UK Continent Interconnector and Reverse Flow

The UK Continent Interconnector

Interconnector-Projekt
Key Figures 1998:

Pipeline Route:	**Bacton - Zeebrügge**
commissioning:	1. Oktober 1998
length:	235 km
compressors:	4 x 28 MW
Max. pressure:	140 bar
capacity:	20 bcm/a (Forward Flow) 2.283 mio. m^3/h 8,5 bcm/a (Reverse Flow)
diameter:	40"
investment:	ca. 665 Million €

UK Continent Interconnector Shareholdings

Shares in %

	1994	2007
British Gas	40	25.00
Conoco Phillips	10	10.00
Distrigaz	5	16.41
TotalFinaElf	10	10.00
Gazprom	10	10.00
Ruhrgas	5	23.59
Eni	5	5.00
Amerada	5	
International Power	5	
BP	10	

Shippers with primary capacity rights

BG International Ltd

BP Gas Marketing Limited

Centrica

Conoco/Phillips Gas & Power Europe

Distrigas S.A.

Elf Trading Limited

E.ON Ruhrgas AG

Total Gas & Power Limited

RWE Trading Limited

Norsk Hydro Energy BV

OAO Gazprom

ZMB

ENI

Essent Energy

Gaz de France

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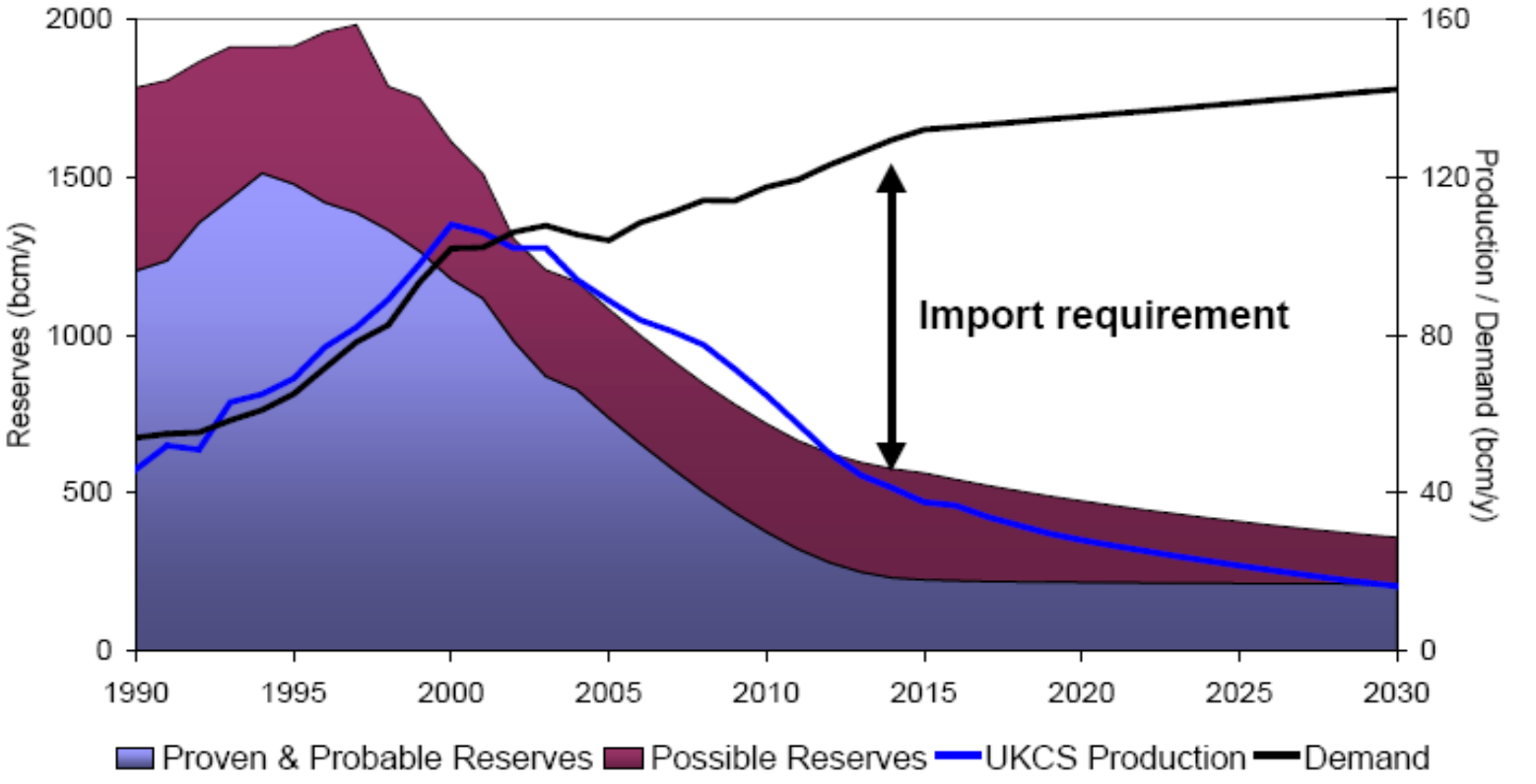
Remaining UKCS Reserves and Production



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History (1)

1992 A study group was formed to evaluate a cross-channel natural gas interconnector.

1993 Distrigas were invited to join the group and full time team was established.

1994 Interconnector (UK) Ltd was formed when nine energy companies made long-term shipping commitments and became shareholders.

1995 A 'European Letter of Comfort' signed by the European Commission.

1996 The Onshore and Offshore alliances were formed to design and construct the pipeline and terminals in the UK and Belgium.

1997 Offshore pipeline and landfalls installed and tested. Interconnector (UK) Ltd and Electronic Data Systems commenced development of the Interconnector Shippers Information System (ISIS).

1998 The UK-Continent Interconnector, one of the most important European infrastructure projects in recent years, commenced operation.

History (2)

2000	Direct access connection for SILK gas supplies installed. Interruptible capacity introduced.
	Short term capacity trading and variable inventory introduced.
2001	Contract awarded to Pipeline Engineering GmbH for conceptual design of compression facilities at Zeebrugge.
2002	IUK took over direct operation of the Bacton terminal.
	European Commission inquiry into Interconnector concluded that it is operated in conformance with EC standards.
2003	Commitment by Shippers to the first phase of an enhancement project to increase UK import capacity of the system. Construction work began at Zeebrugge and Bacton Terminals.
2004	Commitment by Shippers to further enhanced import capacity requiring a total of four compressors at Zeebrugge.
2005	Zeebrugge Phase 1 (two compressors) capacity available to Shippers
2006	Zeebrugge Phase 2 (four compressors) capacity available to Shippers.

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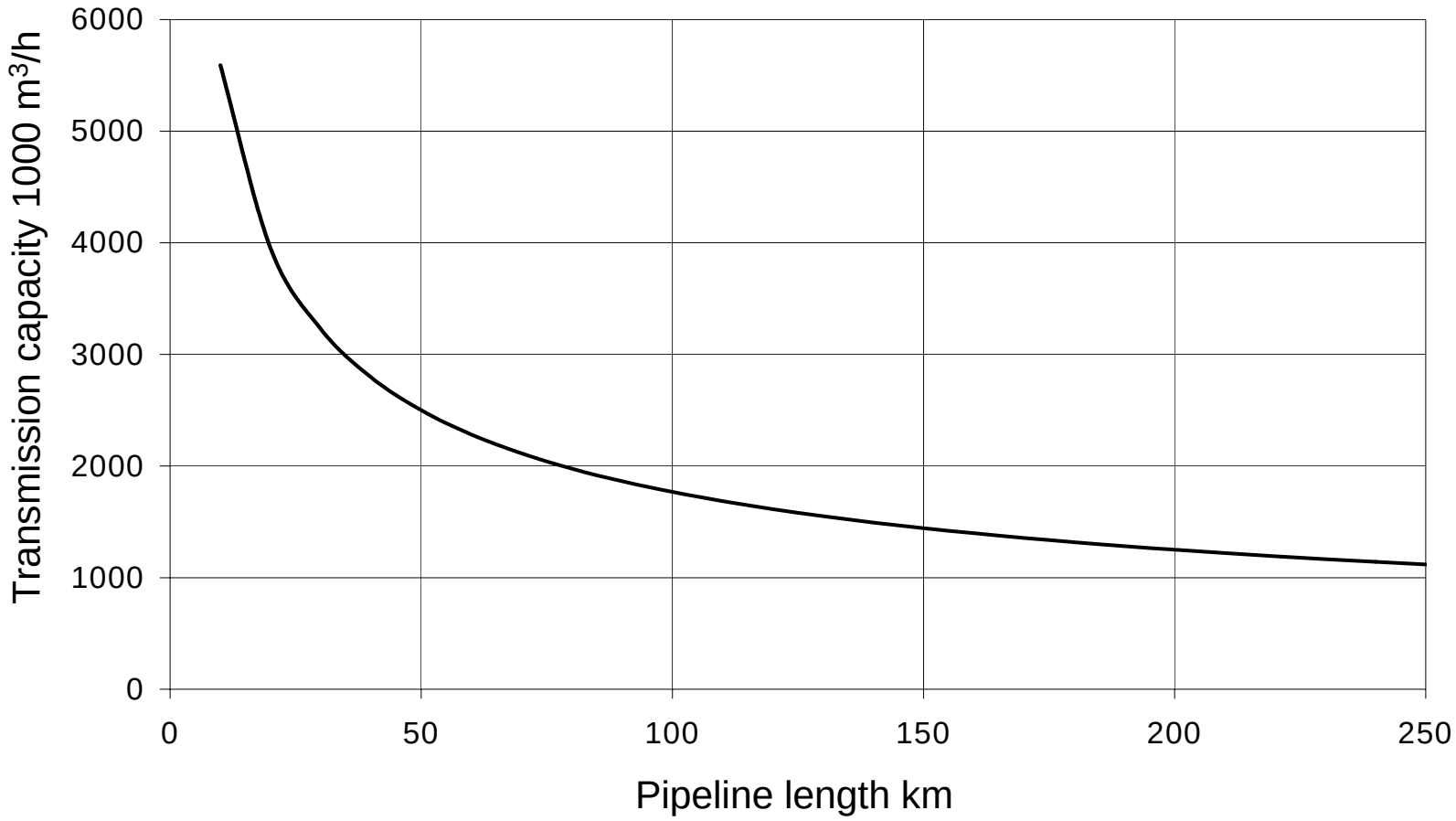
Calculation of pipeline capacity

Diameter mm	pressure A bar	pressure B bar	km	capacity m^3/h
1000	136	80	235	2.283.157
1000	80	63	235	969.546
	84	60	200	0
	84	60	200	0
	84	60	200	0

Transmission capacity in a given pipeline (diameter and length) depends on the pressure differential



Operational Issues

Imperfect arbitration between UK and Continental European gas prices due to technical restrictions for the reversion of physical flows

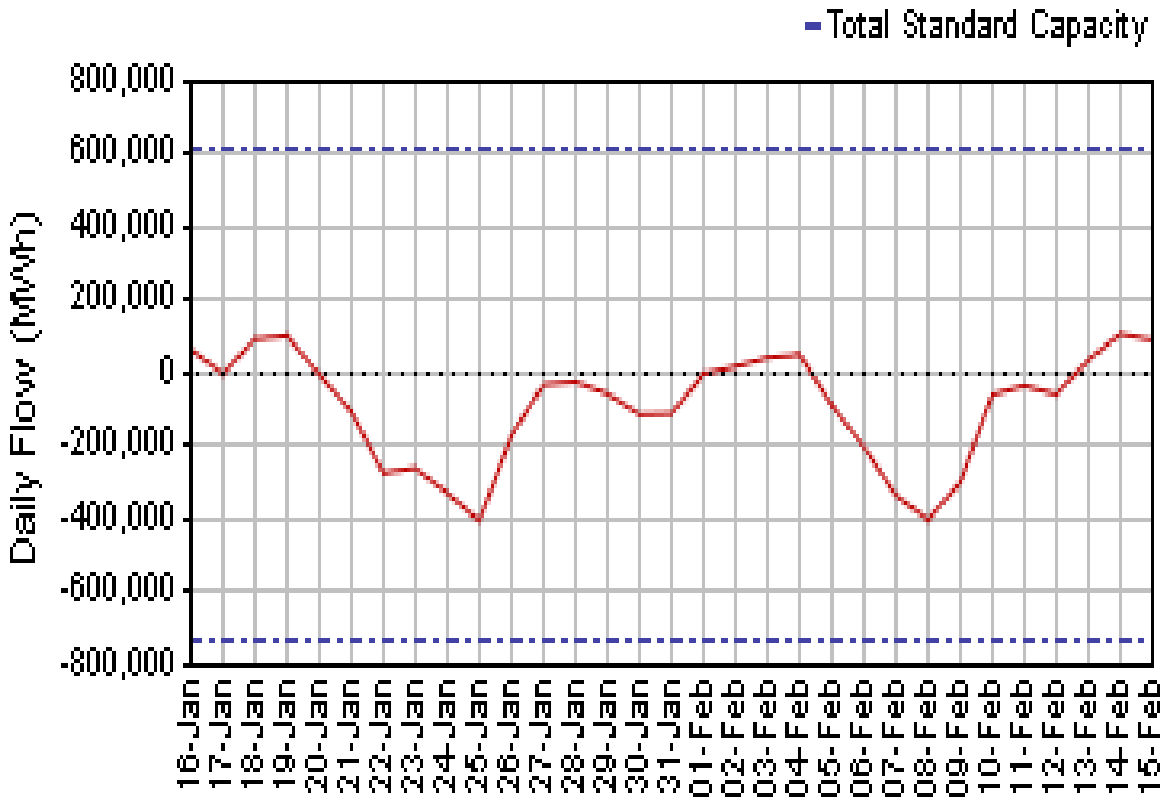
Physical flow reversal took several days

Especially the reversal from reverse to forward turned out to be a problem due to the time lag for increasing the necessary pressure in Bacton from 63 bar (reverse mode) to 138 bar (forward mode)

As a consequence IUK introduced a high transparency with respect to aggregated flow information

Transparency Standards

- Historical Flow Information



The boxes below allow the axis of the graph to be changed:

VIEW HISTORIC DATA:

From (Format dd-mon-yyyy) To GO

CHANGE Y-AXIS SCALE:

Min MWh Max MWh GO

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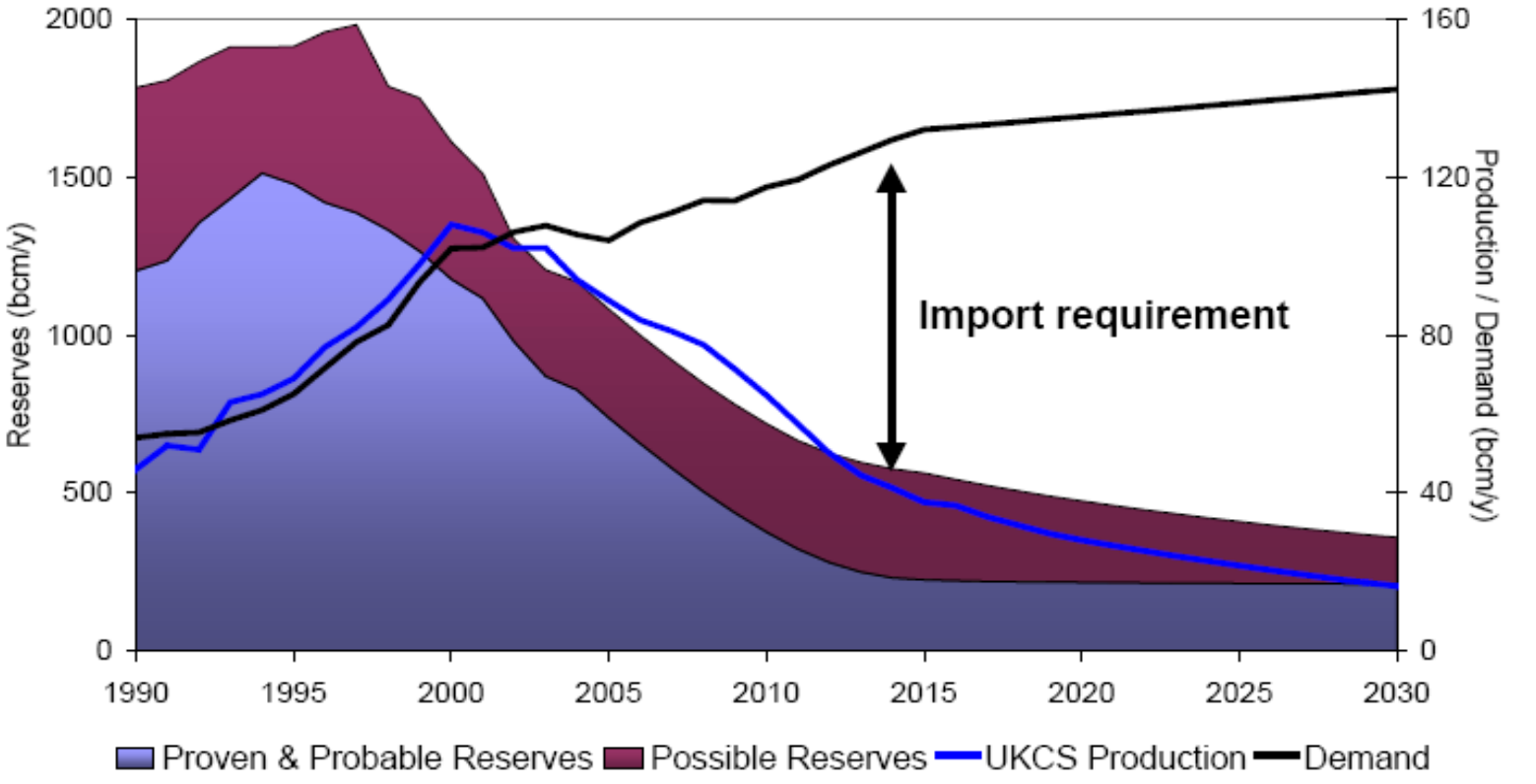
Remaining UKCS Reserves and Production



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UK Supply Options

- UKCS
  - Mostly in production, UK only landing location
- Norway
  - In production or planned, limited continent / UK delivery options
- Continent
  - Subject to local markets, EU liberalisation & possibly long term supply contracts
- LNG
  - Subject to global markets & possibly short term security type contracts

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Enhancement of Reverse Flow Capacity

Number of compressors at Zeebrugge	Effective Date	Reverse Flow Capacity (bcm/y)
0	Oct 1998	8.5
2	Nov 2005	16.5
4	Oct 2006	23.5
Operating Pressure Increase	Oct 2007	25.5