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A LONG TERM SCENARIO ON GLOBAL RESOURCES AVAILABILITY

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OVERVIEW

Most of existing energy scenarios is based on partial or general equilibrium models. So doing, these scenarios may minimize the importance of the potential mismatch between supply and demand. EDF R&D has developed the tool “Mescalito”, to simulate global long term energy supply and Demand trends and which highlights unsatisfied demand or supply surplus. This paper presents the Mescalito approach through a scenario illustrating the risk of a supply disruption.

METHOD

The main idea of the Mescalito approach is based on an independent estimation of supply and demand functions. Supply functions take into account resource base estimates of fossil and fissile fuels. It also incorporates parameters such as production decline rate or maximum production level in order to reflect economical, political or industrial production development capacity. The aggregation of these production functions provides a potential supply. Mescalito estimates also a wishful demand, resulting of the aggregation of several assumptions on per capita energy consumption for different uses (heat, electricity...) and sectors (Industry, residential, agriculture...). As a result and after considering potential exchanges between regions, possible supply does not necessarily equates desired demand, underlying the risk of supply disruption or at least market tensions.

RESULTS

According to this scenario, desired demand would rapidly exceed possible supply. As far as liquid fuels are concern, a supply disruption may occur as soon as 2015 - since the contribution of non conventional oil and synthetic fuels (GTL, CTL, biofuels) would not able to compensate for the rapid decline of conventional oil. Furthermore, this scenario underpins that a risk on Nuclear and gas forms exist also on a longer horizon.

Another interesting result arising from these perspectives is that, even under an assumption of a declining energy consumption trend, the situation of Europe seems particularly worrying. The European Union which is already highly dependent on energy imports is expected to suffer rapidly from the high level of unsatisfied demand resulting from the global lack of resources.

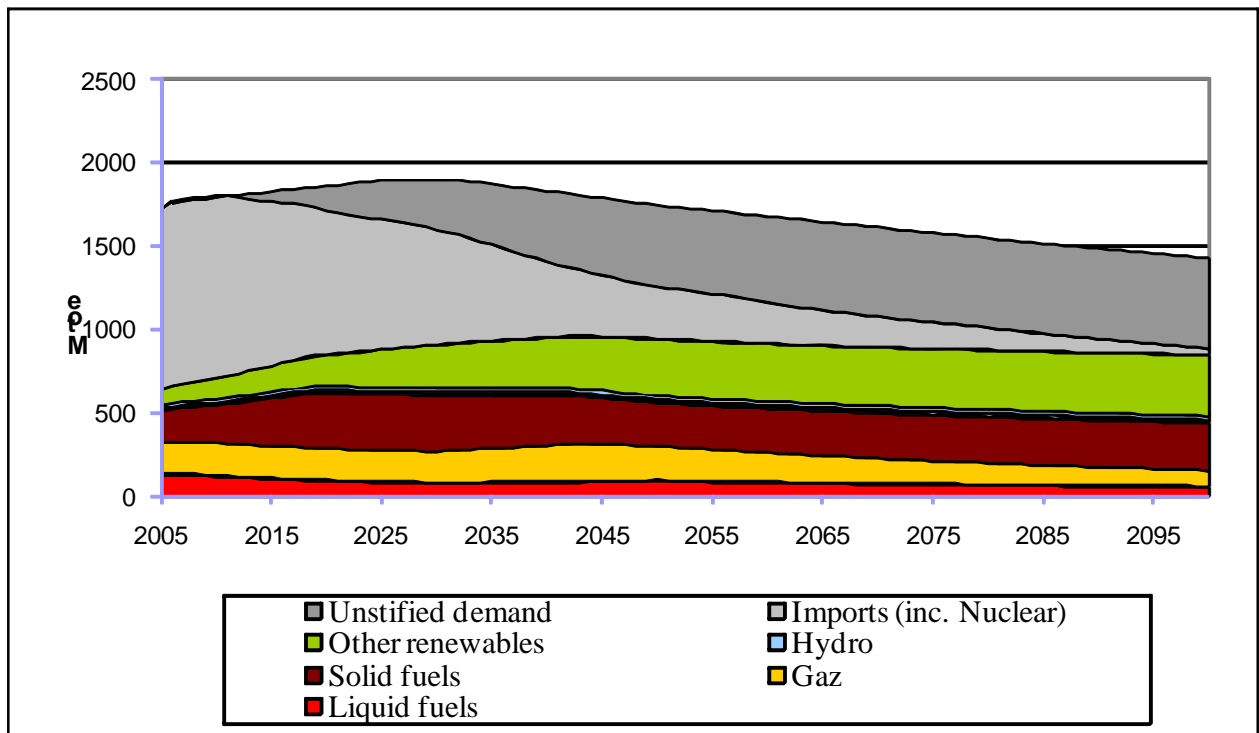


Fig. 1. European Energy Balance, 2005-2100

RESULTS

This scenario highlights the potential economical and political risks energy systems may face and is a clear message for strong policy reactions.

The necessary transition to a low-carbon world would not only be needed to fight potential climate change impacts but also to ease mid-term energy market tensions.