

Getting it Right: Policies that Provide a Solid Foundation for the Development of CMM/AMM and VAM Projects

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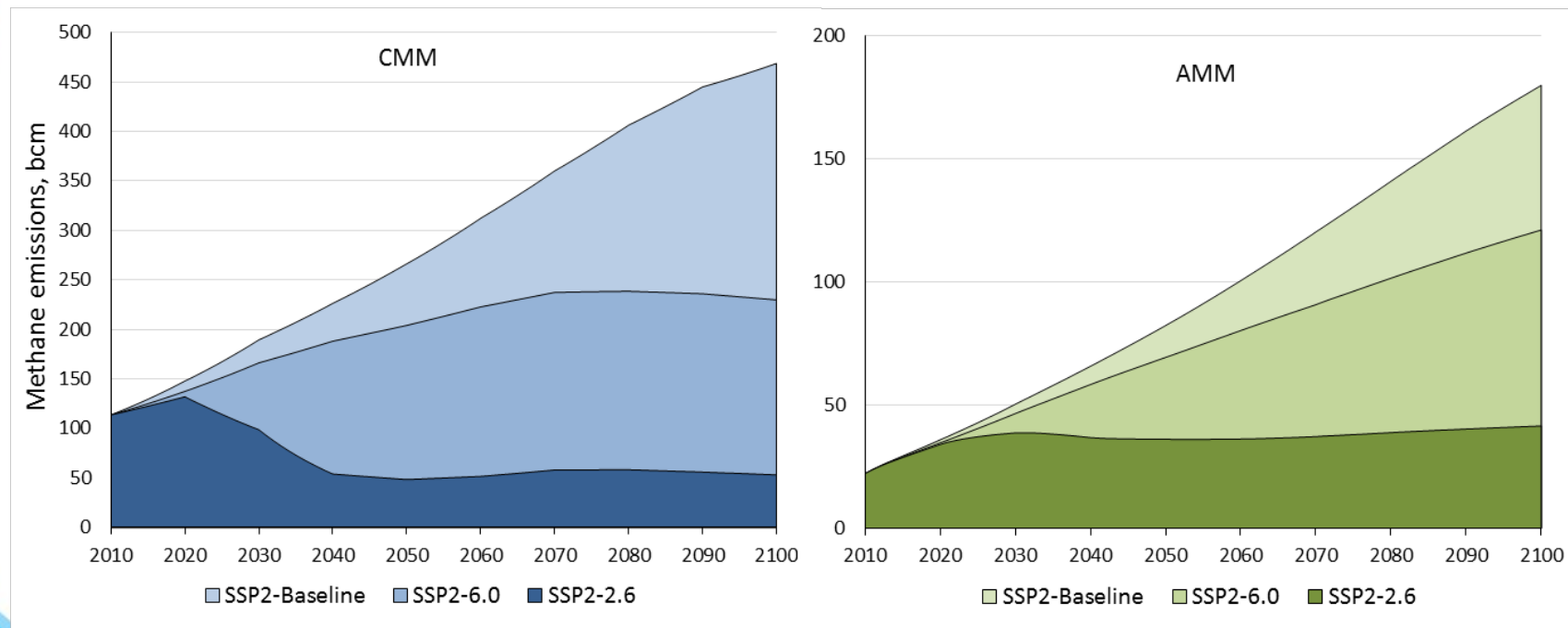


Outline

- Range of policy options for Coal Mine Methane (CMM): ownership rights, incentives and carbon policy
- Policies for VAM (Ventilation air methane) and AMM (Abandoned Mine Methane)
- Two country examples
- Conclusions

Policy is Important to Address Growth in Emissions

- CMM emissions follow the coal production
- AMM emissions grow even if coal production and CMM decline

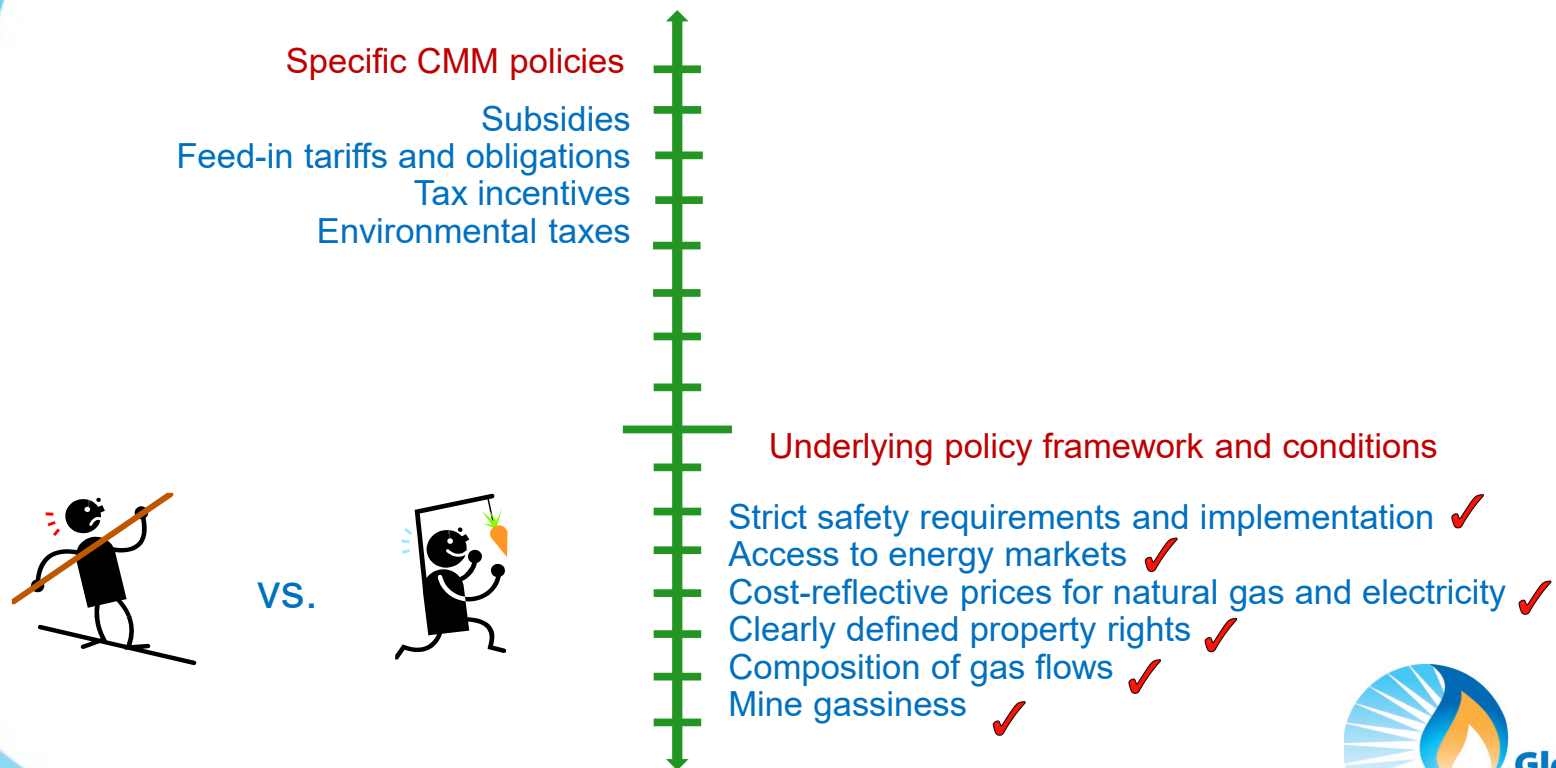


Source: Model for Calculating Coal Methane (MC2M) emissions; Preliminary data

Range of Policy Options

- Less supportive enabling conditions require more policy support for to make CMM projects feasible

MORE TARGETED POLICY SUPPORT NEEDED



LESS TARGETED POLICY SUPPORT NEEDED

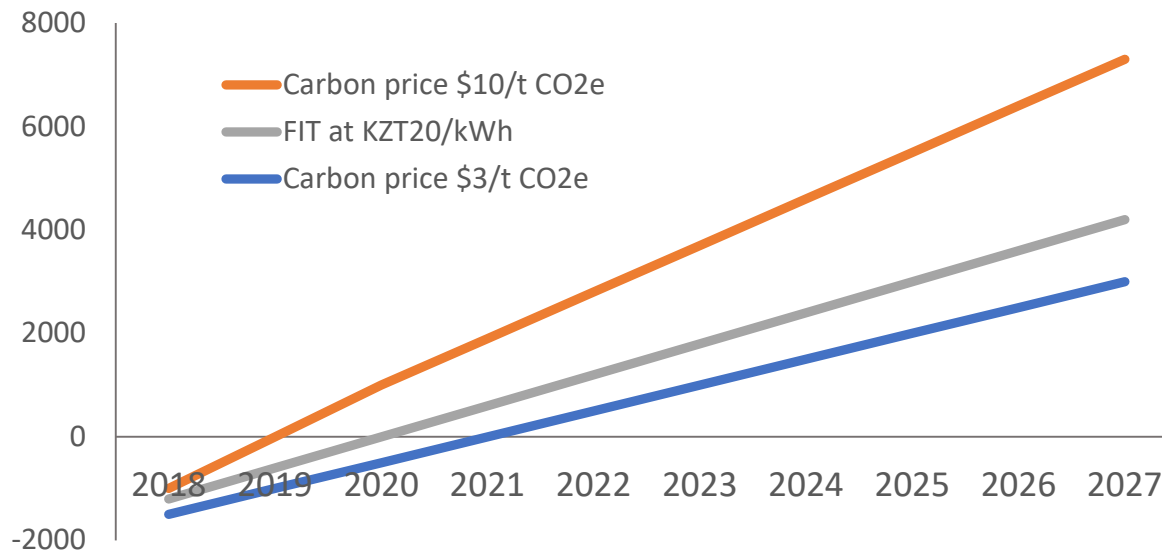
The Importance of Clear Rights in CMM/AMM Utilization

- Ownership is a form of incentive for CMM
 - Poorly defined ownership and leasing rights can create conflicts and obstacles to utilization
- Clear rights reduce uncertainty, risks and costs
 - Basis for producing and selling CMM-based electricity
 - Clear rights is key to multi-party projects

Incentives Can Speed Project Implementation

- Examples:
 - Carbon price
 - Feed-in tariff (FIT)
 - Reduced taxes or royalties

Illustrative example:
Impact of carbon price and FIT on project economics



VAM Projects Have Specific Policy Needs

- Majority of CMM is VAM (60~70% of CMM emissions)
- At least 6 projects in Australia, China and the U.S.
- Projects usually not self-financing from energy
- Carbon price or offsets are important (only one known project did not use carbon credits)
- Permitting rules affected initial VAM timelines and costs

Blue Creek Mine #4 Mine, Alabama, USA
2009-2013



Marshall County Mine, West Virginia, USA
First commercial-scale project, commissioned in 2012







Key AMM Policy Actions for Success

- Enact clear procedures for obtaining AMM ownership rights
- Allow for transfer of methane rights from the mine to the gas developer
- Set royalties at a low level to encourage investments
- Offer reduced taxes or other incentives to support AMM projects
- Consider including AMM as a renewable energy resource

Based on draft paper on AMM policies, scheduled for release later this year

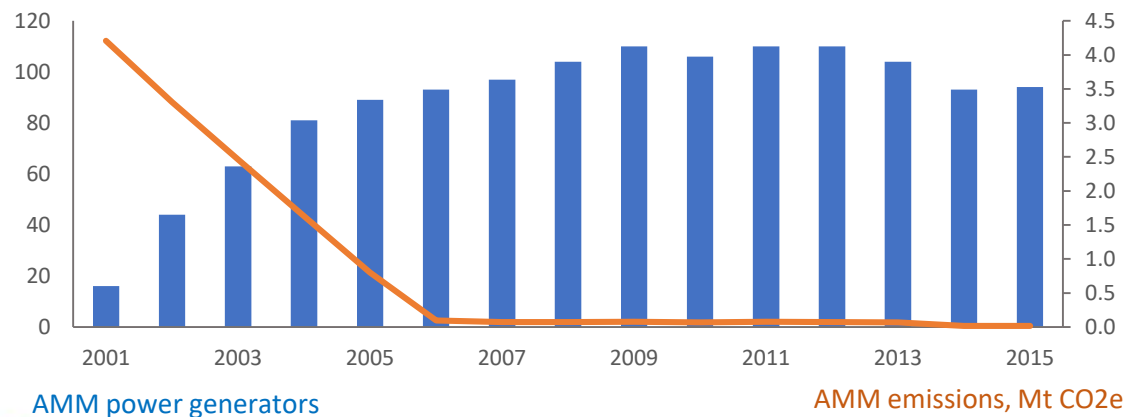
AMM Case Studies: Key Findings

Country	AMM utiliz. rate	Royalties	Key Policies
Germany 	99%	10%	<ul style="list-style-type: none"> • Clear gas rights and licensing process • Feed-in tariffs/market premium for AMM
UK 	58%	Taxes instead	<ul style="list-style-type: none"> • Clear rights and licensing procedures • Fairly high taxes • AMM exempted from climate change levy
Australia 	31%	10%	<ul style="list-style-type: none"> • AMM is not defined as a resource • Flaring is prohibited
US 	29%	12.5%	<ul style="list-style-type: none"> • Royalty relief (some states) • AMM in Renewable Portfolio Standards (some states) • Carbon offsets

Based on draft paper on AMM policies, scheduled for release later this year

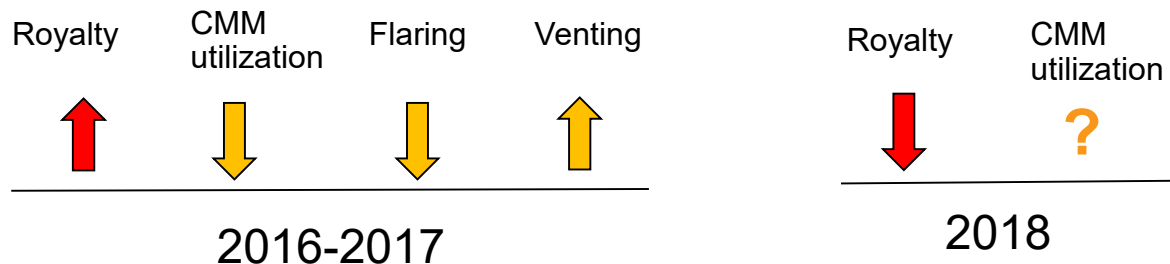
Case Study 1: Germany

- Rights to CMM are provided to coal companies
- Feed-in-tariff (and later market premium incentives) for CMM and AMM
 - Primary factor driving active project development
- As of December 2017, active AMM projects utilized up to 99% of AMM



Case Study 2: Ukraine

- Variable tax policies : royalties
 - 29% of royalty tax for CMM capture (July 2016)
 - Revenues (savings) from CMM utilization became taxable
 - Mines stopped flaring
 - CMM utilization decreased by one third
- Tax Code was amended in December 2017
 - No royalty tax
 - No income tax by 2020
 - Penalties for venting have been increased



Conclusions

- AMM /CMM emissions will likely grow in the future
- Countries use a mix of policy instruments to encourage coal methane projects
- Clearly defined property rights reduce risks
- Projects can be profitable but incentives are important
- Consistent policies are critical to project success

Thanks and Contact Information

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Backup slides

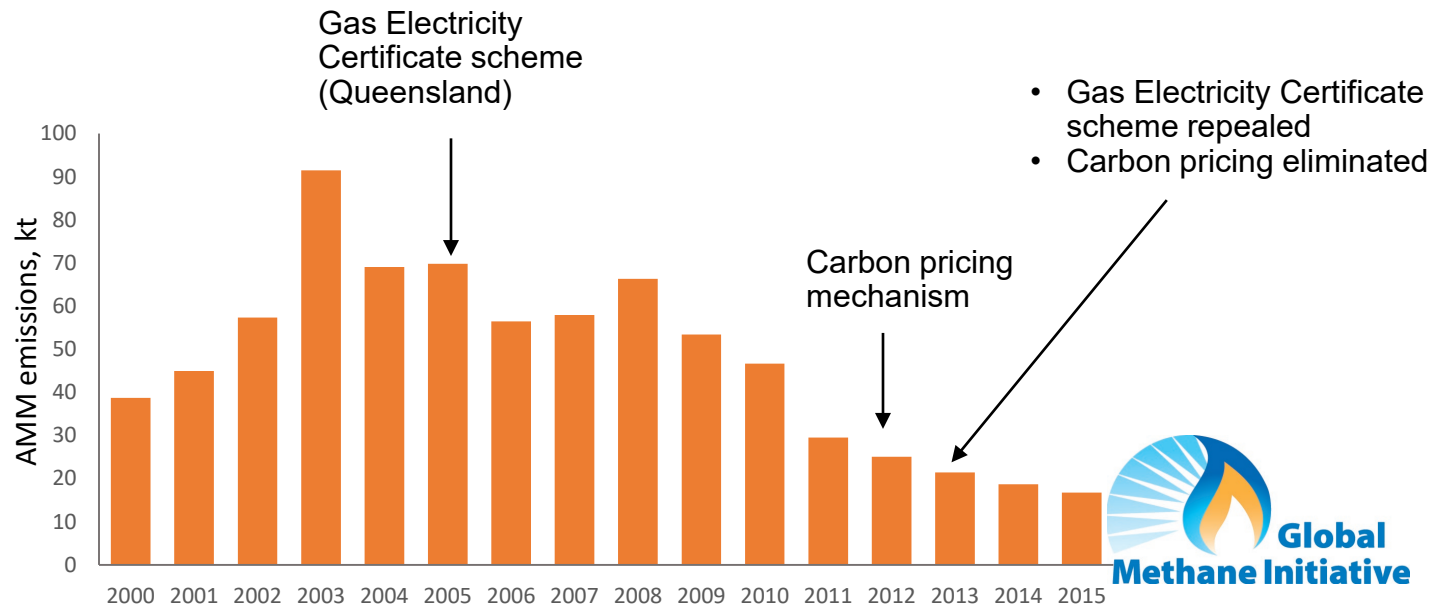
Australia

- Each state sets its own regulation
- Companies should apply for a petroleum title
- Royalty rate is 10%
- Australia utilizes 31% AMM emissions

Mining Act 1992
(New South Wales)

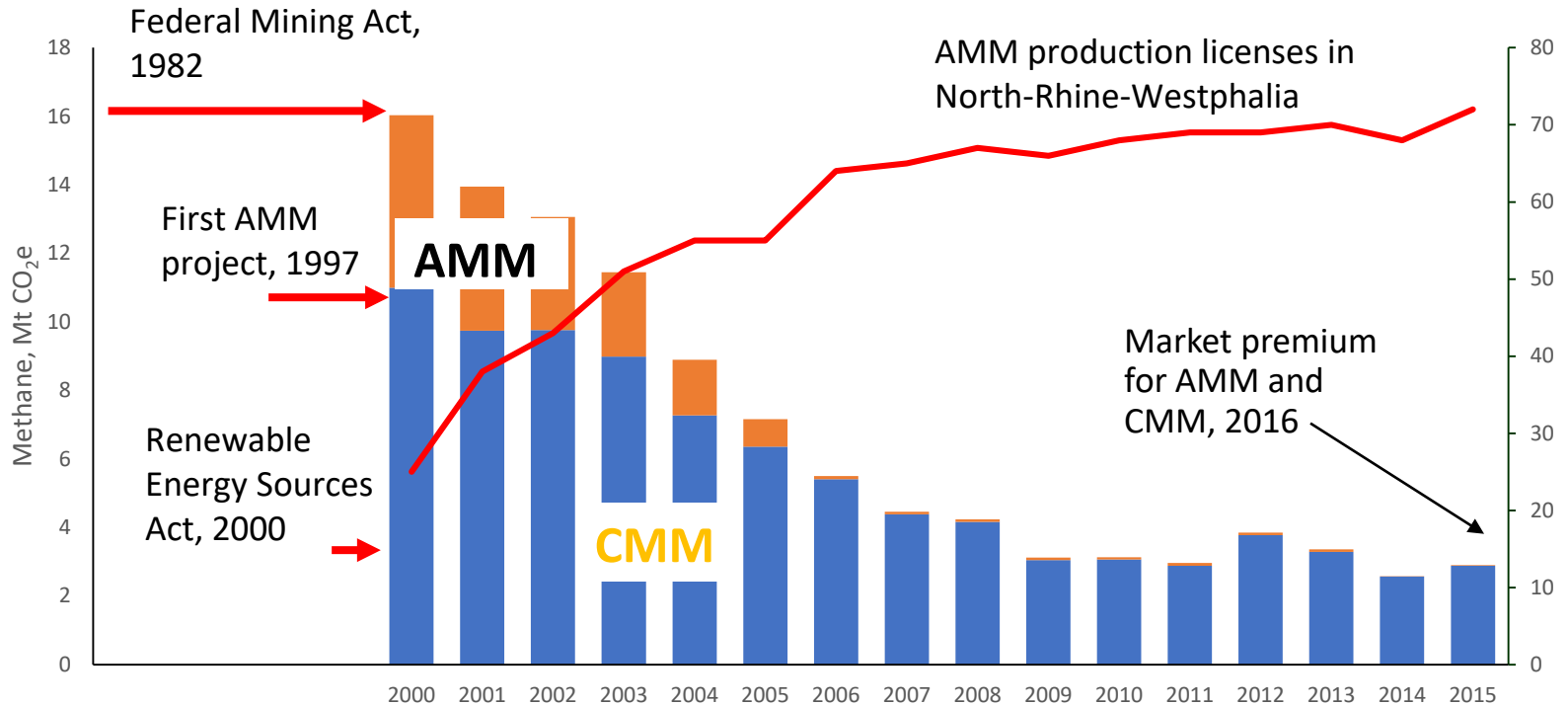


Mineral Resources
Act 1989
(Queensland)



Germany

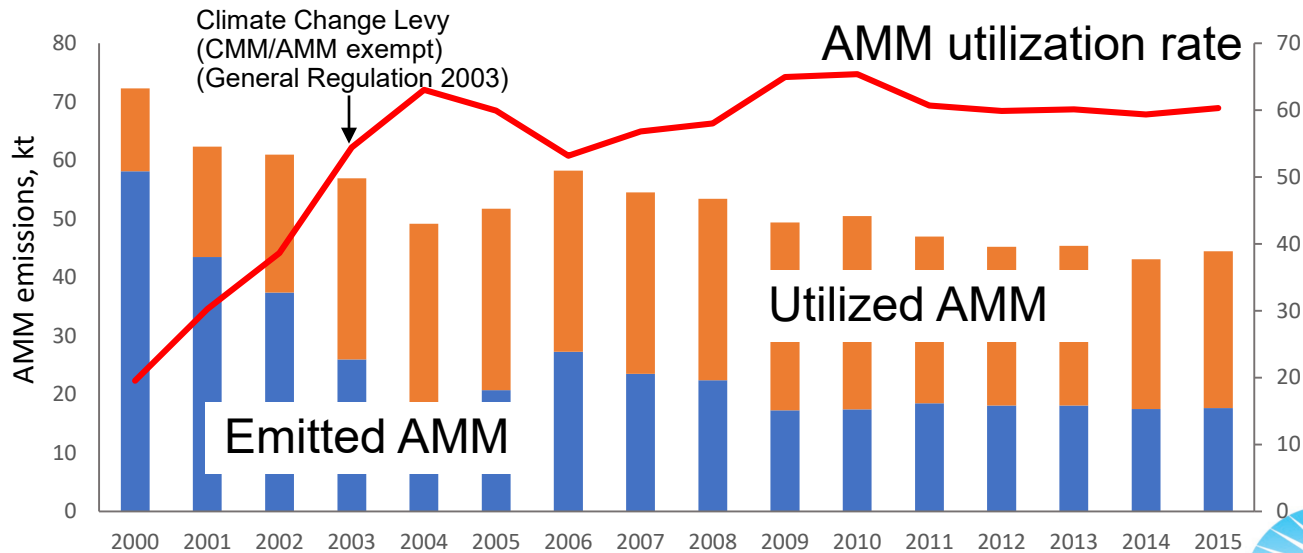
- Policy is important!



- Germany utilizes 99% of AMM

United Kingdom

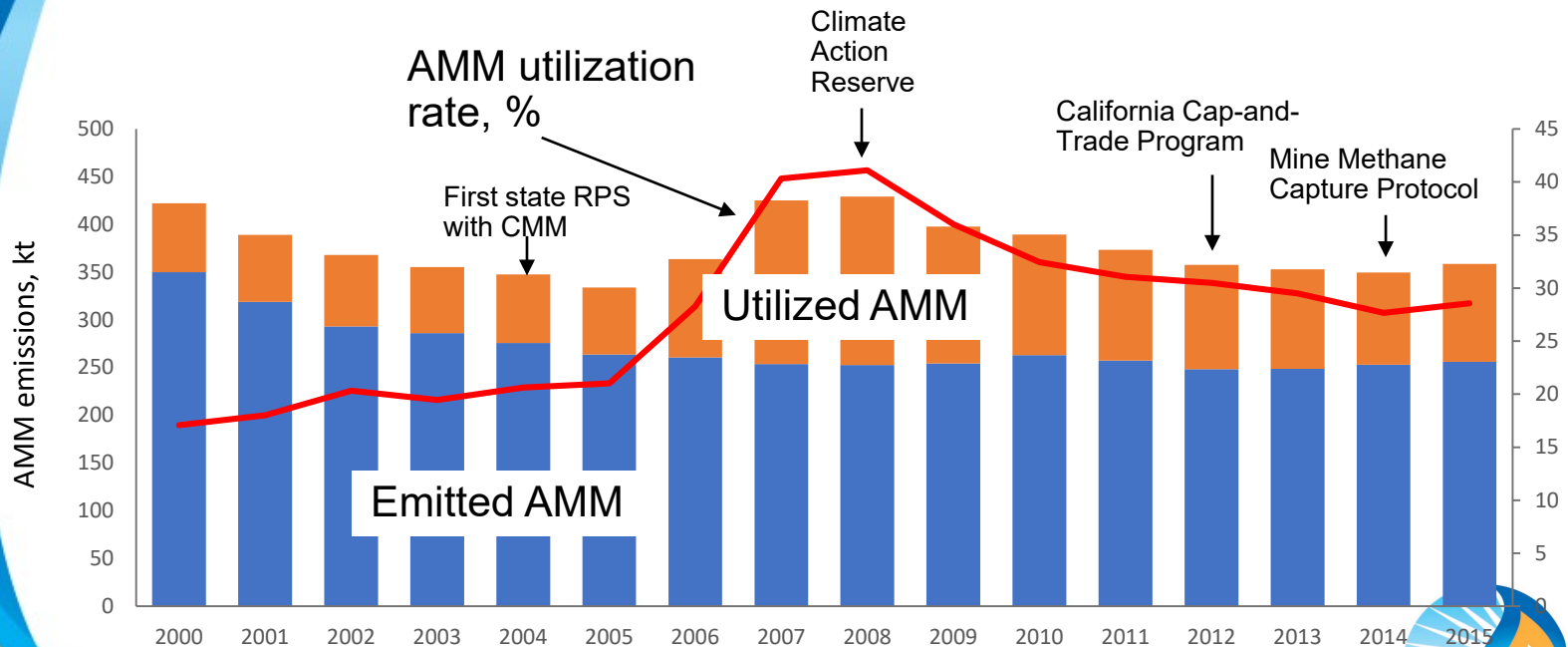
- Clear defined property rights
 - Petroleum Act of 1998
 - License fees are relatively low
- Little tax incentive for AMM
- No royalties for extracting AMM



- AMM utilization rate is about 60%

United States

- No federal incentives
- Some states provide royalty relief
- Some states included AMM in Renewable Portfolio Standards



United States: AMM projects

