CMM and AMM Projects: Analysis of the 2021 CMM Project List

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Introduction and Acknowledgements

- Global Methane Initiative (GMI) created the Coal Mine Methane (CMM) Project List to track and analyze CMM projects around the world
- The latest version was updated at end of 2020-start of 2021. Advanced Resources International (ARI) compiled most of the information for GMI
- CMM Project List is the best available source of information on operational and former/future CMM projects:
  - Data are provided by country, project status, start year, project end use type
  - List includes descriptions of projects, mines, and equipment
  - Emission reductions are included, where available
  - Data gas exist
- The previous version was published in 2016

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- Evgeniy Alekseev
- Meredydd Evans and Nazar Kholod
- Oleg Tailakov
- Others

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Snapshot of the 2021 CMM Project List

- 15 countries host CMM abatement projects
- 328 known projects at various stages of operation
- 260 operational projects:
  - 156 CMM projects, including 4 VAM projects
  - 104 Abandoned Mine Methane (AMM) projects
- 36 projects are under development
- 32 projects have been closed / not operational

- For comparison, the 2016 version of the list contained information about 238 projects

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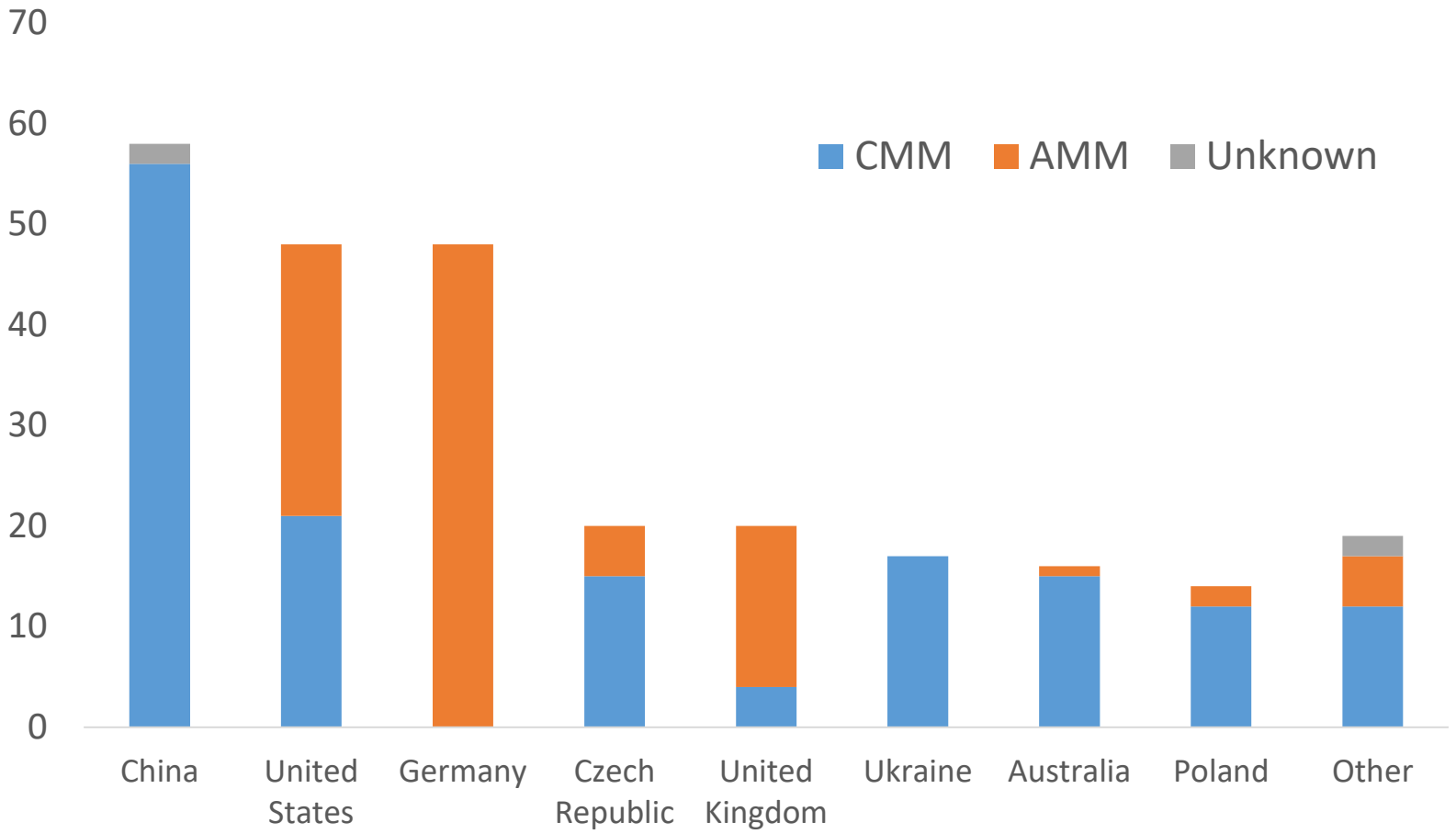
Countries with the Most CMM Projects

Countries with the largest number of operating CMM and AMM projects are: China, United States, Germany, Czech Republic and the United Kingdom



* CMM includes operational projects for ventilation air methane (VAM) destruction or use

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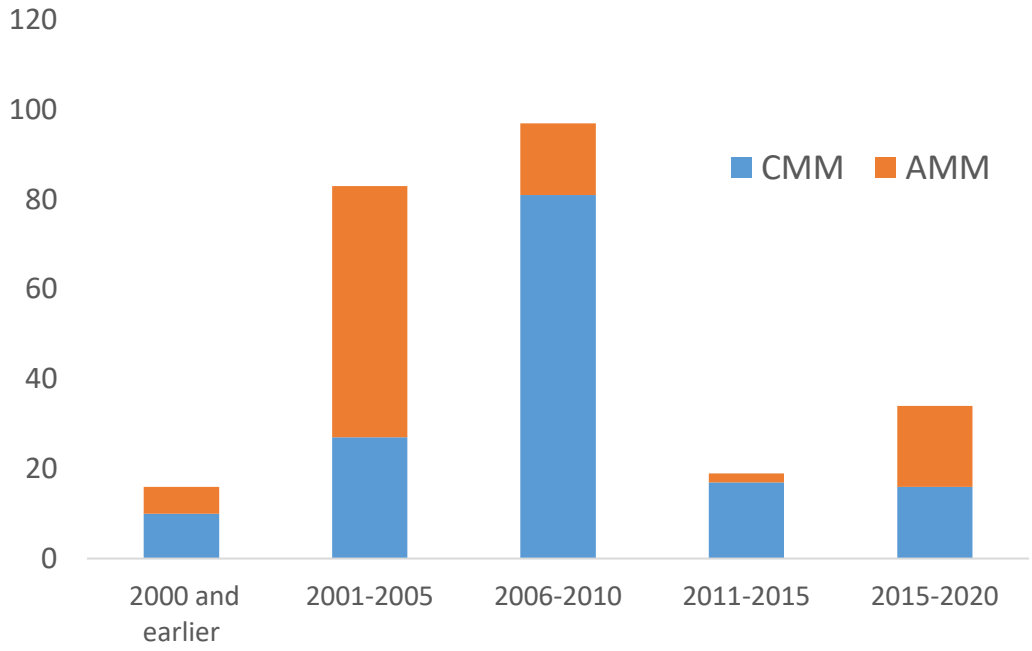
Dynamics of CMM Project Commissioning

- 70% of the operational projects were created in 2001-2010:
  - Many projects created in the 2000s were supported by the mechanism of Joint Implementation
  - The largest number of projects was in Ukraine
- Average age of operational projects is 13 years
- During the past 10 years:
  - China and USA created two-thirds of all operational CMM projects
  - Germany and UK created 60% of all operational AMM projects
- In the past 5 years, the United States created 76% of all new projects



Start years of operational projects

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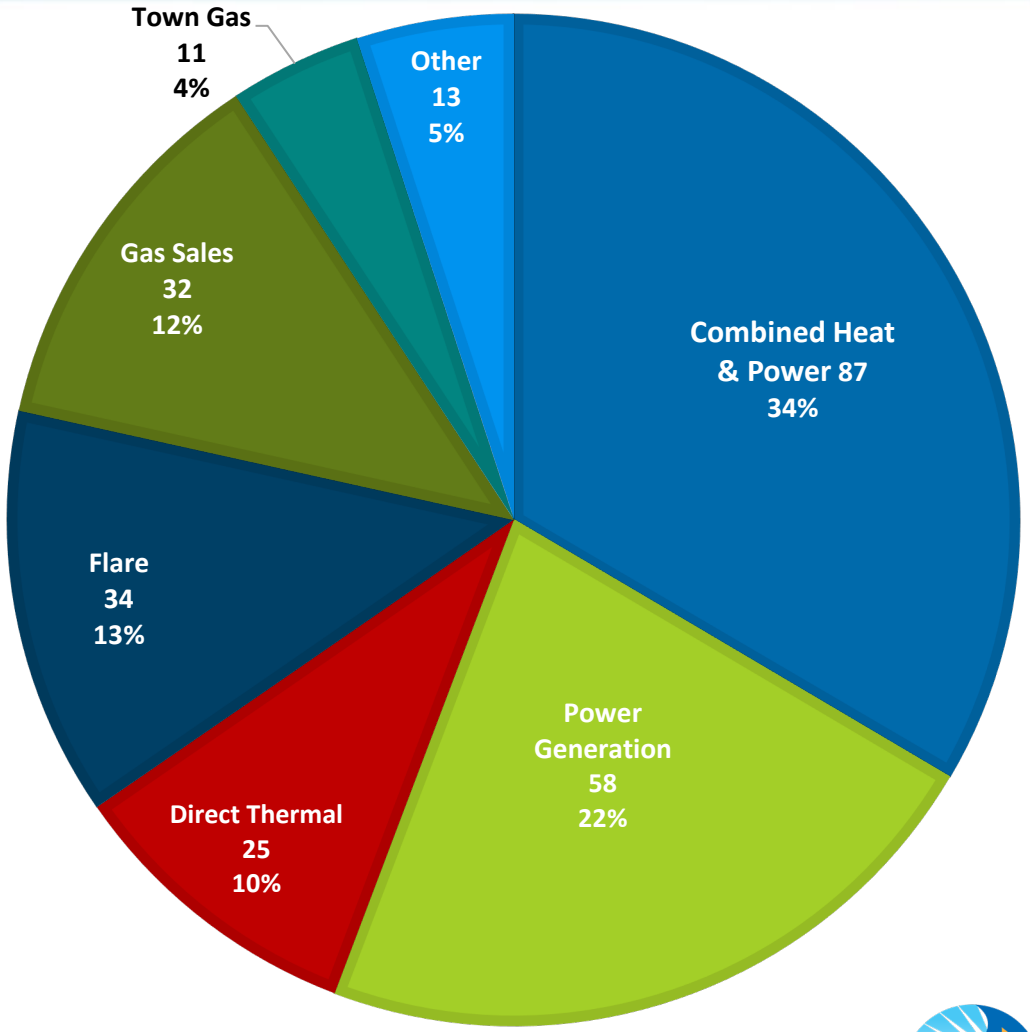
CMM Project by End-Use

- All operational projects:
  - Most projects generate either heat or power or both (66%). Combined heat and power account for 34% of all projects.
  - Flaring – 13%
  - Gas sales – 12%
- As a subset, AMM projects:
  - Generate combined heat and power (51% or 53/104 of operational AMM projects)
- Rated capacity of equipment at CHP installations is in the range of 30 kW to 55 MW, with the average of 5 MW



All operational projects

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Known Emission Reductions

- The average annual emission reduction per project (where data are available) is 150,000 MTCO2e
- The largest project in terms of emission reductions is the Power Generation Project at Sihe Mine (China) with an annual emission reduction of 3,6 million tons of CO_2e
- Data on emissions reductions for many mines is yet to be collected
  - Only 30% of the projects have information on annual emission reductions

Conclusions

- The CMM Project List is a living document as GMI is working to update information and fill the gaps
- CMM and AMM projects demonstrate a wide range of possibilities to utilize methane
- National experts and country representatives at GMI play essential roles in collecting and verifying information
- We encourage all experts to contribute to the development of the International CMM Project List