

**Ideas for participation in the 2019 Global Methane Challenge**

Categories of Action	Non-Sector Specific	Oil and Gas Sector	Coal Mines Sector	Biogas Sector		
				Agriculture	Municipal Solid Waste	Wastewater
<b>I. Establish systematic, comparable and transparent monitoring activities and emissions inventories</b>	<ul style="list-style-type: none"> <li>Take steps to improve data gathering and reporting</li> <li>Collect every year and maintain inventories and information on levels of emissions of methane from all sectors</li> <li>Foster cooperation and exchange of information between international, national, and subnational and local authorities on issues related to methane emissions</li> <li>Designate institutional organizations responsible for the establishment of yearly inventories of air pollutant inventories</li> <li>Increased transparency of methane emissions through inclusion of emission metrics in corporate reporting</li> </ul>	<ul style="list-style-type: none"> <li>Quantify methane emissions from oil and gas sector</li> <li>Maintain data for all large point sources</li> <li>Participation in Oil and Gas Methane Partnership (Climate and Clean Air Coalition)</li> </ul>	<ul style="list-style-type: none"> <li>Quantify methane emissions from coal mines sector</li> <li>Maintain data for all large point sources</li> </ul>	<ul style="list-style-type: none"> <li>Quantify methane emissions from agriculture sector</li> <li>Maintain data for all large point sources</li> </ul>	<ul style="list-style-type: none"> <li>Quantify methane emissions from municipal solid waste sector</li> <li>Maintain data for all large point sources</li> </ul>	<ul style="list-style-type: none"> <li>Quantify methane emissions from wastewater sector</li> <li>Maintain data for all large point sources</li> </ul>
<b>II. Establish an action plan to reduce methane emissions</b>	<ul style="list-style-type: none"> <li>Develop or implement national action plans to reduce methane that contribution to national emissions reduction strategies</li> <li>Develop or implement policies or programs (including voluntary programs or partnerships) within their country that mitigate methane in one or more sectors</li> <li>Adopt, on the basis of sound scientific and</li> </ul>	<ul style="list-style-type: none"> <li>Undertake assessment of the costs of abatement and publish results</li> </ul>	<ul style="list-style-type: none"> <li>Undertake assessment of the costs of abatement and publish results</li> </ul>	<ul style="list-style-type: none"> <li>Undertake assessment of the costs of abatement and publish results</li> </ul> <p><b>GMI Agricultural Program Development</b> Develop an Resource Assessment, which identifies and ranks agricultural methane emission sources based on waste handling methods, physical and chemical properties, emission intensity, scale and other key factors.</p> <p>Evaluate sector- and scale-</p>	<ul style="list-style-type: none"> <li>Undertake assessment of the costs of abatement and publish results</li> </ul>	<ul style="list-style-type: none"> <li>Undertake assessment of the costs of abatement and publish results</li> </ul>

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	economic criteria, strategies, policies and programs with measures that reduce methane emissions			specific technologies, waste characteristics, income level, and country (public and private) capacity to deploy technologies.  Identify market barriers and areas where the country capacity needs strengthening to support the deployment process.		
<b>III. Improve public awareness</b>	<ul style="list-style-type: none"> <li>Promote, in a manner consistent with national laws, regulations and practices, the provision of information to the general public, on national annual emissions of methane</li> <li>Consult widely during design of regulations</li> <li>Work with NGOs to promote awareness of methane mitigation</li> </ul>		<ul style="list-style-type: none"> <li>Share information on coal mine sector specific methane emissions</li> </ul>	<ul style="list-style-type: none"> <li>Share information on agriculture sector specific methane emissions</li> </ul>	<ul style="list-style-type: none"> <li>Share information on municipal solid waste sector specific methane emissions</li> </ul>	<ul style="list-style-type: none"> <li>Share information on wastewater sector specific methane emissions</li> </ul>
<b>IV. Capacity-building/Technical Support /Project Finance</b>	<ul style="list-style-type: none"> <li>Support research, development and deployment of technologies for methane emissions detection and measurement will facilitate emissions reductions in the future</li> <li>Incentivize partnerships between international and national companies to adopt best practices and knowledge sharing</li> <li>Host, organize, or participate in one or more technical workshop(s) addressing methane mitigation in one or more sectors.</li> <li>Engage in Pay-for-Performance Funding Mechanisms</li> <li>Engagement with development banks or</li> </ul>			<ul style="list-style-type: none"> <li>Financial support for offset protocols</li> </ul>		

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	<p>financial institutions to fund methane mitigation projects</p> <ul style="list-style-type: none"> <li>• Institutions incorporate methane emissions in as a metric when evaluating new or potential projects</li> </ul>					
<b>V. Mitigation Activities</b>		<p><b>Oil and Gas Sector</b></p> <ul style="list-style-type: none"> <li>• Install vapor recovery units</li> <li>• Flaring in place of venting for both offshore and onshore gas wells</li> <li>• Direct use of methane</li> <li>• Reinjection of methane</li> <li>• Plunger lift system</li> <li>• Install leak detection technology and repair programs (LDAR)</li> <li>• Install green completions at gas production wells</li> </ul> <p><b>Natural Gas Sector</b></p> <ul style="list-style-type: none"> <li>• Production abatement options <ul style="list-style-type: none"> <li>a) Use catalytic converters in selected well field engines and compressors;</li> <li>b) Replace wet seals with dry seals in centrifugal compressors;</li> <li>c) Direct/enhanced inspection and maintenance at production sites;</li> <li>d) Installation of flash tank separator in glycol dehydration systems;</li> <li>e) Replace high-bleed pneumatic devices with low bleed devices or with instrument air (compressed, dry air) systems and;</li> <li>f) Optimize glycol recirculation rates</li> </ul> </li> <li>• Processing abatement options <ul style="list-style-type: none"> <li>a) Retrofit fuel gas for reciprocating compressors and blowdown valve;</li> </ul> </li> </ul>	<p><b>Coal Mine Sector</b></p> <ul style="list-style-type: none"> <li>• Ventilation Air Methane oxidation</li> <li>• Degasification for pipelines injection</li> <li>• Open flare</li> <li>• On-site use in coal drying</li> <li>• On-site use of mine boiler</li> <li>• Flow reversal allowing for excess heat to be transferred for heating use or power production</li> <li>• Capture pre-mine drainage coal mine methane from underground coal mines for recovery and use</li> <li>• Retrofit coal-fired boilers to use as an auxiliary fuel</li> <li>• Deploy oxidation technologies to mitigate ventilation air methane emissions</li> <li>• Install gas collection systems to recover and use methane from closed “abandoned” underground coal mines</li> </ul>	<p><b>Agriculture Sector</b></p> <ul style="list-style-type: none"> <li>• Adopting anaerobic digestion technology</li> <li>• Develop a network of centralized digester systems for improved economies of scale</li> <li>• Dietary Supplementation practices</li> <li>• Selection of high quality grasses</li> <li>• Increase grain level</li> <li>• Increasing feed conversion efficiency</li> <li>• Increasing animal productivity</li> <li>• Encourage the continued adoption of nutrient management practices</li> <li>• Improved manure management / Install anaerobic digesters for use in manure management systems</li> <li>• Biogas recovery / production</li> <li>• Increase adoption of no-till</li> </ul> <p><b>Rice Cultivation Sector</b></p> <ul style="list-style-type: none"> <li>• Inclusion of known best practices (rice, cultivar, water regime, fertilizers, rice straws, seasonal irrigation)</li> </ul>	<p><b>Municipal Solid Waste Sector</b></p> <ul style="list-style-type: none"> <li>• Gas collection/capture</li> <li>• Electricity generation</li> <li>• Direct utilization of gas</li> <li>• Change in waste management practices</li> <li>• Implement measures to reduce and recover food waste</li> <li>• Organics diversion / organics management</li> </ul>	<p><b>Wastewater Sector</b></p> <ul style="list-style-type: none"> <li>• Installing anaerobic sludge digestion (new construction or retrofit of existing aerobic treatment systems)</li> <li>• Installing biogas capture systems at existing open air anaerobic lagoons</li> <li>• Installing new centralized aerobic treatment facilities or covered lagoons</li> <li>• Installing degassing devices at the effluent discharge of anaerobic municipal reactors</li> <li>• Optimizing existing facilities/ systems that are not being operated correctly and implementing proper operation and maintenance</li> </ul> <p><b>Wastewater Methane Use Options</b></p> <ul style="list-style-type: none"> <li>• Digester gas for electric and heat generation with combined heat and power (CHP)</li> <li>• Digester gas for electricity or heat only</li> </ul>

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		<ul style="list-style-type: none"> <li>b) Replace wet seals with dry seals in centrifugal compressors;</li> <li>c) Convert gas pneumatic controls to instrument air (compressed, dry air) and;</li> <li>d) Direct inspection and maintenance at gas processing plants</li> <li>• Transmission abatement options             <ul style="list-style-type: none"> <li>a) Convert gas pneumatic controls to instrument air (compressed, dry air);</li> <li>b) Use pipeline pumpdown techniques to lower gas line pressure before maintenance;</li> <li>c) Direct inspection and maintenance at compressor stations and surface facilities for leak detection;</li> <li>d) Replace wet seals with dry seals in centrifugal compressors, and;</li> <li>e) Replace compressor rod packing system</li> </ul> </li> <li>• Distribution abatement options             <ul style="list-style-type: none"> <li>a) Use hot taps in service pipeline connections;</li> <li>b) Direct inspection and maintenance at gate stations;</li> <li>c) Use composite wrap for non-leaking pipeline defects, and;</li> <li>d) Use pipeline pumpdown technique to lower gas line pressure before maintenance</li> </ul> </li> </ul>				
<b>VI. Policy</b>	<ul style="list-style-type: none"> <li>• Establish a voluntary national emission reduction target for methane (nationwide and/or sectors)</li> <li>• Include methane emission reduction</li> </ul>	<ul style="list-style-type: none"> <li>• Develop or promote implementation of sector-specific best practices guidance documents for methane mitigation</li> <li>• Commit to the Zero Routine Flaring Initiative (World Bank)</li> </ul>	<ul style="list-style-type: none"> <li>• Develop or promote implementation of sector-specific best practices guidance documents for methane mitigation</li> </ul>	<ul style="list-style-type: none"> <li>• Develop or promote implementation of sector-specific best practices guidance documents for methane mitigation</li> </ul>	<ul style="list-style-type: none"> <li>• Develop or promote implementation of sector-specific best practices guidance documents for methane mitigation</li> </ul>	<ul style="list-style-type: none"> <li>• Develop or promote implementation of sector-specific best practices guidance documents for methane mitigation</li> </ul>

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	<p>targets/commitments in Nationally Determined Contributions</p> <ul style="list-style-type: none"> <li>• Adopt a “Business Determined Contribution” or methane reduction target, company-wide or sector-specific</li> <li>• Develop a national methane strategy in key methane-emitting sectors</li> <li>• Develop a company-wide or sector-specific strategy to reduce methane emissions</li> <li>• Prepare a letter of support for the campaign and indicate intended activities to undertaken, signed by a Minister or CEO</li> <li>• To take actions in sectors that are of priority for the country in question or company</li> <li>• To take action on technology that are priority for the sector in question</li> <li>• Adopt a carbon pricing policy</li> <li>• Phase-out fossil fuel subsidies</li> </ul>					
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