QUESTIONS AND ANSWERS

1. What is methane?

Methane is a hydrocarbon that is a primary component of natural gas. Methane (CH_4) is also a "greenhouse gas," meaning that its presence in the atmosphere affects the earth's temperature and climate system. Methane is the second most important greenhouse gas next to carbon dioxide.

2. Why is there concern about methane emissions?

Methane is 23 times more potent as a greenhouse gas than carbon dioxide (over a 100-year period). Over the last two centuries, methane concentrations in the atmosphere have more than doubled, largely due to human-related activities. Methane now accounts for 16% of global greenhouse gas emissions from human activities.

3. Where does methane come from?

Methane is emitted from a variety of both anthropogenic (human-influenced) and natural sources. Anthropogenic emission sources include coal mining, natural gas and oil systems, landfilling and agriculture. About 60% of global methane emissions come from these sources, and the rest are from natural sources (principally wetlands, gas hydrates and permafrost, and termites).

4. Who are the biggest methane emitters?

In order of importance, China, Russia (and other Eurasian countries), India, the United States, and Brazil are estimated to be responsible for almost half of all anthropogenic methane emissions. The key methane emission sources for these countries vary greatly. For example, the two key sources of methane emissions in China are coal and rice production, whereas Russia emits most of its methane from natural gas and oil systems. India's primary sources are rice and livestock production, whereas landfills are the largest source of U.S. methane emissions.

5. Why concentrate on actions to reduce methane?

Reducing methane emissions has many important energy, safety, economic, and environmental benefits. First, because methane is both a potent GHG and has a short atmospheric lifetime, methane reductions can produce significant near-term results. In addition, methane is the primary constituent of natural gas. Thus, the collection and utilization of methane provides a valuable, clean-burning energy source that improves quality of life in local communities and can generate revenue and improve living standards. Producing energy from recovered methane can also avoid the use of higher-emitting energy resources such as wood, coal or oil. This can reduce end user and power plant emissions of CO_2 and air pollutants such as sulfur dioxide (which is a major contributor to acid rain), particulate matter (a respiratory health concern), and trace hazardous air pollutants. Capturing methane from coal mines can also improve safety conditions reducing explosion hazards.

6. What efforts are being made in the United States to reduce methane emissions?

U.S. industries along with state and local governments collaborate with the U.S. Environmental Protection Agency (EPA) to implement several voluntary programs that promote profitable opportunities for reducing emissions of methane. These programs are designed to overcome a wide range of

informational, technical, and institutional barriers to reducing methane emissions, while creating profitable activities for the coal, natural gas, petroleum, landfill, and agricultural industries.

Many of the available methane emission reduction opportunities involve the recovery of methane emissions and use of the methane as fuel for electricity generation, on-site uses, or off-site sales of methane. For example, in the case of coal mining methane is removed from underground mines either in advance of mining, during mining activities, or after mining has occurred to reduce explosion hazards. Instead of releasing this methane to the atmosphere, profitable uses for the methane can be identified and implemented. Some of these options include natural gas pipeline injection, power production, co-firing in boilers, district heating, coal drying, and vehicle fuel. For more information on methane reduction opportunities and EPA's voluntary programs, please visit EPA's web site at www.epa.gov/methane.

7. Have efforts to reduce methane emissions in the United States been successful?

The collective results of EPA's voluntary methane partnership programs have been substantial. Total U.S. methane emissions in 2001 were more than 5% lower than emissions in 1990, in spite of significant economic growth over that time period. EPA expects that these programs will maintain emissions below 1990 levels in the future due to expanded industry participation and the continuing commitment of the participating companies to identify and implement cost-effective technologies and practices.

8. Why aren't efforts to mitigate methane emissions more widespread?

Even with these multiple benefits, methane recovery is not widespread for several reasons. First, methane is generally a secondary issue in the industrial processes from which it is emitted. Coal mines, for example, want to vent methane from the mine workings because it is explosive and historically, mining companies have not viewed methane as an energy resource in its own right. Second, those responsible for the emissions may not be familiar with the technologies available for methane recovery or the potential for profitable projects. This is especially true in developing countries where information exchange and technical training are needed to generate support for methane recovery projects. Finally, and often as important if not more important, poorly-functioning energy markets and financially-insolvent utilities and municipalities within many countries fail to provide the private sector with a climate that will attract their investment in projects to capture and utilize methane.

9. What is the objective of the Methane to Markets Partnership?

The Methane to Markets Partnership is an action-oriented initiative that will reduce global methane emissions to enhance economic growth, promote energy security, improve the environment, and reduce greenhouse gas emissions. The initiative will focus on cost-effective, near-term methane recovery and use as a clean energy source. It will be done internationally through collaboration between developed countries, developing countries, and countries with economies in transition – together with strong participation from the private sector. The Methane to Markets Partnership targets three major methane sources for action: landfills, underground coal mines, and natural gas and oil systems. Cooperative research into methane science issues and cost-effective activities to reduce agricultural emissions over the longer-term will also be undertaken. Other specific benefits include improving mine safety, reducing waste, and improving local air quality.

10. What countries are participating in the Methane to Markets Partnership?

Partners in this effort share certain characteristics, including generating significant levels of methane emissions, range of emission sources, special expertise, and geographic and economic

significance. The number of partners is expected to be limited initially so as to enable effective implementation of the Partnership. Founding member countries identified to date include Australia, India, Italy, Japan, Mexico, Ukraine, the United Kingdom, and the United States. In the future, it is expected that the initiative will be expanded to include other developed and developing countries, as well as countries with economies in transition for which methane is an important emission source.

11. What commitments do countries make that are participating in this initiative?

It is envisioned that participating countries will agree to a charter that outlines the purpose, organization and action plan for the Partnership. While the details will be worked out by the founding partners through a consensus-based process, national commitments for partners could include:

- Building on existing, reliable inventory systems to identify and monitor methane emissions;
- Identifying cost-effective opportunities for capturing methane emissions for energy production and undertaking collaborative projects aimed at these specific opportunities;
- Supporting the development of voluntary consensus standards;
- Identifying and removing legal, regulatory, financial, and other institutional barriers; and
- Developing an action plan for reducing methane emissions and a process for evaluating its implementation.

In addition, developed country partners would assist developing countries and countries with economies in transition in expanding methane recovery projects through cooperative technical assistance and technology deployment. The U.S. intends to commit up to $53 million over the next five years to facilitate the development and implementation of methane projects in both developing countries and countries with economies in transition through a range of activities, including the export of the successful U.S. voluntary programs, data development and institution building, feasibility assessments and technology demonstrations.

12. Can non-governmental organizations participate in the Methane to Markets Partnership?

Active involvement by private sector entities, financial institutions, and other non-governmental organizations is important to the success of the Partnership. All interested non-governmental organizations will be encouraged to participate in the Partnership.

13. What are the expected benefits of the Methane to Markets Partnership?

The Partnership has the potential to deliver by 2015 annual reductions in methane emissions of up to 50 million metric tons of carbon equivalent or recovery of 500 billion cubic feet (Bcf) of natural gas. These measurable results would be in addition to methane reductions being achieved as part of the U.S. EPA's domestic voluntary partnership programs. If achieved, these reductions could lead to stabilized or even declining levels of global atmospheric concentrations of methane. To give a sense of scale, this would be equivalent to:

- Removing 33 million cars from the roadways for one year, planting 55 million acres of trees, or eliminating emissions from fifty 500 MW coal-fired power plants; or
- Providing enough energy to heat approximately 7.2 million households for one year.

14. How much methane will be recovered and reduced in the U.S. as a result of this partnership?

Potential methane reductions achieved by the Methane to Markets partnership do not include results expected from U.S. EPA's domestic methane emission reduction activities. Since 1993, the EPA has been

collaborating with U.S. industries and state and local governments to implement several voluntary programs that promote cost-effective opportunities for reducing emissions of methane. These programs include the Natural Gas STAR Program, Landfill Methane Outreach Program, the Coalbed Methane Outreach Program and the AgSTAR Program. Collectively, these programs are projected to achieve annual methane emission reductions of approximately 16 MMTCE by 2015.

15. How does this relate to other U.S.-led international efforts to address global climate change?

In addition to reducing greenhouse emission growth at home, the United States is leading several international partnerships to develop advanced energy and carbon sequestration technologies. These partnerships aim to achieve long-term reductions in projected CO_2 emissions, and include the International Carbon Sequestration Leadership Forum, the International Partnership for a Hydrogen Economy, the Generation IV International Forum (Nuclear), and the International Thermonuclear Experimental Reactor research project. The Methane to Markets Partnership complements these longer-term efforts by providing near-term, greenhouse gas reduction benefits. Along with improved scientific knowledge, these efforts promise to diminish the risks of global climate change without harming the global economy.

16. What US Government agencies will be involved in the Methane to Markets Partnership?

The U.S. Environmental Protection Agency will play a lead role in the Partnership by building on the success of the Agency's voluntary domestic methane partnership programs. Other Departments will also play a central role in the Partnership. These include the Department of State, which leads on international climate change policy and activities; the Department of Energy, which has valuable expertise in natural gas and coal mine methane technologies; and the U.S. Agency for International Development, which provides important technical expertise in the economic reform of energy sectors to create markets that support private sector projects in developing countries and those with economies in transition.