

**AUGUR, Challenges for Europe in the world in 2030: narratives in preparation of the November 2011 meeting in Brussels.**

**1- Consolidation : a world trapped into debt**

This scenario depicts a consolidation of the influence and active role of financial institutions and business corporations at the expense of governments. Governments, trapped by the high level of public indebtedness caused by the 2008 crisis, are forced to reduce spending. In this world the process of trade liberalization goes on and also implies further financial liberalization. This benefits big emerging countries but prevents other developing countries from catching-up. The decrease in the role of states increases income inequalities. The main objective is economic growth, but it is founded on inequalities, and must be driven by the richest.

In this scenario social cohesion is low: there is hope for mass to become member of the elite. Governance faces regulatory capture, and government is for the elite, by the elite. A large diffusion of the US consumption style is ambitioned, with an increasing demand for energy and mobility, mostly in big emerging countries. Management practises and lifestyles lead to an inefficient use of natural resources, which increases environmental stresses. The access to such a lifestyle is however limited by the inequalities, and only rich people have access to it.

The population is thus divided in two groups (both between countries and within countries): small rich global elite is responsible for much of the emissions and can mitigate at low cost if necessary. A large poor group does not emit much and is vulnerable to impacts of climate change (also in industrialized regions).

In this world Middle-East oil companies act as profit maximizing firms independent of any political influence, so they try to maximize their discounted cumulated oil revenues. Given the high internal rates of returns demanded by private oil companies (17.26% to 21.97%, according to the Texas Comptroller's Property Tax Division<sup>1</sup>), maximizing their discounted cumulated oil revenues implies to refrain from investing in new capacity and to maintain the medium term oil price above 120\$/bl, even if doing so might reduce future profits by fostering a fast penetration of oil substitutes and triggering energy efficiency abroad.

No climate policy is ambitioned and environmental policies are only reactive, but the challenges to mitigation can be low for two reasons: (i) emissions are relatively low because only produced by the richest, and (ii) there is a high capacity to mitigate.

Indeed, energy security considerations drive investments in energy efficiency improvements by big energy companies and lower the energy intensity of world production (for example big companies push for bio-energy, allocate land-resources). However this reduces options for adaptation for local communities and nature conservation. Energy security considerations might also lead to the choice for fossil technologies that can relatively easy be combined with mitigation measures (for example,

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<sup>1</sup> Determination of 2002 Discount Rate Range for Petroleum and Hard Mineral (*available at: <http://www.window.state.tx.us/taxinfo/proptax/drs02/>*)

energy corporation “conspiracy”: they buy the technology and patents and can deploy them quickly in case of climate policy).

Here the potential for mitigation is high but will not be used in the short-run because of a lack of global governance. Investments in innovative or very low-carbon energy production such as nuclear and renewable energy are not increased in the short run because they require subventions from the state to be profitable. However, in the longer run this scenario could be a technology breakthrough scenario, for instance for geo-engineering.

## 2- Bilateral global governance

This scenario is based on the hypothesis of increased coordination between China and the USA, who impose their leadership on other countries. In this scenario, government interventions are increased.

As in the consolidation scenario, social cohesion is low: there is hope for mass to become member of the elite. A large diffusion of the US consumption style is ambioned, with an increasing demand for energy and mobility, mostly in China and a few big emerging countries. Management practises and lifestyles lead to an inefficient use of natural resources, which increases environmental stresses. The access to such a lifestyle is however limited by the inequalities, and only rich people have access to it.

The population is thus divided in two groups (both between countries and within countries): small rich global elite is responsible for much of the emissions. A large poor group does not emit much and is vulnerable to impacts of climate change (also in industrialized regions).

In this scenario, USA and China impose their leadership on oil producers so that oil prices are stabilized and stay below 80\$/bl for as long as possible. As a consequence there is no significant progress made in energy efficiency, and an energy-intensive lifestyle spreads throughout the world, leading to an “environmentally-stressed” world in which energy and mobility demand are growing. This world may be locked in oil-intensive pathways, and may be very vulnerable to peak oil.

China and the USA thus seek energy diversification and energy security, so they increase investments in nuclear power and renewable energy. They do not worry for CO<sub>2</sub> emissions, and clean air in big cities is not their top priority, so they disregard carbon capture and storage and electric vehicles, favoring synthetic fuels such as Coal-to-liquids or biofuels instead. China urbanizes rapidly and saturates at very high urbanization rates. City planning includes significant urban sprawl.

No climate policy is ambioned outside of Europe and environmental policies are only reactive. Europe maintains its objective of 20% CO<sub>2</sub> emissions reduction in 2020 compared to 1990 levels.

In other regions development proceeds slowly, inequality remains high, and economies are relatively isolated, leaving these regions highly vulnerable to climate change with limited adaptive capacity.

## 3- A regionalised global governance

In this scenario the emphasis is on regional development, thanks to local steering and deepened regional institutions and markets. It is a fragmented world with inclusive growth, which implies intermediate levels of economic development, and relatively rapid and diverse technological change. Policies are focused on local solutions to economic, social, and environmental sustainability. There

are no proactive climate policies except for Europe which maintains its objective of 20% CO<sub>2</sub> emissions reduction in 2020 compared to 1990 levels.

In this scenario oil-producing countries seek maximization of local households' welfare. This comes down to assuming that oil companies and sovereign funds consider broader government objectives, such as calming short term social tensions or building infrastructure capable of ensuring sustainable development beyond the 'oil era'. To do so, oil producers maintain low prices for as long as possible, so that oil-importing regions do not shift away from oil too quickly. In the meantime, lower oil revenues allow for lower exchange rates for oil-producing countries, to the benefit of other sectors. The development of local industry partially offsets short-term losses in oil revenues and better prepares these countries for the post-oil era. This period of low oil prices will likely be followed by a steep and lasting surge in oil prices which will begin just before Peak Oil. This surge will be triggered by tensions between high demand, which cannot be reduced overnight, and the constraints on the deployment of oil and oil substitutes' production capacities. With this strategy, short-term inflows of oil revenues come at a pace compatible with the absorption capacity of the local economy, and the high post-Peak Oil inflows fall into a more mature industrial structure.

The world is thus developing rapidly powered by cheap fossil energy. There is a strong push for development in developing countries which follow the fossil and resource intensive development model of the industrialized countries. This is aided by high levels of international trade allowing for specialization of countries. A global "development first" agenda is enforced leading to the achievement of the MDGs before 2030. Development policies emphasize education and health, leading to a strong build up of human and social capacity in developing countries. As a result, per capita incomes in developing countries increase rapidly with strong convergence of inter- and intra-regional income distributions.

At the same time industrialized countries continue their focus on economic growth aided by consumerism and resource intensive status consumptions, including – inter alia – a preference for individual mobility, meat rich diets, and tourism and recreation. Developing countries rapidly adopt these consumption patterns. The gross world product increases rapidly, with a continued large role of the manufacturing sector.

Labor markets are freed, allowing for large international mobility that buffers the effect of aging populations in industrialized countries. All regions urbanize rapidly and saturate at very high urbanization rates. City planning includes significant urban sprawl.

Investments in technological innovation are very high, with a focus on increasing labor productivity, fossil energy supply, and managing the natural environment. With the help of technological progress, fossil resource extraction is being maximized at low costs, and local externalities of fossil energy production (e.g. health effects) are well controlled. Due to the strong reliance on fossil energy, alternative energy sources are not actively pursued. This is re-enforced by high discount rates posing additional barriers on capital intensive investments in the energy supply and end use sectors.

Massive infrastructure investments are undertaken to strengthen resistance against environmental perturbations including climate variability and climate change. This is complemented by high disaster preparedness. Environmental consciousness is strong on the local scale, and focused on end-of-pipe engineering solutions for local environmental problems. Agro-ecosystems are highly managed

building on strong technological progress in the agricultural sector. Land use management is generally very resource intensive including water system management. Action on global environmental problems is hampered by high discount rates and a development first paradigm that believes in high opportunity costs of global environmental action.

4- An ecological and inclusive multilateral world

In this scenario, strong global governance, increased regulation of the world economy and stronger cooperation policies benefit low income countries. Development policies emphasize education and health, leading to a strong build up of human and social capacity in developing countries. As a result, per capita incomes in developing countries increase rapidly with strong convergence of inter- and intra-regional income distributions.

In this convergent world, development proceeds at a reasonably high pace, with rapid changes in economic structures toward a service and information economy, and with reductions in material intensity. Inequalities are lessened, technological change is rapid and directed toward environmentally friendly processes, with the introduction of clean and resource-efficient technologies including lower carbon energy sources and high productivity of land. Technological transfers are high, and urbanization is planned and controlled.

The emphasis is on global solutions to economic, social, and environmental sustainability, including improved equity.

In this scenario environmental policies are proactive. We implement two sub-scenarios for this one:

(1) In order to encourage environment-oriented ways of life, governments implement proactive environmental policies, including climate policies in order to meet the Copenhagen pledges (see Table below). Europe maintains its objective of 20% CO<sub>2</sub> emissions reduction in 2020 compared to 1990 levels.

Country	2020 Target under Copenhagen Accord
China	40-45% reduction in emission intensity relative to 2005
India	20-25% reduction in emission intensity relative to 2005
Brazil	36% reduction in emissions relative to BAU <i>(10% reduction in energy-related emissions)</i>

(2) A global agreement to maintain global temperature below 2°C is found. Europe commits to a more stringent reduction objective of 30% emissions reduction in 2020 compared to 1990 levels. Other developed countries follow Europe so as to reach an objective of 450ppm CO<sub>2</sub> concentration in the atmosphere on the long run. A global framework is instituted so that developing countries complete the necessary emission reductions. In Europe, the cap-and-trade system is complemented by transport-specific measures focusing on passenger cars mobility reduction, that favour low-carbon modes and lower mobility needs.

In this scenario oil markets are regulated and oil-producing countries participate in the climate coalition, so they refrain from investing in new capacity in order to maintain the medium term oil price between 80\$/bl and 100\$/bl. This price level is consensual as it is sufficient to trigger technical change and energy efficiency without hurting too much oil-importing countries during the transition phase to the 'post oil era', while providing sufficient revenues to oil-producers. There is a global reluctance to develop non-conventional fossil fuels.

The trend is towards maximum reduction of CO<sub>2</sub> emissions, through investments in low-carbon technologies in all economic sectors. The electric sector is decarbonised first, thanks to investments in adequate technologies, such as nuclear, renewable energy, biomass and in carbon capture and storage. Vehicle electrification is quick because of high oil prices and benefits from electricity decarbonisation and the carbon prices. Large efforts are made to improve energy efficiency in productive sectors as well as in the dwelling sector with Very Low Energy buildings.