DECEMBER 2009

A FAST-ACTION PLAN FOR METHANE ABATEMENT

EXECUTIVE SUMMARY

This concept paper outlines a fast-action plan for global methane abatement to catalyze projects that accelerate reductions in methane emissions in the next five years. Rapid methane reductions are one of the few near-term options to buffer global warming from more than a century of global carbon dioxide already emitted. Even reductions in future emissions of carbon dioxide will take time to be felt in the global climate system. Quick cooling is especially important to sensitive regions of the planet like the Arctic and Amazon, which are undergoing rapid, and potentially catastrophic, environmental change due to unexpectedly rapid warming. Over the twenty year time frame important to slowing warming in these most sensitive areas, methane emissions cause more than half as much warming as all carbon dioxide. ››

›› **Methane reduction opportunities are easily available at low cost, but have been marginally exploited. This is due to lack of focus on methane's near-term potential and more recently, because of the worldwide credit meltdown and uncertainty over the Copenhagen outcome. This fast-action abatement plan, including public-private mechanisms and guarantees, would serve as an interim financing vehicle to remove current barriers to clear the backlog of already-waiting methane abatement projects, many with low or even negative costs; serving to re-intensify methane abatement programs. It would deploy a mixture of price floors, prepayment of carbon credits, guarantees and other tools to jumpstart methane project development, beginning immediately after Copenhagen; and can begin even before binding Copenhagen commitments take effect, benefitting sensitive areas and the entire globe.**

A FAST-ACTION PLAN FOR METHANE ABATEMENT

INTRODUCTION: WHY DOES THE GLOBE NEED RAPID METHANE REDUCTIONS?

Methane emissions are the second largest cause of global warming, after carbon dioxide. By weight, methane warms seventy times more than equivalent CO_2 over a twenty year period. Like carbon dioxide, methane emissions anywhere create warming everywhere. While this is a problem for a rapidly warming Earth in general, it is especially critical for regions that may reach critical thresholds or "tipping points" that affect the global climate system or large human populations, such as those in the Arctic and the Himalayan region.

Over the past 100 years, the Arctic has warmed at over twice the rate of the rest of the globe. We have already seen rapid and unexpected loss of Arctic sea ice, and many scientists now predict the first ice-free summer in the Arctic within the next few decades; some believe, even by 2020. Seabed and permafrost release of methane and CO_2 from such ice and tundra melting could further accelerate warming of the entire globe. Sea level rise from increased melting of the Greenland ice sheet and Arctic glaciers, even of only a few decimeters, would endanger millions throughout the world with additional flooding. The Himalayas and other land glaciers similarly are melting at an increasingly rapid rate; more than 40% of the global population depends on water from the Himalayan system alone.

FIGURE 1: AVERAGE MONTHLY ARCTIC SEA ICE EXTENT SEPTEMBER 1978-2009

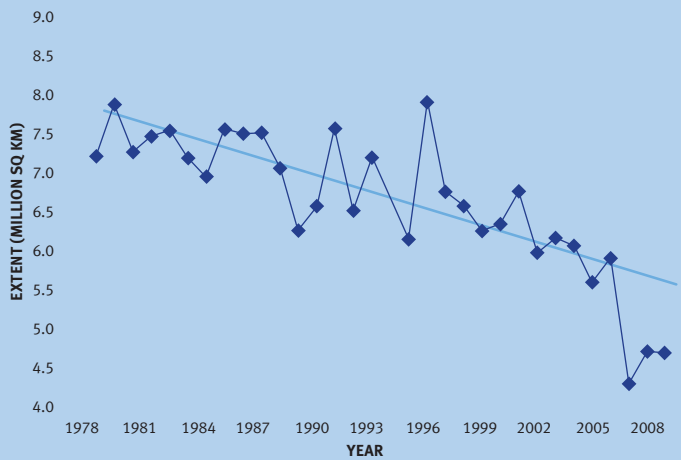

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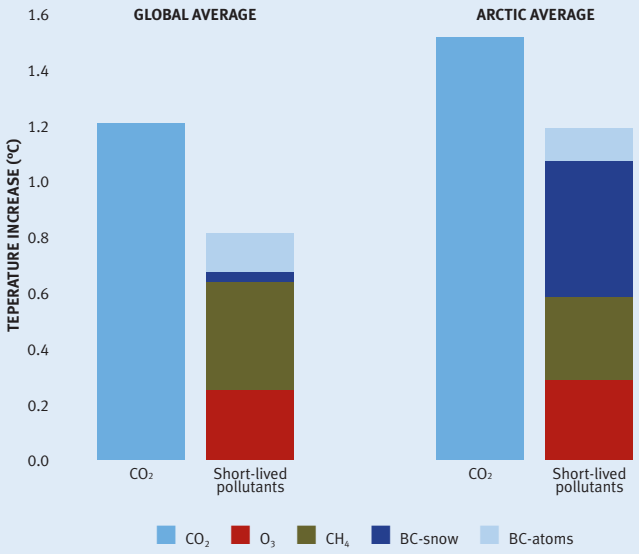
FIGURE 2: SLPS HAVE GREATEST IMPACT IN ARCTIC (BUT ALSO GLOBALLY)



Quinn, Impact of Short-Lived Pollutants on Arctic Climate, presented at AMAP, Oslo, September 15 2008

So the rapid warming we see in these sensitive regions will have global effects, making the long-term battle against global warming that much harder.

Reductions in CO_2 and other long-lived gases need to serve as the backbone of any meaningful effort to reduce warming in the Arctic region, as well as globally, for the long term. More than anything else, *global warming* drives *Arctic warming*. But even were fossil fuel CO_2 phased out rapidly over the next few decades, the reduction in global warming would not occur quickly enough to prevent significant impacts on the Arctic and land glaciers. Preservation of these sensitive regions, to the extent it is even possible, will require means that act more rapidly.

Shorter-lived climate pollutants may provide one such means. Increasingly robust research indicates that three short-lived pollutants – black carbon, ozone, and methane – have had nearly the same temperature impact on the Arctic as CO_2 over the past century. Since they have such short lifetimes – from a few days for black carbon, to a decade for methane – reductions in these pollutants would show a more rapid Arctic climate response than could occur from CO_2 reductions alone.

Methane abatement is the most readily available of these short-lived pollutant options. As a well-mixed greenhouse gas, methane reductions anywhere will slow Arctic warming, and relatively quickly. When measured on a 20-year timescale, gram for gram methane reductions have at least 70 times the cooling effect as the same amount of CO_2 reductions, with recent models indicating that methane's global warming potential (GWP) actually may prove up to 100 times the CO_2 equivalent on a 20 year timescale (GWP 20). Twenty years represents a critical time period for the Arctic and other sensitive areas. And even on longer timescales of 100 years (GWP100), used as the principal metric in climate negotiations, methane's GWP lies between 25-32 GWP.

Of perhaps greater importance to developing countries, methane reductions significantly reduce air pollution and smog by reducing ground-level (tropospheric) ozone. Such ozone-related smog already causes tens of thousands of deaths annually, and millions of respiratory disease symptoms, as well as significant crop damage that decreases food production. These figures are forecast to grow exponentially as countries industrialize. In addition, projects that address methane also make good sense from a development perspective. Landfills and wastewater treatment plants set up to capture methane from the beginning result in significant health, energy and economic co-benefits. Even small-scale methane projects, such as those that capture methane for biogas from just a few livestock, can bring huge development benefits to rural areas.

Finally, global methane reductions pack a one-two climate punch in the Arctic by also reducing ozone there, which otherwise blankets the Arctic with smog in the springtime, hastening Arctic spring ice melt. And many projects that reduce methane also reduce other climate forcers, not only long-lived gases such as CO_2 but short-lived forcers not covered by any current climate agreements, such as ozone and black carbon. For example, a methane project that produced biogas locally for cooking, heating or transport would also reduce CO_2 and black carbon emissions that would otherwise result from the burning of wood, dung or coal for these purposes.

Not only do the technologies to address methane already exist, but current structures such as Methane-to-Markets and the Clean Development Mechanism already have produced hundreds of shovel-ready projects. Many such projects have strong potential to become self-sustaining, or continue at relatively low cost (carbon prices below $10/ton), but have not moved forward due to lack of finance guarantees or a reliable price for carbon. In recent months, as noted below, these projects have slowed to a near-stop due to a significant freezing of global credit markets in the current financial crisis – a new and acute challenge just as we have begun to understand the urgent need for methane reductions to slow the warming curve.

LARGE POTENTIAL FOR METHANE REDUCTIONS

Studies by the International Institute for Applied Systems Analysis (IIASA) and U.S. Environmental Protection Agency (U.S. EPA), as well as many independent studies have shown that global methane reductions of up to 40% the projected global total are available at costs of under $40/ton, with up to 15% negative cost (self-paying). These low-cost methane sources include coal mines, oil and gas pipelines, landfills, wastewater facilities, and animal waste. (See Annex I for cost curves associated with various methane abatement strategies.)

All these analyses agree that many of these sources can be effectively addressed through relatively inexpensive, low-tech "end of pipe" solutions. The engineering and management capability to mount new projects globally is in place, and hundreds of "shovel-ready" projects are queued to go. Many thousands more projects could be developed and deployed in the coming few years. As noted above, reductions would carry significant health benefits by curbing local smog formation; and in many cases also provide significant local economic development benefits, as well as expansion of job opportunities in the firms providing technology and project development.

Institutional infrastructure exists to help move methane reduction projects to completion. For example, the global Methane to Markets partnership (M2M) has grown to more than 25 countries representing roughly 70% of the world's methane emissions; it provides a continuous flow of information on best practices and supportive national policies. The U.S. has provided the bulk of M2M funding thus far, with $50 million provided since its inception. Financing for some projects has come through the Asian Development Bank and the International Finance Corporation, and financial support for pre-project development costs has come through numerous national agencies.

Regulation eventually may serve as the main path for future methane abatement, particularly as regards often-public sector sources of methane such as landfills and wastewater treatment facilities. Today however, few non-OECD countries – and not even all OECD members – ban the venting of methane. In the absence of regulation, the Clean Development Mechanism (CDM) has been the primary market-based incentive for owners of landfills, coal mines, and food production facilities to capture and utilize methane. Methane abatement represents some of the CDM pipeline: around 15% of all projects under development or 600 projects globally, which together could reduce up to 100 million t CO_2e per annum, or about 4% of the identified IIASA potential.[1]

...YET UNREALIZED POTENTIAL

Nevertheless, despite these mechanisms global methane reduction projects have been deployed much more slowly than warranted by their value to the global climate system in the 17 years since the first Rio Conference and in the 12 years since the Kyoto Protocol. For example, IIASA has estimated a total annual reduction potential of 2.7 billion tons CO_2e at under 40 Euros/ton. Yet the leading global methane program M2M estimates that, as of 2008, only 25 million tons of annual CO_2e methane reductions have been achieved through US investment in the program: less than 1% of the total global potential.[2] While this, and the CDM methane pipeline amounting to 4% of global potential, is a start, why are not more reductions presently in view?

Some reasons include:

- Lack of widespread appreciation of the need for fast action to cool the planet quickly, particularly given rapidly-evolving environmental changes in the cryosphere, Amazon and elsewhere.
- Lack of understanding of the outsized value of methane in moderating near-term warming, and the large potential gains.
- Little understanding, even in the air regulatory community, much less the general public, of the value of methane reductions in reducing background global ozone (a major component of smog), for both health and climate reasons.
- Although methane reductions are encouraged in CDM projects, the CDM process often takes years, and considerable up-front investment, to navigate successfully.
- Political resistance from both big CO_2 emitters, and their critics. Big emitters want to preserve methane action as part of a cheap basket of offsets for CO_2; and many climate advocates would like to keep methane action contained exclusively within Kyoto-type mechanisms, fearing also that a focus on near-term climate forcers will distract from the task of long-term CO_2 reduction.
- Finally, lack of any alternative mechanism on the table to advance methane reductions at a speed commensurate to their short term value.

With a growing realization of the threat presented by early and rapid warming, and of the need for near-term as well as long-term strategies, the chief hurdle today perhaps is financial. Because many, perhaps most, such projects do not pay for themselves in captured energy value alone, they have needed revenues from emission reduction credits to be profitable. M2M, for example,

[1] UNEP Risoe CDM/JI database.

[2] See US EPA, Methane to Markets Fourth Annual Report (October 2009), http://www.epa.gov/methanetomarkets/pdf/2009-accomplish-report/m2m_usg_fullreport.pdf, at p. 10.

has proven useful in identifying projects and for providing some feasibility funding, but under its current charter does not provide the financial support needed when identified projects are ready to move forward.

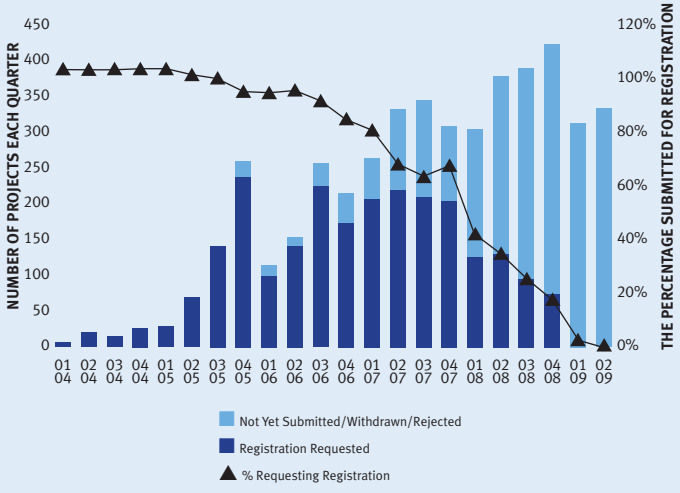
In addition, as noted above, available mechanisms such as JI or the CDM have carried large up-front costs, with limited amounts that have proven uncertain and slow in coming. The costs of certification have limited the pool to large-scale projects alone, even though much carbon-equivalent tonnage could be captured in small (but potentially widespread) projects aimed at methane abatement.

AND NOW, A STRANGLED PIPELINE: BOTTLENECKS AND THE ECONOMIC CRISIS

Unfortunately, even the relatively slow development pace for methane abatement projects, including under the CDM, has slowed even more in the last year. The United Nations Environment Programme (UNEP) tracks the progress of CDM projects through the pipeline from initial proposal through to registration and CER issuance. New projects entering their database have fallen by half (see Figure 3), and this is corroborated by other analysts such as New Carbon Finance. All market analysis firms covering the CDM have steadily downgraded their expectation of CER supply in recent months as projects have been cancelled or delayed.

Most observers attribute this slowdown a confluence of negative factors:

FIGURE 3: DROP IN ACTIVE CDM PROJECTS



UNEP Risøe database.

Number of CDM projects starting the public comments period each quarter, the number of them that have requested registration, and the fraction in % as a curve.

- **The lack of available debt and equity financing due to the credit crunch.** Even self-paying projects have not been launched because of the simple lack of commercial loans.
- **A related decline of primary prices of Certified Emission Reductions (CERs) by over 50% since mid-2008.** The fall in CER prices appears to have leveled off, but investors are unwilling to count on any level given current economic uncertainty.
- **The closing CDM window.** Any CDM revenue has become even more uncertain given the expiration of the Kyoto Protocol in 2012, with a replacement agreement (and CDM/JI rules subsequent to 2012) still under negotiation.

In just one example, the nonprofit Small Enterprise Assistance Fund, or "SEAF," has more than 240 stand-alone CH_4 abatement projects in a pipeline within Asia, such as for wastewater or coal mines, available within its Cleantech Deployment Fund. Several have completed construction and are ready to start operations, with others in construction and/or the planning phase. These projects are on track to create methane abatement equal to 2 million metric tons CO_2e by the end of 2009 with more than 10 million per year by 2012. (SEAF notes that with fully adequate funding these abatement figures could double.) Yet due to the current credit crisis, the plans are on hold for all of these SEAF projects, even the ones approaching the operational phase.

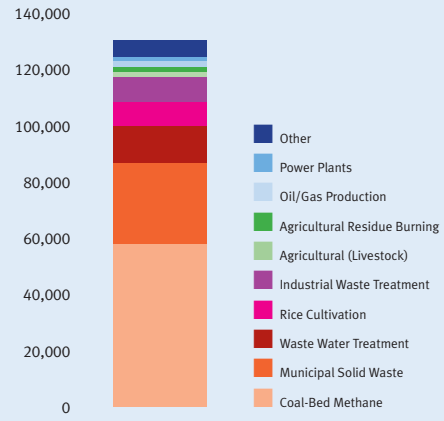
BREAKING THE LOGJAM POST-COPENHAGEN: A GLOBAL METHANE FUND

If there is to be a hope of deploying sufficiently large methane abatement measures in time to help protect the Arctic and other sensitive areas of the globe, these bottlenecks must be cleared, and quickly.

Under most circumstances, using an existing financial mechanism – one that already provides financing for methane abatement in some form – would prove the most effective means to address such gaps. It is the consensus of this Panel however, which includes expertise from the development, financing, climate and scientific communities, that methane abatement, especially in the 2010-2015 period, represents one of those exceptions to that norm, where a new and methane-specific mechanism will work far more effectively and rapidly. The Panel believes a separate methane mechanism is desirable for several reasons;

- The GEF and CDM, while granting access to methane financing, maintain a focus on CO_2-oriented projects; to date, methane comprises only 15% of the total. This approach does not reflect methane's disproportionate, and urgently needed, near-term cooling potential.

FIGURE 4: KEY CH_4 MITIGATION MEASURES <40€/TON CO_2eq WORLD, 2020



- Some CDM rules present special barriers to methane. For example, although the IPCC recommended that CER credits from aerobic landfills be awarded at start-up, the CDM later changed that policy to stretch CER awards over the entire 20+-year lifetime of the landfill. This one policy change made such projects uneconomic; not one has applied for CDM validation.
- As with all UNFCCC-related mechanisms, the CDM also de-emphasizes methane's greater potential for slowing near-term warming by using only GWP-100 to calculate CERs.
- The CDM faces many difficulties in its operations, difficulties that slow methane projects as much as other projects. A chief difficulty is the need for up-front financing for CDM validation of projects, as noted above.
- Although methane projects can also prove self-financing over time, they typically have large up-front capital costs. This places them in a shadow status where they are neither sufficiently non-economic to prove additionality, a key CDM requirement; nor sufficiently economic to draw private investment, or financing from multilateral development banks or national mechanisms.

In short, methane projects come across as neither clear climate projects (because they are non-CO_2, and evaluated in 100-year GWP terms), nor clear investment projects (because they cannot promise great immediate return).

Perhaps most important, the ***experience*** of the past decade shows that existing mechanisms have not been sufficient to exploit even a small part of methane's potential for global climate benefit. Despite all the avenues available to methane projects – the World Bank group and regional MDBs; investment guarantee mechanisms such as the U.S. Ex-Im Bank or Sweden's NUTEK; the GEF; and the CDM – methane's potential remains unrealized precisely because it has no mechanism focused singularly and clearly on exploiting that potential as fully as possible for near-term climate benefits.

Any successful mechanism to accelerate methane reductions should address the specific barriers to methane abatement projects noted above, while supporting and working with existing mechanisms such as the CDM and GEF. A bridge financing mechanism, with just a few financial tools designed to do just that, has the potential to not only clear the methane backlog, but stimulate even greater investment in methane abatement rapidly within the next five years, so that project pipelines do not stall waiting for the details of a 2012 agreement or an improved economic outlook.

Specifically, it is the recommendation of this Panel that governments, private foundations and private sector actors should consider creating such a Global Methane Fund (GMF) in the course of 2010, beginning immediately after COP-15 in Copenhagen, to demonstrate real commitment and how quickly meaningful methane abatement can take place.

The GMF should have a realizable yet ambitious goal: ***the mitigation by 2020 of 50% of the global methane reductions available at less than $40/ton,***[3] through an intensive global program beginning in early 2010.

Our concept of the GMF is one that, although voluntary, would support and strengthen the CDM as well as private methane investment, by providing a level of stability and predictability to methane abatement projects that has proved elusive over the past decade. The GMF concept is also consistent with proposals, under a future Copenhagen Agreement, to create a "Fast Action Fund" of several billion dollars per year during 2011-2012. Indeed, the GMF conceivably could form part of a suite of supported activities under a "Fast Action Fund," but focused on the specific set of tools listed below, which are aimed squarely at addressing the issues which have slowed or prevented methane abatement activities over the past two decades, and the during the past two years in particular. The GMF would also work closely with the existing Methane-to-Markets partnership, relying on M2M expertise to identify projects and enlist public and private sector partners.

3 This would amount to .9 Gt CO_2e calculated on a 100 year GWP, or about 3 Gt CO_2e on a 20 year GWP, which is equal to 120% of US power sector CO_2 emissions in 2008, see Energy Information Administration, http://www.eia.doe.gov/oiaf/1605/flash/pdf/flash.pdf

4 Some carbon market analysts are projecting that, even without US participation, global markets would reach $550bn annually by 2012 and a little over $2 trillion by 2020. See http://carbon.newenergyfinance.com/?p=about&i=pressreleases.

We believe this concept has the potential for real and measurable near-term climate benefit. Recent analysis (see Annex I), drawing on previous work by IIASA and USEPA, estimates that even a very conservative program – one targeting just oil and gas leaks, landfills, and coal mines – could achieve. Four Gigatons of annual CO_2e emissions reductions by 2020, calculated on a 100 year GWP. On a 20 year GWP, these reductions would amount to roughly 1.3 Gt CO_2e, or roughly 50% of US power sector emissions in 2008.

The total public cost of achieving these reductions (net of private return) would be in the range of $45 Billion over ten years, or roughly $4.5 billion per year on average. However, due to the significant leverage provided by the GMF's investment, (see Figure 5) ***the GMF would need to provide financing for a small portion of the total public cost – of which most would be paid back to the Fund from future carbon credits.*** Indeed, Panel experts believe the leveraging capacity of the GMF to be such that as little as $100 million annually in the first five years may prove sufficient to meet this ambitious goal. $100 million is a small fraction of the forecasted value of annual global carbon allowances by 2020, with estimates of the latter ranging from hundreds of billions of dollars to a trillion dollars or more.[4]

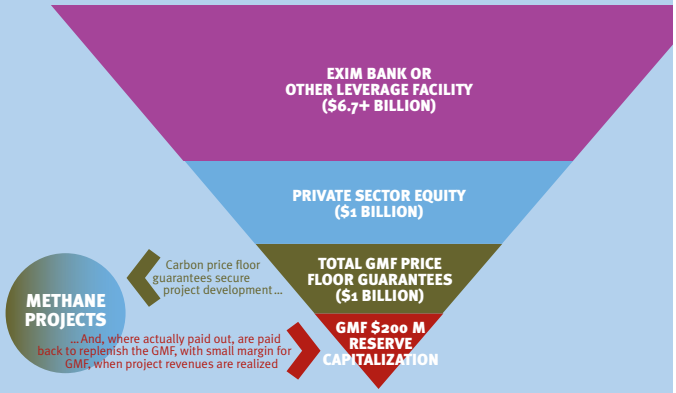
DESIGN ELEMENTS OF THE GLOBAL METHANE FUND

Overall Shape and Goals: The Global Methane Fund would be a free-standing fund created by several interested donors (including private foundations, if interested, as well as governments) over the course of 2010, with a Board that would include recipient and investor representatives, as well as donors. In keeping with the near-term climate focus behind the GMF, we would also propose a Board seat for affected peoples – specifically, a seat that represents Arctic indigenous, Himalayan and small island state populations – those that are seeing the earliest impacts of climate change in this near-term period.

The GMF, initially capitalized at $200-300 million, would focus its efforts on activities that support rapid methane abatement through a combination of grants, price floors, prepayment of carbon credits and other tools to jumpstart methane project development. The GMF role would be designed to be complimentary to other public, private and hybrid financing entities, filling the necessary gaps and thus leveraging many times its investment. And GMF project risk mitigation tools will stimulate further private project—and technology deployment – innovation and financing.

As an initial phase in early 2010, the GMF could begin as a financing mechanism, with a lean Secretariat that would begin

FIGURE 5: ILLUSTRATIVE ANNUAL LEVERAGE OF GLOBAL METHANE FUND TOTAL INVESTMENT = 7.7+ BILLION



This figure illustrates how the GMF commitment of $200 million in carbon credit price guarantees may be able to leverage as much as $6.7 billion in total project investment. A $200 million reserve allows the GMF to provide up to $1 Billion in project support, since only a small percentage of projects are expected to require the guarantee to be honored. The credit price guarantee in turn secures an equal or greater private sector equity investment. Finally, private sector equity investment can leverage up to 6.7 times that investment from leverage facilities such as the EXIM Bank. When project carbon credits are achieved in excess of the carbon price floor, any funds transferred through the guarantee from GMF are paid back to the GMF, with an appropriate margin (see Figure 6).

creating links to the CDM, GEF, MDBs and other financial institutions. It would develop methods to ensure financing is targeted to the most viable projects with the greatest return of tons (in carbon equivalents) possible. In addition, links with the Methane-to-Markets (M2M) program (newly re-chartered in 2010, quite possibly with an expanded and more global constituency) will be important to the later Fund's success. M2M resources will assist potential projects to find expertise in their area of focus, such as aerobic landfills or biogas production; and M2M already has a rich registry of projects needing financing to move forward.

An important function for the GMF even in its early stages will also be to work on key methane policy issues, whether at the national level, or to promote changes in CDM rules (such as that regarding aerobic landfills noted above, or related to small-scale livestock projects requiring programmatic CDM validation). The financing mechanism stage, which would require modest seed funding, could begin such work immediately, even as efforts continue to gain additional pledges that would support transformation to a fully functional Global Methane Fund later in 2010.

GMF TOOLKIT: UNCLOGGING THE PIPELINE

As a Fund, and based on conversations with methane investors and financing experts over the past months, two primary means

of encouraging methane investment appear to have the greatest potential for increasing methane abatement within a 2-5 year time frame:

1. Pre-payment of the first five to ten years of emissions reduction credits up to a reasonable level (e.g. $20/ton CO_2e) for support of start-up activities, including CDM validation. Such pre-payment would address the frozen credit markets that have halted so many methane projects in their tracks during the past year. Where possible, this amount would be re-paid once the project comes on line and credit revenue is generated. Projects needing such "seed funding" would be subject to rapid yet stringent review by a team of methane experts; typical levels needed for such funding run between $300,000-$500,000. The GMF would provide up to $250,000 of such funding, disbursed only as project development reaches successive benchmarks. (Should validation fail, and the project not prove commercially viable, the funds would in effect be written off; yet hopefully recovered through payments from the floor price mechanism (below), or perhaps very low interest charged on start-up repayments.)

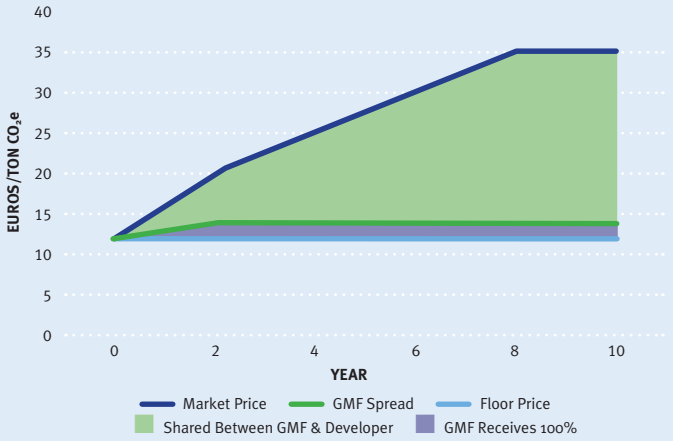
Such assistance for CDM validation would prove especially vital to least developed countries, which have potential for projects with significant co-benefits in health and overall development in the methane world; as well as for Programmatic CDM projects.

This function would help move methane projects forward, but it would not be enough in isolation.

2. Offer a "floor price" for methane. While most investors in the carbon finance world believe the price of greenhouse gas allowances, and therefore adequate funds to support methane projects, will increase in the years between now and 2020, they are uncertain how rapidly that will occur. This uncertainty remains great enough to paralyze methane investment. The primary function therefore of the GMF, and its most innovative feature, would be to *guarantee a floor price for carbon credits rising from methane projects,* and pledge to make up the difference should the actual price fall below the floor.

The GMF could set the floor periodically, perhaps quarterly, based on the market at the time. At the present time for example, a floor guarantee of €11-12 Euros for methane in post-2012 commitment period would appear sufficient to spur many methane projects. If the price is above the floor, the GMF could stipulate that it could receive a certain percentage of the spread, or perhaps the first euro or two of that spread, which would be returned to the GMF for the support of additional activities. Below that price, the GMF would need to make up the difference. (see Figure 6).

FIGURE6: GMF CARBON FLOOR PRICE ILLUSTRAION



In this example, the GMF would guarantee a carbon credit floor price of 12 Euros/ton CO2e. To the extent the carbon credit market price exceeded 12 Euros/ton, the GMF would receive a fixed spread of 2 Euros/ton, which would go to replenish the GMF and expand its guarantee capability.

Specifically, the floor price guarantee would include the following elements, and others as specified by the GMF's Board:

1. The GMF would set its floor price for specific methane activities, based on its judgment of their level of importance in meeting the objective of rapid methane reductions, as well as their judgment that such activities are under-represented in the global CDM portfolio;
2. The floor price would apply for at least the first five years (preferably longer, up to 10), to cover market risk for these projects; which by definition are riskier and more difficult that those already well represented in the global CDM portfolio;
3. The Board would need to set floor in a sufficiently generous manner in order to stimulate investment in the target activities, and to allow the developer to return back to the Fund a euro or two above the floor; before capturing margin when prices are above the floor at issuance. The small Fund gain on the surplus above the floor would both help to cover periods when prices may fall below the floor; and also help finance the Fund's related support, above, for early project preparation activities; such that the Fund to some degree becomes self-financing after its first few years of operation.

The Fund will need periodic actuarial assessment of the likelihood of any price floor for any activity to be substantially above the spot price at issuance, including during the period of the price guarantee, in order to determine how much funding it needs on-hand to issue such guarantees. It is the Panel's opinion however that the chance that price will be zero is zero, since even in the absence of a compliance market such

activities already are clearly desirable in the voluntary market, where prices for such activities are $3-4 today. (Indeed, in reality there already exist "compliance markets" in the post-Kyoto world, driven by the EU ETS Phase III, the pre-compliance markets in the US, the soon-to-be passed Australian cap-and-trade regime, Japanese voluntary action etc.). It is therefore not realistic to imagine a price lower than Euros 7 under any scenario of market development.

In addition, government and private foundation commitments to the Fund may need only to exist in stand-by, and not necessarily in drawn-down funds placed in the GMF's trust fund. It might even prove possible for contributing governments also to underwrite bond issues for public subscription to finance the floor price mechanism than to use their own treasuries, particularly with large commitments to take the Fund rapidly to scale.

The Panel already has initiated contacts with carbon market financing modelers (such as Point Carbon and New Carbon Finance) to help model the minimum fund size to carry out floor price guarantees, using sophisticated models of global supply and demand to assess the risk of any particular level of price support ever needing to draw on the Fund; and what the size of such a Fund would need for different levels of price support. Our current view however is that the Fund would on average be in surplus, due to the capture of "surplus price margins," at a price round Euros11-12/tCO_2. We believe that a fund offering, for example, Euros one million in face value of floor price support at Euros 11, would need stand-by commitments of no more than Euros 200,000, at a 95% confidence level of forward price projections.

MOVING FORWARD

Given the existing specific barriers currently holding up many shovel-ready methane projects, these two relatively simply tools should suffice to free up the methane pipelines in a relatively short time period, perhaps even before the post-2012 commitment period begins. Staff required to administer a Global Methane Fund under this model could remain relatively streamlined and targeted, minimizing overhead.

The amount needed to capitalize this work would require initial pledges of between $200-300 million. This amount could be split by the Board between pre-payment in support of CDM validation or support of start-up activities; and necessary funding to support floor price guarantees. (The Panel has as noted above begun work to calculate necessary levels of funding "in the bank" to provide such floor guarantees; however from existing ventures it appears clear that the GMF would not require the full spread price in-hand. For example, to use a concrete example, a currently validated small wastewater project in India expected to generate 70760 CERs in reductions, using a CER floor price of $10, might require only $10-15,000 on-hand.)

In addition, the goal of the Fund, through the floor price mechanism, would be to become self-financing to the greatest degree possible: when projects generate above the floor price, the Fund could either receive a certain percentage of the profits above that price, or alternatively the first amount ($1-2) above the set floor. These proceeds would immediately flow back to the Fund to support additional methane abatement projects.

Of course, if donors so desire, the GMF need not be limited to these two tools. For example, in some cases, projects may be economic without carbon credits because they yield a stream of energy production that pays for the capital and operating costs of the project, plus investor return. The only hurdle to such projects may be the lack of market-based financing in current tight credit markets, or a risk associated with first-of-kind projects. In that case, the GMF might provide market-type financing, but with concessions on interest rates or security.

In other cases, projects may not be economically viable even with a reasonable carbon but are important for demonstration purposes or for scale. In such a case, the GMF could provide a grant to underwrite the "above-market" portion of the project.

Certain custom financing options might also be appropriate. For example, there may be projects that do not need direct financing (or only direct financing), except for some portions of the project deemed higher risk, many employing new technologies. In these cases, projects can secure private financing if insurance is provided for some portion of a project's technology or system. In these cases, the CDM can provide tailored support.

Lending operations of this kind would require however a greater number of staff and overhead than that initially envisioned, but would also serve to increase the number of realized methane abatement projects.

FIT WITH OTHER EFFORTS

As noted above, the GMF is designed to complement rather than displace other public and private financing institutions. It would therefore operate with a minimum of staff and overhead, and attempt to leverage financial, management, and knowledge resources from other entities.

In the short-term, the GMF could work closely with existing institutions, such as:

- M2M and national trade assistance agencies (to identify worthy projects);
- The CDM (to certify projects for additionality and verifiability);

- Regional and multinational development banks (to provide financing);
- Public-private partnerships that pair nongovernmental organizations with credible, private investment institutions to bring the appropriate skills to manage the Fund;
- Pension funds and sovereign wealth funds to direct major institutional for-profit investments toward clean energy projects, including methane; and
- Nonprofit investment funds (to generate, administer, and service project financing).

Details of the Fund could be worked out relatively quickly to get projects moving during the first half of 2010, and perhaps much earlier.

OTHER COMPLEMENTARY ACTIONS

In addition, as the Global Methane Fund takes shape in 2010 certain interested nations, individually or as a group, could choose to demonstrate both commitment and potential by providing funding for methane abatement through existing development funds and programs; or into existing active private sector and NGO investment funds (such as the SEAF Cleantech Deployment Fund). In this way, early-action governments could demonstrate actual methane abatement starting within 60 days of funding due to the large queue of shovel-ready projects; and as appropriate, receive "given credit" for these pre-deployed funds towards their total contributions in the ultimate GMF was finalized. This "pilot phase" could inspire others to take action more quickly if they could see how funding could create significant methane abatement immediately after Copenhagen.

A second manner that governments could employ to stimulate methane investment could include preferential treatment of methane investments or credits. For example, Arctic governments could choose to credit methane abatement projects using the 20-year GWP measure – which for the purpose of slowing Arctic climate change is far more relevant than the currently used 100-year-GWP. This would result in a large premium several times the current price of carbon credits being paid for methane, which could stimulate methane projects significantly.

GOVERNANCE

Governance of a new methane financing facility would be based on the most successful models among many innovative financing mechanisms formed earlier this century to address multisectoral development, health and environmental issues, for the example the Global Fund to fight AIDS, Malaria and Tuberculosis (GFATM). These principles would include a balance between donors and recipients, and combined funding streams from private foundations and private sector actors as well as governmental and multilateral institutions. It also would include a strong commitment to performance-based management, including independent verification of mitigated tons – for example, by using firms already supporting CDM projects.

A key early issue for the Board, even in the "financing mechanism" stage, will the location and preferred legal status of the Fund (international organization or non-profit) and its Secretariat; a number of countries, including Switzerland, Norway, Sweden, France and the U.S., have however moved towards streamlining the procedure for such status in recent years, and this process may move relatively quickly. The Board will also need to determine where to place funds both for use in enabling early project activities, and in "trust" for the floor pricing mechanism (or whether it will require that funds for the latter even be deposited, per the discussion above). A trust fund simply administered by the World Bank on the Fund's behalf may prove the most rapid and efficient mechanism for this purpose; while a private foundation such as the UN Foundation could assist in receiving funds from private entities, as it has done in the past for similar efforts.

The Panel will actively explore these and other options during and after Copenhagen.

Over time, any methane financing facility could be integrated into or coordinated with other global financing arrangements emerging from the UNFCCC post-Copenhagen. Alternatively, it might also serve as the model for a more comprehensive and voluntary "Near-term Climate Stabilization Fund" that might include support for mitigation of other near-term forcers not yet included in the Kyoto basket, such as black carbon and ozone; or as part of national plans or nationally appropriate mitigation strategies (NAMAs) as well, depending on what emerges out of Copenhagen.

CONCLUSION: THE CHALLENGE

A commitment by concerned nations, foundations and investors to explore the creation of a Global Methane Fund would begin to fill a critical gap in the race to protect the Arctic and other parts of the world vulnerable to rapid climate change. It would provide significant health benefits by lowering local ozone smog and other pollutants; spur development by providing gas for clean electric power projects and transportation; create environmentally friendly jobs; and not least, demonstrate early success and commitment to real efforts on combating rapid climate change.

The pipeline of shovel-ready methane projects is long. Through a near-term Global Methane Fund, interested countries, if they chose to move quickly, could make a very rapid and highly effective down payment in tackling Arctic and global climate change.

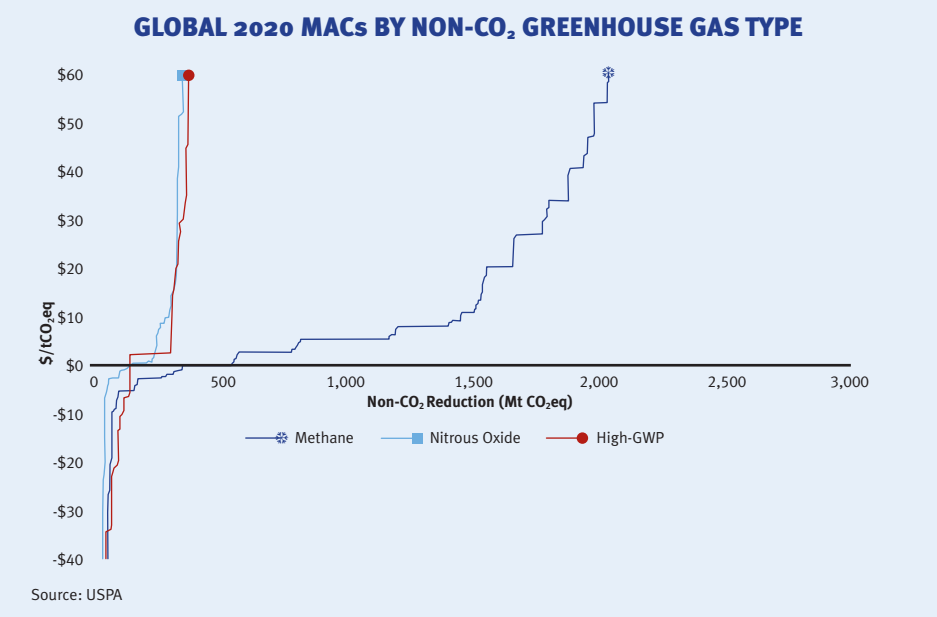
ANNEX I

GLOBAL METHANE PROJECTED GROWTH AND REDUCTION COST CURVES

The two major global methane emissions reduction potential studies are IIASA's ongoing GAINS model analyses and U.S. EPA's 2006 report *Global Mitigation of Non-CO_2 Greenhouse Gases*. Both the EPA and IIASA analyses are essentially of *technical reduction potential*; and both organizations estimate large potential reductions:

- EPA's study estimates a global 2020 methane emissions reduction potential of about 2100 $MtCO_2e$ at a cost of less than \$60/CO_2e; and
- IIASA estimates a global 2020 emissions reduction potential of ~2700 $MtCO_2e$ in 2020 at a cost of less than 40 Euros (~\$60)/ton of CO_2e.

As can be seen in EPA's supply curve shown below, EPA also estimates that ~500 $MtCO_2e$ can be reduced at no net cost:



Source: USPA

The following pages present both the GAINS and U.S. EPA's Methane to Markets data on which they base these potential reductions, providing considerably more detail on methods used to develop their projections, as well as estimated reduction distribution by cost, geography and source.

The Clean Air Task Force's independent analysis, taking into consideration feasibility of reductions as understood at this time, projected an *achievable reduction potential* through a global investment program of 389 $MtCO_2e$ in 2020 and 908 $MtCO_2e$ in 2030, with analysis limited to global energy systems plus U.S. landfills. Baseline energy system methane emissions projections were based on applying EPA emissions factors to IEA WEO 2008 energy projections through 2030.

CATF 2020 projections are thus only about 22-30% of the 2020 EPA and IIASA estimated technical reduction potential, and thus should be considered a highly conservative estimate. Nevertheless, for comparison purposes even this conservative estimate represents 1.3 Gigaton of CO_2e emissions reductions (calculated on a 20 year GWP basis) annually, equivalent to roughly 50% of total annual US CO_2 emissions from the power sector in 2008.[5]

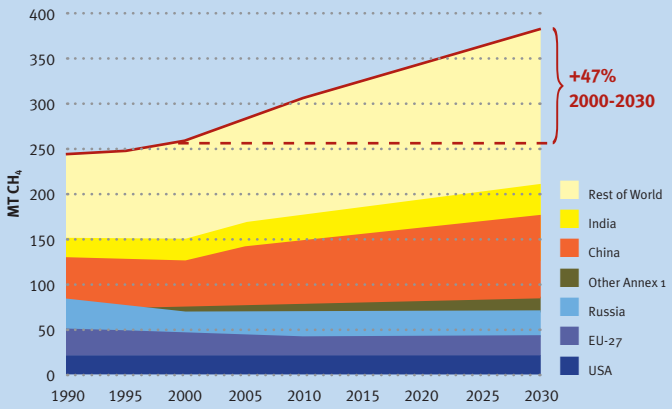
Key points to keep in mind regarding potential to reduce global methane emissions also include:

1. The full achievable methane emissions reduction potential will only be known with any accuracy after a large scale methane emissions reduction investment program has been in place for some time. Based on European and U.S. experience with other pollutants such as sulfates, costs can be expected to go down over time.
2. Regardless of any differences between IIASA, EPA or CATF projections, all point towards the same conclusion that potentially large CO_2e methane emissions reductions could be produced by an effective global investment program. CATF's estimate of ~400 $MtCO_2e$ in 2020 and ~900$MtCO_2e$ in 2030 are clearly conservative relative to EPA and IIASA reduction potential estimates.

Given the relatively sparse global methane emissions reduction experience to date and the many areas of uncertainty (value of captured methane, technology evolution, baseline projection uncertainties, etc.), it may prove most important to put an aggressive global methane emissions reduction program in place to provide actual performance monitoring and evaluation to inform future efforts, rather than continue spending resources to refine more theoretical supply curve projections.

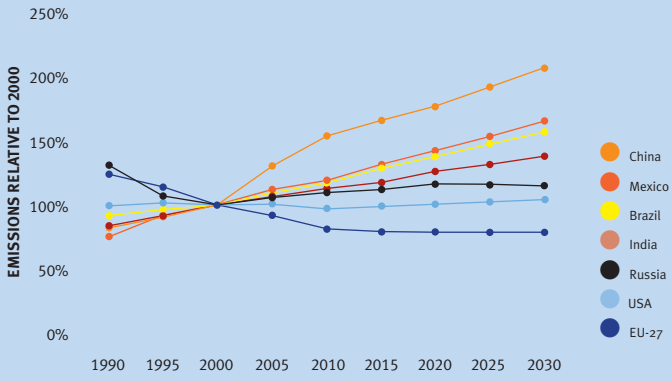
[5] In 2008, US power sector CO_2 emissions were roughly 2.5 Gigatons, see Energy Information Administration, http://www.eia.doe.gov/oiaf/1605/flash/pdf/flash.pdf

GLOBAL CH_4 EMISSION BASELINE PROJECTION: AVERAGE GROWTH RATE: 1.3% P.A.



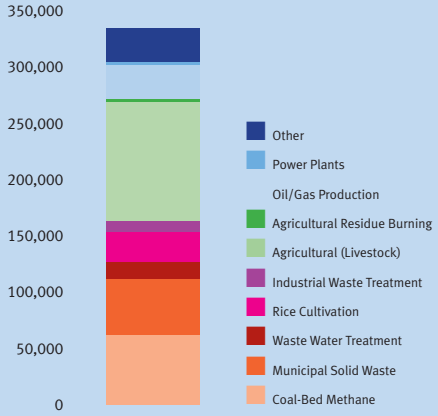
Source: IIASA

TOP 7 EMITTERS OF METHANE BASELINE TRENDS



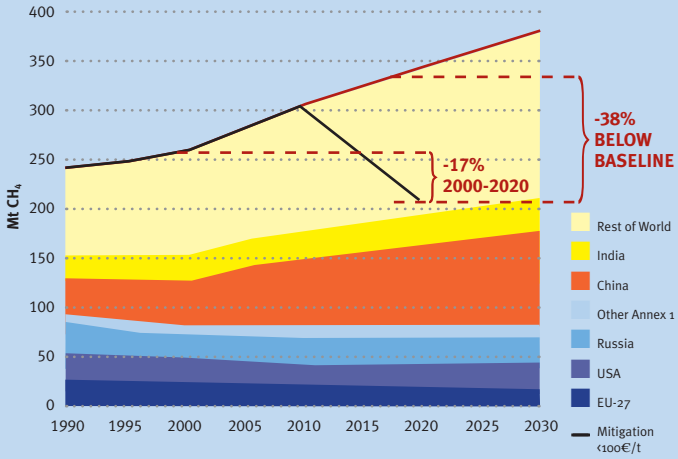
Source: IIASA

FUTURE SOURCES: GLOBAL CH_4 BASELINE PROJECTION FOR 2020, BY SECTOR



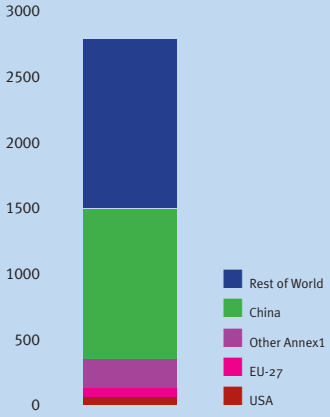
Source: IIASA

GLOBAL CH_4 COULD DECLINE BY 17% AT <40€/t CO_2eq



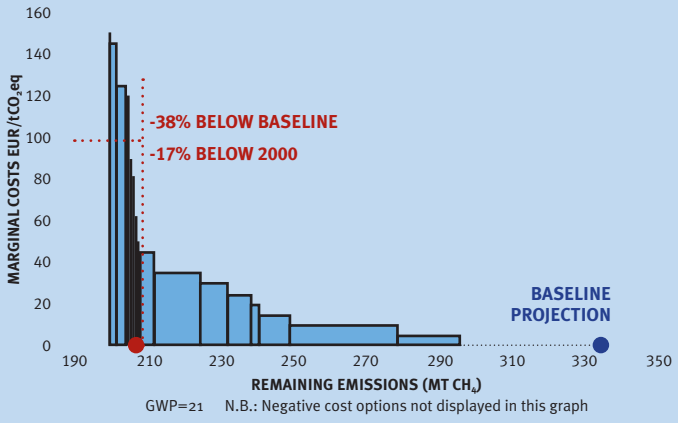
Source: IIASA

CH_4 MITIGATION POTENTIAL <40€/t CO_2eq 2020, BY WORLD REGION



Source: IIASA

MARGINAL CH_4 ABATEMENT COST CURVE WORLD, 2020 (4% INTEREST RATE)



GWP=21 N.B.: Negative cost options not displayed in this graph

Source: IIASA

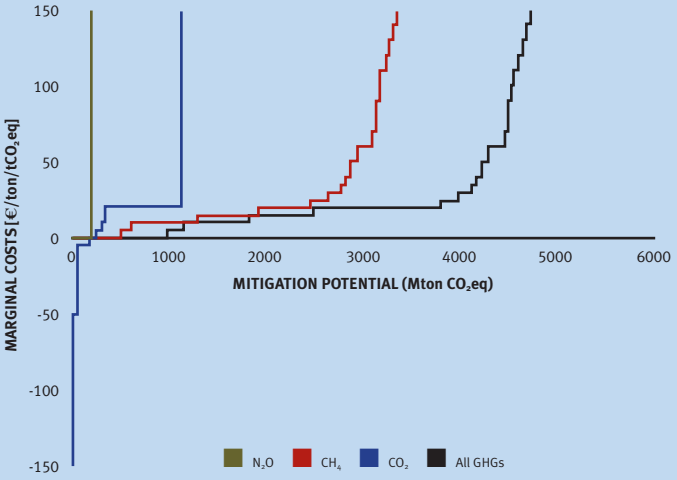
LARGE POTENTIAL IN M_2M SECTORS

- Methane can be relatively inexpensive to reduce compared to CO2 Based on the value of recovered gas.
- 500 $MMTCO_2e$ could be reduced at or below a $0 cost per ton of carbon.

COST PER $MTCO_2E$	$0	$15	$30	$45	$60	BASELINE ($MMTCO_2E$)
Agriculture	13%	21%	30%	34%	36%	269.3
Coal Mines	15%	80%	80%	80%	80%	449.5
Landfills	12%	41%	50%	57%	88%	816.9
Oil & Gas	10%	25%	33%	38%	24%	1,695.8

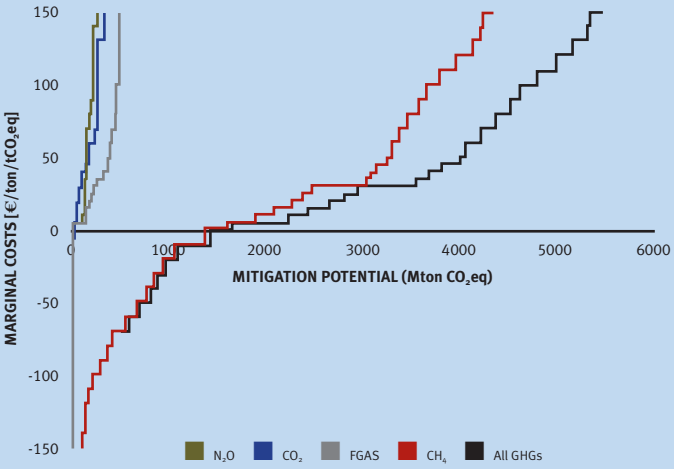
Source: Global Mitigation of Non-Co2 Greenhouse Gasses:1990-2020 (EPA Rep[ort 430-R-06-005)

GAINS GHG MITIGATION COST CURVES CHINA, 2020, BY GAS



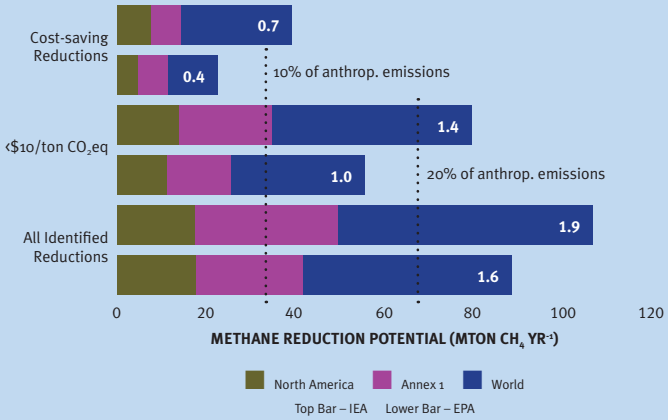
Source: IIASA. N.B.: Negative cost options for non-CH_4 not displayed in this graph

GAINS GHG MITIGATION COST CURVES ANNEX 1 PARTIES, 2020, BY GAS



Source: IIASA

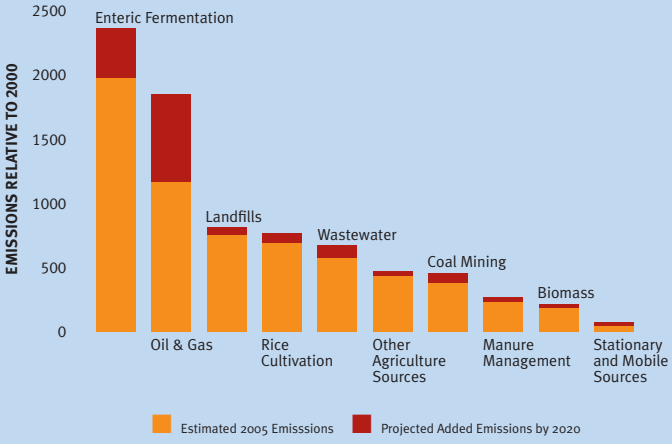
METHANE EMISSION REDUCTION POTENTIAL IN 2010



Source: IEA and EPA data as presented in West & Fiore, 2005

PROJECTED METHANE INCREASE TO 2020

Global anthropogenic methane emissions are projected to increase by 23 percent to 7,904MMtCO_2 by 2020



Source: EPA

Produced with the support of the Clean Air Task Force, Climate Policy Center-Europe and Clean Air-Cool Planet