European Policy Brief

GLOBAL IQ

Global integrative quantitative assessment

Ongoing project

This Policy Brief was prepared by Toulouse School of Economics

INTRODUCTION

Policy context

'Globalization' refers to a complex set of political and social issues in at least five dimensions: **global public goods** management, like climate change or knowledge, **global flows** of goods and services but also of populations, **global risks**, ranging from environmental risks to health and financial risks, **global governance** with the urging necessity of better policy coordination between governments, and **global society**, linked to internet and international medias development, raising the issue of a better shared system of political and human values at the humanity scale. The **GLOBAL-IQ** project focus on the links between the global public goods issue, with a strong emphasis on global climate change, and the global flows of goods and population with a specific concern about the risky aspects of an uncertain future.

KEY OBSERVATIONS

Global megatrends

Six megatrends are considered inside the project: (i) population, (ii) affluence, (iii) climate, (iv) resources and energy use, (v) economic growth and trade, last (vi) technological trends.

After experiencing a dramatic expansion in the last century, **global population** is expected to stabilize at around 9 billion people in 2100 with a slow declining trend after 2050. This overall trend masks significant regional moves, with a population decline in Europe and China and a continuous growth in South-East Asia and Africa. This stabilized population will also be older. Following Japan and Germany, high-income OECD countries (but also China) will enter the mature state of a median age higher than 45 after 2030. Facing them, a belt of 'young bulge' countries (Central America, Sub-Sahara, Middle East, South and Central Asia) will maintain a median age of 25 or younger. Migrations and in particular climate migrations are

difficult to assess, climate migrants figure is projected to reach 200 million by 2050.

Two main factors will affect consumer's life. The **rise of income** will multiply by 2.5 the size of the world middle-class, with a complete reversal of proportion between North America and Europe with respect to the rest of the world (mainly Asia). On the other hand, 70 % of the world population will live in cities by 2050. The number of **mega cities** (more than 10 million people) is also expected to rise sharply, putting hard pressure on their local environments and being exposed to climate change in coastal areas.

Today **climate change** projections vary between +2 and +4 °C by the end of the century. Beside this global aspect, regional climatic sub-systems are facing potential *tipping point* disruptions. To meet the challenge of stabilizing the temperature rise within + 2°C by 2100, developed countries should become carbon neutral by the middle of the century, an each day more unrealistic target as the global carbon emissions trend accelerates with the economic recovery from the 2008 crisis. The result is that the world will have to prepare to face severe climate damages and future potential climate regional regimes shifts. This raises the issue of the **adaptation** to climate change. Besides human impacts, climate change will have large effects on biodiversity, environments and natural resources like water.

An expanding population living in a growing world will sharply increase the pressure over the access to **natural resources**, either nonrenewable or renewable ones. By 2030, water demand will be 40% above the current water supplies, with nearly half the world population living in areas under severe water stress. Even if most conventional oil and natural gas reserves could be depleted within the century, a considerable amount of coal and nonconventional fossil fuels will remain accessible at reasonable costs, pointing for a permanent need to mitigate carbon emissions despite the predictable exhaustion of some conventional fossil energy sources. Current energy scenarios do not predict a major shift toward carbon free energy, like solar power, during the present century without very stringent mitigation efforts aimed at reaching the + 2° target. Huge uncertainties affect these predictions, varying from a reversal to present energy demand by 2030 to a 40 % increase over the same period. The same applies to the prospects of shale gas exploitation and of carbon capture and storage.

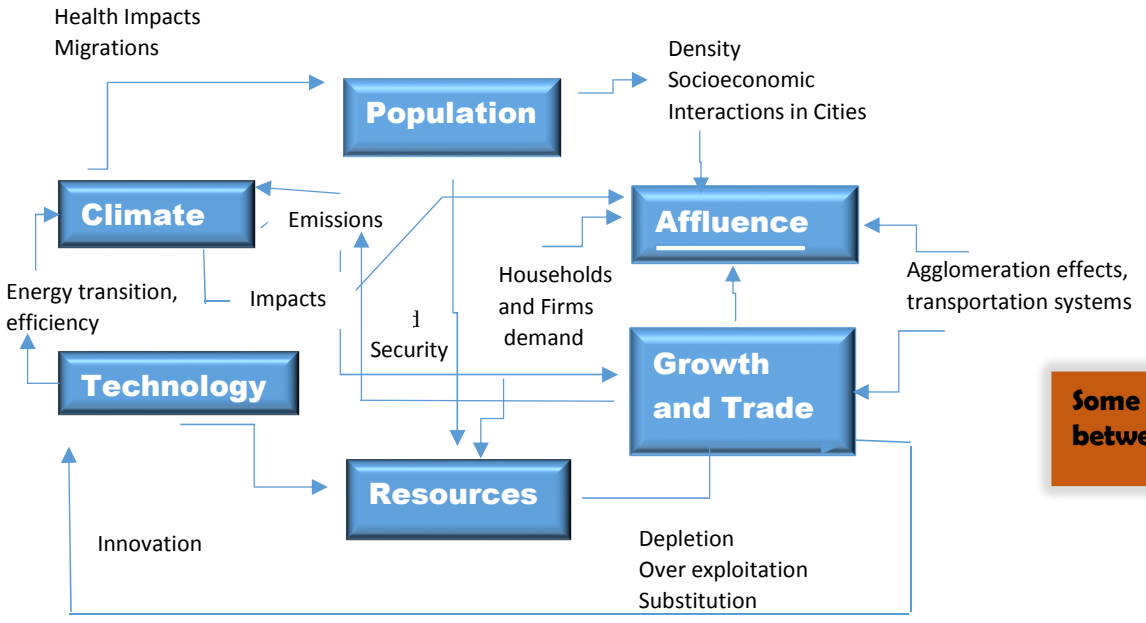
If the world **economic growth** perspectives are strongly positive, computing a reasonable forecast is hard to achieve. Simple rule of the thumb methods predict a 4.5 multiplication of the world GDP per capita by 2050. The result should be that most developing countries would have an average income equivalent to the US income today while the US would benefit from a 2050 income of 90, 000 $/c. In

parallel, a massive move of the growth potential should flow from developed to emerging countries. The GDP share of the US should decrease by 3% between 2010 and 2050, the European share should lose 5% while the China share expands by 11%, followed by India and South-East Asia. This general move will be accompanied by significant changes in the **world trade flows**. By 2050 the Asia-Pacific block should become the China's second biggest trade partner, replacing the European Union. Latin America should also be the first US trade partner at the same time.

Last, **technological trends** are characterized by the rapid growth of innovative activities in the emerging countries and an overall increase in R&D expenditures both by governments and private firms. This means higher competition between countries inside the global knowledge society but also larger cooperation opportunities, easing of financial access for emerging countries and an overall acceleration of technical progress because of potential technological spillovers.

Designing global scenarios for the future

A natural approach would be to merge the previous megatrends forecasts into a prospective scenario of the global future. General factors resulting from double linkages, high uncertainties on key variables prevent using it. To assess the perspectives of global change, the social sciences and humanities favor instead a shared scenarios approach, the so-called **'Shared Socioeconomic Pathways'**



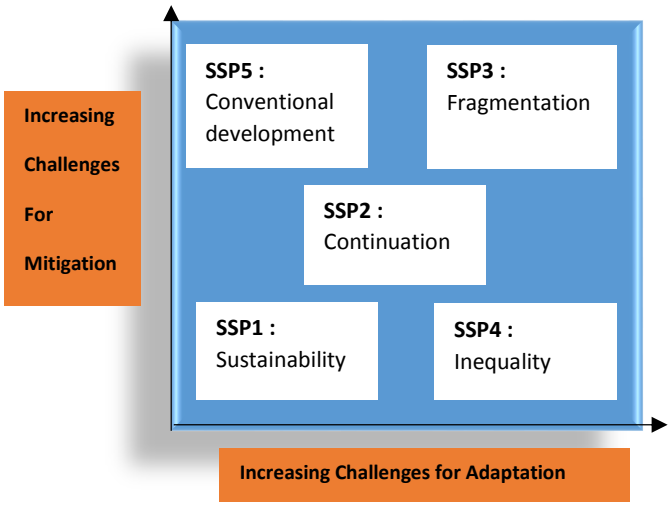
Some complex linkages between megatrends

(SSP).

This method should help better integrate the quantitative predictions produced by long run simulation models and impact assessment

models together with various narratives of possible futures developed by different communities within the social sciences.

The following matrix describes the organization of scenarios in two main dimensions: challenges of global changes for **adaptation** and challenges for **mitigation**.



Main aspects of the scenarios narrative are:

- **SSP1: Sustainable development**

It is a world of sustained efforts to achieve development goals with a reduced pressure on natural resources and environments and less fossil fuels dependency. Fast development of low-income countries will be observed, together with the rise of the middle-class, open trade and 'green' oriented technological progress. Large access to carbon free energy in the developing world will be made available while the efficacy of international governance will improve. Millenium goals are achieved in the next decades.

- **SSP2: Continuation**

Past trends continue with some progress toward sustainable development goals resulting in a slowly decreasing fossil fuels dependency and a stabilization of the pressure over natural resources. Some low-income countries achieve significant progress, other lag behind. Open trade remains limited and international governance remains weak. Millenium goals are delayed by several decades with enduring difficulties in safe water and medical care access for low income countries.

- **Fragmentation**

Convergence trends are broken in this scenario, the world fails in achieving sustainable goals with little success in reducing fossil fuel dependency and improving the global environmental status. Countries focus their efforts in maintaining energy access and food security for their own. In this de-globalizing world, international trade is restricted and technological progress limited. Global governance tools do not develop and carbon mitigation policies are not implemented. Millenium goals are not attained and the adaptation capacity of low-income countries weakens.

- **Inequality**

This is a world of growing inequalities both between the world regions and inside countries. To reduce fossil fuel dependency and tackle the carbon emission mitigation issue, the energy industry relies on low-cost technologies. Global governance is effective but

controlled by a global elite without benefits for most of the population. Challenges to adaptation are high because of insufficient income, low human capital accumulation and inefficient local institutions.

- **Conventional development**

The world priority is economic growth as the main solution to social, economic and environmental problems. The energy system remains dominated by fossil fuels use, with high trends of GHG emissions and a strong mitigation challenge. Technological progress remains robust, facilitating the adaptation challenge and the attainment of human development goals.

RECOMMENDATIONS FOR POLICY-MAKERS

Global prospective studies and more sectoral analysis converge toward two main conclusions: world transformation is under the control of long term ranging forces and drivers, only letting a small opportunity of significant changes for short run decision-making; the various socio-economic processes driving global change are more and more interlinked both at a geographical and historical scale, preventing from a piecemeal approach to policy making. Action will be more and more a course of action and strategy an array of dedicated strategies in need of coordination and constant reflexivity.

When facing global change, policy action faces the trade-off between promoting the change, when it seems beneficial, and resisting it, when adverse consequences appear prominent. But trade-off resolution creates new trade-offs as the megatrends description shows. If population expansion seems today under control, this is the consequence of a dramatic fall of fecundity rates, creating new problems for the future of labor force participation, health care and pension systems. Such a fall is a consequence of the better growth conditions experienced in many developing countries, resulting in an impressive rise of the standard of living at the world scale, but with a high environmental prize and threats over the access to resources and betterment of food conditions for those who remain poor.

Priority setting is another strong challenge. This is not just a problem of agenda. In a quickly changing world with a significant shift of the balance of power from first industrialized countries to emerging countries, each country has an incentive to defer temporarily from an agreement in the hope to gain a better negotiation position in future

rounds. 'Priority' thus becomes more a matter of 'maturity' than of an ordering of issues by their degree of emergency or severity. The result is the loss of meaning of the political action for the citizens and a relative disconnection of actual policy agendas with the perceived severity of economic, social and environmental problems in the general public.

The message from the global scenarios is also that the future world will combine new fragmentation lines, both at the interstate and intrastate levels, and new interrelated opportunity spaces. Low cost communication and transport systems have the paradoxical result of increasing the opportunity to cooperate with far distant people rather than with your own neighbors. The territorial vicinity basis which has been at the core of the emergence of unified human societies since the Neolithic revolution is undermined by this new trend. This is a particular problem for the European Union, which has always seen itself as a coalition of neighbors without predefined territory extension. The consequence for Europe is that it will have to match more closely **coordination**, in exploiting and promoting the comparative advantages of the individual member states in different policy domains, economic sectors or regions, and **cooperation**, to preserve the mutual advantages of vicinity and resist fragmentation forces.

RESEARCH PARAMETERS

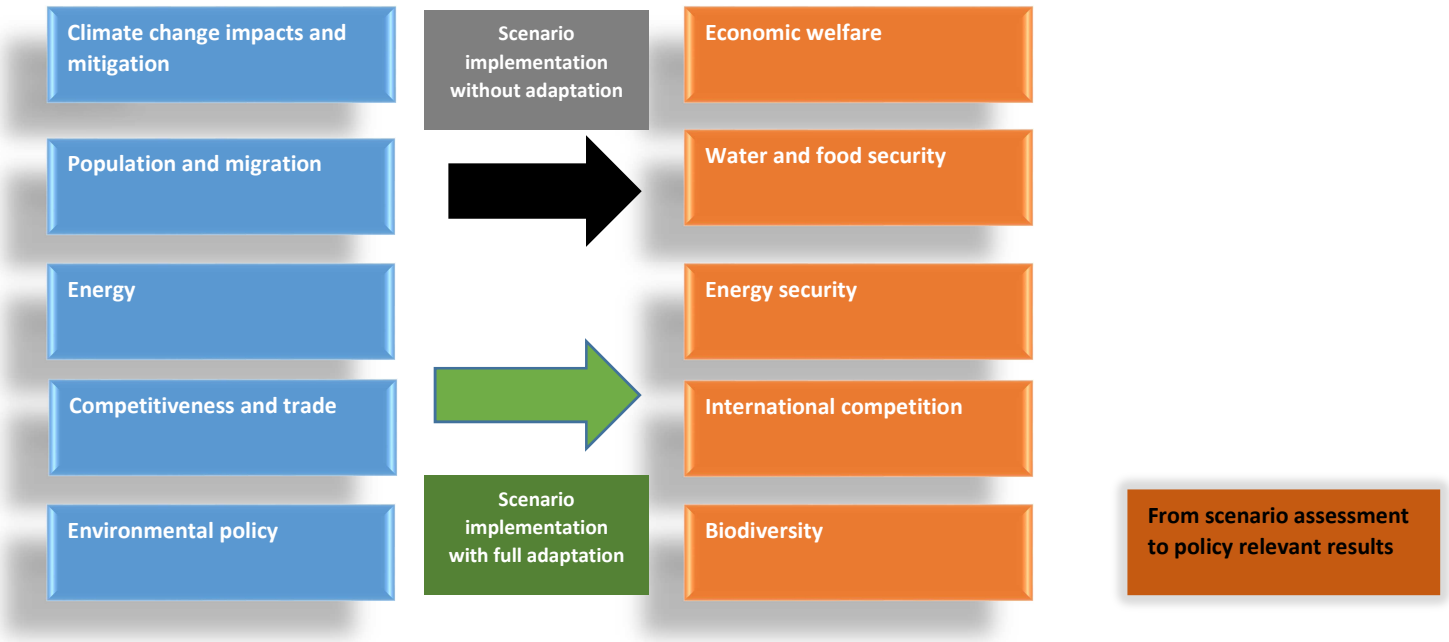
Choosing a scenario and implementation strategy

The Global-IQ project has adopted the SSP2 scenario (continuation) as its **middle-of-the-road** prospect. Hence all the quantitative and sensitivity analysis is done by considering the other SSP's as possible deviations from this central figure.

The scenario implementation method inside the quantitative analysis is done for five main domains resulting into five areas of policy informing results.

The implementation will distinguish for each domain a **no adaptation** scenario where the various drivers impact the policy challenges without active adaptation of firms or households to cope with global change from a **full adaptation** scenario where the economic agents take full advantage of their adaptation capabilities.

Analysis will be performed in terms of GDP variations at different scales and horizons for the different areas under study concerning the welfare policy challenge, an approach completed by indicators simulations for the other policy challenges.



PROJECT IDENTITY

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Funding scheme	FP7 Collaborative Project
Duration	36 months
Budget	3.462.830 euros
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