

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

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Turning Coal Mine Methane into an Asset: Implementing Best Practices and Policies

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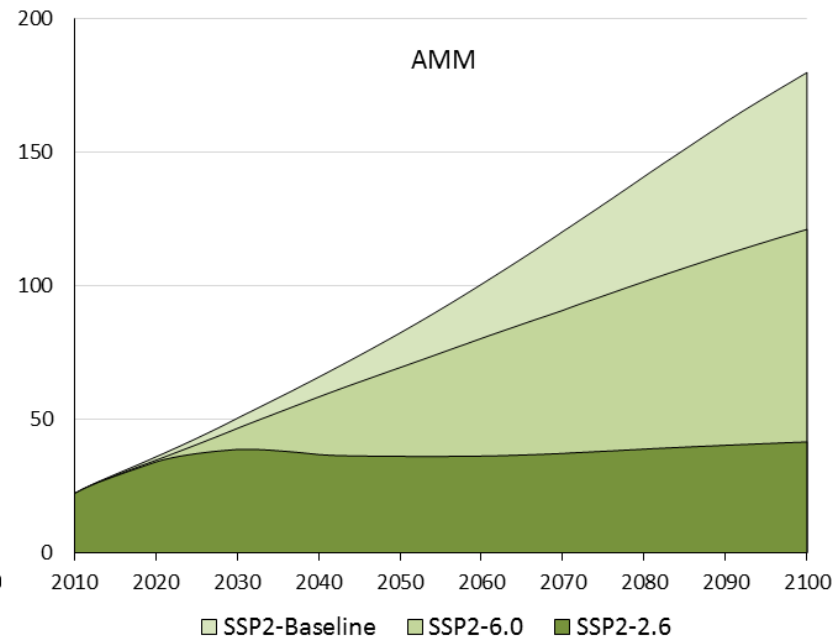
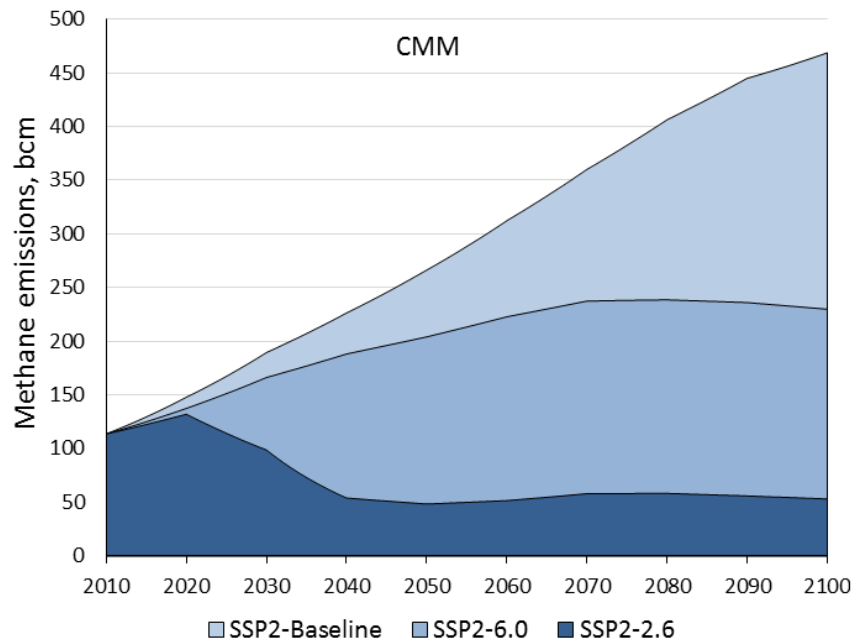


Outline

- 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



Range of Policy Options

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

MORE TARGETED POLICY SUPPORT NEEDED

Specific CMM policies
Subsidies
Feed-in tariffs and obligations
Tax incentives
Environmental taxes



VS.



Underlying policy framework and conditions

Strict safety requirements and implementation ✓
Access to energy markets ✓
Cost-reflective prices for natural gas and electricity ✓
Clearly defined property rights ✓
Composition of gas flows ✓
Mine gassiness ✓

LESS TARGETED POLICY SUPPORT NEEDED

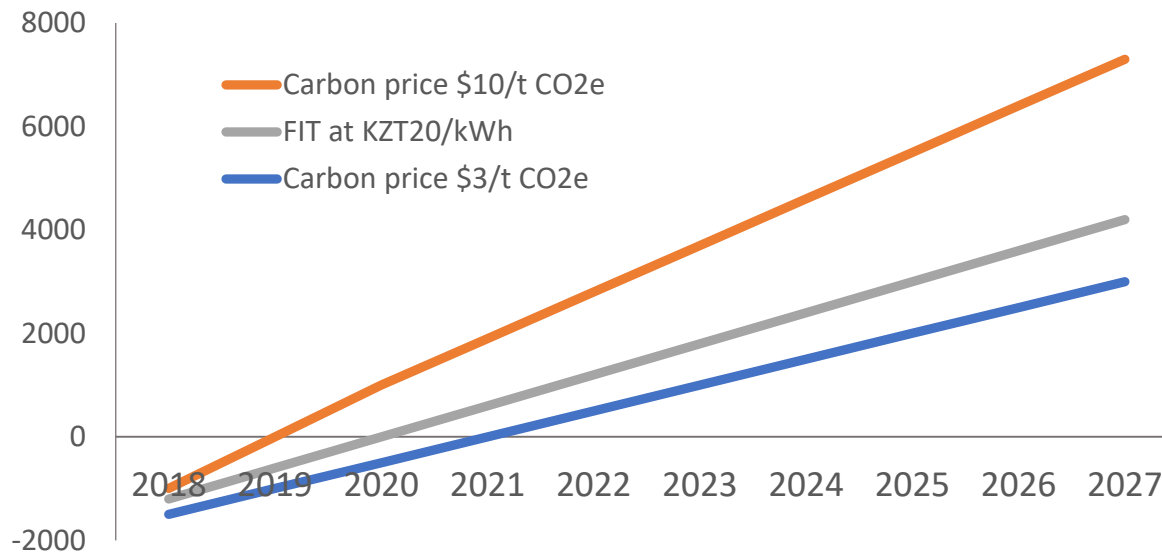
The Importance of Clear Rights in CMM/AMM Utilization

- 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

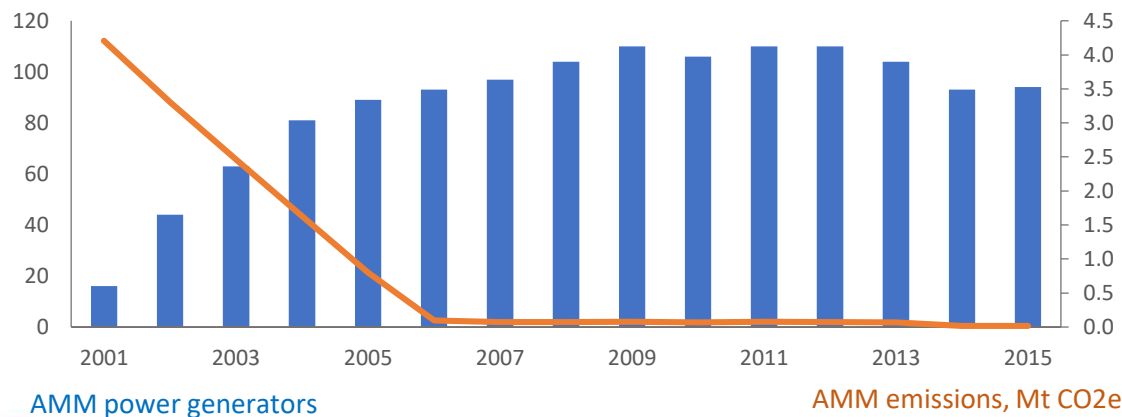
AMM Case Studies: Key Findings

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

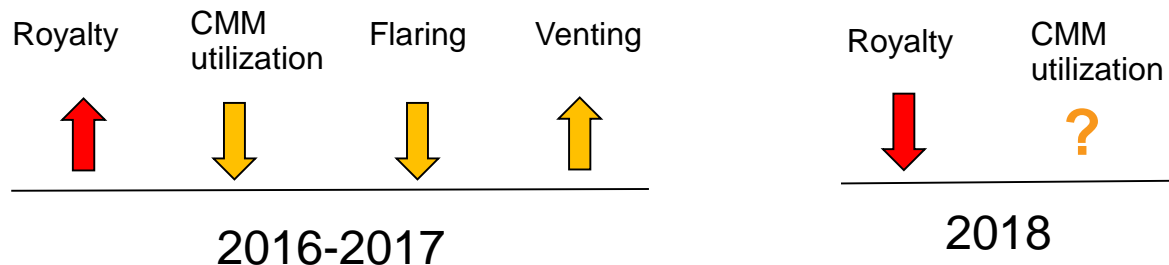
Case Study 1: Germany

- 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

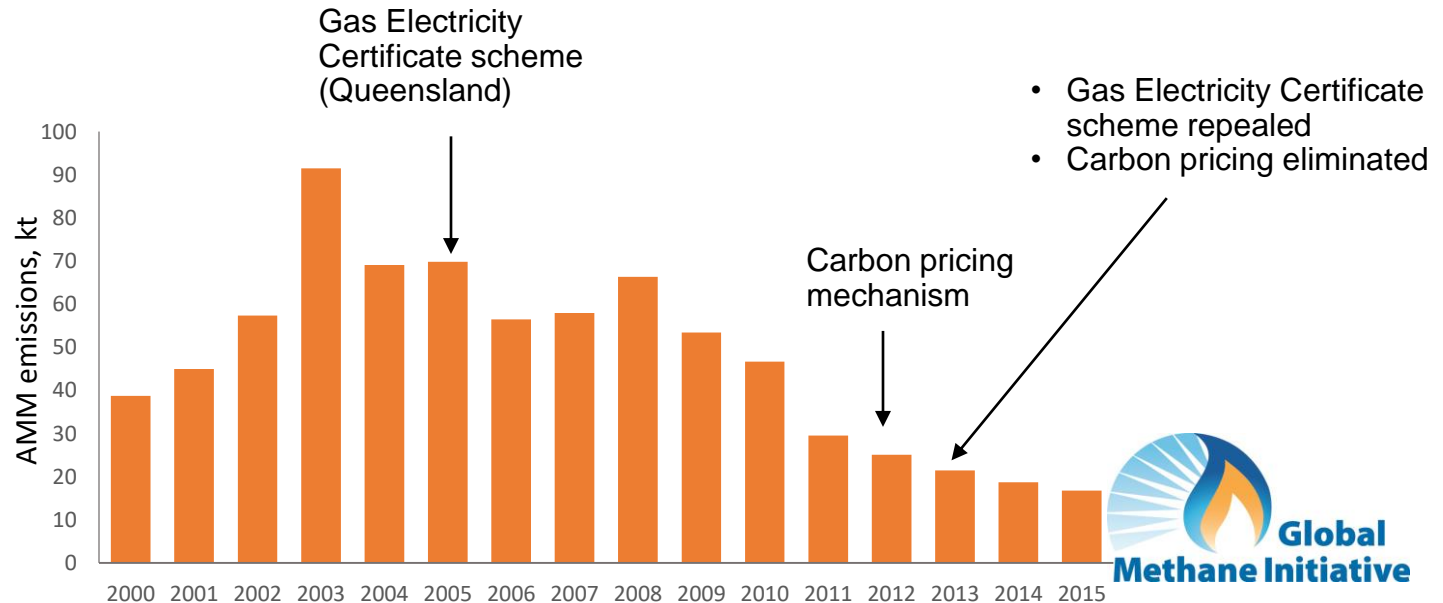
Australia

- 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)

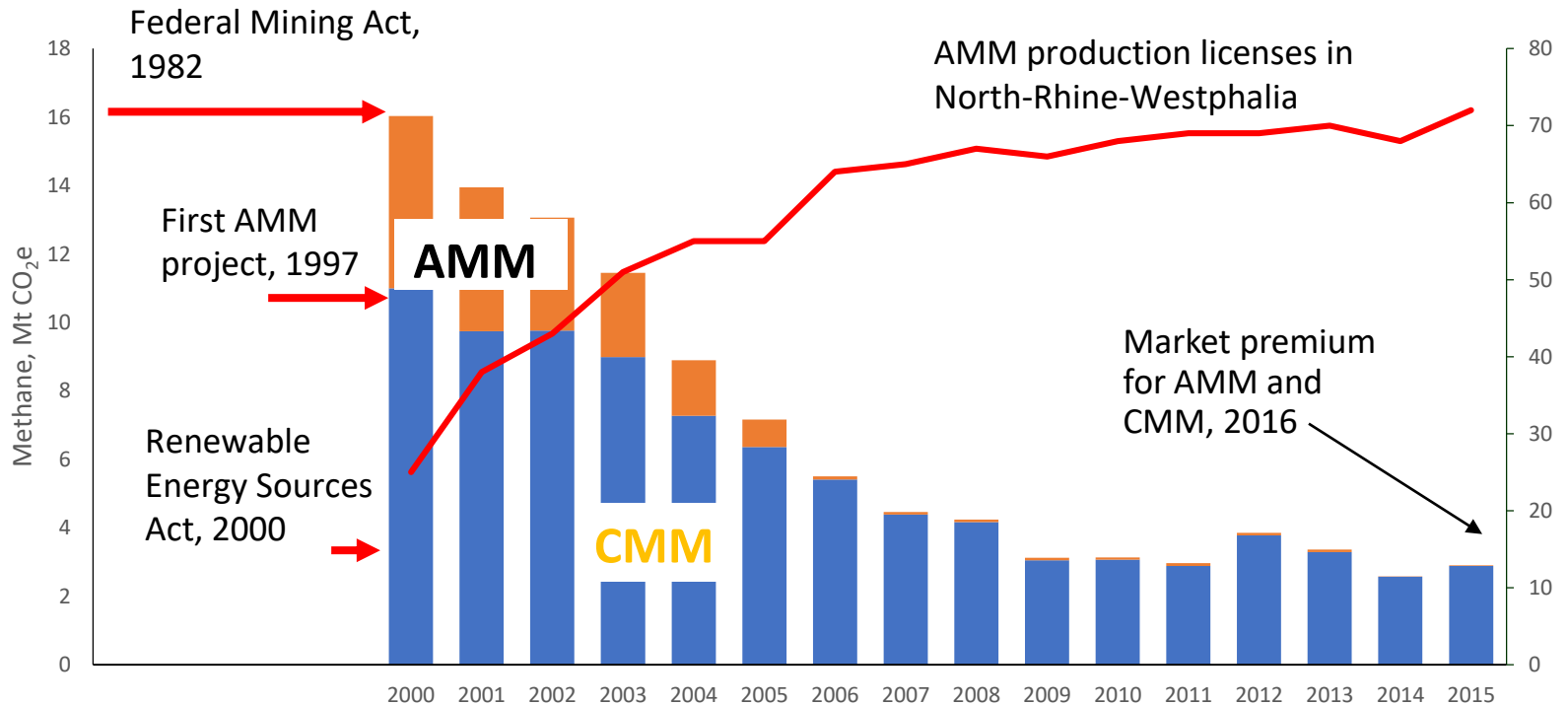


Mineral Resources
Act 1989
(Queensland)



Germany

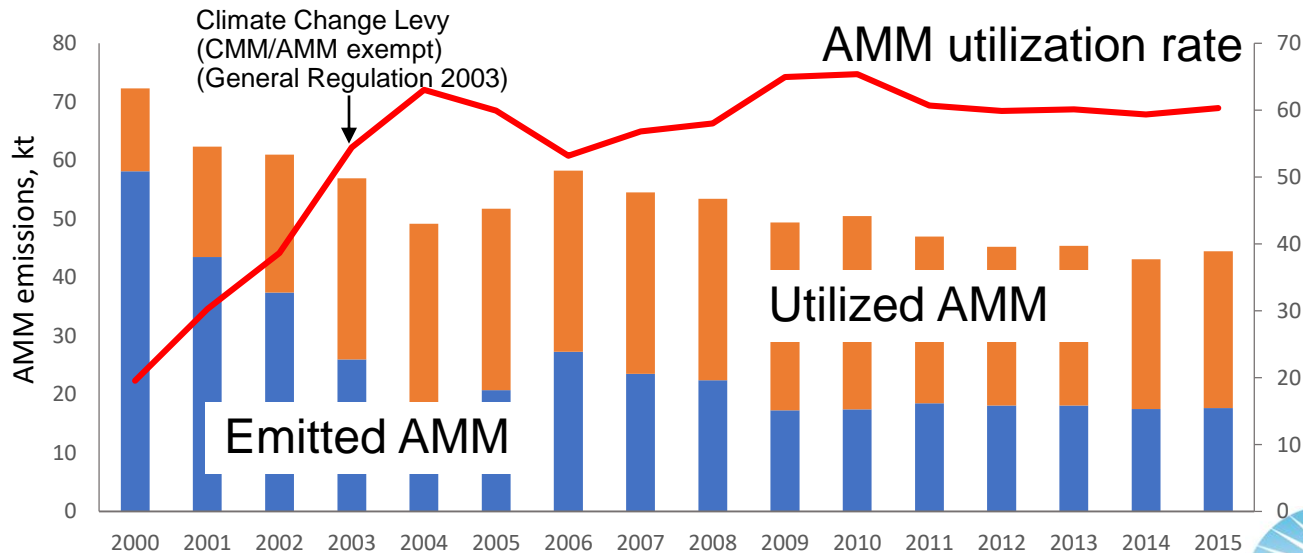
- Policy is important!



- Germany utilizes 99% of AMM

United Kingdom

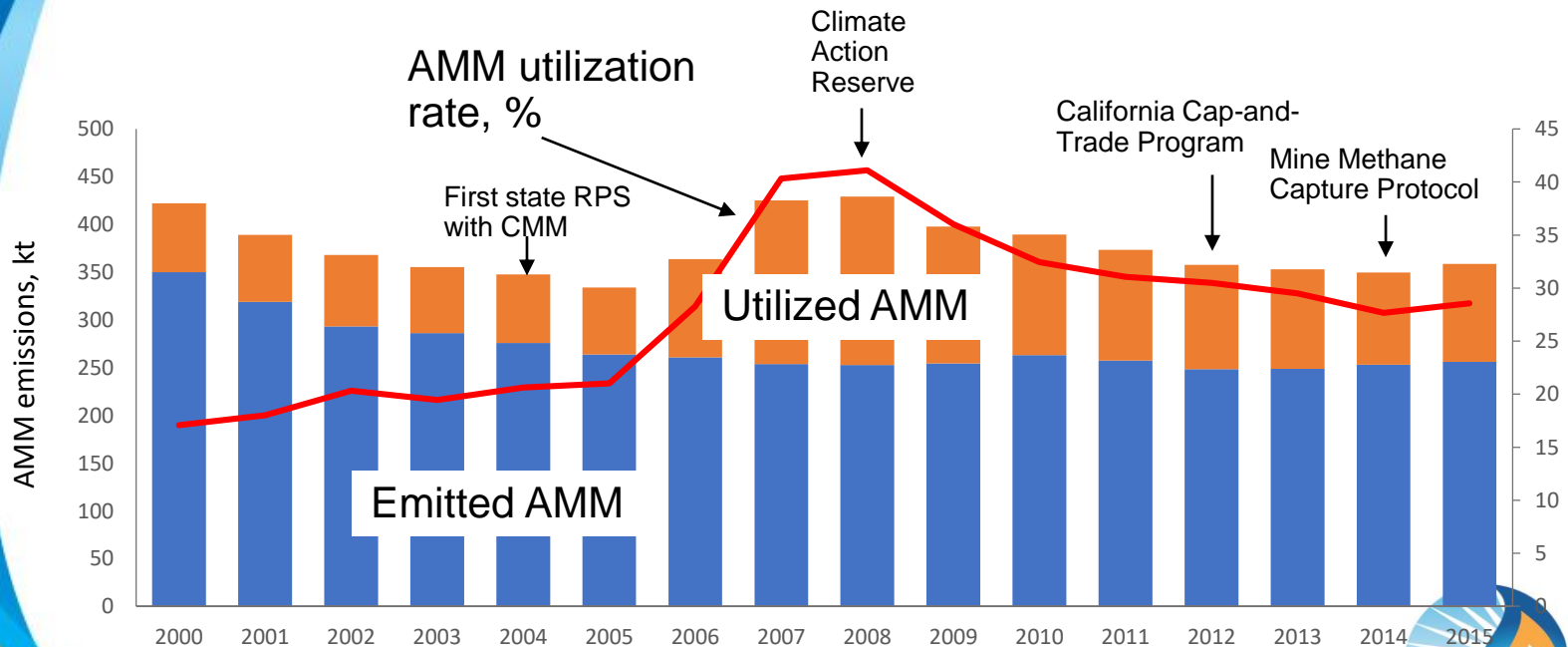
- Clear defined property rights
 - Petroleum Act of 1998
 - License fees are relatively low
- Little tax incentive for AMM
- No royalties for extracting AMM



- 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

