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ECN Seminar

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Gas Supply Security in an Enlarged Europe

Developments in gas pipelines and LNG infrastructure for closing EU-30 gas supply –demand gap

- Presentation by:

Patrick Cayrade

Director Energy Department

BeicipFranlab

Developments in gas pipelines and LNG infrastructure

- 1- Europe : the largest world market for natural gas import over the period to 2020
- 2- The gas supply –demand gap in EU-30
- 3- The magnitude of required gas infrastructure investment
- 4- Development of LNG markets: opportunities to improve security of supply?
- 5- Constraints to realisation of infrastructure investment: gas price, financing, regulation
- 6- Conclusions

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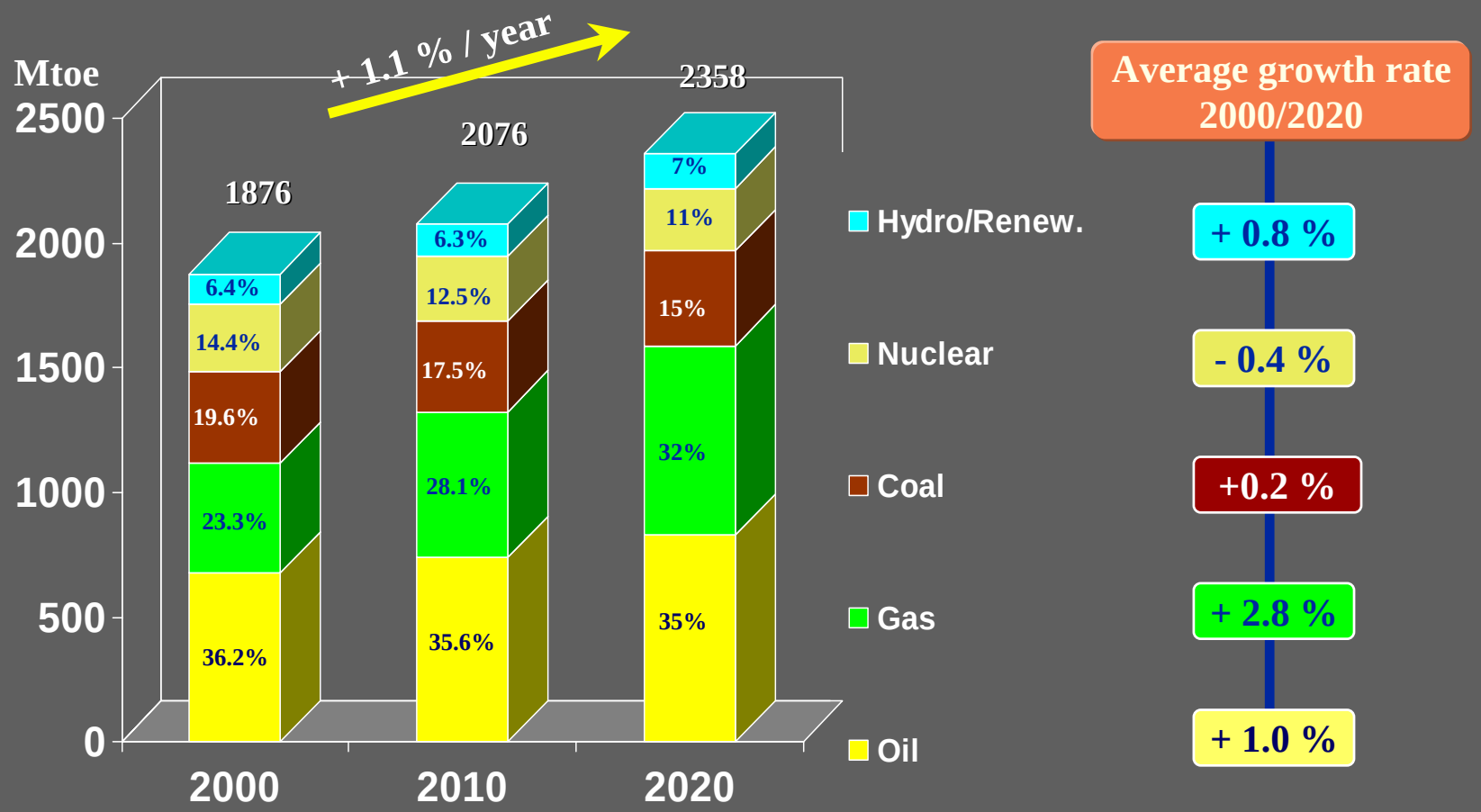
1- Europe : the largest world market for natural gas import over the period to 2020

1- Europe: the largest gas import market should enter an exceptional growth period

Gas: growth from 500 Bcm in 2000 to 820 Bcm in 2020



Source : Projections Becip Franlab -TotalFinaElf
Including Western Europe + Eastern Europe exc. FSU + Turkey = EU27

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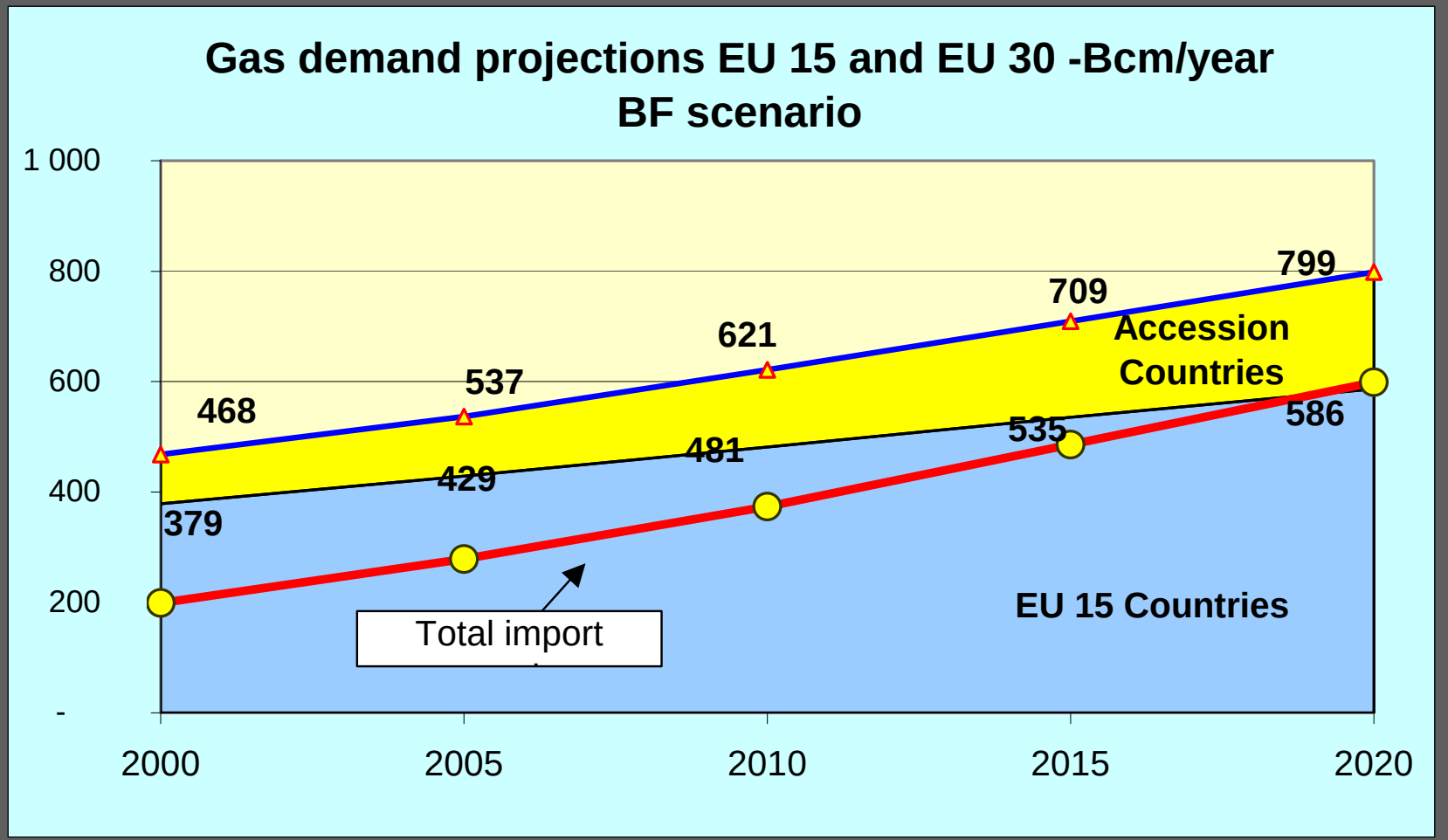
European gas import needs could reach 600 Bcm in 2020

(from which around 400 Bcm not yet contracted)



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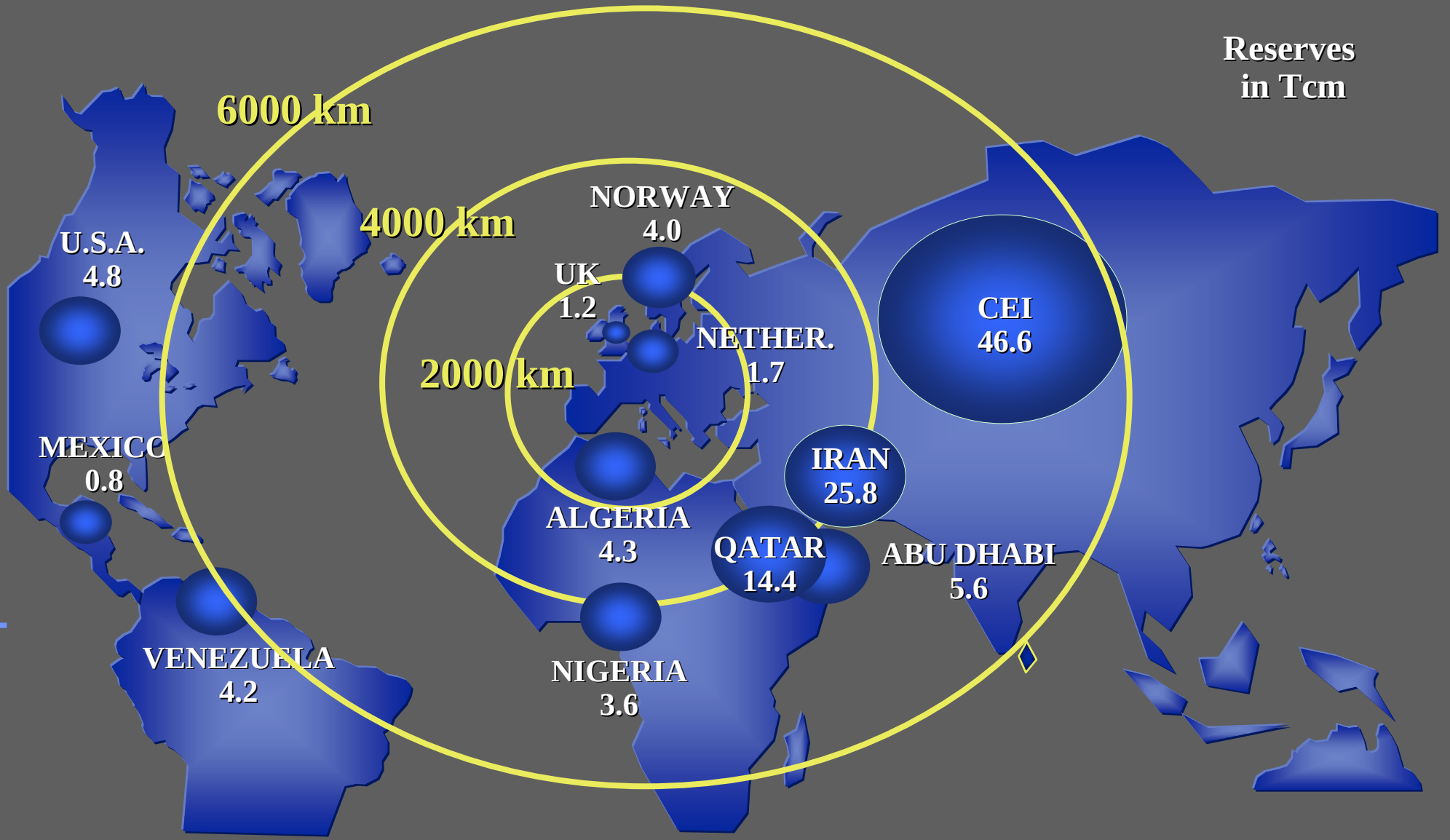
2- Gas Sources for supplying Europe-30



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2- The gas supply –demand gap in EU-30

Potential supply from outside Europe-30

Gas exports by EU 30 suppliers in year 2020

Billion m3		EU 30	Far East South Asia	USA		Other	Total Export
Russia		**220**	20		60	Ukraine/Belarus	**300**
Norway		**100**	-	5	-		**105**
Algeria		**100**	-	5	5	Maroc /Tunisia	**110**
Libya		**15**	-	-	-		15
Iran	LNG + pipe Turkey	**20**	35	5	-		60
Azerbaidjan	Pipe Turkey	**10**	-	-	-		10
Turkmenistan	Pipe Turkey	**5**	-	-	55	Russia	60
Egypt		**12**	-	-	3	Jordan /Syria	15
Irak	Pipe Syria + Turke	**5**	-	-	5	Syria	10
Nigeria		**20**	-	15	5		40
Qatar		**10**	35	5	20	UAE Dolphin/Kuw/E	70
UAE	LNG Adgas	**1**	12	-			13
Other Middle Ea	LNG Yemen /Omar	**5**	25	-			30
Angola		**5**	-	5			10
Trinidad		**15**	-	15			30
Venezuela		**5**	-	10			15
Total		**548**	**127**	**65**	**153**		**893**

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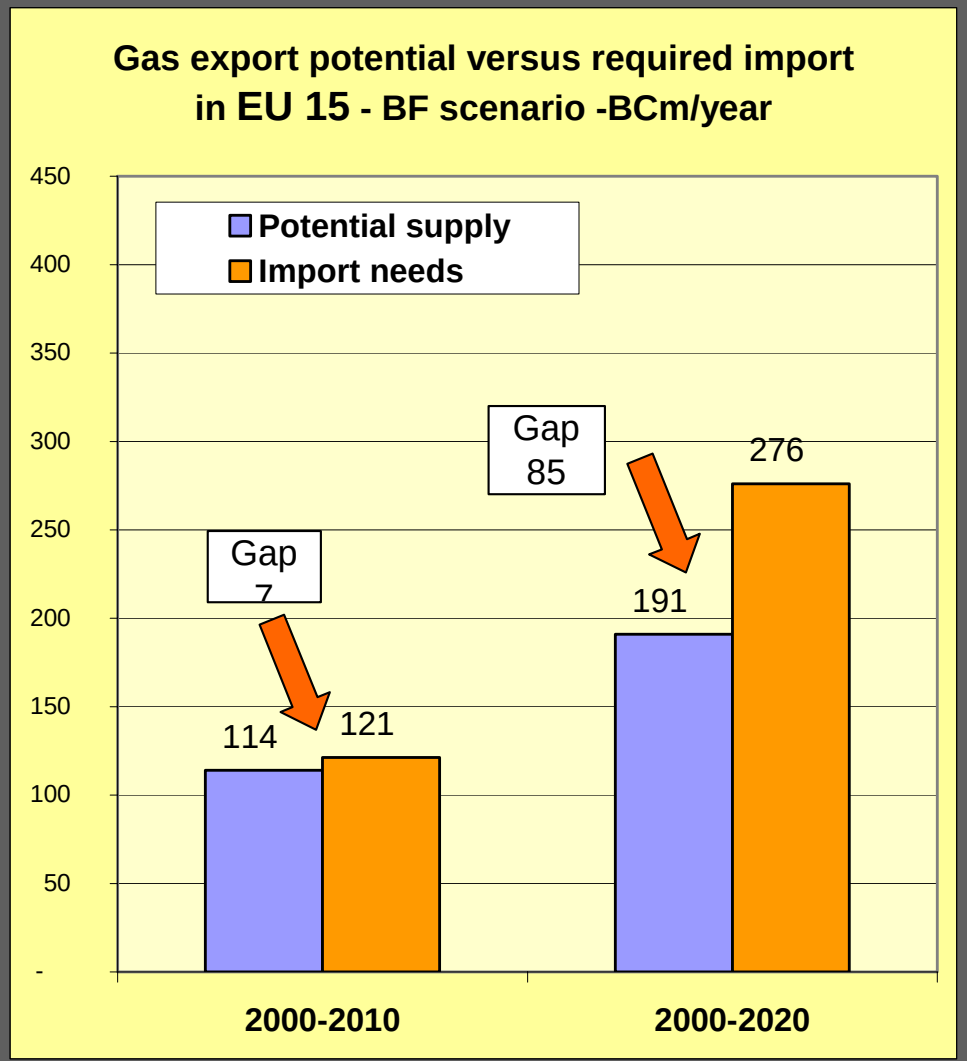
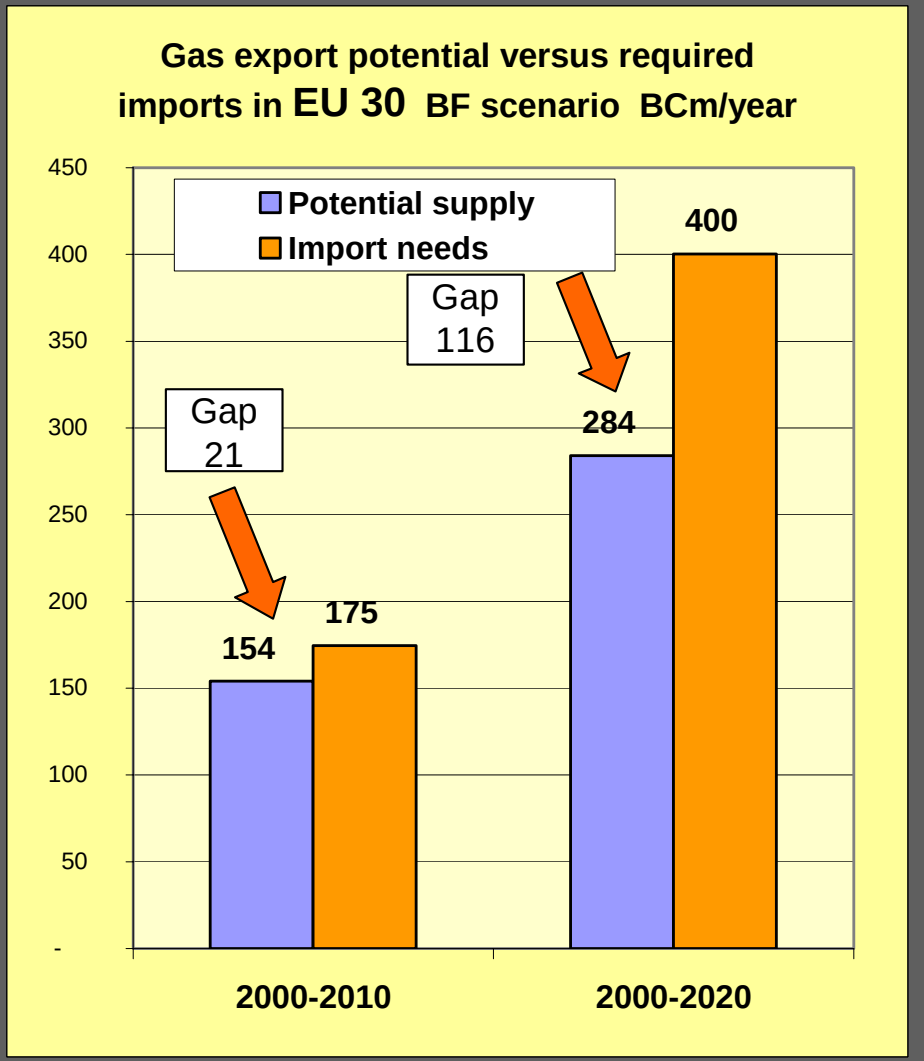
Gas exports forecast from Russia

Billion m3	2000	2010	2020
Production	585	630	690
Import	13	50	100
Total Gas Supply	598	680	790
Internal consumption	396	445	490
Other uses (cycling, reserves)	8		
Exports	194	235	300
To Europe EU 15	80	90	100
To Europe EU 30	**130**	**170**	**220**
To ex CIS excl. EU 30	64	60	60
To Asia		5	20

Supply /demand balance in EU 15 and EU 30 –incremental/ 2000





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Closing gas demand /supply gap in EU-30 in 2020

Unit: BCM /year		Import in 2020 Likely	Import in 2020 Required	Supply Cost
				Us$/MMBtu
Norway	Pipe & LNG	100	100	2.0 /2.2
Russia	**Pipe & LNG**	**220**	**250**	**1.6 /2.7**
MEDA area	Pipeline	152	145	1.1 /1.7
& West Africa	& LNG			3.0
Caspian &	**Pipeline**	**40**	**70**	**1.1 /1.3**
Middle East				
LNG Middle East	LNG	16	15	2.8 /3.0
LNG Atlantic	**LNG**	**20**	**45**	**3.0**
Total		**548**	**625**	

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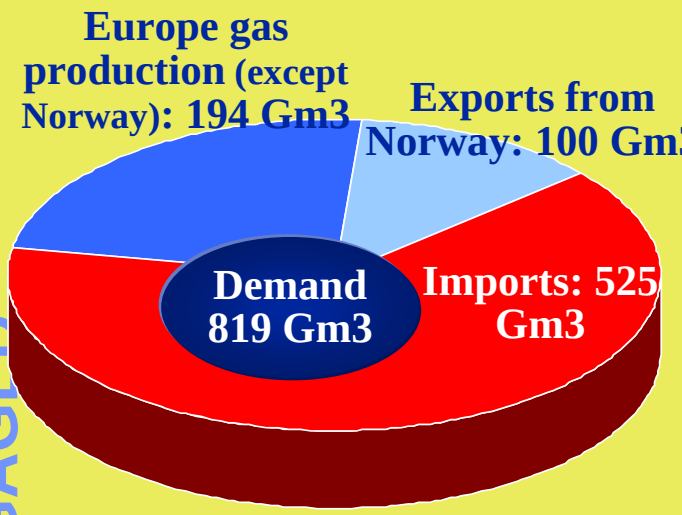
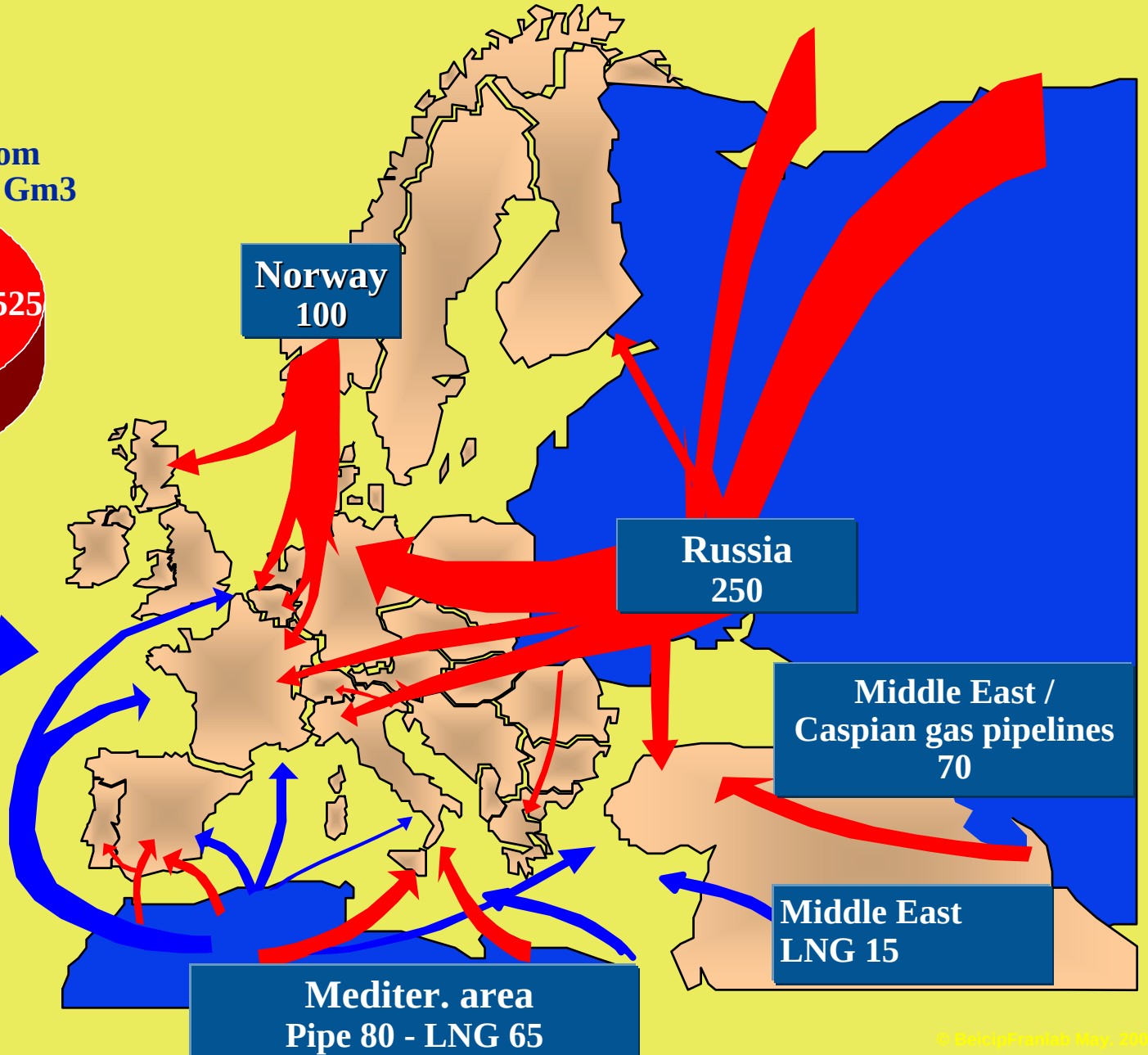
Gas supply routes to Europe in 2020





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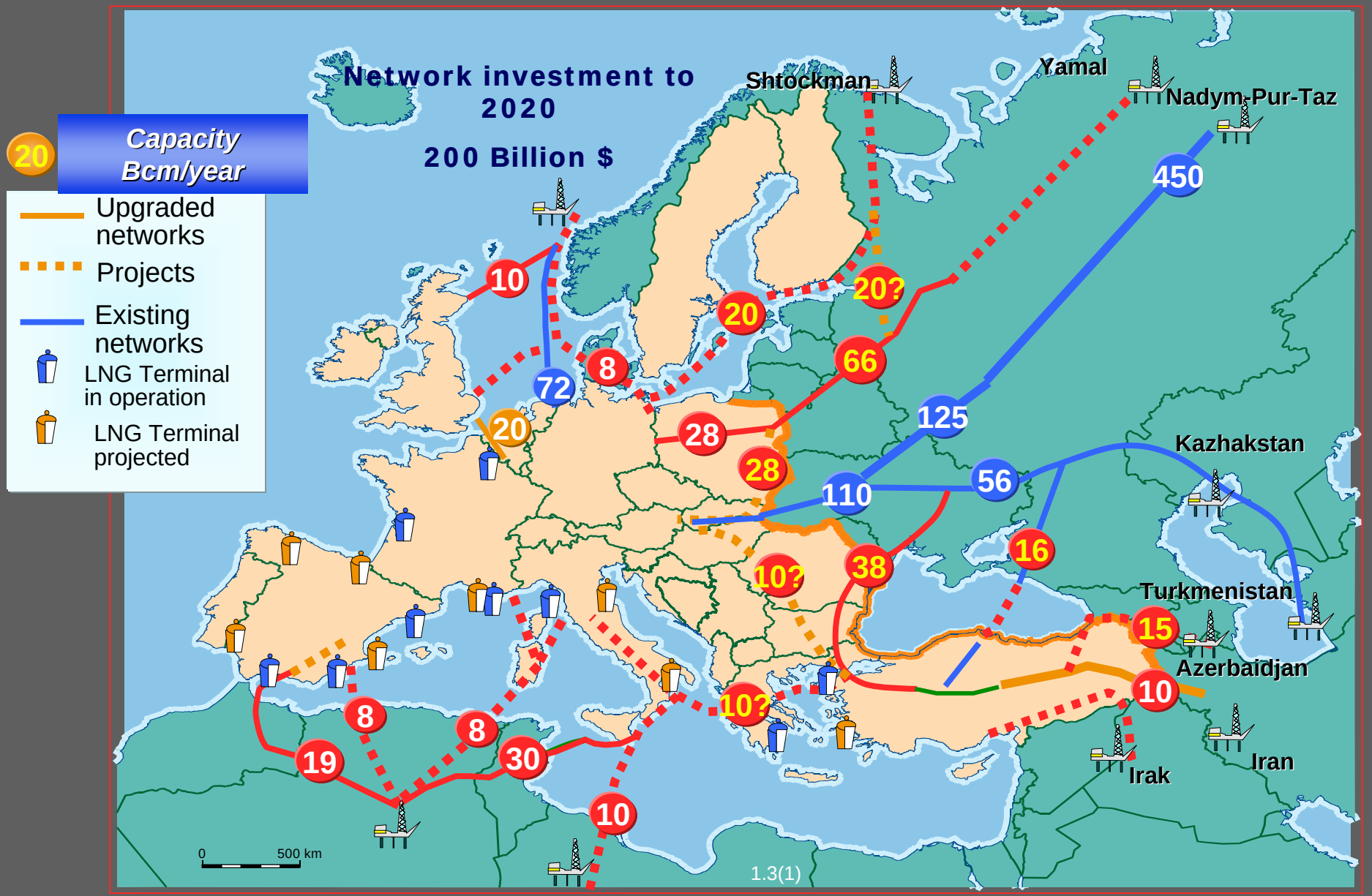
3- The magnitude of required gas infrastructure investment

Gas transport routes and facilities -Europe 2020



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Examples of infrastructure investments

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- **Pipeline Algeria to Spain « Medgaz »**

- Capacity: 8 Bcm
- Length: 747 km
- Investment: 1.17 Billion US$
- Delivered cost: 1.17 US$/MMBtu

Production cost in Algeria: 0.45 US$/MMBtu

LNG project Egypt to Spain and France

- Capacity: 4.8 Bcm
- Distance: 1,700 miles
- Investment: 1.58 Billion US$
- Delivered cost: 2.56 US$/MMBtu

Liquef. Plant: 900 Million US$
Tankers: 360
Terminal: 320

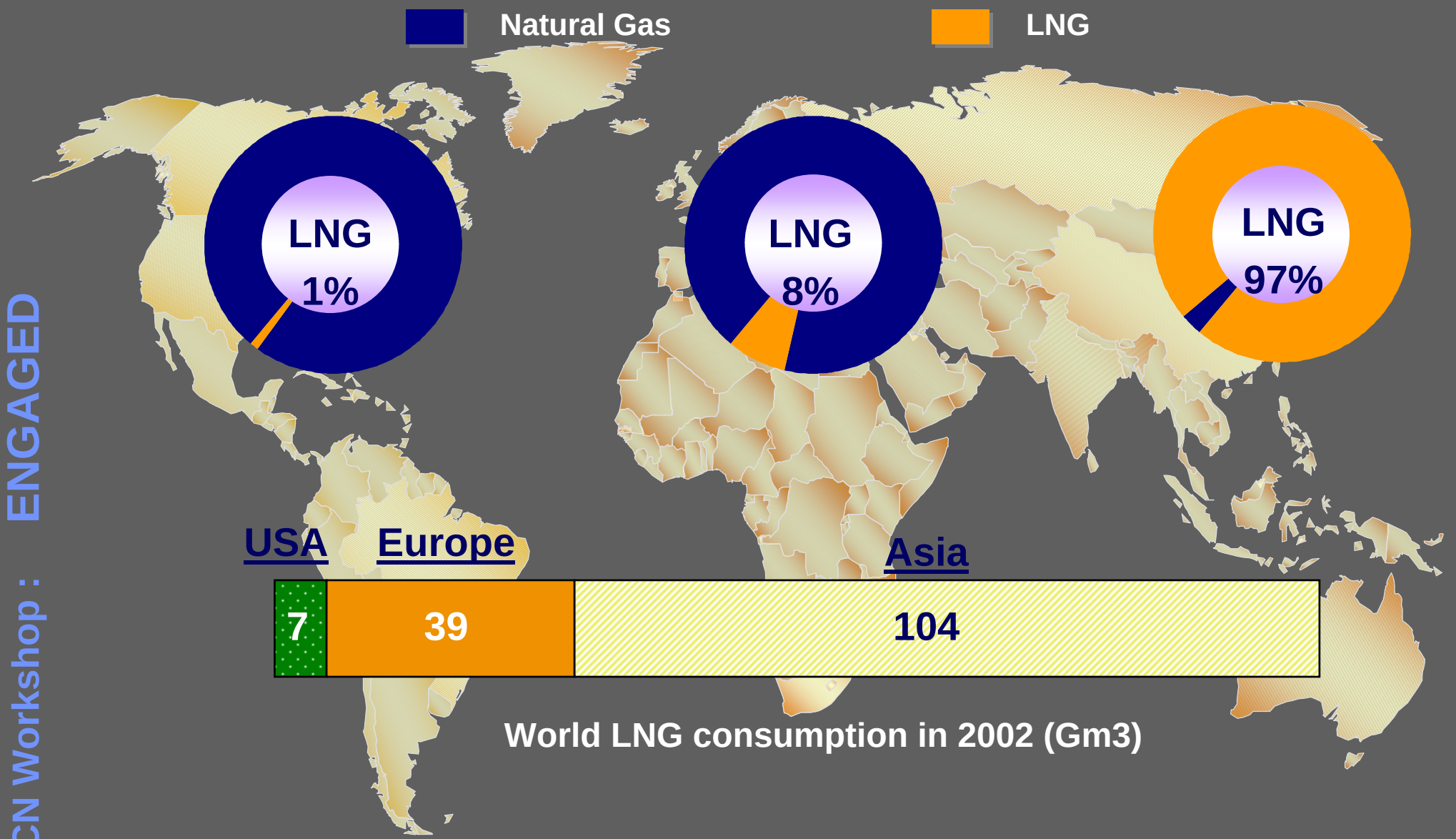
Production cost in Egypt: 0.65 US$/MMBtu

4- Development of LNG markets:

opportunities to improve security of supply ?

- Different roles played by LNG in 3 markets: Europe, Asia, USA
- The 3 marlkets were practically separated but become increasingly interconnected
- USA will become a major LNG importer, with obvious consequences on European supply
- For European market, LNG links could be preferred to improve security of supply

Specific aspects of LNG markets: a very different role on each market



Source : TOTALFINAELF

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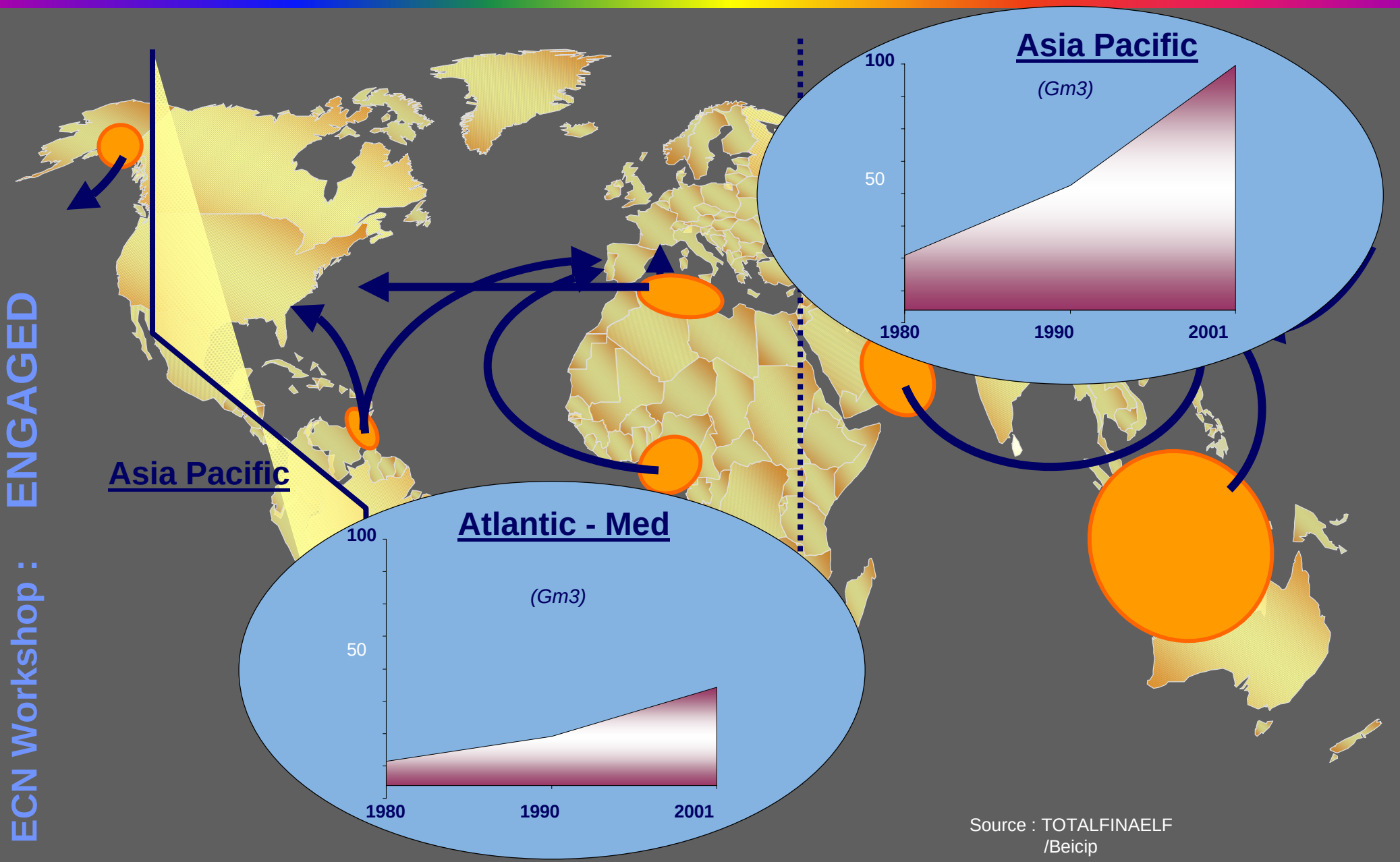
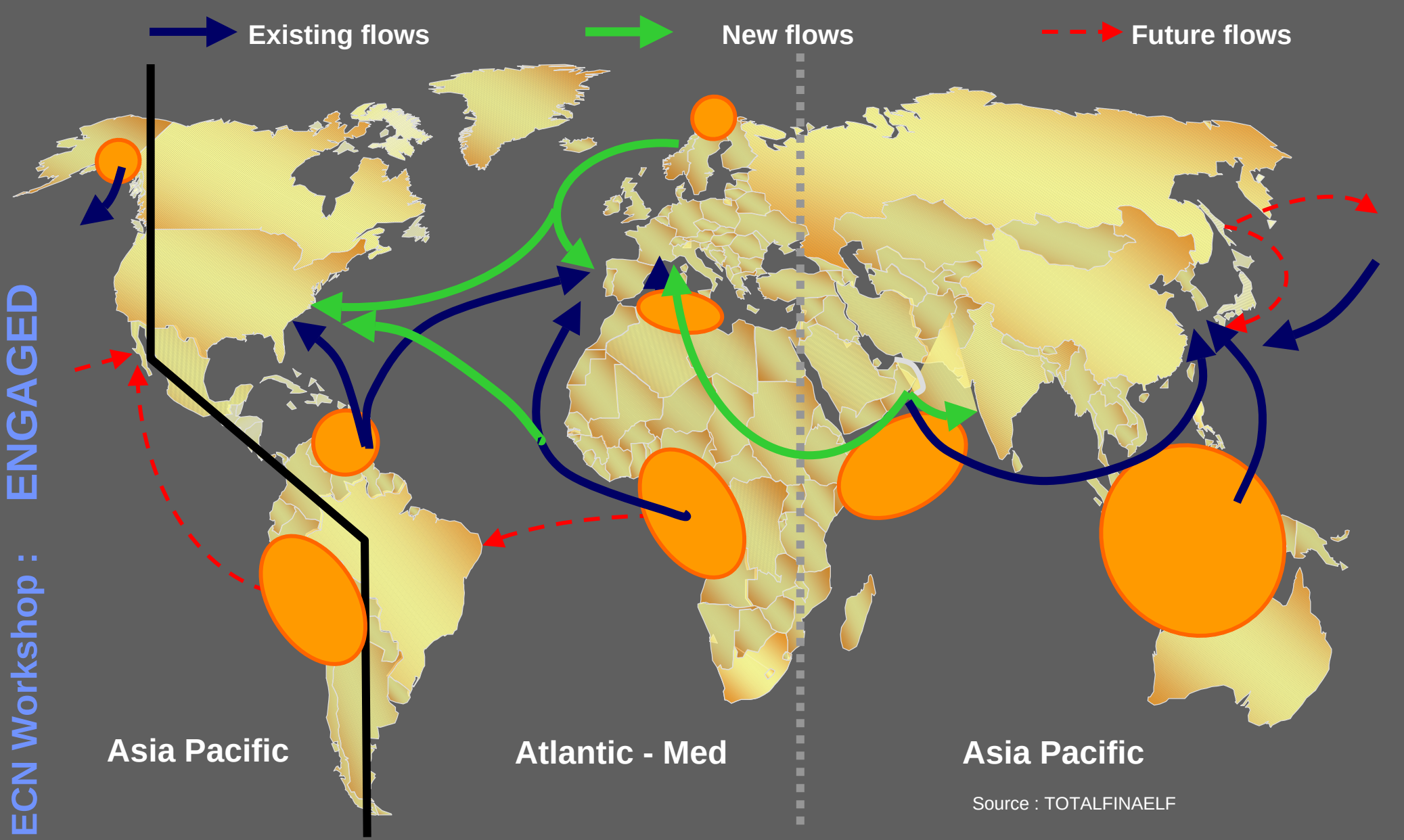
LNG markets: Initial scheme was simple...



Source : TOTALFINAELF /Beicip

… But LNG trade is becoming more complex



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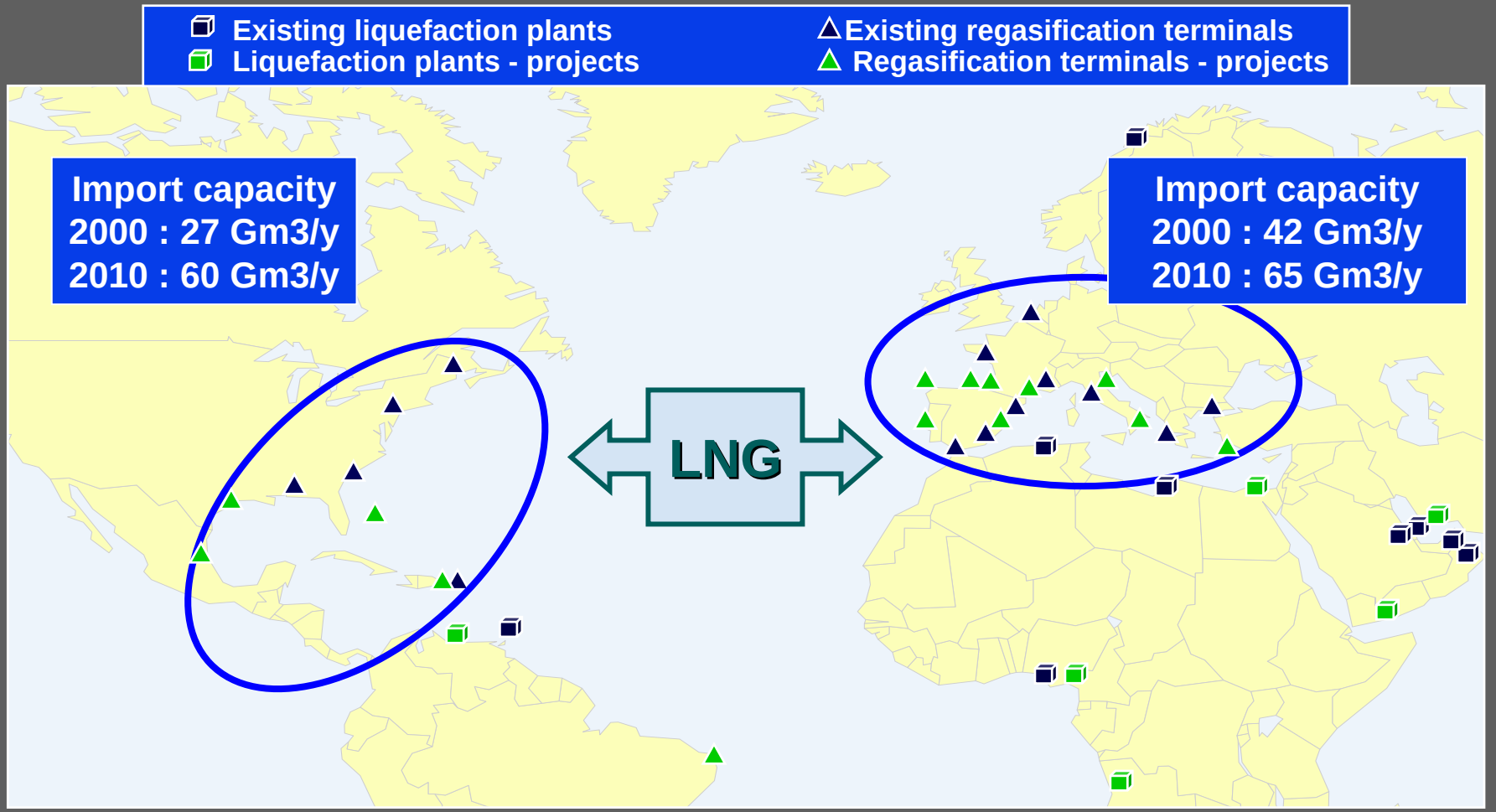
LNG markets: development of LNG infrastructure



Source : TOTALFINAELF

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5- Constraints to realisation of infrastructure investment

- 1- Impact of gas price: decoupling gas and oil prices ?
- 2- Spot markets against Long Term Contracts
- 3- Gas exporting countries reactions to European gas sector structural changes
- 4- The danger of over-regulation

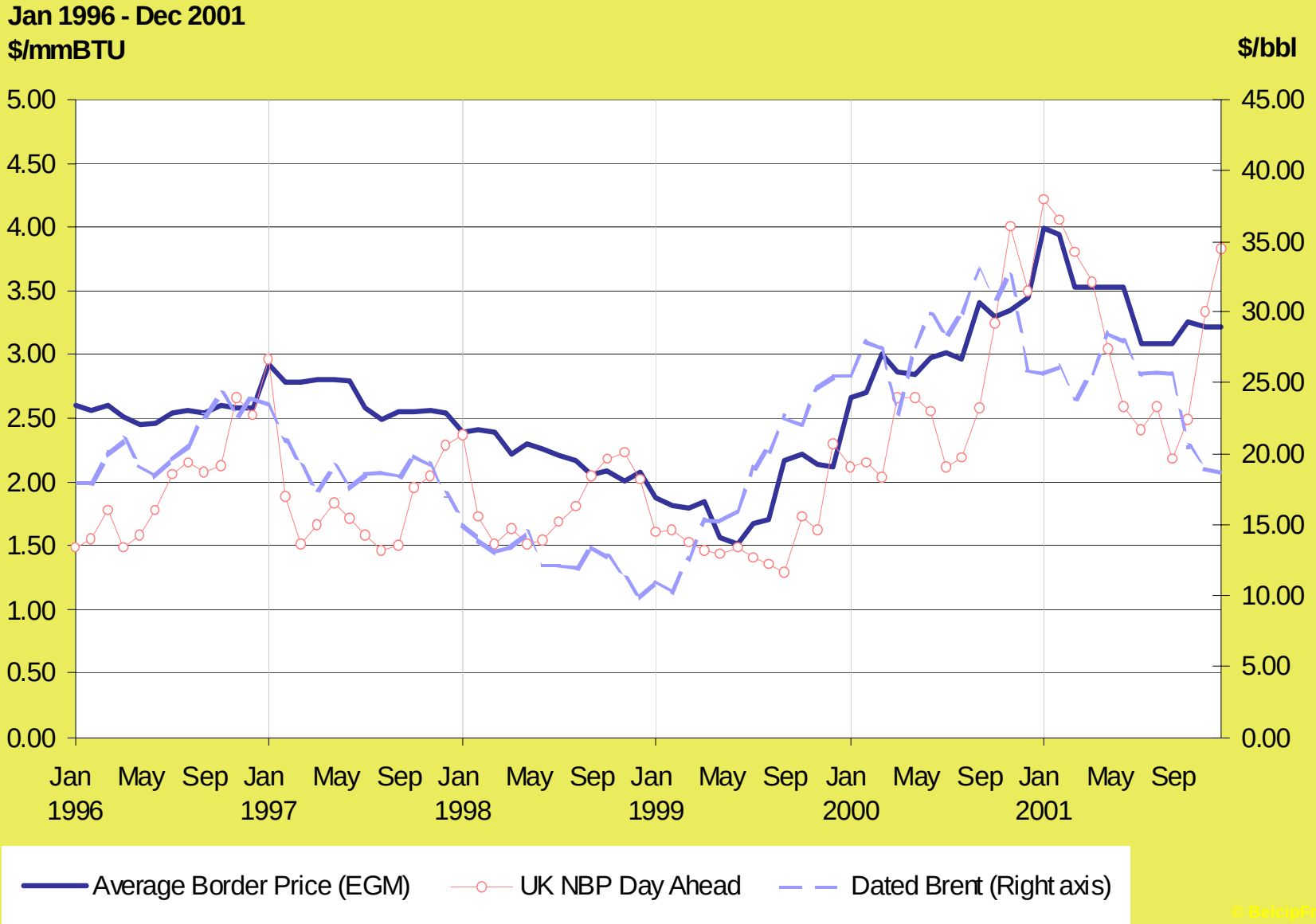
5- Constraints to realisation of infrastructure investments

5.1- Impact of decoupling gas and oil prices

- The average value of gas in Europe is a netback value for its different uses and substitutes (half way between USA and Japan).
- In Europe the average gas import price has been at 80% of Brent parity over more than 15 years
- The "decoupling" has not occurred and will be more "optical" (price seasonnality) than real
- More probably the coupling will improve (shift to 100% parity) at EU border, due to increase in gas value
- The impact would be an improvement of financeability of large infrastructure projects, but a basic higher price of gas to customers

5.1- Impact of decoupling gas and oil price

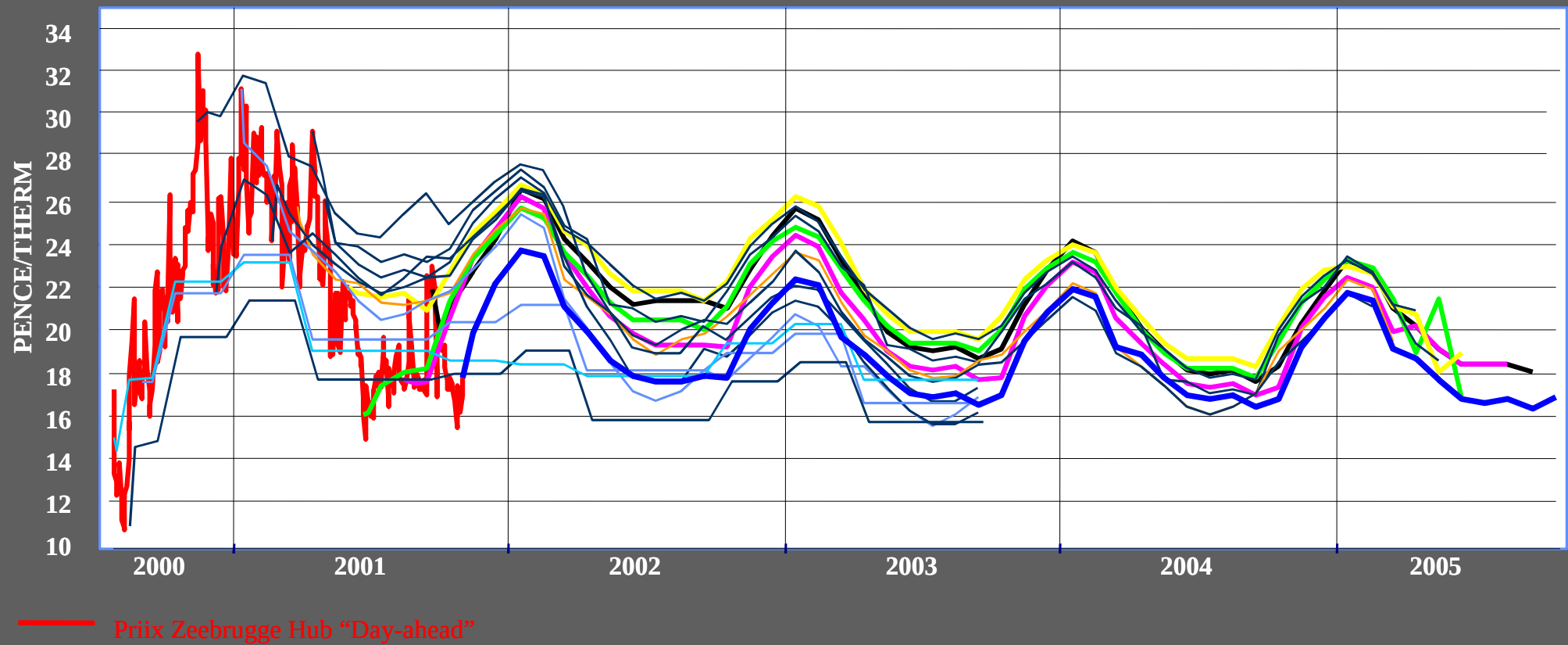
UK: an image of what will happen in Europe



5.1- Impact of decoupling gas and oil prices

Continental Europe gas market: the new reality

Zeebrugge “Hub” Gas prices



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5-2 Spot markets against LT contracts

Main concerns

- Due to the development of spot markets,
  - Prices in the spot market could become increasingly based on gas to gas competition and long-term pricing would come under pressure
    - ☞ Existing long-term contracts come under pressure in both price and volume
  - Companies that have signed take-or-pay contracts would fail to comply the take-or-pay clauses.
    - ☞ Higher costs would fully or partially be passed to the customers
  - Long-term gas purchase contracts might be discouraged
    - ☞ Higher risk (thus cost) for the large investments needed for major pipelines

5-3 The main worries of gas exporting countries related to the European Gas structural changes

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Worries related to volumes:

- ⇨ Worries related to weakening or progresssive end of « Take or Pay clauses » and « destination restriction clauses »
- ⇨ Global gas competitivity linked to political decisions on buyers side (taxation, carbon emissions restriction rules, etc..)
- ⇨ Security of suppliers for buyers to be balanced by security of outlets for sellers

Worries related to prices

- ⇨ The loss of previsibility linked to possible new price formulas
- ⇨ The risks related to a fully « spot market » gas pricing system
- ⇨ The new risks (and opportunities) linked to pricing seasonnality

5-3 The main worries of gas exporting countries related to the European Gas structural changes

Worries related to projects financing

- ⇨ Volume uncertainties and prices volatility could deteriorate « projects bankability »
- ⇨ Potential risks and complexity if joint sales by projects partners no more legal for sales to UE buyers
- ⇨ The unbundling between upstream facilities and transmission systems could deteriorate financiability of certain projects

5-4 The danger of over-regulation

- A) Limits to market liberalisation
  - Full liberalisation is not able to secure market balance and security (ex: California)
  - Necessity of Long Term Contracts
- B) Paradox of administrative “investment obligation” proposed by European Commission
  - The only incentive to investment should be adequate return
- C) Separation of ownership (between trade, transmission, distribution):
  - May be dangerous. Accounting and juridicial separation is sufficient.

5.4- The danger of over-regulation

*D) Generalised Open Access to storage and LNG terminals is detrimental to investment in required infrastructure

*Draft Directive on speeding up EU gas liberalisation (March 2001)- Discussion of "Danish clause":

* *"Exemption from regulatory approval of tariff and access terms in case of new infrastructure (terminals, pipes) which contribute to enhancing competition and security of supply"*

*Spain LNG access code: 25% of capacity reserved for short term entry rights – terminals built twice as large as needed - hinder new development

*Same question in US: FERC adopts a "case by case" approach to regulation of future terminals, open access should not be mandatory at all terminals.

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6- Conclusions

*Enlargement to EU 30 leads to an increase of external dependence (import gap from 85 to 116 Bcm in 2020, dependence 70% to 75%)

* Enlarged Europe is faced with a major challenge over next 20 years: secure investment to import up to 500 Bcm of gas

* Development of LNG markets may ease diversification and security of supply

✉How to bridge the supply /demand gap in 2020: draw on Caspian gas directly or through Russia? Or draw on other sources (Middle East and Atlantic LNG)

*Uncertainty about future gas price is not resolved and may hinder financing of required investment

*Excess of regulation may hinder a timely development of required infrastructure facilities.