Futures 58 (2014) 3–20

Contents lists available at ScienceDirect

Futures

journal homepage: www.elsevier.com/locate/futures

Spacecraft: A steady progress scenario for the EU

Bertrand Château *

Enerdata, 47 Avenue Alsace Lorraine, 38000 Grenoble, France

ARTICLE INFO

Article history:
Available online 19 January 2014

Keywords:
Energy transition
Energy scenario
Climate change
Energy forecast
European Union
PACT
PASHMINA

ABSTRACT

"Spacecraft" can be qualified as a steady progress scenario for Europe. It is one of the various scenarios of the European R&D projects PACT and PASHMINA which attempt to describe possible pathways for carbon transition in Europe and the related paradigm shifts in technology and economy. To some extent, this scenario depicts in details "green economy" conditions, perspectives and consequences.

This article highlights first the policy context of such a scenario both at European and World levels, and the resulting consequences on demography and economy in the one side, on governance of climate and oil resources issues on the other hand.

It then comes into details of what would be the content of such a scenario as regard social preferences, behaviours, technologies and resulting economic perspectives in the EU. A particular focus is given on urbanization and mobility issues.

Quantitative projections deducted from the storyline of the scenario, thanks to VLEEM-TILT and POLES models are then presented: demography, economy, housing, mobility, energy, CO_2 emissions.

Conclusions and policy findings of this scenario are finally presented.

1. "Spacecraft": a steady progress scenario for post-carbon transition

It is now recognized by most experts and policy makers across the World, that physical limits in oil and gas resources as well as climate change issues constitute major obstacles to a long-lasting and sustainable economic development on the model experienced by OECD countries in the last 50 years. Either the World does not succeed in addressing these issues in a timely way and then the risk of recurrent economic and financial crises will increase a lot.[1] Or the World succeed in establishing new socio-economic development models accounting fully with these limits and constraints, and conditions for sustainability may be achieve.

The EU has undertaken several researches to understand and quantify such new socio-economic models and their consequences on energy and GHG emissions. Two in particular, which have been carried out in close interaction: PACT[2] which addressed the post-carbon transition issues and PASHMINA[3] which addressed the so-called Paradigm shifts leading to these new socio-economic models.

One of the key question of these two programmes was the following: if we have to reduce drastically the use of fossil fuels in general, and oil and gas in particular, and therefore to replace them massively by "something else" (energy efficiency/thriftiness, renewables, nuclear, carbon capture and sequestration – CCS), can we lead this substitution or will it be forced by the circumstances, and in both cases what will change in the life-styles, the consumption pattern, the GDP growth, etc.

* Tel.: +33 607095557.
E-mail address: bertrand.chateau@enerdata.net

[1] Stern Review on the Economics of Climate Change, October 2006.
[2] PACT: PAthways for Carbon Transition (*www.pact-carbon-transition.org*).
[3] PASHMINA: PAradigm SHift Modelling and INovative Approaches (*www.pashmina-project.eu*).

0016-3287/$ – see front matter © 2014 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.futures.2014.01.002

Various scenarios have been therefore elaborated and quantified to capture these different routes towards post-carbon and new paradigms. Among them, the PACT scenario "Spacecraft" (very close to the "Apple" scenario of the PASHMINA programme) describes a transition process duly planned and managed by governments and big stakeholders, in a rather consensual movement worldwide, driven by the recognition of the limits (resources and climate), and the willingness to anticipate and manage them in due time, mostly through technology and innovation.

2. Globalisation and governance of resources and climate issues

"Spacecraft" assumes a rather consensual and cooperative context worldwide, driven by the recognition of the limits (resources and climate), and the willingness to anticipate and manage them collectively in due time.

2.1. Climate change and GHG mitigation

The UN negotiation process speeds up after the post-2012 Kyoto Protocole discussions. IPCC is not challenged anymore, and its conclusions and warnings are taken very seriously by all major countries around the World.

Most countries of the World, including Emerging Countries, North America, Europe and Asian and Pacific OECD, agree on a common position on how to achieve a macro-economic optimum, which is: (a) to commit themselves to mandatory reduction objectives of the carbon intensity of the GDP, accounting for carbon content of imported and exported goods; (b) to use extensively flexible mechanisms to trade carbon internationally.

In counterpart for the adhesion of the poorest countries to the new Protocole, rich countries (mostly OECD) accept to pay for their adaptation to climatic change.

2.2. Availability and accessibility to oil and gas resources

Depletion policies of main oil and gas producing countries (Gulf countries, Russia, ...) are mostly driven by prices on international and regional markets. In order to secure the return on exploration-production investment and avoid turbulences on the market prices, long term contracts constitute the main trading mechanism. Oil and gas producers and consumers reinforce their relations in order to prevent price shocks. This could be done within an international, well-balanced institution that could emerge from a renewed IEA, or/and through upstream/downstream re-integration of oil and gas industries.

2.3. World trade

WTO is strengthened and all World countries join progressively the institution. Protectionism decreases everywhere, which favours World trade dynamics. No barriers are settled to compensate for international discrepancies in GHG mitigation efforts, although GHG embodied in imports/exports is accounted for in CO_2 intensity targets.

2.4. World finance

The role of IMF is increased, in particular for avoiding major financial crisis that could jeopardize the World economic development, and for paying for adaptation in poor countries. Financing investment in developing countries becomes progressively easier and more secure, for an increasing number of countries, high financial resources being available and more controlled worldwide.

3. The socio-economic model of the European Union

The EU is expected to experience a moderate-to-high GDP growth in this scenario, thanks to a high World demand for its high value products and services. But the fierce competition of China and Emerging Countries for current goods and services, as well as the technology leadership of the USA, do not allow the EU to hope for very high GDP growth rates in the coming decades.

East/West socio-economic discrepancies within the EU are expected to decline under the combined effect of economic growth and EU political reinforcement.

Targets on GHG intensity are rather easy to reach for the EU, thanks to the speed and content of the GDP growth, and because the on-going mitigation efforts.

No major changes should be expected in this scenario for the EU, as regard energy security issues and international partnership.

3.1. Human capital

Policies dedicated to immigration, birth rate and women activity, working time and retirement, education, are driven by considerations of GDP maximization within a international context of fierce economic competition.