CARBON LIMITS

Mitigation Options and Policy Support for Stranded Associated Gas

3rd Almaty Energy Forum – 6 October 2023

Stranded associated gas

What is it?

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- Stranded associated gas is natural gas in discovered fields that is currently not commercially producible for either physical or economic reasons:
  - the volume may be too small for utilization
  - the gas may be too impure to develop utilization options

Typical ways to deal with stranded gas: venting, flaring or reinjection

Flaring dynamic in Kazakhstan

2012-2023

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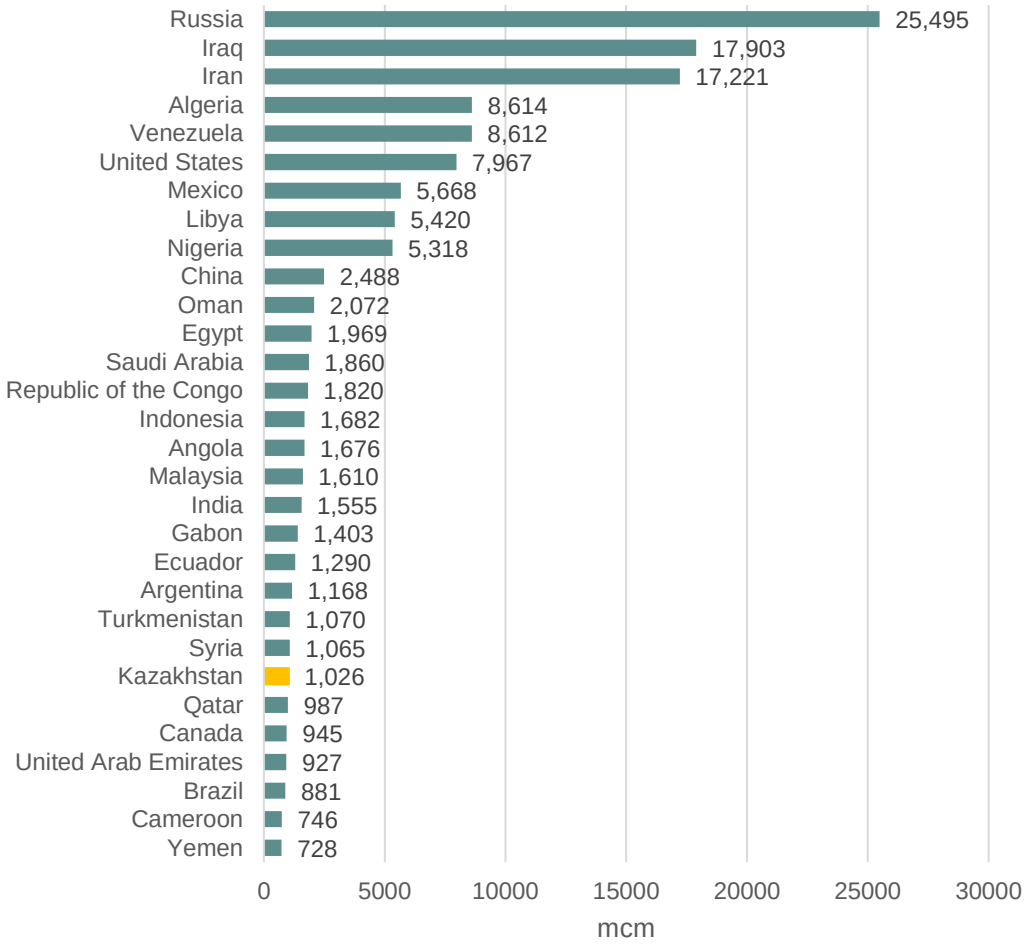

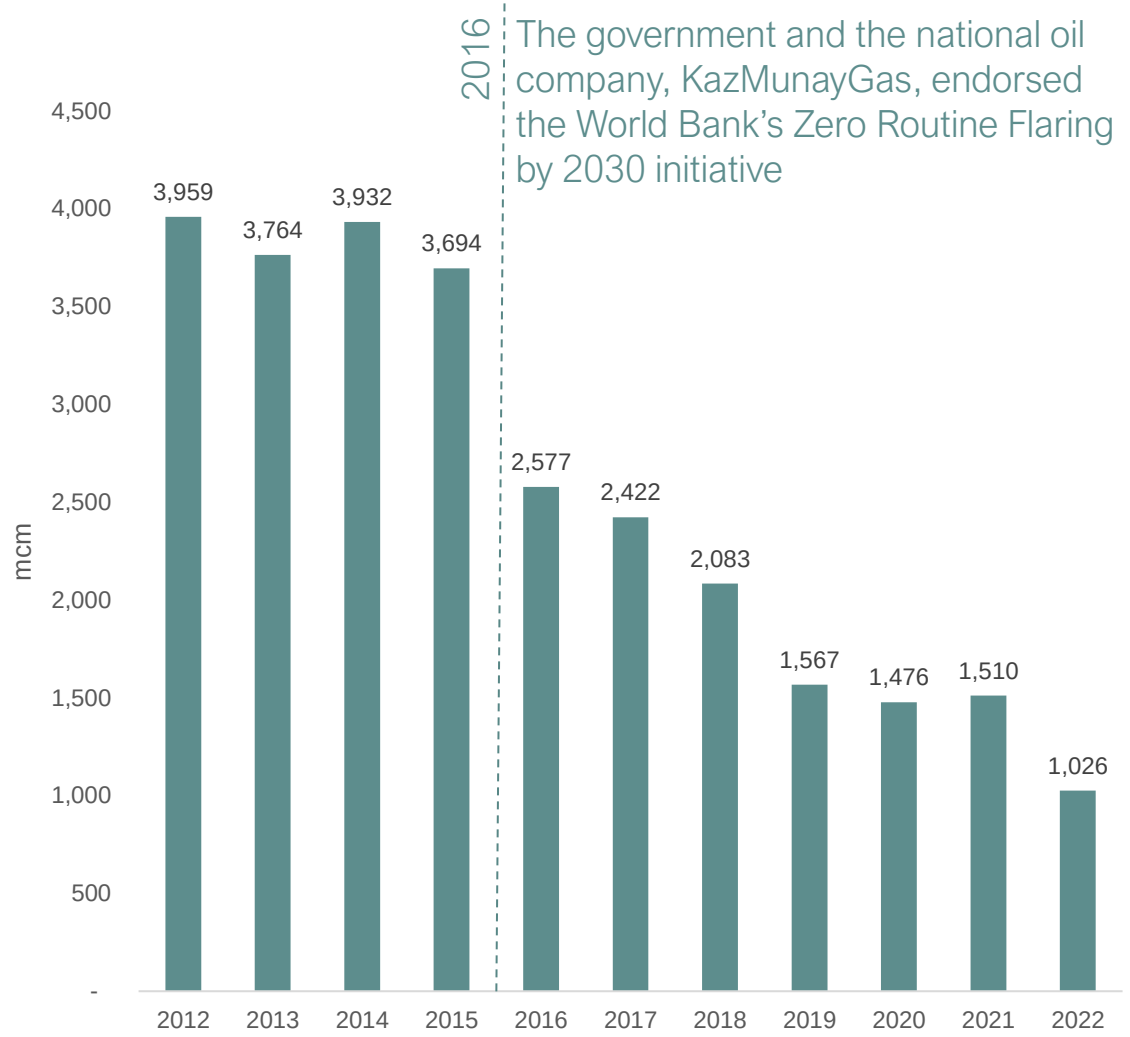

Source: World Bank (2023)
https://flaringventingregulations.worldbank.org/kazakhstan

Stranded Associated Gas

Flaring and venting

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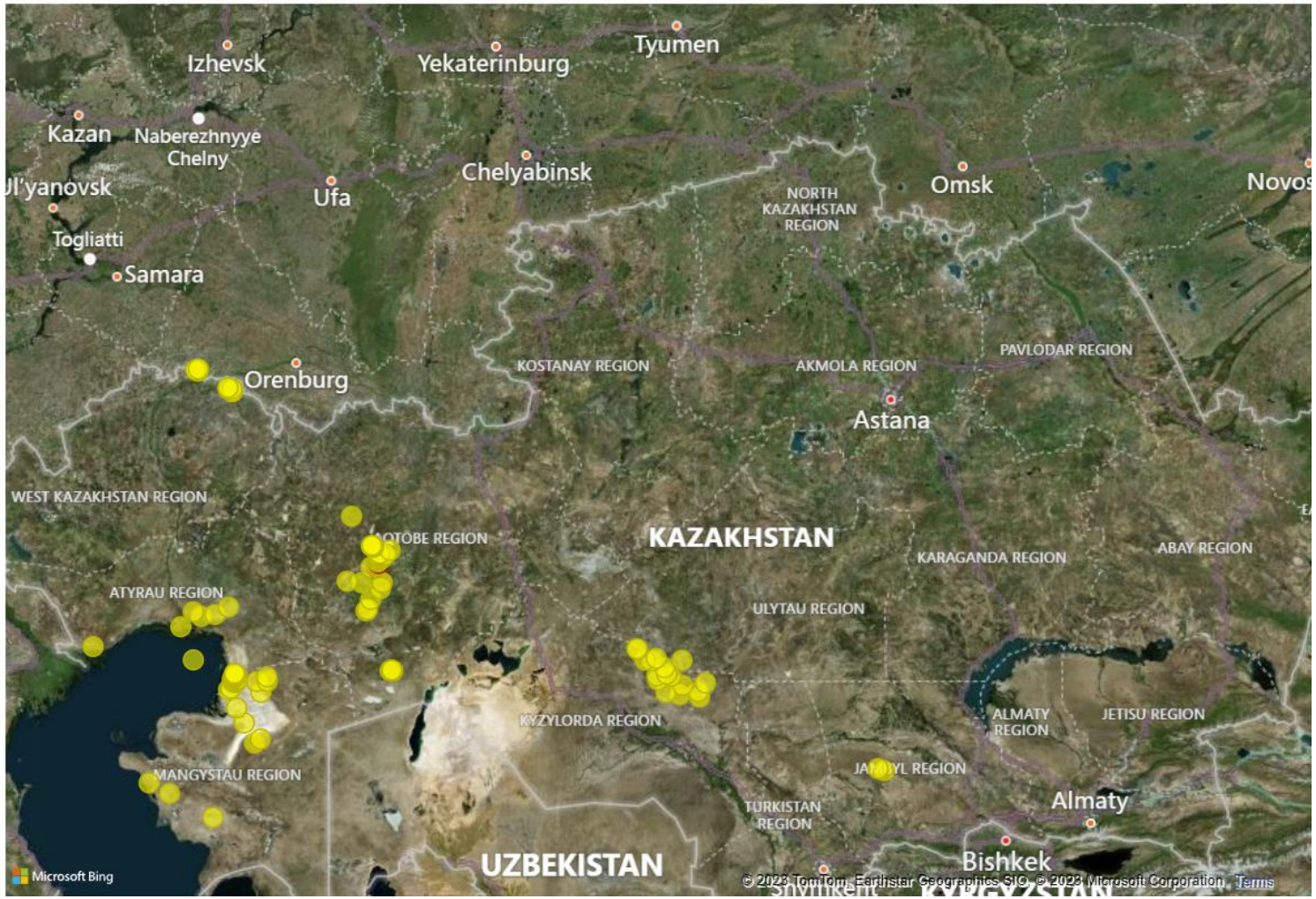

Source: World Bank – Global gas flaring tracker (2023)
https://www.worldbank.org/en/programs/gasflaringreduction/global-flaring-data

Technologies for gas utilization

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- While associated gas recovery, particularly in smaller capacities, faces major technical and financial barriers to implementation, significant efforts by suppliers have been made in recent years (with further developments still under R&D) to overcome the technical hurdles and improve economic viability.
- For almost all associated gas flare and venting situations, technically viable solutions do exist, and in many cases, investment in flare gas recovery and utilization can be economically viable.

Source: Aggreko

Source: Greyrock

Source: GasTechno

Source: Capstone

Source: Galileo

Abatement cost analysis

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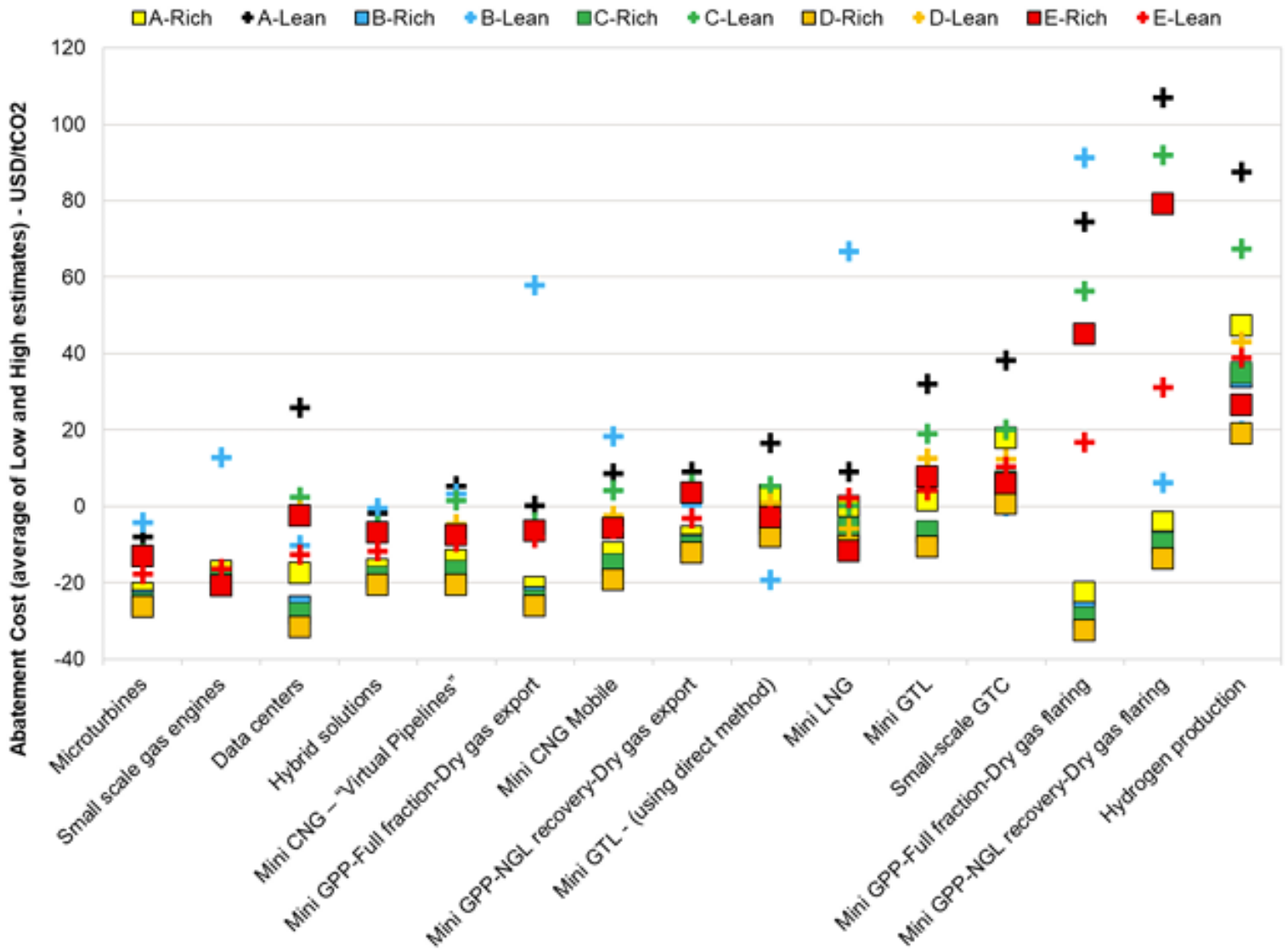
Abatement cost (average of Low & High estimates) for the 15 utilization options and the 10 production-composition profiles evaluated (in US$ millions).



Source: Carbon Limits, 2021

Conclusions

Utilization of stranded associated gas

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- Utilization of stranded associated gas is important to further reduce flaring and venting.
- Utilization technologies for stranded gas exist on the market.
- For any production profile and/or any geographic/site conditions, careful selection of the utilization technology and its design elements will help improve the economics of the project, including:
  - choice of the best-suited utilization option from the available technologies, based on specifications of the associated gas profile and the site location
  - type of pretreatment deployed to maximize the highest value products at the lowest cost,
  - optimal sizing, i.e., selecting sizing based on either average flowrate over the project lifetime, minimum flowrate, maximum flowrate or another sizing which results in optimum returns. Note: Size selection will have an impact on the reduction in flaring achieved, sometimes very large impact

Thank you!

Anastasia Isaenko

Anastasia.Isaenko@carbonlimits.no

+47 46 94 32 25