Excerpts from the chat discussion

Question: Once coal seams have been degassed of CH4, can they be used to store CO2 (in the carbon sequestration paradigm)? Any limits in terms of depths? (too shallow/too deep)

Answer: Feasible but has to be determined case by case

Q: What are the typical problems with that?

A: The way how you de-gas the reservoir. The other are operation and equipment available, and the critical pressure

Q: Is the concern primarily with the pressure CO2 can place under the ground and thus push out water, remaining CH4 and eventually escape to the surface?

A: That’s right, the pipeline material, the pumps, the geology of the reservoir

A: Please google RECOPOL project. You should learn a lot...

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Q: We in the Balkans there is predominantly surface mining of the coal. Is it the same situation in terms of methane emissions like in the underground mining?

A: Sometimes yes however rates of methane emissions vary greatly

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Q: What are the best market-proven VAM capture/utilization technologies/OEMs?

Q: Do you know any technologies of economical harvesting of VAM (vent air methane)? I know of oxidation tech - but that's just for DESTRUCTION of CH4. Is there a way to elevate concentration of VAM to combustible levels?

A: Comment: At West Cliff mine in Australia thy where operating for 10 years a VAM plant for 4000m3/h of air with 0,3 - 1% CH4

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Comment: Remember that many coal mines often become flooded after abandonment. Our work shows that once these mines are abandoned and flooded methane emissions are minimal.

Q: How much is minimal?

A: This depends on the deposit depth in some regions the coal seam is part of the aquifer for example in the Sabinas basin in Mexico

A: The inventories require improvements CMM AMM included

A: The models being created can include recommendations on local reporting however often these data are considered confidential.

A: As pointed out there is not one typical coal mine, many are unique to a region and even differ within a region depending upon the rank of the coal, for example. Because the mines
are often flooded CO2 sequestration may be difficult, but CO2 can be sequestered in saline aquifers so there may be potential.

A: We should also consider other win-win solutions. Such as the Geothermal potential of flooded, abandoned mines. Low-medium enthalpy geothermal can be used effectively for district heating and cooling solutions. An example is the use of the abandoned mines in the town of Springhill, Nova Scotia, Canada.

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Comment: The last underground coal mine given a permit in Canada included a Canadian Federal requirement to limit GHG emissions (including methane) to 500,000 tCO2e per year, which requires a substantial investment in methane drainage and VAM capture.

Q: Only 500,000 multiplied by 120? WOW
A: I think that the 500000 has already taken into account the GWP, probably at 25 times
A: Yes. 25.
A But if this CH4 will be released to atmosphere? then 25 times is inaccurate.
A: Precisely…
A: a revised GWP should be 83-84 times discounted
A: Maybe they will use that number for the next mine. I just hope my hip replacement isn't done with a sharp stick instead of surgical steel.
A: 83-84 is the average of the GWP over a twenty year time horizon, at initial release GWP is estimated to be 120 on the twenty year time horizon
A: indeed

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Q: Is some of this gas in Poland used for district heating?
A: Yes, it is sold by mining company to natural gas delivery company
A: Thanks. Would be good to know statistics on this. Any source to look for?
A: Ask Justyna (the presenter) - She has some data

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Q: Any chance of using the VAM capture in addition to natural gas through a turbine?
A: I guess not - too much!

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Comment: One reason why Australian utilisation rates in terms of total methane might be so high is that there are statutory requirements to degas above 9 m3/t.
A: Then we are waiting for regulation to enforce?
A: The Australian regulation is safety related - gas outbursts - as I understand it.
A: Yes that is correct
A: It is a good reason. Then because of inaction we have to wait for accidents to happen, in order to get an enforcement from the Governments? That will be expensive! Enforcement is a must, we cannot rely on goodwill to increase safety.

A: I suppose national regulations to make pre-mining gas drainage compulsory would (a) improve safety and (b) encourage research into monetising the efforts.

A: Money talks. When met coal reaches $1000/t because of scarcity, people will run after a return and invest.

A: I agree

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Comment: Please see https://cdm.unfccc.int/UserManagement/FileStorage/CK1D9YF5R6SZIHO0W4BJPLUQT8M7XE. That is an example project financial analysis. Without carbon, the IRR is merely 4%, with carbon income, IRR can reach 22%.

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Comment: Alberta did a lot of work on this and generally coal will absorb CO2 preferentially while displacing methane however swelling of coal limits the injection of CO2

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Comment: We know that methane is also held in the rocks associated with coal. Open pit mines in Canada are currently working at SRs of 20bcm/t. Open pit mines are far more numerous than underground mines and typically produce much larger tonnages.

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Comment: Coal core desorbing can be undertaken from surface in order to project more accurately the as is methane in situ

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Comment: The emissions contribution is less significant than the warming contribution of methane. IPCC says methane is responsible for half of the warming experienced to date. Moreover, because it’s short lived, controlling methane is the ONLY way to reduce the pace of warming in the near term.

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Comment: all mines and regions with coal-bearing basins, have a geological uniqueness. We must be careful to have detailed geological evaluations to assess the risks to develop effective methane mitigation strategies for the subsurface, and the atmosphere.

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Comment: FLARING is the cheapest

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Comment: More information on Long Reach Directional Drilling technology and its latest encouraging applications under DDMET project for drainage of longwalls' underlying and overlying strata was presented during Krakow workshop on Sept. 28th. Please see it at UNECE website.
Comment: I fully agree on the data availability. Poland is though not bad in reporting, but still progress could be done on opening access to public statistics and also unit-level / company data on all aspects of environmental impact, incl. methane emissions. Please see state-of-play around Poland’s coal mining data landscape https://instrat.pl/en/unece-methane-workshop/

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Comment: In terms of Just transition I draw attention to https://ca.indeed.com/Mining-jobs-in-British-Columbia