	HOP! research project **Macro-economic impact of high oil price in Europe**

Deliverable 4.2

Outcome of the HOP! final conference

Seville, June 2008

Project co-funded by the European Commission – DG Research
6th Research Framework Programme

HOP! Macro-economic impact of high oil price in Europe

Contract n.: SSP-CT-2006-044164

Duration: 01.01.2007 – 30.06.2008

European Commission – DG Research – 6th Research Framework Programme

Partners: TRT - Trasporti e Territorio SRL, Milan, Italy (coordinator)
ISI - Fraunhofer Institute Systems and Innovation Research, Karlsruhe, Germany
IPTS - Institute for Prospective Technological Studies, DG-JRC, Seville, Spain

Website: www.hop-project.eu

Deliverable n.: 4.2

Title: Outcome of the HOP! final conference

Authors: Tobias Wiesenthal JRC IPTS, Burkhard Schade JRC IPTS

Version: 1.0

Date: 30 June 2008

This document should be referenced as:

Wiesenthal T, Schade B.; Outcome of the HOP! final conference, Deliverable 4.2 of HOP! (Macro-economic impact of high oil price in Europe). Funded by European Commission 6th RTD Programme. Seville, Spain.

Status: Restricted

Distribution: HOP! partners, European Commission

Availability: Public (only once status above is accepted)

Filename: D4.2 HOP!.doc

Quality control: Angelo Martino TRT

LIST OF CONTENTS

1 Context

Oil prices have been rising steeply over the past years, reaching peaks of around 140 US$/barrel in June 2008. Such prices raise concerns about impacts on the economies of oil-importing countries, such as those that occurred in the 1970s. However, today's (and most likely also future) oil price peaks are based on different grounds than previous ones; furthermore, economies and institutional settings developed substantially since the 1970s. An analysis of past oil price crises can therefore not sufficiently predict the affects of future oil price peaks.

The HOP! project aims at estimating the various direct and indirect effects of a long term future oil price escalation on the EU's economy based on a combined modelling approach. The impacts on the transport and energy sector and the overall economic system are assessed via a combination of the partial equilibrium global energy model POLES with the ASTRA transport and macroeconomic model. The project is co-funded by the European Commission DG Research as part of the 6th Framework Research Programme and is undertaken by three partners, with TRT Trasporti e Territorio taking the lead and collaborating with Fraunhofer Institute Systems and Innovation research (ISI) and the Institute for Prospective Technological Studies of the European Commission JRC (IPTS).

The model-based quantitative analysis is combined with expert opinions, which are obtained primarily through scientific events: the first workshop in November 2007 discussed the model assumptions and the project methodology, while the final conference provided a forum for discussing the final HOP! project results.

These minutes summarize the outcome of the final conference, which took place in Brussels on 5 June 2008. The meeting provided extremely useful discussions on the outcome of the HOP! project and documented a strong interest of the EC as well as various stakeholders in this piece of research.

The present report follows the structure of the conference. The contents of the various presentations are briefly described, followed by a summary of main discussion points of each session. The slides of the presentations and related papers from the project team can be downloaded from the project website www.hop-project.eu. They contain interesting and relevant information beyond the summaries provided in the minutes.

The conference was well attended with almost 70 experts from science, policy and interest groups. The project partners would like to thank all participants for their valuable inputs to the fruitful discussions and the speakers for their outstanding presentations.

2 Objectives and structure of the conference

Experts' discussions form one key element in attaining the HOP! project aims, complementing the quantitative modelling. The exchange with the scientific and policy community is primarily organised through meetings, such as the HOP! workshop and the final conference. The objective of the HOP! conference was hence to discuss the outcome of the HOP! project with the widest possible audience. For this, it aimed at combining the scientific dimension (to comment on the approach and findings) with the policy dimension (to connect with relevant EC initiatives, including the research priorities).

The conference consisted of four major sessions (for the detailed agenda see annex):

1. The first session aimed at introducing the project and at providing its context;
2. The second session presented the impacts of high oil prices on the transport and energy sectors and the reaction by industry;
3. The third session focussed on the presentation of the overall economic implications of high oil prices, the links to climate change and the role of monetary policy;
4. The fourth session contained an intensive discussion on the policy responses.

Chairman Prof. Marco Ponti, Politecnico di Milano		
1st session	<u>Introduction and Context</u> *Opening remark* *Keynote of EC on the relevance of the issue* *Objectives, methodology and scenarios of the Project*	 *Odissefs Panopoulos (EC DG RTD)* *Dario Paternoster (DG ECFIN)* *Angelo Martino (TRT)*
2nd session	<u>The impact on the transport and energy sectors</u> *Model results: reactions in the transport & energy sectors* *Implications for vehicle technologies and fuels*	 *Burkhard Schade (IPTS)* *Ingo Drescher (Volkswagen)*
3rd session	<u>The economic implications</u> *Model results: economic implications in the EU* *Oil prices and climate change mitigation* *Impact of high oil prices – the role of central banks*	 *Wolfgang Schade (ISI)* *Terry Barker (University of Cambridge)* *Diego Rodriguez Palenzuela (ECB)*
4th session	<u>Policy responses</u> *Suggestions from the HOP! Scenarios results* *What is done on the OECD level*	 *Davide Fiorello (TRT)* *Christoph Erdmenger (Germany's Environment Agency)*

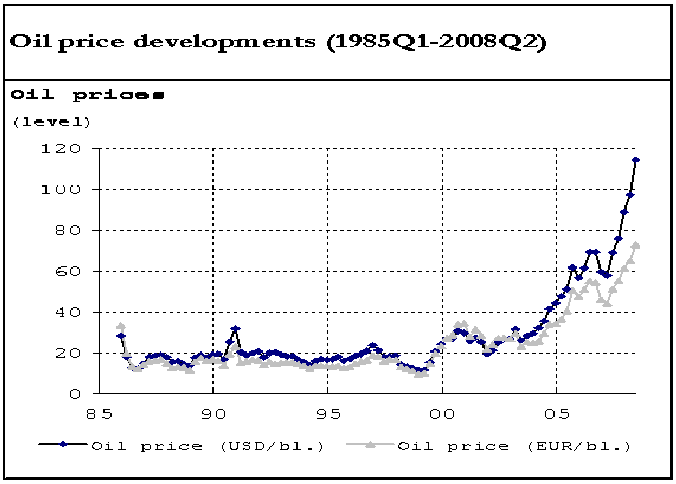
3 Introduction and Context

The conference was chaired by Prof. **Marco Ponti**, Politecnico di Milano.

Odissefs Panopoulos (European Commission, DG RTD) introduced the conference by setting the challenges of the day. He stressed that high oil prices are likely to reflect the increasing gap between rapidly increasing demand and a stabilising or decreasing supply of oil. If such gap happened soon, or if technological alternatives to oil failed, there might even be a risk of physical scarcity of energy supply.

Given the importance of oil as an energy source, Mr Panopoulos expressed doubts about a purely economic approach that trusts in market mechanisms to find alternatives to oil. He called for the auditorium to use the conference as an occasion for assessing the impacts of oil scarcity on the society beyond the scope of economic modelling.

As a second speaker, **Dario Paternoster** (European Commission, DG ECFIN) gave an insight into the impacts of high oil prices as estimated in the Commission's spring economic forecasts. Like all other re-known institutes and modellers, also DG ECFIN had underestimated the oil price developments in the past. They have thus been corrected upwards in the annual spring economic forecasts. With the global demand for oil likely to remain high and supply being tight, elevated oil prices may persist for some time.



Historic oil prices

Source: Presentation by Dario Paternoster, 5 June

On the supply side, high oil prices would affect the production decisions and changes in relative prices. On the demand side, there would be a shift in purchasing power between countries. He pointed out that in Europe the latest oil price rises meant an increase in the monetary oil import value despite a decrease in oil import volumes over GDP.

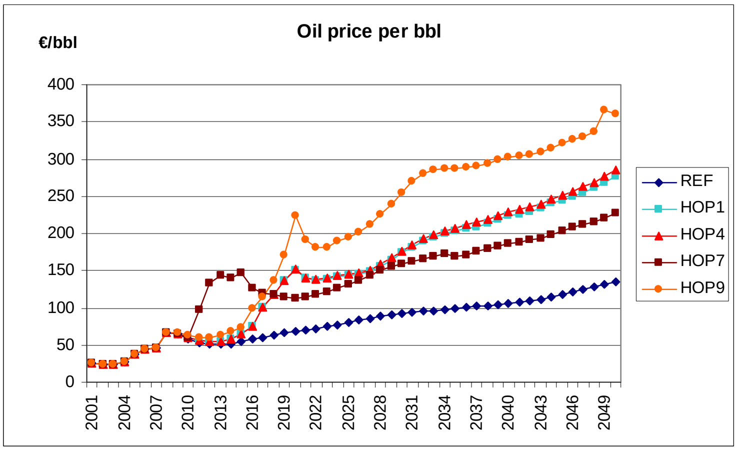
DG ECFIN performed an assessment of high oil prices with the QUEST III model, assuming a gradual increase of oil prices of 100% over three years. As a result, energy prices would have increased by some 16% after three years. Consumer prices would increase gradually while at the same time domestic consumption would be reduced. Overall, this would lead to a reduction of GDP of some 0.6% after three years, and 1.4% after 10 years. An even further increase in the oil price (additional 25%) would add effects in the order of half of the impacts of a 100% increase on GDP and consumer prices, demonstrating the non-linear nature of the impacts.

The outcome of the assessment crucially depends on how wages respond and on the elasticities of oil substitution. If instead of falling as in the default scenario, wages rose with the increase in energy prices, the output and employment losses could be much larger. Furthermore, the easier it will be to substitute between oil/energy and other inputs in production and goods, the lower will be the overall effects on the economy.

Angelo Martino (TRT) concluded the session by introducing the HOP! project; its objectives, methodologies and context. He set the context of high oil prices that are due to structural changes in the global supply and demand patterns, geopolitical tensions and speculations. Some direct impacts of high oil prices can already be observed today, such as protest of primarily concerned groups (e.g. fisherman, lorry drivers) and policy makers discussing e.g. tax relieves.

He then presented the methodology of the project. The global energy model POLES and the EU strategic transport and macroeconomic model ASTRA were linked in order to analyse a set of scenarios describing various levels of oil prices in 2020 (150 EUR_{2000}/bbl; 220 EUR_{2000}/bbl and 600-800 EUR_{2000}/bbl) and different responses of the energy and transport sectors to this shortage.

Mr Martino concluded by presenting the structure and the objectives of the conference, namely to discuss both the results and the methodology of the HOP! project.



Oil price developments in selected HOP! scenarios

Source: Presentation by Angelo Martino, 5 June

N	Oil price (year 2020 €/bbl)	Investment size	Investment target	Fuel taxes	Price growth path
Ref	Low (70)	Low	Efficiency & New Sources	EU directives	Stable
1	High (150)	High	Efficiency & New Sources	EU directives	Smooth rise
4	High	Low	Neither	EU directives	Smooth rise
5	High	High	Efficiency & New Sources	Reduced Tax	Smooth rise
6	High	High	Efficiency & New Sources	Carbon Tax	Smooth rise
7	High	High	Efficiency & New Sources	EU directives	Early Step
7b	Extremely high (600)	High	Efficiency & New Sources	EU directives	Early Step
7c	Extraordinarily high (800)	High	Efficiency & New Sources	EU directives	Early Step
8	High	High	Efficiency & New Sources	EU directives	Late Step
9	Very High (>200)	Very High	Efficiency & New Sources	EU directives	Smooth rise

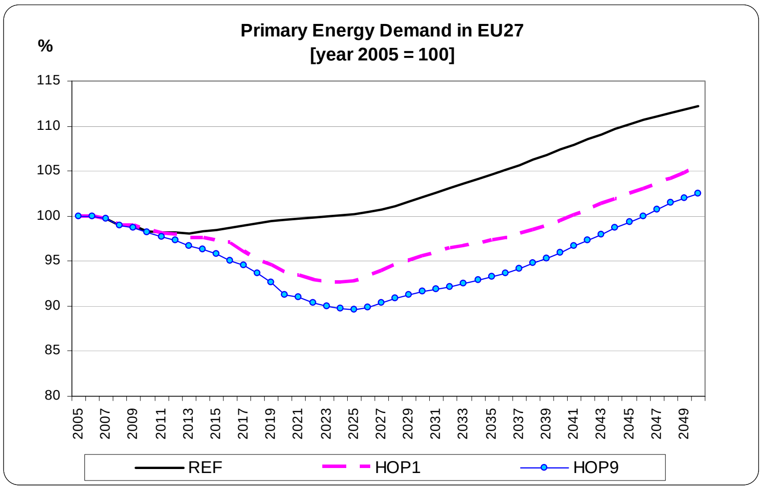
4 Impact of high oil prices on the transport and energy sectors

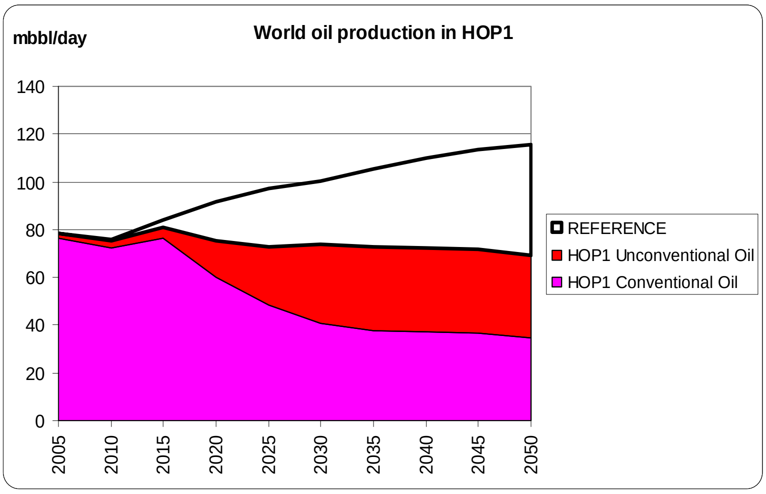
The session was opened by **Burkhard Schade** (European Commission, JRC-IPTS). He presented the HOP! model results with a special focus on the energy and transport sectors for oil prices reaching 150 and 800 EUR_{2000}/bbl in 2020 and rising further towards 2050 (see figure in the previous page). The scenario results show that high oil prices trigger:

- *Transport and energy demand reductions*: gross inland energy consumption is projected to decrease by in-between 5% and 10% in the period following the oil price shock in the scenarios with oil prices around 150/220 EUR_{2000}/bbl, and by some 20% for oil prices reaching 600 EUR_{2000}/bbl. In terms of final energy consumption, reductions would be even greater with the transport sector experiencing the largest reductions. This is induced by a substantial decrease of passenger and (to a lesser extent) freight transport activities as well as a change of modal splits and modifications in the composition of the fleet mix in favour of electric, hydrogen and particularly biofuel-powered cars.

- *Switch to non-oil energy sources*: oil consumption would be most affected and loose its dominant share in a scenario assuming high oil prices. The share of gas would, however, remain more or less stable and coal would gain in relative terms. Renewable energy carriers would benefit most from the oil-price induced changes in the fuel mix, providing more than 30% of the overall energy consumption by 2050. In particular biofuels would gain a large share of total transport fuel demand.

- *Exploitation of unconventional oil resources*: unconventional oil resources would substantially gain in importance if conventional oil resources are assumed to be low. In scenario HOP!1 with oil prices reaching 150 EUR_{2000}/bbl in 2020, oil production would be equally





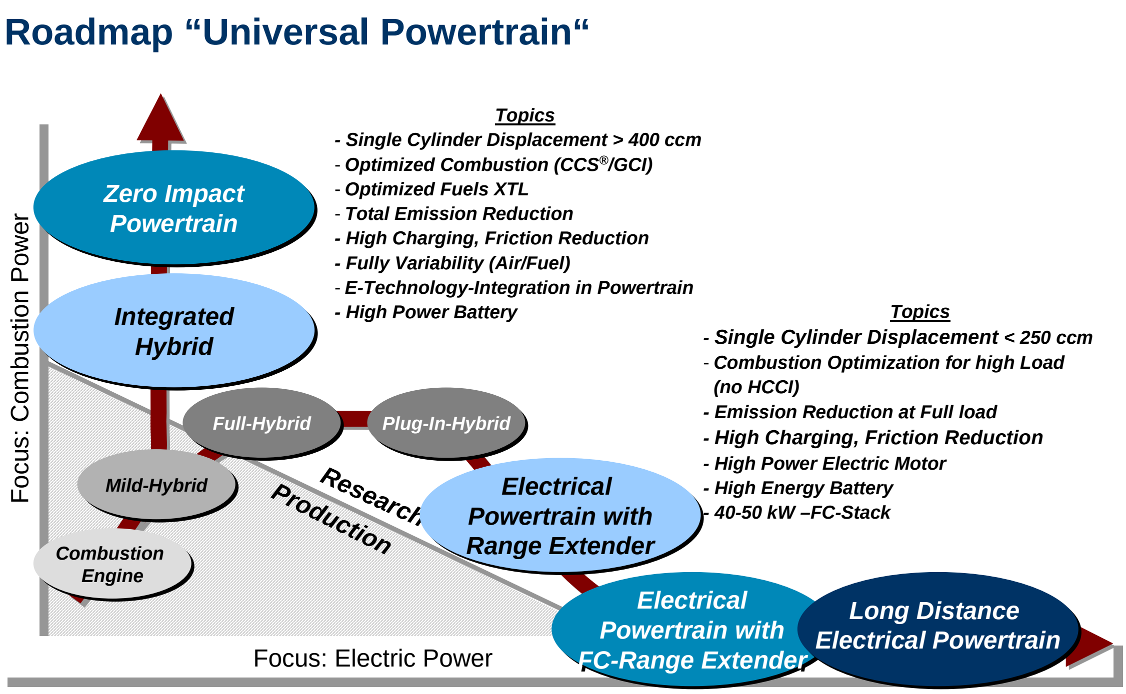
Primary Energy Demand and World Oil Production in selected HOP! scenarios and the reference case

Source: Presentation by Burkhard Schade, 5 June split between unconventional and conventional oil resources. Nevertheless, total oil production would remain below today's levels compared to a reference scenario that assumes a steady further increase.

Mr Schade pointed out that these changes rely on the assumptions of both technological options and investments being available. In case that investments were insufficient or technologies could not be built up fast enough, resulting e.g. from a very fast jump in oil prices, much larger reductions of energy consumption could be observed in the model results.

Ingo Drescher (Volkswagen AG) introduced Volkswagen's Fuel and Powertrain strategy. Energy security has significantly gained in importance as a driver for the strategy over the past years. Improving fuel efficiency by 25% through hybridisation, downsizing and gearbox technologies forms one cornerstone of the strategy. Another cornerstone is the introduction of synthetic fuels, which shall be biomass-based in the long run ('sun fuel'). Compared to conventional biofuels, this advanced BtL fuel combines the advantages of a diversified feedstock with much larger savings of GHG emissions in the order of 90% compared to fossil fuels.

With the improvements in battery technologies, electric vehicles become more interesting for car manufacturers. Nevertheless, the main barrier for their introduction remains the still limited electrical energy storage potential (per unit of weight). Current batteries allow for some 7 km/100kg weight, while VW aims at achieving a 70km range per 100 kg battery weight. Under the assumption of a realistic battery weight of 300kg, this would yield an acceptable travel distance of 210 km.



Volkswagen's Fuel and Powertrain Roadmap

Source: Presentation by Ingo Drescher, 5 June

The presentations stimulated a lively **discussion**, which shall be summarised under a few overarching points:

- The impact of high oil prices on GHG emissions was discussed. On the one hand, the reduction of energy consumption and the increase of renewable energy carriers lower GHG emissions. On the other hand, the extraction of unconventional oil and other alternative fuels such as Coal-to-Liquid and the rising importance of coal will increase emissions. According to the model results, overall energy-related CO_2 emissions would be reduced in the HOP! scenarios. However, the model does not take into account emissions that are generated during the production of fuel, and thus underestimates the important additional emissions from CtL and unconventional oil.

- Some participants mentioned that even in the reference case, the projected oil production remains far below the values given by the IEA, in particular until 2020. Others found that the oil production in the reference case is overestimated, in particularly given the recent reports on peak oil (e.g. from the Energy Watch Group). This point could not be resolved.

- The impact of biofuels on food availability and prices was raised as an important issue for consideration. While the biofuel model used in the HOP! project assumes some feedback on feedstock prices, it does not contain physical resource limits. This was deliberately not built in into the model because a prioritisation of either food or energy crop cultivation is a societal choice.

- The unique role of the EU was underlined. Compared to other world regions, and especially the USA, fuel taxes in the EU are on a very high level. Furthermore, for some time the EU has been pursuing a policy to move towards efficient energy use and low-carbon energy sources. Altogether, it can be expected that high oil prices would hit the EU to a lesser extent than many other oil-importing regions.

- The time lag in bringing new technologies onto the market was mentioned. The approval time and construction period of plants for the exploitation of tar sands seems to be very long and may have been underestimated in the model-based analysis.

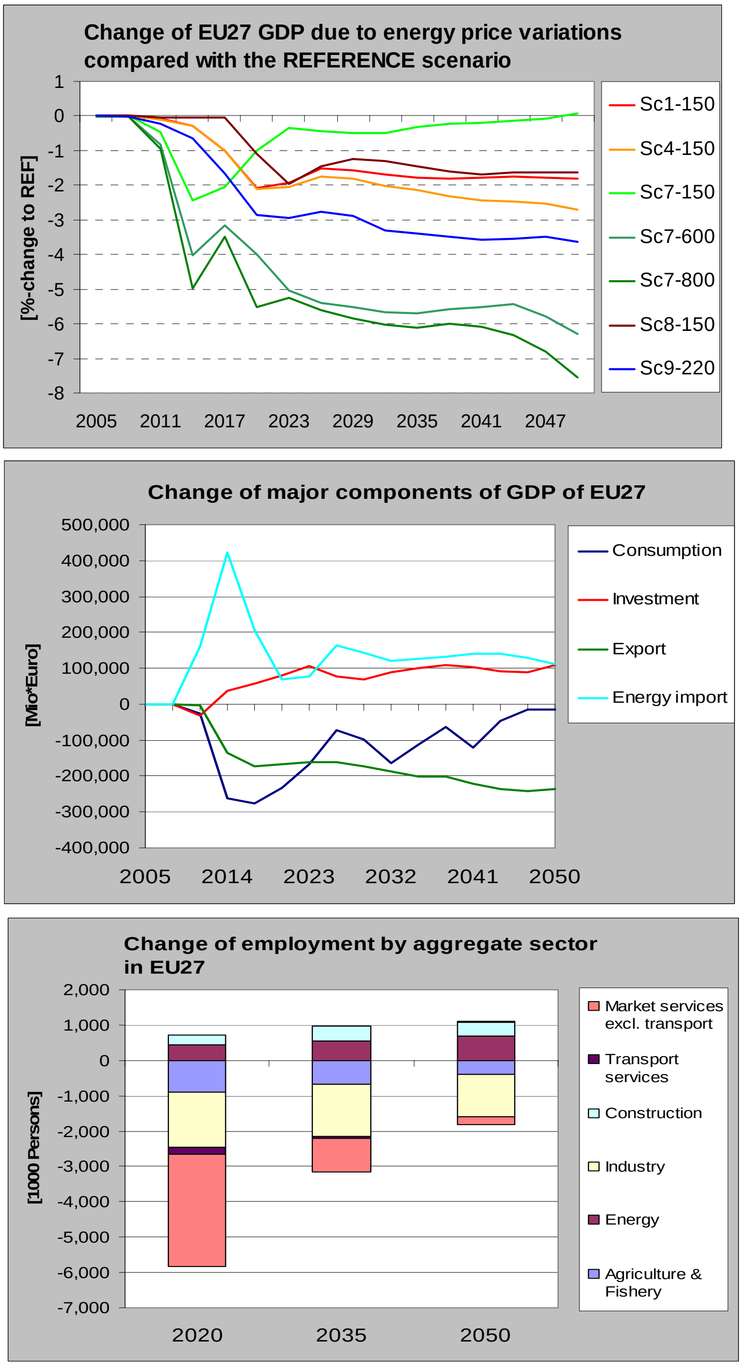
5 Economic Impact of high oil prices

Wolfgang Schade (Fraunhofer ISI) presented the HOP! project results concerning the impacts of high oil prices on the EU economy and employment. He briefly introduced key parameters in the reference scenario: the EU GDP is assumed to increase by an average annual rate of some 1.4% between 2010 and 2050, with especially the new Member States seeing above-average growth rates.

Relative to the reference scenario, all scenarios with high oil prices would face a reduction in GDP growth. By 2050, this would be in the order of some 2% for a scenario assuming an oil price of 150 EUR_{2000}/bbl by 2020, rising to 7% if prices reached 800 EUR_{2000}/bbl by 2020. Nevertheless, even the highest increase of oil prices would stop economic growth only for a few years, while in all other scenarios GDP would still grow throughout the entire time period, yet at a limited rate.

The change in GDP is due to a lowering in exports and in domestic consumption. Moreover, the level of energy imports in monetary terms would increase. The counterbalancing factors are (1) the rising investments in energy efficiency or alternative energy sources, (2) structural change towards more domestically based sectors, and (3) lower energy intensity.

Employment in the EU27 would be affected to a significant extent. The scenario results indicate a reduction in employment of 15% (HOP!1) up to 30% (HOP! 7c) shortly after the oil price peak, but almost getting back to reference levels by 2050. The sectors most affected would be market services, transport, industry and agriculture and fisheries. On the other hand, additional employment would be created in the construction and energy sectors. The decline of employment strongly depends on how the energy sector is able to



Effect of selected HOP! scenarios on the European economy and employment compared with reference

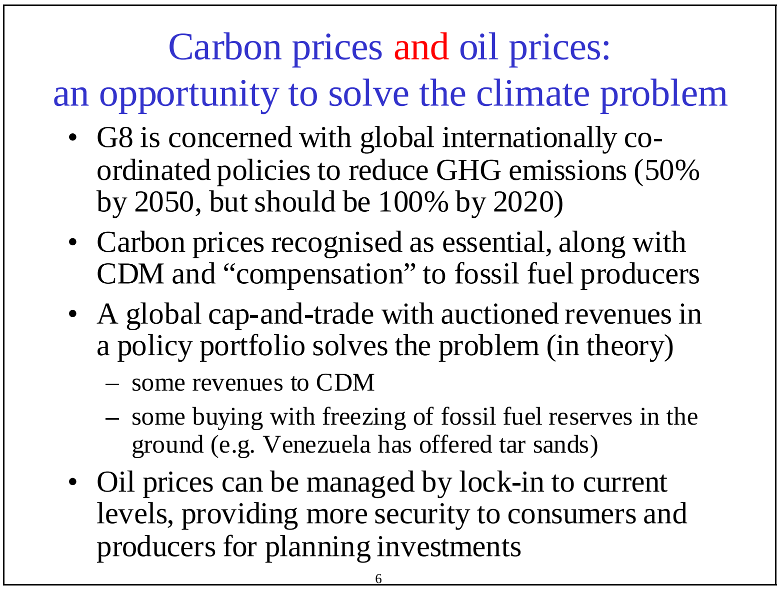
Source: Presentation by Wolfgang Schade, 5 June forward price increases and how profits of the energy sector are used from a macroeconomic perspective e.g. if the sector re-invests them or if they are used as transfers to fund efficiency improvements for less well-off households.

These outcomes do not take into account the impact of high oil prices on the global GDP, which in return would affect the EU economy. Under the assumption of global GDP growth rates being reduced by high oil prices from reference levels by 30%, 50% and 70%, respectively, the EU economy would be affected much stronger. The additional reduction of the EU GDP would be in the order of some 1-2%.

Mr **Terry Barker** (University of Cambridge) clarified the important link between high oil prices and climate change policies. He recapitulated the importance of reducing global GHG emissions by more than 70% below business-as-usual levels in order to have a 50% probability of limiting global temperature increase to 2 degrees by 2100. This implies policies equivalent to a carbon price of some 100 US$/t CO_2.

There are significant differences between the effect of a carbon tax and high oil prices. An elevated carbon tax would primarily reduce coal in electricity consumption, while high oil prices primarily would curb down oil consumption in transport (with lower CO_2 emission per unit than coal) and may create an incentive for even more CO_2 intensive substitutes such as CtL (coal-to-liquid), coal and unconventional oil. Furthermore, a carbon tax creates revenue for governments, while the rent of high oil prices goes to energy producers. Moreover, carbon taxation as a policy instrument can be designed in a societal acceptable way, while high oil prices would primarily hit the low-income groups.

Keeping a high carbon tax even in the presence of high oil prices is therefore important. It could steer the search for oil alternative from carbon-intensive sources to low-carbon options.



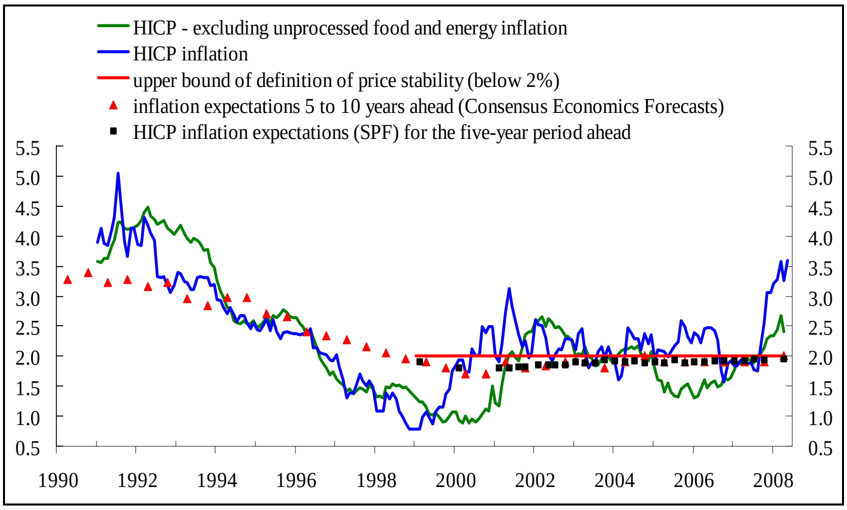
Linking carbon prices and high oil prices

Source: Presentation by Terry Barker, 5 June

Mr **Diego Rodriguez Palenzuela** (European Central Bank) explained the role of a stability oriented monetary policy in containing the negative impacts of high oil prices through the stabilisation of longer-term inflation expectations and the prevention of costly price-wage spirals. He reminded that the objective of the ECB is to maintain price stability, which is to be achieved over the medium run. He reminded that three main factors underpinned the relatively limited impact of recent high oil price increases on the overall economy - even though some sectors have been hit significantly – compared to the oil price crisis of the 1970s. First, there is an important component of demand pressure in explaining strong oil prices increases, stemming from economic catching up in large emerging countries. Second, energy efficiency in Europe has increased remarkably over the past two decades. Third, higher credibility and commitment to price stability in many central banks across the globe has reduced the macroeconomic adjustment costs to higher oil prices.

Mr Rodriguez Palenzuela then emphasised - from a monetary perspective - the implications of the fact that higher oil prices represent primarily, although not exclusively, a shock of real nature, affecting in the first relative prices and terms of trade.

- This meant in particular that oil price shocks in the medium to long run affect the economy's potential, while monetary policy cannot affect potential growth (beyond its contribution of anchoring nominal developments).
- The analysis of the longer-term impact of oil price increases is thus particularly appropriate in models of the real economy.
- Yet, especial scenarios with a stronger medium term focus may need to include interaction with overall price formation and also monetary policy;



Price developments and inflation expectations in the euro area

Source: Presentation by Diego Rodriguez Palenzuela, 5 June

The session was enriched by **discussions and questions**. The main discussion points are summarised in the following:

- In the HOP! project, it was decided to use constant Euros instead of US$ as currency also for oil prices. This decision was made in order to eliminate the effect of currency exchange rates and follows in-depth discussions held at the first HOP! workshop in November 2007. However, some participants felt that the oil price should have been calculated in US$ as this is the currency in which oil primarily is traded.

- The general assumption of increasing investments (in energy technologies) at times of low GDP growth was questioned for not being in line with observations made. Such controversies could nevertheless not be observed when calibrating the ASTRA model. Also todays situation can not be compared with any past energy price induced economic downturn, which were expected to be temporary following the business cycle such that it makes sense to cut back company activities including reducing investments and wait for the business cycle becoming positive again thus triggering investments again. Today, and this is becoming clearer to everybody day after day, the situation is different: this oil price crisis will not be solved by time passing by. It is caused by the structural inability to make production keeping up with the pace of demand growth. The only solution – besides crisis and economic recession thus reducing oil demand – is to invest in alternatives and energy efficiency. At the same time such investments belong to the most safe to become profitable as energy is one of the life-bloods of economies. Thus in this situation investment can and will increase despite reduced economic growth.

- A general rule of thumb for the impact of high oil prices on inflation was given: a 10% increase in the oil prices results in around 1% increase in energy inflation. With energy inflation constituting some 10% of total inflation, this means an increase of total inflation of some 0.1%.

6 Policy responses and concluding remarks

Davide Fiorello (TRT) drew the policy-relevant conclusions from the HOP! project:

- One of the key factors for dampening the negative impacts of high oil prices will be the timely availability of sufficient investments for increasing energy efficiency and expanding energy sources to substitute oil. A central question therefore is whether the energy-sector itself will make the required investments, and where those would be made given that many energy companies are global players. Policy choices can affect investments through direct public investments; fiscal and monetary policy; regulation measures to prompt technical progress (e.g. consumption limits for vehicles); and market regulation.

- Another important policy challenges will be to address the distributional effects of high oil prices. Particularly low-income households cannot afford higher energy costs. Therefore, specific support to these groups, and policies against unemployment, may be needed. However, support policies should be cautious to not eliminate the incentive to save energy, e.g. as energy subsidies for low income households would do, but to support the shift to efficient technology also of low income households. Thus the support could be subsidies or micro-credits to purchase efficient appliances (e.g. A++ fridges).

- For the transport sector, the HOP! results show that taxation discounts do not provide real benefits in the long-term, while at the same time cutting government earnings. This comes at a time where government revenues would in any case be reduced due to the lower transport demand. There is a reduced room for 'neutral' road fiscal policies reform.

- Synergies with climate change mitigation policies can exist and should be exploited rather than going for oil substitutes that are carbon-intensive.

Christoph Erdmenger (German Federal Environment Agency UBA) interpreted the HOP! project results as follows. The good news of both the project and the conference is that

- The project approach seems to be useful and enriches the discussion on high oil prices from a scientific basis.

- The project shows that the discussion about oil can also be sensibly addressed from the demand side (without neglecting the supply side).

- Although the results indicate that high oil prices will have negative impacts on the economy, the costs seem to be bearable. (As a side remark he mentioned that the losses are nevertheless much higher than the costs needed for attaining an ambitious GHG reduction target; synergies should be exploited.)

On the other hand, there is also some bad news:

- From a methodological point of view, the strong role of the EU in exporting energy technologies should have been considered in more detail.
- The results for employment are striking. After a renewed check of the accuracy of these model results, these figures should be a primary concern for society.
- Despite the oil-price induced changes in the fuel mix and reduced energy consumption levels, no GHG emission reduction targets would be reached. This implies that an active climate change policy would need to be continued also in times of high oil prices.

From these grounds, Mr Erdmenger concluded that

- We will need to act to high oil prices, but there is no need to rush. Instead, potential negative impacts on other overarching policy targets (e.g. climate change mitigation; food prices and land use change) need to be considered in every proposal on how to react.
- There can be win-win situations between fighting climate change and reacting to high oil prices. However, as there can also be adverse situations, these synergies will need to be exploited through an active policy.
- Finally, one should realise that also natural gas is an alternative for encountering both climate change and high oil price, but only on a transitional basis.

This final session of the conference was followed by extensive **discussions**, which shall be summarised below:

- Some participants stressed the importance of policies looking at the distributional effects of high oil prices. However, tax reductions or subsidies should only be of temporary nature (in line with the HOP! results), while in the long term structural energy efficiency measures should mobilise energy savings in these groups (and beyond).
- Higher oil prices do not only mean a loss for oil-importing countries, but at the same time rising revenues for some energy producing companies. It was discussed whether these should be taxed, and the revenues being used for investments in oil substitutes and efficiency measures. A contrary viewpoint was also presented: higher profit of companies will be passed on to the stakeholders, hence bringing the money back to society (in this case the money might not be used for investments); as a consequence, no additional taxation would be needed.
- Some debate occurred around the question of how far decoupling between energy consumption and GDP can go, or whether we can ultimately expect a growth in GDP despite a scarcity of oil. It was pointed out that so far, GDP growth always meant a simultaneous growth in energy consumption. However, in the EU, a relative decoupling could be achieved, i.e. GDP grew much faster than energy consumption. A total decoupling does hence not seem unrealistic. Furthermore, energy consumption may

increase even with oil production declining as oil substitutes would become more important.

- The related point of a probability of physical energy scarcity was also discussed widely. On the one hand, some physical scarcity could occur especially if oil production was drastically reduced over very few years, given the importance of oil as an energy source. On the other hand, with sufficient investment available and a smooth increase in oil prices allowing for investments to materialise in new production capacities, there are abundant renewable and other energy carriers who could substitute oil directly or indirectly. Nevertheless, one should look again into the additional capacities needed (e.g. for nuclear power).

- A clarification was sought whether the project dealt with high energy or with high oil prices only. Indeed, prices are interlinked in the models, with the gas price following the oil price to some extent. Furthermore, the increasing demand would imply coal prices to rise. Therefore, the project deals with high energy prices, but induced by a high oil price.

- The project team also clarified the mechanisms through which high oil prices mean an increase in coal consumption, despite the two not being direct substitutes. The model results indicate a further switching from primary energy sources (such as oil, gas) to electricity in most end-use sectors. This trend has been observed over the past decades in the EU and the growing importance of electricity would continue even more rapidly at high oil prices. With gas prices increasing faster than coal prices, coal would gain a larger share in electricity generation, thus indirectly substituting (some) oil.

- It was asked whether ECB and US Federal Reserve are going to co-ordinate their monetary policies in order to address the different impacts of high oil prices in world regions. The response was negative as there are obvious differences in the strategies of the ECB and the US Federal Reserve. These can be explained by at least two factors: firstly, the FED has the objective both to support economic growth while stabilising prices, while the ECB's sole mission is price stability. Secondly, the FED reacted not primarily to high oil prices, but to the general economic situation in the USA (credit crunch; financial services; banking problem).

- The long-term effects on international trade would have been worth exploring further. Unfortunately, this could not be done due to model constraints. As a proxy, sensitivity runs were made for three levels of reduced global GDP (see section 5).

- Finally, the question was raised on the differences between the effect of a carbon tax and high oil prices on climate change policy. Differences are in the prime sectors tackled: transport vs. energy; the fuels mainly affected: oil vs. coal; and the revenues: private companies vs. government. In the case of revenues for the governments, these could be used for additional investments in low-carbon technologies.

Furthermore, some **technical recommendations** regarding the presentation of project results were provided:

- Changes should not be shown only relative to the reference scenario, but also in total terms or relative to the starting year 2005.
- A differentiation between the EU12 new Member States and the pre-2004 EU-15 could be helpful.
- A detailed differentiation of the impacts across different income groups could be relevant for assessing social consequences of high oil prices. Even though this cannot be modelled with the tools applied in the project, it should be discussed in the final report in a qualitative way.

7 Agenda of the conference

Thursday, 5 June 2008, 9:30 – 17:00
Centre Albert Borschette, Rue Froissart 36, Brussels.
Room AB0D

Morning session (chairman Prof. Marco Ponti, Politecnico di Milano)		
9:00 – 9:30	Registration and coffee	
9:30 – 10:15	*Opening remark* *Keynote of EC on the relevance of the issue and the importance of the project* *Objectives, methodology and scenarios of the HOP! Project*	*Odissefs Panopoulos (EC DG RTD* *Dario Paternoster (DG ECFIN)* *Angelo Martino (TRT)*
10:15 – 11:00	The impact on the transport and energy sectors *Model results – reactions in the transport and energy sectors* *Implications for vehicle technologies and fuels*	 *Burkhard Schade (IPTS)* *Ingo Drescher (Volkswagen)*
11:00 – 11:30	Discussion	
11:30 – 11:45	Coffee break	
11:45 – 12:45	The economic implications *Model results: economic implications in the EU* *Oil prices and climate change mitigation* *Impact of high oil prices – the role of central banks*	 *Wolfgang Schade (ISI)* *Terry Barker (University of Cambridge)* *Diego Rodriguez Palenzuela (European Central Bank)*
12:45 – 13:30	Discussion	
13:30 – 14:30	Lunch break	
Afternoon session (chairman Prof. Marco Ponti, Politecnico di Milano)		
14:30 – 15:30	Policy responses *Suggestions from the HOP! Scenarios results*	*Davide Fiorello (TRT)*
	What is done on the OECD level	*Christoph Erdmenger (Germany's Environment Agency)*
15:30– 16:45	Final discussion	
16:45 – 17:00	Concluding remarks	
17:00	End	

8 List of participants

NAME	SURNAME	ORGANISATION	COUNTRY
Harry	Arkesteijn	Eukep	The Netherlands
Terry	Barker	University of Cambridge	United Kingdom
Daniele	Bassano	D'Appolonia	Italy
Arnaud	Burgess	TNO Business Unit Mobility and Logistics	The Netherlands
Giuseppe	Casamassima	TRT Trasporti e Territorio	Italy
Francois	Cattier	EDF	France
Kat	Cheung	European Turbine Network	The Netherlands
Giorgio	Cornetti	META-RICERCHE SNC	Italy
Donaat	Cosaert	Flemish Parliament / viWTA	Belgium
Francesca	D'Angelo	European Commission, DG MARE	Belgium
Mercedes	de Miguel Cabeza	European Commission, DG ECFIN	Belgium
Ales	Doucek	Nuclear Research Institute Rez plc	Czech Republic
Ingo	Drescher	Volkswagen	Germany
Charles	du Boisberranger	Polis	Belgium
Christoph	Erdmenger	Germany's Environment Agency	Germany
Ansón	Esther	Gobierno de Aragón	Spain
Francesco	Ferioli	ECN	The Netherlands
Davide	Fiorello	TRT Trasporti e Territorio	Italy
Leen	Govaerts	VITO, Flemish Institute for Technological Innovation	Belgium
Jorge	Grazina	EU Commission, DG INFSO	Belgium
Mathieu	Grisel	EU Commission, DG RTD	Belgium
Anders	Hansen	Roskilde University	Denmark
Nicki	Helfrich	ISI Fraunhofer	Germany

Stephan	Helmreich	AustriaTech	Austria
Olivier	Houppemans	European Turbine Network	The Netherlands
Olga	Ivanova	TML	Belgium
Klaus-Dietmar	Jacoby	European Commission, DG TREN	Belgium
Asa	Johannesson Linden	European Commission, DG ECFIN	Belgium
Ingmar	Juergens	European Commission, DG ENTR	Belgium
Sudhir	Junankar	Cambridge Econometrics	United Kingdom
Boyan	Kavalov	European Commission - JRC Institute for Energy	Belgium
Katri	Kosonen	European Commission, DG TAXUD	Belgium
Gustav	Krantz	Swedish National Energy Agency	Sweden
Massimo	Lombardini	European Commission, DG TREN	Belgium
Matthias	Maedge	NGVA EUROPE	Spain
Judit	Madarassy	Clean Air Action Group	Hungary/Belgium
Silvia	Maffii	TRT Trasporti e Territorio	Italy
Maarten	Maresch	EUKEP	The Netherlands
Angelo	Martino	TRT Trasporti e Territorio	Italy
Julien	Matheys	Vrije Universiteit Brussel - ETEC	Belgium
Orsola	Mautone	European Environment Agency	Denmark
Elena	Medvedeva	Energy Charter Secretariat	Belgium
Maria Cristina	Mohora	European Commission, DG TREN	Belgium
Andreas	Naegele	European Commission, DG TREN	Belgium
Odissefs	Panopoulos	European Commission, DG RTD	Belgium
Vasileios	Paschos	European Commission, DG RTD	Belgium
Dario	Paternoster	European Commission, DG ECFIN	Belgium

Marco	Ponti	Politecnico di Milano	Italy
Beate	Raabe	OGP Europe (The International Association of Oil & Gas Producers)	Belgium
Diego	Rodriguez Palenzuela	European Central Bank	Germany
Enrique	Rodríguez Partearroyo	IBERDROLA	Spain
Bert	Saveyn	EU Commission, JRC-IPTS	Spain
Burkhard	Schade	EU Commission, JRC-IPTS	Spain
Simone	Schucht	INERIS	France
Wolfgang	Schade	ISI Fraunhofer	Germany
Petr	Steiner	Hart Energy Consulting	Belgium
Johan	Stessens	VITO, Flemisch Institute for Technological Innovation	Belgium
Marek	Sturc	EU Commission, DG Environment	Belgium
Zsolt	Tasnàdi	EU Commission, DG TREN	Belgium
Paul	Timms	ITS, University of Leeds	United Kingdom
Wendel	Trio	Greenpeace international	Belgium
Thierry	Vexiau	MEEDDAT (Ministry of sustainable development)	France
Maria Rosa	Virdis	EU Commission, DG RTD	Belgium
Tobias	Wiesenthal	EU Commission, JRC-IPTS	Spain