

11 Technology Stories with PRIMES2 for the European Union; an Analysis for Demand Side, Power and Steam Generation Sector⁴⁴

11.1 Introduction

This chapter explores the implications for the European Union of accelerating the progress of key energy technologies in the demand and supply sectors over the period 2010-2030.

The chapter does not consider the driving forces or policies (e.g. R&D support) that would induce contribute in obtaining the assumed technology progress. The analysis aims at deriving the benefits arising from such a progress, in terms of system costs and pollution. The use of a system model also allows estimating the likely size of the market for the technologies and the side effects on the energy system.

This chapter builds on the results of PRIMES V.2 model including the interactions between demand and supply.

The baseline scenario is the one presented in other chapters and concerns the EU member states. The scenario is consistent with the world energy projections made with the model POLES, in particular regarding the world energy prices evaluated by POLES as a result of demand and supply interaction in the worldwide markets.

For sensitivity analysis purposes, the approach considers two baseline scenarios, which for the EU differ, only in the dynamic evolution of world energy prices. The baseline scenario involving relatively low rates of increase of gas and oil border prices to the EU is called “low price baseline”, while the one assuming high growth of gas and oil prices in the long run is called “high price baseline”. Both scenarios assume stability for the price of imported coal.

⁴⁴ This chapter presents the most updated version of the activity on technology stories carried out with PRIMES. The work involved Pantelis Capros, Leonidas Mantzos and Kostas Delkis. The results were presented in successive workshops jointly organised by the IEA/OECD and the European Commission.

For analytical purposes, the chapter presents the results separately for each cluster of technologies, for which accelerated technology progress occurs. Such a set of assumptions lead to a scenario called “technology story”. One such story concerns the demand-side and six concern the supply-side (in fact the power and steam generation technologies). The chapter also presents the combined effects from the demand and the supply-sides.

The following matrix summarises the definition of the model runs.

Table 11-1: Definition of technology stories.

		Low prices for oil and gas	High prices for oil and gas
Demand side	Baseline	Low price baseline	High price baseline
	Demand-side story	Low price and demand-side story	High price and demand-side story
Supply side (6 cases)	Demand-side progress as in the baseline	Low price and supply-side stories without demand effects	High price and supply-side stories without demand effects
	Demand-side progress as in the demand-side story	Low price and supply-side stories with demand effects	High price and supply-side stories with demand effects
Number of scenarios for the EU		14	14

11.2 Definition of Technology Progress Stories

A technology story assumes a different from baseline evolution of technological progress affecting a defined group of energy technologies. The assumptions correspond to an assertion that a cluster of technologies, grouping techniques that are based on similar technological components, will improve over time at a rate higher than other technological groups.

Assumptions underlying the technology stories are described in detail in chapter nine. The demand-side story and a pessimistic supply-side story have been added.

In summary, the technology stories are defined as follows: