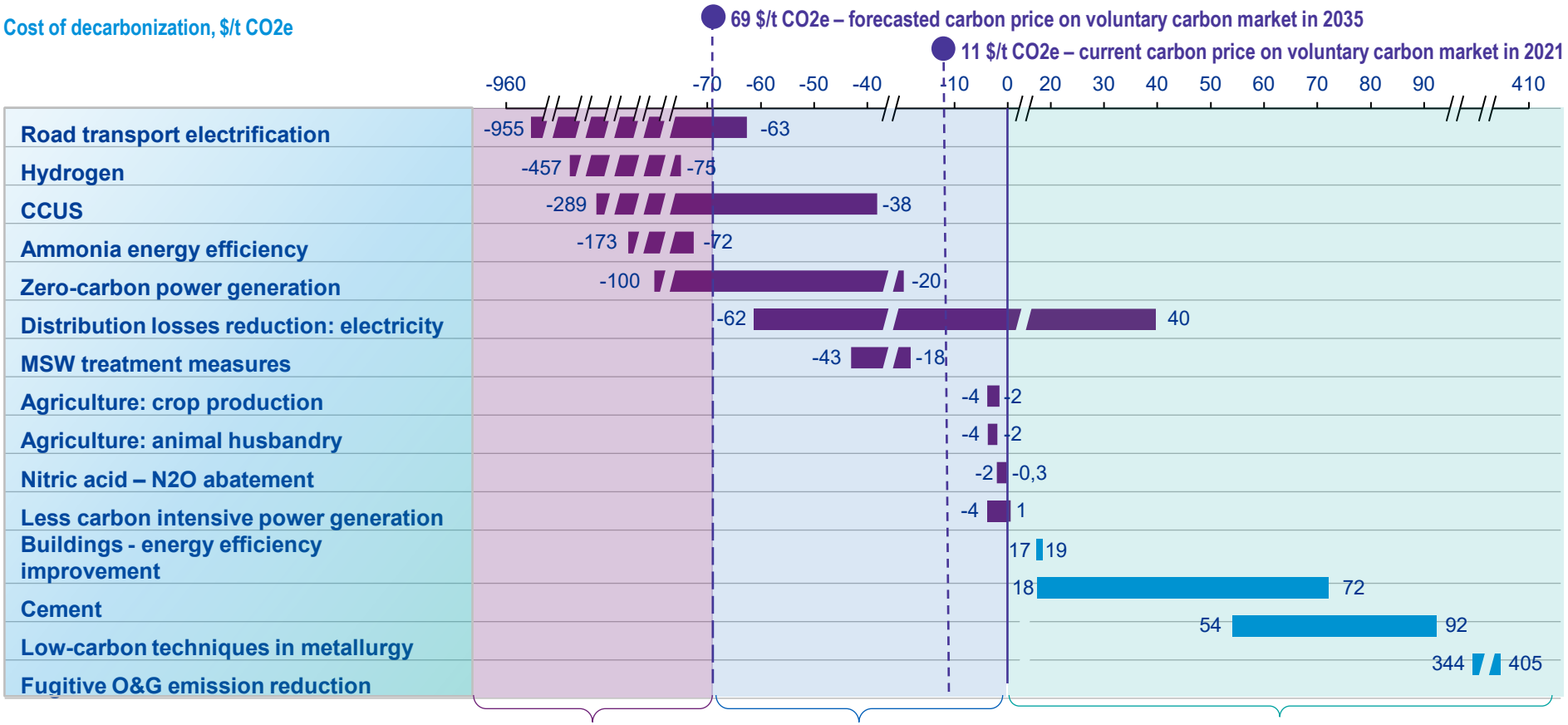
Decarbonization potential in Russia (available techniques and strategies)



GHG emissions 2019	According to National Inventory report
Increase GHG emissions 2035	Increase due to current trend of economic and industrial development
Less carbon intensive power generation	switch from coal generation to CCGT (natural gas)
Zero-carbon power generation	zero-carbon generation sources (Nuclear, Hydro, RES)
Public transport electrification	Increase of electric public transport share
Buildings - energy efficiency improvement	Reduction of specific energy consumption of residential buildings (electricity and heat)
Distribution losses reduction	Reduction of losses in grids: electricity – 7,3%, heat – 7,4%
Fugitive emissions reduction	22% reduction of fugitive emissions from natural gas transportation
Hydrogen	Switch from fossil fuel to hydrogen
Energy efficiency in ammonia production	Implementation of BAT and reduction of material consumption
Nitric acid – N2O abatement	Implementation of BAT and reduction of N2O emissions
Low-carbon metals production	15% decommission of sinter, coke and pig iron facilities and switch to steel production from DRI/HBI.
Low-carbon Cement production	Complete transition to dry method of cement production
Agriculture: animal husbandry	Use of antibiotics, implementing a complete-mix digester for CH4 emissions utilization
Agriculture: crop production	Crop management efficiency improvement including reduction of fertilizers consumption
MSW treatment measures	Increasing recycling and incineration share. Reducing the disposal of MSW at landfills up to 50%.
CCUS	Carbon capture, utilization and storage in oil and gas industry
GHG emissions in 2035 (potential)	After all above activities

* NGHGI – The National Greenhouse Gas Inventory 2021 (2019 data) Source: KPMG analysis, for more details see Appendix

Economic comparison of decarbonization measures



Total potential

~376 Mt CO2e

Non-market incentives

~60 Mt CO2e

Applicable for carbon market

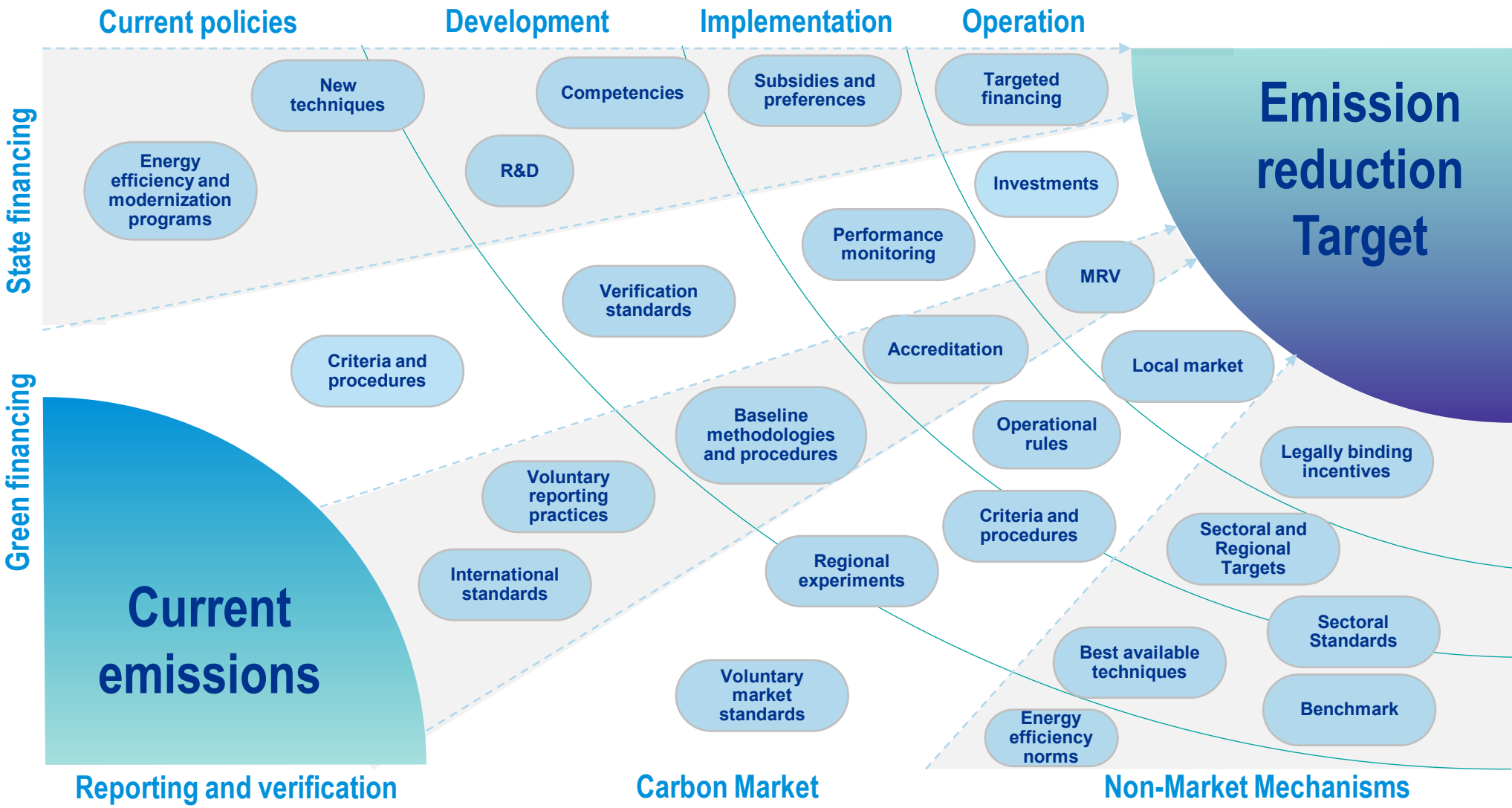
~265 Mt CO2e

Producing financial income

~51 Mt CO2e

Source: KPMG analysis, for more details see Appendix

Decarbonization policies improvement pathways



Conclusions

1/3

of total annual GHG emissions in Russia is attributable to heat&power generation

376 Mt

of CO2 eq. GHG emission reduction is achievable using available techniques by 2035 (-18% compared to 2019 level)

70%

of total decarbonization potential is attributable to energy sector: switch to less carbon intensive power generation techniques (CCGT), energy efficiency improvement, Zero-carbon power generation, Green/blue Hydrogen etc.

84%

of decarbonization potential may be achieved as economically attractive or financed with Carbon market mechanisms.

16%

of total decarbonization potential may be achieved with non-market instruments (subsidies, preferences, taxes, allowances)

Thank you for attention!

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