Editorial

Over the past two years (2007 and mainly 2008) strong policy drives were underway in the EU to achieve the completion of the internal energy market, increase renewable energy supply, reduce CO_2 emissions and make the EU more energy-efficient. Europe has agreed a forward-looking political agenda to achieve its core energy objectives of sustainability, competitiveness and security of supply. This agenda, marked by the adoption of the EU Climate Change Action and Renewables policy package (the so-called 20-20-20 policy) in December 2008, means substantial change in Europe's energy system over the next years, with public authorities, energy regulators, infrastructure operators, the energy industry and citizens all actively involved. It implies an unprecedented sequence of policy choices and investments to be implemented in the European Union Member-States, during a time of much change in global energy markets and international relations.

In this context, the publication of the seventh special issue on "Energy Policy Studies" is well timed. The subjects of the articles are very pertinent in view of the challenging energy policy agenda. By including some of the most representative and recent policy analysis studies, the publication aims at contributing towards getting better understanding about the different methodologies used in impact assessment studies and their policy-relevant conclusions. The selected articles follow different methodologies and tackle different policy analysis issues.

From a scientific perspective, the common feature of the articles selected for this issue is addressing energy policy issues by using large-scale applied economic-engineering models. The articles belong to the scientific discipline of "applied modelling for energy policy analysis". This discipline, standing at the crossroads of quantitative economics and operations research, has its origins in the first oil crisis and got a considerable boost when climate change challenge got importance.

The articles illustrate the use of the most known and widely used energy and economy models, including NEMS (energy markets and systems of the USA), PRIMES (energy markets and systems of the EU), POLES (energy system simulation model), E3ME (econometric model for the EU with emphasis on interactions with energy and environment) and GEM-E3 (general equilibrium model for the EU with emphasis on interactions with energy and environment).

From a policy perspective, the articles deal with long-term energy and economy projections, consider the climate change challenge as a driver of energy policy adjustment and evaluate the implications of policy measures. One of the papers focuses on the World economy, two on the European Union, one on the US and three papers on national issues, namely on Italy, Belgium and Spain.

Public authorities and the industry never lost interest in long-term energy policy analysis, which has even more developed, despite the growing liberalization of the energy markets. This is due to the significant external costs associated with energy and to the large uncertainty surrounding the long-lasting energy investments. In the current energy policy context, the evaluation of policy instruments and the impact assessment studies got high importance. Their complexity is such that only system-wide and quantitative-based studies are able to deliver pertinent results. All articles included in the present issue are of this nature.

The article by Paul Bulteel and Pantelis Capros on "The Role of Electricity" summarizes the results of a large-scale project of Eurelectric (the association of electricity utilities in Europe) which aimed at proposing and studying a long-term view on how the power sector of Europe could restructure in order to deliver carbon-free electricity and help other sectors, such as transportation, in reducing emissions through higher use of electricity. The resulting message is a positive one: with the right policies that include a long-term visibility of carbon pricing to allow integration of climate change impacts in investments and business strategies of the power sector, it is possible to reduce substantially greenhouse gas emissions without unreasonable costs to the economy, and at the same time to reduce oil and gas dependency.

The article by Terry Barker, Paul Ekins *et al.* assesses the impacts on international competitiveness of the EU economy stemming from

environmental tax reforms, which shift taxation away from employment towards polluting activities. The analysis suggests that, when revenues are appropriately recycled, environmental tax reforms can lead to both environmental and economic benefits – a policy win-win – although the latter are only small.

The article by Andy Kydes and John Conti summarizes and discusses the latest reference case outlook for the U.S. energy markets to 2030, as released by the Energy Information Administration in 2008. This is the outcome of a large-scale official exercise by the US administration, supported by the NEMS energy model. The paper highlights impacts on projected energy consumption, energy prices, and carbon dioxide emissions.

The article by Juan Carlos Ciscar, Leonidas Paroussos and Denise Van Regemorter focus on the evaluation of different participation schemes for reaching a global emission reduction level sufficient for not exceeding the 2° Celsius temperature target from the perspective of the world economy. The results, obtained by using the GEM-E3 world general equilibrium model, have been included in the European Commission communication on 'Limiting Global Change to 2° Celsius the way ahead to 2020 and beyond'. The conclusions emphasize on the importance of broadening the participation of countries and of increasing flexibility in trading emission allowances for reducing the global economic welfare costs of climate change mitigation.

The article by A. D'Orazio and C. Poletti deals with the Italian energy policy and focuses on two crucial issues: the environmental sustainability of economic growth and the security of national energy supply. The analysis shows that if the new policies and actions that are up in the agenda of the Italian government are actually implemented, there will be significant reduction in the gap between EU targets as specified for Italy and actual developments, both for greenhouse gas emissions and the renewable energy forms. As for security of supply issues, the article claims that the reasons of the "gas emergency" in 2006 were twofold: the inadequacy of the intertemporal flexibility tools, such as storage capacity, and the bad functioning of the gas markets whose prices were not allowed to adjust for signalling the gas scarcity.

The article by G. Németh, L. Szabó, J. C. Císcar and A. Soria uses the POLES energy model applied to Spain and studies how the Spanish energy

system may undergo a transformation towards cleaner technologies and renewable energy resources, contrasting actual trends towards higher CO_2 emissions and more dependence on fossil fuels. The policy scenario puts priority on improving energy efficiency in all sectors, promoting higher penetration of renewables and enhancing electricity and gas inter-connections. Such combined policies could also moderate the possible pressures on electricity prices, which is already a sensitive issue in Spanish energy policy.

The article by William D'haeseleer, D. Gusbin *et al.* discusses several alternative energy scenarios for Belgium that have been investigated by the government-appointed Commission Energy 2030. The paper identifies the power sector as of critical importance, because of the climate change challenge in relation to major policy issues which include the nuclear phase-out, the security of gas supply and the possible development of carbon capture and storage. Some of the scenarios analyze the role of the EU flexible mechanisms, such as the CDM or other intra-European instruments, which become important in case domestic mitigation actions are limited for various reasons.

As guest editor, I personally thank the authors for their important contributions which are well timed and pertinent in view of the ambitious European energy policy agenda. Many thanks to Jef Dermaut for his very effective assistance in making this special issue a reality.

Pantelis Capros
Guest Editor