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Gas Demand in Europe:
The role of the power sector

Oxford Institute for Energy Studies
Natural Gas Research Programme

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"Energy Markets: Fundamental Changes or Business as Usual?"
Energy Risk Management Seminar
CASS Business School - 28 June 2005

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OIES Natural Gas Research Programme

WHO WE ARE: a gas research programme located at an independent academic research institute in Oxford*, specialising in conventional energy research

WHO WE ARE NOT:

- **consultants**
- **sellers of exclusive, high price business reports**

WHAT WE PRODUCE: independent research on national and international gas issues

Information about our programme and its publications can be found on our website: http://www.oxfordenergy.org/gasprog.shtml

*Oxford Institute for Energy Studies is an educational charity

Research Programme: published work

- A Global LNG Market: is it likely and if so, when? James T Jensen
- Natural Gas and the Producer/Consumer Dialogue, Jonathan Stern (co-authored with Coby van der Linde for the IEF)
- Asian LNG Trade and Gas Market Reform: implications for gas and power customers, Jeffrey Skeer
- Argentine 2004 Gas Crisis, Anouk Honore
- Fraternal Friction or Fraternal Fiction? The Gas Factor in Russian-Belarusian Relations, Chloe Bruce

All downloadable from the website

Research Programme: work in progress

- Gas Demand in Europe by 2015 – the importance of the power sector, Anouk Honore
- Gas Price Formation in the UK: markets and insecurity of Supply, Philip Wright
- The Future of Russian Gas and Gazprom, Jonathan Stern
- The German Path to Gas Liberalisation: something special? Heiko Lohmann
- Entry-Exit Transmission Pricing Around Notional Hubs: Can It Deliver A Pan-European Wholesale Market In Gas? Paul Hunt
- Will There Be An Effective Organisation of Gas Exporting Countries? Regional Groupings and Market Power. Hadi Hallouche
- The Interconnector Pipeline: a key link in Europe's gas network. Mark Futyan

European Gas Demand: outline

- Why gas demand ?
- OIES on-going research
- Historical data
- Non-power sector
- Power sector
  - Assumptions
  - Probable / possible scenarios (2005-2010)
  - High and low case scenarios (2010-2015)
- Conclusions

Why Gas Demand ?

- A very under-researched subject in comparison to supply
- Scenarios tend to focus on “the gap” between supply and demand 20-25 years into the future and are very seldom price sensitive
- Statements about demand increasing by 1.5-3%/year up to 2030 tell us very little about the short/medium term future

We are not convinced by the forecasts of gas demand shown at conferences

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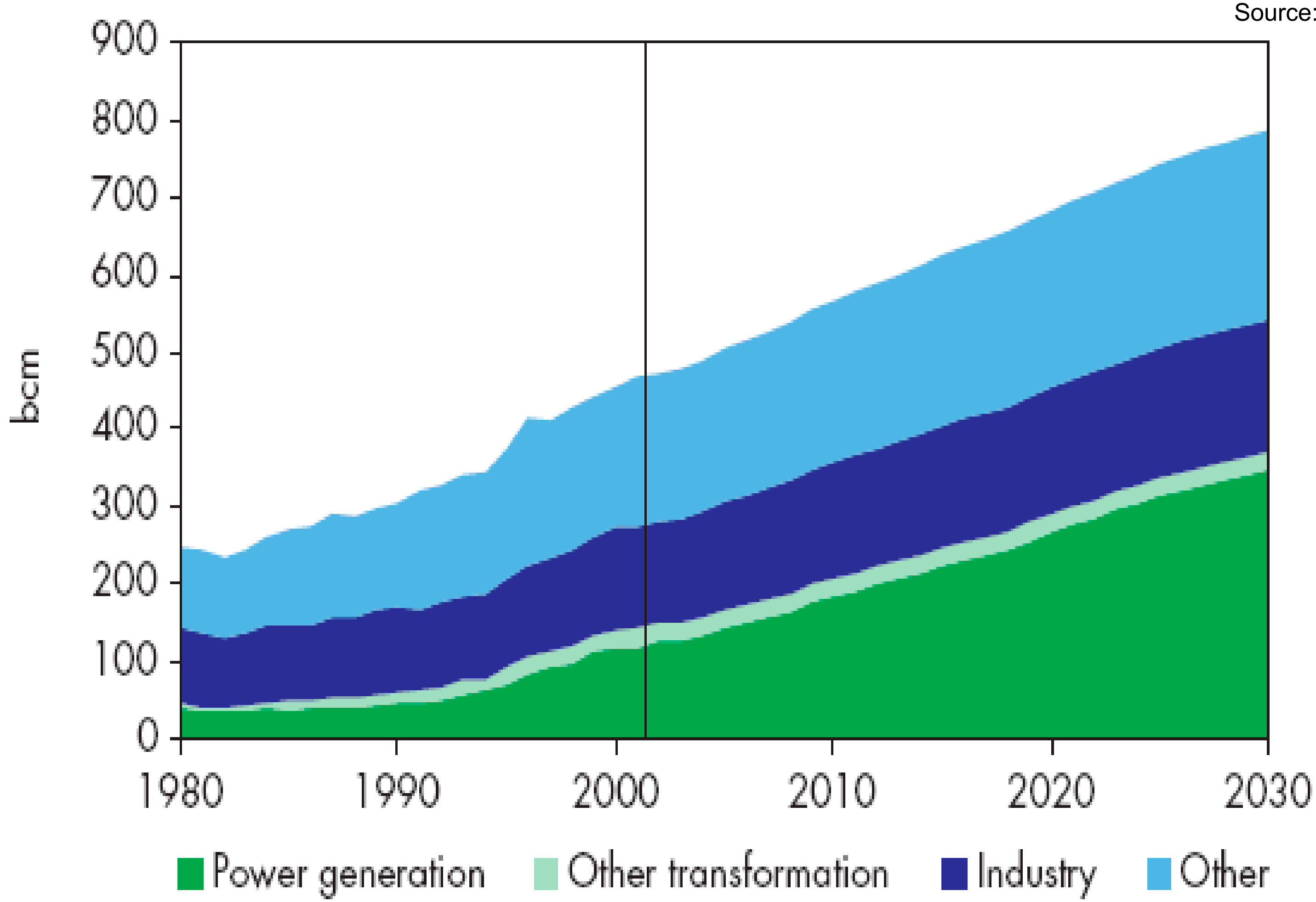
European* Gas Demand Projections to 2030 (IEA)

* Europe 25

Source: WEO 2004



70% of incremental demand is for Power

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IEA and other projections

- **IEA = 620 bcm in 2015 for EU25**

  Power: 220 bcm - Non-Power: 400 bcm
- **Eurogas = 450 mtoe for 2015 for EU15**

  Power = 120 mtoe – Non-Power: 330 mtoe
- **Cedigaz: 458 – 474 bcm for 2010 for 7 major markets**
- **Consultants – eg: Global Insight**

xxx[1] bcm in 2015 for 7 major markets

Assumptions / models are not known

Very difficult to compare time series because of different geographical grouping and different definitions of sectors

1: This information is NOT in the public domain, which is why it has been erased.

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European Gas Demand: OIES Research

- **The study: Total 34 countries**

  In detail: 7 major markets (83%* of total EU25 gas demand): Belgium, France, Germany, Italy, the Netherlands, Spain and the UK

  PLUS: Hungary, Poland, Romania, Turkey

  AND: Austria, Czech Republic, Denmark, Finland, Slovak Republic

  =>16 MARKETS = 93%* of *European* gas demand

- **What follows are the <u>preliminary conclusions</u> of our on-going study**

* These shares will remain the same (or even increase a little) by 2015

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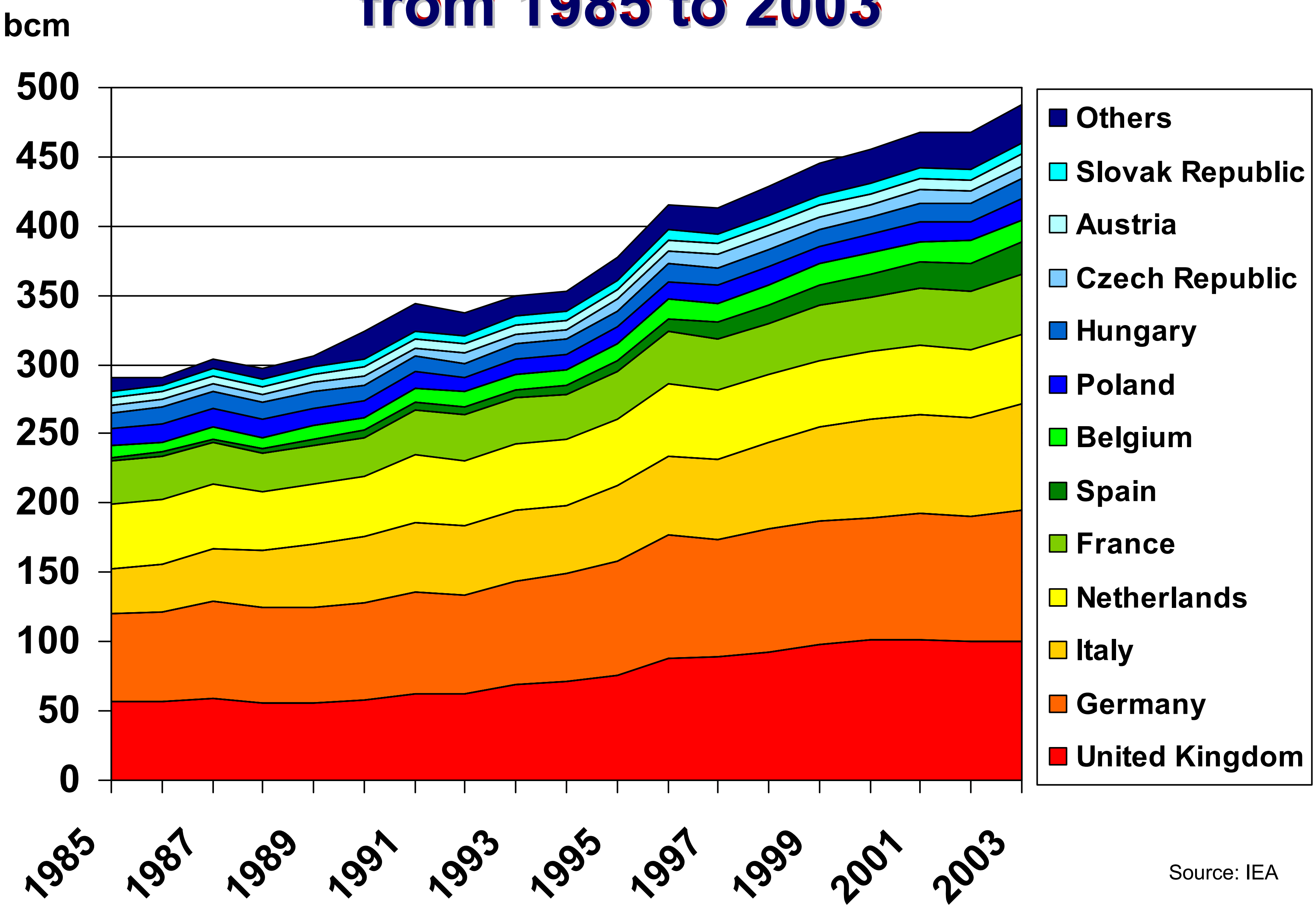
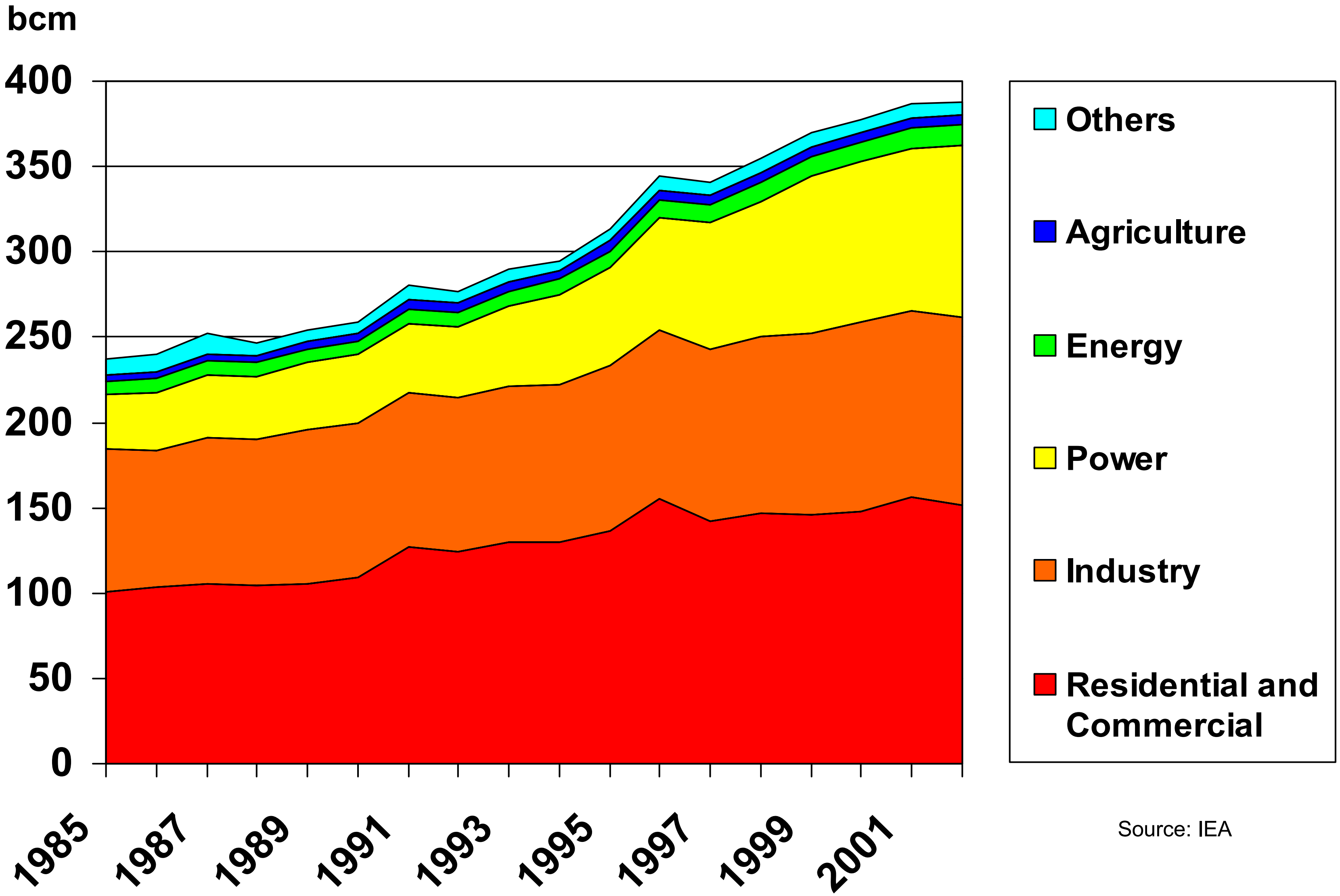
Gas Demand in EU 15 + 10 from 1985 to 2003



Source: IEA

Gas Demand by Sector in 7 major markets (1985 – 2002)



Source: IEA

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Sectoral Demand Changes in 7 major markets

Source: IEA

(%)	POWER		Residential / Commercial		Industry		TOTAL		
	1990 -02	2000 -02	**1990 -02**	2000 -02	**1990 -02**	2000 -02	**1990 -02**	2000 -02	2000 -03
Belgium	**140**	- 0.3	**44**	4.8	**61**	- 0.3	**65**	1.6	- 1.3
France	**664**	41	**38**	0.4	**34**	7	**47**	5	10
Germany	**15**	16.7	**65**	4.7	**4.6**	- 3.5	**30**	3.4	7
Italy	**125**	- 1	**35**	1	**20**	- 0.5	**49**	- 0.4	8.7
NL	**61**	9.6	**7.5**	3	**- 13**	- 7.2	**15**	2.4	3
Spain	**760**	67.6	**499**	28	**186**	12	**277**	23.2	39
UK	**1278**	- 1	**28.6**	1	**10.9**	- 8	**71.4**	- 1.8	- 1
EU7	**153**	6.9	**39**	2.8	**21.2**	- 0.9	**49.6**	2	6.7

Electricity Generated by Gas in 7 major markets - 2002 vs. 1990

Source: IEA

	1990		2002		Average annual % change 1990-2002
	TWh	% of total generation	TWH	% of total generation	
Belgium	5.4	7.7	17.8	22	10.4
France	3.0	0.7	17.1	3.1	15.5
Germany	40.5	7.4	55.9	9.6	2.7
Italy	39.7	18.6	108.7	39.4	8.8
NL	36.7	50.9	59	61.3	4
Spain	1.5	1	32.4	13.4	29.1
UK	5	1.6	150.2	39.3	32.8

Non-Power Sector

- No outlook/scenario/forecast has anything interesting to say about future growth of residential, commercial and industrial gas demand (except in Spain)

- Everybody sees, non-power demand increasing by 0.8-1% per annum over the next 25 years

Individual countries in southern Europe (Portugal, Greece…) may grow faster but do not affect the European total

Power Sector

- Not saying the models are not correct, but we do not know their assumptions. We chose a different approach: bottom-up

- Question we ask: Do we currently see the power station construction to support projected levels of gas demand ?

- Methodology: Look at gas-fired power plants projects in Europe, at different stage of development, and “convert” MW of capacity into BCM of gas demand

Key questions for the power sector: how much, where and by when ?

Gas Demand for the Power Sector: <u>Assumptions</u>

- Construction lead-time: 4/5 years from idea to power plant running at full capacity
- Load-factors: “base” / “middle” or “peak” load
- Efficiencies
- Probability of actually being built

2005 -2010: TWO Scenarios

- 1st scenario: PROBABLE SCENARIO

  Plants recently operational + plants under construction => most probable

- 2nd scenario: POSSIBLE SCENARIO

  Probable scenario + plants with administrative consent

What About 2010 – 2015 ?

- **Many factors can influence the decision to invest in gas-fired generation**
  - **Environmental regulations (ETS – LCPD ...)**
  - **Prices (high oil-linked prices)**
  - **Economical and political incentives (renewables, clean coal technologies?)**
  - **Nuclear phase-out**
- **Again TWO scenarios: HIGH and LOW case**

These measures *may* produce a radically different demand outcome… but not before 2015 ?

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First Results of the Study /1

- Increase in gas demand is highly sensitive to the development of gas-fired generation in two countries: Spain and Italy

- If any significant numbers of power plants in Spain and Italy are not built, increases in gas demand will be correspondingly reduced

- Note the importance of load factor assumptions

  (For 2010 gas demand: difference between high and low load factors is 40 Bcm for most likely outcome, and 60 Bcm for possible outcome)

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First Results of the Study /2

- Before 2010, and possibly up to 2015, European gas demand (especially in north west Europe) will not increase as quickly as generally believed because of slow power generation growth

- Gas demand by 2010/2015: impact of the UK gas bubble ? Only lower gas prices up to 2015 would lead to huge increase in gas demand

- By 2015, large numbers of new CCGTs will not be in operation, although construction may have commenced, despite of EU ETS, LCPD or the possibility of nuclear phase-out

The final report:

"Gas Demand in Europe: the importance of the power sector"

will be published in Autumn 2005 on the OIES web site:

www.oxfordenergy.org

Comments or questions are welcome, please contact the author:

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