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Towards a comprehensive climate change agreement in Copenhagen

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The European Commission publicized on 28 January 2009 a Communication titled "Towards a comprehensive climate change agreement in Copenhagen". This Communication addresses concrete issues that will need to be addressed in Copenhagen to come to a successful outcome, including targets for developed countries and actions for developing countries; financing; and building an effective global carbon market.

The Communication is accompanied by a Staff Working Document (SWD) "Extensive background information and analysis". This SWD gives scientific background to the Communication and includes various alternative mitigation scenarios and modelling results on a global scale.

Several research institutes contributed to this SWD (JRC-IPTS , JRC-IES , IIASA , MNP , KUL) using a broad set of models (POLES, GEM-E3, IMAGE, G4M, GLOBIOM, GAINS).

The main results of the quantitative assessment in the SWD that are based on modelling are:

- Targets developed countries: A selected number of key criteria which are currently under international discussion for setting comparable and effective reduction targets for developed countries for the period after 2012 have been analysed, i.e. GDP/capita, GHG/GDP, GHG emission trends since 1990 and Population trends. The analysis clearly shows that using a single indicator for the allocation of individual country efforts leads often to disproportional costs or gains for single countries. Therefore, it is unlikely that setting targets for developed countries based on a single criterion will gain political consensus. Using a combination of these criteria in order to define a target instead of a single indicator will lead to a more acceptable and fair outcome.
- Appropriate global action to be undertaken: Actions in the energy system and industrial sector on a truly global scale are crucial to ensure that the 2°C limit can still be met. In developing countries, around two third of the reduction potential compared to baseline in the energy system and in the industrial sectors comes from measures typically related to efficiency improvements, that can be realised at no or low cost in the short and mid term because of the significant energy savings. On a global level energy efficiency improvements represent around 50% of the actions until 2020. They require substantial upfront investments. However, there is no single silver bullet technology.
- Further development of the global carbon market: The analysis shows that a gradually developing global carbon market decreases costs significantly to reduce GHG emissions, also if targets are 'fairly' allocated and not only on the basis of cost efficiency. Offsetting mechanisms can provide incentives for reductions that are not credited themselves, as such stimulating also own appropriate action by developing countries. These new types of offsetting mechanisms would only credit reductions that go beyond a reference emission level that reflects own appropriate mitigation actions in developing countries.
- Reduction in emissions from deforestation and forest degradation (REDD) in developing countries: It has been assessed what the costs would be to halve emissions from gross deforestation by 2020 and reverse net forest loss by 2030. To achieve this through a performance-based financial incentive, an estimated € 18 billion in 2020 (2005 prices) will be necessary, if leakage can be limited to a regional scale. Not reducing emissions from deforestation would lead to a significant cost increase for additional action required in the energy and industry sectors amounting to an increase of costs of around three times the cost of action on REDD. The analysis shows that increased demand for bio-energy may turn out to be an important driver for afforestation and reforestation. However, in the short term, reducing emissions from deforestation is more cost efficient than increased afforestation or reforestation. If crediting of REDD actions would be fully allowed for offsetting purposes, then targets for developed countries would need to be made much more stringent. In the above assessment they would need to be cut from -30% to -38% compared to 1990 by 2020
- Incremental costs related to a global pathway to meet the EU's 2°C objective: Additional costs in the energy system are estimated at € 152 billion in 2020 (2005 prices) of which € 81 billion can be

attributed to mitigation costs in developed countries. € 71 billion comes from mitigation costs in developing countries, of which, however, € 38 billion are compensated through carbon credit trades in the carbon market. In practice this means that significant shifts in investment flows need to be realised, with some sectors/technologies receiving much higher investments compared to baseline (e.g. energy efficiency) and some much lower (e.g. primary energy production). To achieve the REDD objectives through an incentive-based approach, an estimated € 18 billion in 2020 (2005 prices) will be necessary, if leakage can be limited to a regional scale. Global net incremental investments to reduce global emissions in the energy, industry and deforestation sectors need to increase gradually to around € 170 billion per year in 2020. It is estimated that more than half of the additional net investments (around € 90 billion in 2020) will have to be realised in developing countries. Costs for mitigation to reduce emissions from agriculture, are estimated at an € 6.5 billion in 2020, of which developing countries represent € 5.0 billion.

Other additional elements that are quantitatively assessed are the impacts on future targets of LULUCF accounting rules and potential surpluses of Assigned Amount Units from the period 2008-2012, the impact of the financial crisis on mitigation costs and the co-benefits of greenhouse gas mitigation action in relation to local air pollution both on the level of impacts on the mitigation costs of other local air pollutants and health impacts. It finally also addresses energy supply security impacts.