GREENPEACE

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The scale of mitigation required to stay as far below 2C as possible and avoid dangerous climate change necessitates that, *inter alia*, we move beyond a project-based Clean Development Mechanism for many developing countries. According to the Intergovernmental Panel on Climate Change Fourth Assessment Report, the lowest stabilization scenario requires greenhouse gas reductions globally of -50% to – 80% on 2000 levels. The lower end of this range, the much discussed goal of a 50% reduction still carries with it an unacceptably high risk (26-78%) of exceeding 2C. Reaching the global goal will require emission reductions by developed countries of more than 80% in order to ensure that developing countries have a fair share of the atmospheric space to develop. In the near-term, global emissions need to peak by 2015 and emission reductions in the top end of the 25-40% range need to be achieved by developed countries by 2020.

Many developing countries, especially large, rapidly industrializing developing countries, need to begin de-carbonizing their economies. This 'enhanced action' must be supported by technology, financing and capacity building from developed countries in a measurable, verifiable and reportable way. As the CDM is an offset mechanism it is a zero sum game at best as it cannot reduce overall emissions and thus is not the appropriate tool to support these activities. The CDM has provided Parties with useful experience in the carbon market; however it is marred by problems, including: the attainment of sustainable development benefits, types of technologies and projects allowed, additionality, the means for public participation and in its regional distribution. New mechanisms, such as SD PAMs and sectoral approaches, should be explored as means to support developing countries in their efforts.

For those countries that have contributed little to the current climate crisis, namely the Least Developed Countries and the Small Island Developing States, the CDM may be an effective mitigation tool. In this context, however, it is imperative that the CDM meet both of its stated objectives: to reduce GHG emissions and to contribute to the sustainable development of the host country. **The reporting and monitoring of sustainable development benefits must be enhanced and dirty, unsafe or unproven technologies must continue to be excluded, namely nuclear power and carbon dioxide capture and storage (CCS) activities**. This is true regardless of how the CDM evolves post-2012. Greenpeace also believes that the CDM is not the appropriate mechanism to address reducing emissions from deforestation and degradation.

ENHANCE SUSTAINABLE DEVELOPMENT BENEFITS

The CDM is governed by the twin objectives of contributing to sustainable development (SD) in the host country and reducing GHG emissions.[1] It is crucial that both objectives be met in order to justify this offset mechanism. However, many studies have shown that a trade-off between the two objectives exists: the desire to produce low-cost emission reductions trumps a project's potential contribution to sustainable development.[2]

This conclusion is not surprising: SD benefits are not a monetized and thus there is little incentive for investors to ensure their attainment, except possibly in a niche market. This results in a 'race to the bottom,' as countries minimize or simplify the SD component of their project approval process in order to attract investment.[3] Furthermore, with no requirement to monitor or verify the attainment of SD benefits, in contrast to the achievement of GHG reductions, there is little incentive to ensure that even the SD benefits outlined in the project design document materialize.

It is a simple lesson in economics that markets only produce that which has economic value, unless regulatory requirements dictate otherwise. Requiring co-benefits as criteria for the registration of project activities, developing positive lists of clean, safe, renewable project activity types and other options should be explored as means to enhance the sustainable development benefits of the CDM in the second commitment period. Experience with the CDM Gold Standard can contribute to this discussion.

KEEP DIRTY, UNSAFE OR UNPROVEN TECHNOLOGY OUT

NUCLEAR POWER CONTRADICTS CLEAN DEVELOPMENT

The nuclear industry is using the issue of climate change and energy supply as a vehicle to win political and financial support for its dirty and dying sector. Even a massive, four-fold expansion of nuclear power would only provide marginal reductions (4 %) in greenhouse gas emissions, when global reductions of 50 - 80% by 2050 are needed and emissions must peak in 2015. Nuclear energy's 'contribution' to fighting climate change would come too late (long after 2020), be at an immense costs (6 to 10 trillion USD) and create a myriad of other serious hazards related to accidents, waste and proliferation. Due to its large costs and negative impacts, nuclear energy is an obstacle to the necessary development of effective, clean and affordable energy sources – both in developing and industrialized countries.

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[1] Article 12.2 of the Kyoto Protocol.

[2] Aaron Cosbey *et al.*, *Making Development Work in the CDM: Phase II of the Development Dividend Project* (Winnipeg: International Institute for Sustainable Development, 2006); Emily Boyd *et al.*, *The Clean Development Mechanism: An Assessment of Current Practice and Future Approaches for Policy* (Norwich: Tyndall Centre for Climate Change Research, 2007); Karen Olsen, "The Clean Development Mechanism's Contribution to Sustainable Development: A Review of the Literature" (2007) 84 Climatic Change 59; Christoph Sutter & Juan Parreño, "Does the Current Clean Development Mechanism (CDM) Deliver its Sustainable Development Claim? An Analysis of Officially Registered CDM Projects" (2007) 84 Climatic Change 75; Karen Holm Olsen & Jørgen Fenhann, "Sustainable Development Benefits of Clean Development Mechanism Projects: A New Methodology for Sustainability Assessment based on Text Analysis of the Project Design Documents submitted for Validation" (2008) 36 Energy Policy 2819.

[3] Christoph Sutter, *Sustainability Check-Up for CDM Projects: How to Assess the Sustainability of International Projects under the Kyoto Protocol* (Berlin: Wissenschaftlicher Verlag, 2003).

Activities related to nuclear power must not be allowed to become eligible for the Kyoto flexible mechanisms in order to avoid:

- Undermining climate protection by taking resources away from more effective and clean solutions;
- Dumping this expensive and unsafe technology on developing countries with all the associated economic and environmental impacts (accumulation of massive financial debts, increased dependency on foreign fuel and technologies, increased risk from reactor accidents and contamination); and
- Decreasing global security as volumes of nuclear waste with no safe methods of disposal increase massively and nuclear materials are spread.

Nuclear power can provide only marginal contribution to carbon mitigation

The IEA's *Energy Technology Perspectives 2008* Blue Map scenario illustrates this point.[4] This scenario assesses what energy mix could achieve a 50% reduction in carbon emission by 2050. The agency assumes a four-fold increase of nuclear power generation, from today's 2,600 TWh/year to 9,900 TWh/year in 2050, which would contribute only 6% of the required carbon reductions from the energy sector (and roughly 4 % of overall greenhouse gases). Unprecedented rates of growth would need to be achieved and sustained for four decades to make even this small contribution. On average 32 large (1,000 MWe) nuclear reactors would need to be built every year from now till 2050 – compared to an average of only 3,000 MW new nuclear capacity per annum in the past decade.

To put this into perspective: in the 1980s - the decade of nuclear's fastest growth - the industry built an equivalent of 17 large reactors a year,[5] growing at half the rate needed to realize the discussed 'Blue Map' scenario. Considering the current investment costs for new reactors (the French EPR is currently over 4,500 USD/kW) and the cost estimates (7,500 USD/kW according to Moody's May 2008 report) of getting over a thousand large new reactors are 6,000 to 9,600 billion USD dollars – and this only considers the upfront investment.

While nuclear power presents itself as the largest carbon free source, its potential role in carbon mitigation is very limited and is not worth taking, given all its risks and costs.

Nuclear energy - in trouble on all sides

Even today, running at one tenth of the hypothetically required construction speed, the nuclear industry is struggling with serious problems and has hit many bottlenecks:

- **Massive technical problems and ever rising costs** have affected attempts to build new reactor units, for example both the French EPR units in Finland and France experienced years of delays and billions in cost overruns.[6]

[4] International Energy Agency, *Energy Technology Perspectives 2008* (Paris: IEA, 2008).
[5] International Atomic Energy Agency's PRIS database, http://www.iaea.org/programmes/a2/index.html .
[6] For detailed briefings and supporting documents, please refer to at http://www.greenpeace.org .

- **Capacity to produce** reactor components is limited to only several pieces a year and by half a dozen corporations in a handful of countries.[7]
- **Shortages in uranium supplies** to fuel the existing fleet of reactors, where the annual consumption reached 69,000 tons uranium in 2007, compared to annual production of just 41,300 tons in 2007.[8] The world's proven and reasonably assured uranium resources would only be able to cover current consumption for a few decades and, as they deplete, carbon emissions from the nuclear fuel chain would rise significantly.[9]
- **Raw material crunch**, because of its demand for huge volumes of steel and concrete.
- **Lack of qualified engineers, inspectors and personnel** to safely manage and oversee operations at the current scale.
- **Long lead times for projects**. It takes 10 to 15 years, even in countries with developed related infrastructure, to plan, approve, build and start a new reactor. It would take even longer in countries that are just starting their nuclear programs.
- **No safe disposal method for radioactive wastes** that reactors have already produced, despite decades of research and money spent. In the past five years, the estimated costs of radioactive waste disposal grew by 40 billion dollars in United States[10] and by 27 billion pounds in United Kingdom,[11] with no guarantees to deliver safe storage at the end.
- **Growing proliferation problems**: As stockpiles of separated plutonium increase, nuclear technologies and materials spread to new countries. International safeguards are under-resourced and structurally weak. It is only a question of time before they become accessible to terrorist groups. One large reactor can produce 200 kilograms of plutonium every year - enough for two dozens nuclear weapons.

All these factors raise additional skepticism about the potential of nuclear power to really mitigate greenhouse gases on any useful scale and timeframe.

Nuclear power is a hazardous obstacle to clean solutions

Expensive, dirty and hazardous nuclear power stands in the way of clean and sustainable solutions. It could take 10 or more trillion dollars to build enough reactors to produce 9,900 TWh of nuclear electricity as projected under the IEA's 2008 Blue Map scenario. Building enough wind farms to produce the same amount of electricity would cost 6 trillion at current prices, with these costs decreasing over time. Wind has no associated fuel costs and does not require expensive dismantling of the plant at the end of its life and long term disposal of radioactive waste. Other calculations show that compared to nuclear, wind power at today's

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[7] *Platts Nucleonics Week publications; Nuclear Engineering International;* http://www.areva.com .
[8] See World Nuclear Association, online: http://www.world-nuclear.org/info/inf23.html .
[9] Benjamin Sovacool, "Valuing the greenhouse gas emissions from nuclear power" (2008) 36 Energy Policy 2940.
[10] Platts, Nuclear Fuel, 11 August 2008.
[11] Guardian, online: http://www.guardian.co.uk/environment/2008/jul/18/nuclearpower.energy .

costs replaces twice as much carbon per invested dollar and energy efficiency measures three to six times more.[12]

The aforementioned IEA's 2008 Blue Map scenario shows that while massive nuclear expansion reduces carbon emissions from the energy sector by 6 %, the potential of renewable energy sources is about five times bigger and the potential of efficiency is about six time as big. It is clear which technology needs to get priority. Last but not least, time matters. Energy efficiency measures can be implemented in months. A wind farm can be planned and erected in one year. Nuclear reactors take one to two decades to prepare and build.

Every dollar invested in nuclear power means a dollar less invested in energy efficiency and renewable energy sources that can replace several times more carbon for the same cost, and can do that much faster than nuclear power.

CCS IS UNPROVEN, UNECONOMIC AND CONTRIBUTES LITTLE TO SUSTAINABLE DEVELOPMENT

CCS has not yet been proven to be a safe and sound technology

So far CCS projects (here meant as a coal fired power plants equipped with CO2 capture technology, transport system and storage site) have not been tested on the demonstration scale and thus proven to be environmentally "safe and sound", a requirement for inclusion in the CDM. No experiences with large-scale storage sites and the behaviour of large amounts of injected CO2 in the underground exist today. Moreover, issues of site selection criteria, seepage/leakage, liability, monitoring and others are difficult to address and have still not been properly addressed in developed countries to date.

Transferring projects at this stage into developing countries would mean using developing countries as a testing ground for this technology. Developed countries would reap the benefit, leaving developing countries to shoulder the long-term burden. The use of CO2 capture and storage has long-term implications, which one needs to be aware of. The end of a CO2 injection phase or the end of a project is not the end of costs, or responsibility. In contrast to time-limited CDM projects, CCS projects are long-term projects where the end-date can not be predicted ahead of the project.

CCS is not a cost-effective mitigation technology

Cost estimates for CCS vary considerably depending on factors such as power station configuration, CCS technology, fuel costs, size of project and location. One thing, however, is certain: CCS is expensive. It requires significant funds to construct the power stations and necessary infrastructure to transport and store carbon. The IPCC sets costs between US$15-75 per ton of captured CO2. Other sources give ranges between 25 to 100$/t CO2. This is well above the current price of CERs. Starting CCS pilot projects under the CDM can only be understood as a hidden subsidy for the coal industry.

[12] Amory Lovins, The Nuclear Illusion, May 2008.

Large amounts of money flowing into CCS pilots may mean funds are no longer available for clean solutions such as renewable energy projects. This concern is not unfounded. In recent years, the share of research and development budgets in some Annex I countries pursuing CCS has ballooned, with CCS often included as part of renewable energy packages. For example, Australia has three cooperative Research Centres for fossil fuels, one particularly committed to CCS. There is not one for renewable energy technology.

CCS contributes little to host country sustainable development

Few socio-economic benefits can be expected from large CCS projects. Only a limited number of people will find employment indirectly and directly during the project construction, operation, and post-injection (monitoring) stage. A CDM project should improve social, economic, and environmental well being. CCS projects do not deliver this.

CDM IS NOT THE RIGHT PLACE FOR REDD

Deforestation is responsible for around 20% of global emissions[13] and thus it is imperative that a mechanism to reduce emissions for deforestation be included in the post-2012 regime. However this mechanism must reflect both the methodological and governance challenges in getting REDD right. The causes of deforestation are both direct (agricultural expansion, wood extraction, infrastructure development) and indirect (demographic, economic, technological, policy & institutional, and cultural), varying between countries and over time.

The design of the financial component of a REDD mechanism must be able to support a variety of activities that address both sets of causes. While its greater governance regimes must ensure that the rights of indigenous peoples and vulnerable communities are protected. As a market-driven, project-based mechanism, the CDM cannot do this. Methodological considerations also warrant a different structure than the CDM. For instance, to minimize national leakage and reduce baseline uncertainties, a national emissions approach is best.

Billons of dollars have already been spent trying to halt deforestation. REDD requires a separate mechanism tuned to addressing the particularities of deforestation if the mechanism has any chance of succeeding.

[13] H. Holger Rogner *et al.*, "Introduction" in Bert Metz *et al.*, eds., *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge and New York: Cambridge University Press, 2007).