Case Study // Round Table SDG 7: Transforming energy in support of the 2030 Agenda

Coal mine methane production at Karaganda coal basin to enhance mine safety and optimize economics: Drained CMM to power

Kazakhstan

Level: national

Summary

The main objectives include: test of industrial option of emission mitigation with a local mine methane power generation project that would provide direct mitigation of GHG emission and also may help to reduce load from the national electricity grid up to some extent; investigation of possible opportunities for replication of CMM-to-power practice and extension of emission reduction at the current level of coal production.

Situation

Coal mining is one of the key industries of Kazakhstan economy. Kazakhstan is considered in the first ten leaders by the volume of coal reserves and production after China, USA, Russia, Australia, India, South Africa and Ukraine. By the 2017 National Energy Report of Kazenergy Association 96,4 mln. t of coal were produced in the country in 2016 (http://kazenergy.com/en/analytics/the-national-energy-report.html **). At the same time overall methane emission from coal production in Kazakhstan by National inventory reaches 1 bln.m3/a where one third (350 mln.m3/a) comes from deep mines in Karaganda region that produces around 11 mln.t of coal per annum.**

Strategy

Please describe the approach chosen.

In order to maximize the value of generated CMM-based power and to minimize grid network connection cost, it was recommended that any power produced by such a project is supplied into the internal mine electrical system. In this case the value of power to the project does not seem to be the price of electricity sold but the saved cost of electricity supplied from the grid.

Results and impact

Please elaborate on the specific results. Preferably, summarise the results in bullet points.

- **1.4 MW GE Jenbacher CHP generates electric power from CMM that is fed to the group substation of Lenina mine of Karaganda region and covers up to 20% of the mine power load;**
- **CMM-to power operation revealed a possibility to use waste heat of the CHP for the purpose of heating water for the mine needs and thus to provide additional mitigation of emission and coal consumption by the boiler house of the mine;**

Challenges and lessons learned

Please identify challenges encountered during the implementation and lessons learned.

Practical experience of the CHP operation revealed that at a certain point it is also possible to use most of the waste heat CHP for the purpose of heating water for the mine needs even in summer period and thus to provide additional mitigation of emission and coal consumption by the boiler house of the mine.

CMM power generation would increase a likelihood of export of the power to external consumers. Thus, as a part of commercial development phase the developing party should plan considering establishment of a separate local CMM-based power generation/distribution entity to manage technical and legal issues effectively.

Potential for replication

Please elaborate whether the concrete experience is replicable in other locations or contexts.

About 40MW of CMM potential is revealed at gas drainage of Karaganda coal mines by international experts over a pre-FS study that may be considered for further expansion of the CMM power practice in the region.

Contact

Name: **Evgeniy Alexeyev**
Organisation: **Methane Center, Kazakhstan**