



THE CHANGING ARGUMENTS FOR CROSS-BORDER ELECTRICITY TRANSMISSION

Benedikt Unger, 11 May 2015

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- Cutting-edge understanding of practical implications of low carbon futures
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- Successful implementation of our market design concepts
- Quantitative and detailed modelling to back our thinking on market design for electricity, gas and carbon
- Understand commercial perspective of investors and participants
- Over 200 energy market experts in 13 offices across Europe:
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 - Helsinki
 - London
 - Madrid
 - Milan
 - Moscow
 - Munich
 - Oslo
 - Oxford
 - Stockholm
 - Paris
 - Vienna
 - Zurich
- Growing presence in Middle East, Far East; and Central and South America

PÖYRY'S EXPERIENCE ON CROSS-BORDER TRANSMISSION

We have advised commercial companies, regulators, governments and system operators on interconnector economics



- **Interconnector model and cost-benefit analysis (ongoing):**
 - Provided Excel based model and CBA analysis for IFA 2, FABLink, GreenLink, NSN and Viking Link to support ongoing regulatory cap and floor decisions
- **Irish Scottish Links on Energy Study (ISLES) (ongoing):**
 - Regulatory options assessment and CBA study of the proposed ISLES link between Scotland, Northern Ireland, Ireland and Wales
- **Future BritNed Revenue Drivers and Projections (ongoing):**
 - Potential revenue projections for BritNed under different scenarios in future
- **Research on Historic Interconnector Flow and Capacity Value (2015):**
 - Analysis on historic interconnector flows, to inform the estimate of future contribution to GB's security of Supply
- **Intraday value of interconnection (2013/2014):**
 - Revealing the value of flexibility 2013/14, (24 clients from across Europe)
 - Intraday capacity pricing (2013, Elia)
- **Assessment of Danish and Icelandic Interconnectors (2012):**
 - Assessment of direct revenue potential for ICs and wider economic cost benefit case
- **NSN Economic Feasibility Study, IFA2 Economic Feasibility Study (2011):**
 - Assessment of trading revenues for GB-Norway and 2nd GB-France interconnector

CHANGING ARGUMENTS FOR CROSS-BORDER TRANSMISSION

Why is cross-border electricity trading a good idea? What is the business case of the project based on? How are the economic benefits distributed?

Covered in this session:

Ambition to build cross-border electricity transmission

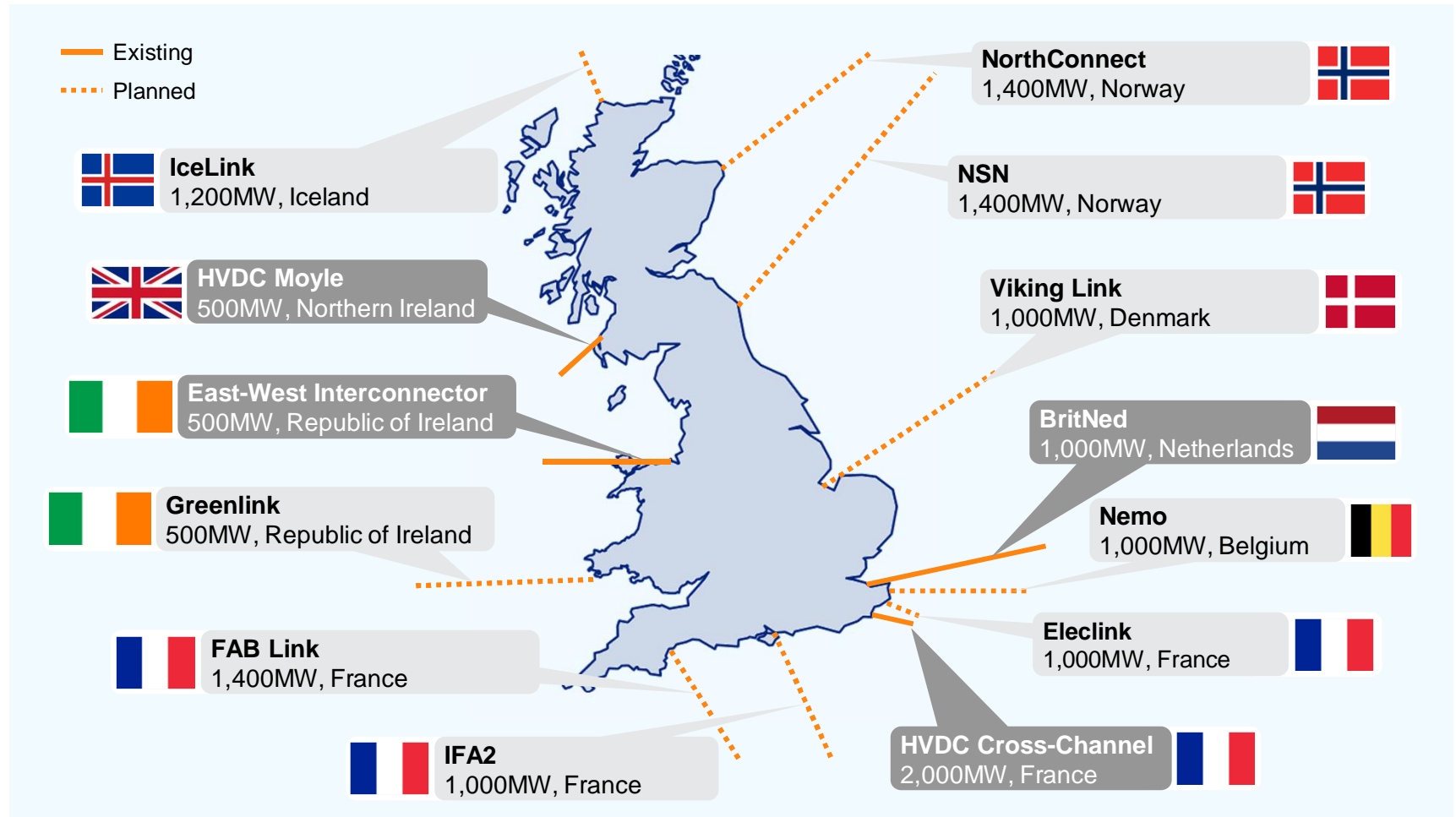
Difficulties in constructing business and economic cases on these arguments

Reflecting changing markets – less straightforward and less predictable benefits

How to address these difficulties and changes

INTERCONNECTION GENERALLY RECEIVED FAVOURABLY

Example GB: 4GW of interconnection could increase to 10GW+ by early-2020's



PROJECTS NEED SOLID BUSINESS AND ECONOMIC CASES

In order to reach FID, cross-border transmission projects need some form of security

Revenue certainty

Stable and predictable price spreads between countries or other form of predictable income.



Business model / business case

External support

Public support, e.g. grants, subsidies, revenue floors, etc. This is reliant on the project presenting a benefit to society overall



Economic need case

BENEFITS FROM INCREASED INTERCONNECTION

Different stakeholders can benefit from cross-border transmission projects



Who benefits from interconnection?



(Interconnector) project owner:
Profits



Consumers:
Lower prices
Higher security of supply



Electricity generators:
Higher revenues



Governments:
Progress towards decarbonisation
Progress towards EU vision
Job creation



System operators:
Improved system operation
Higher security of supply



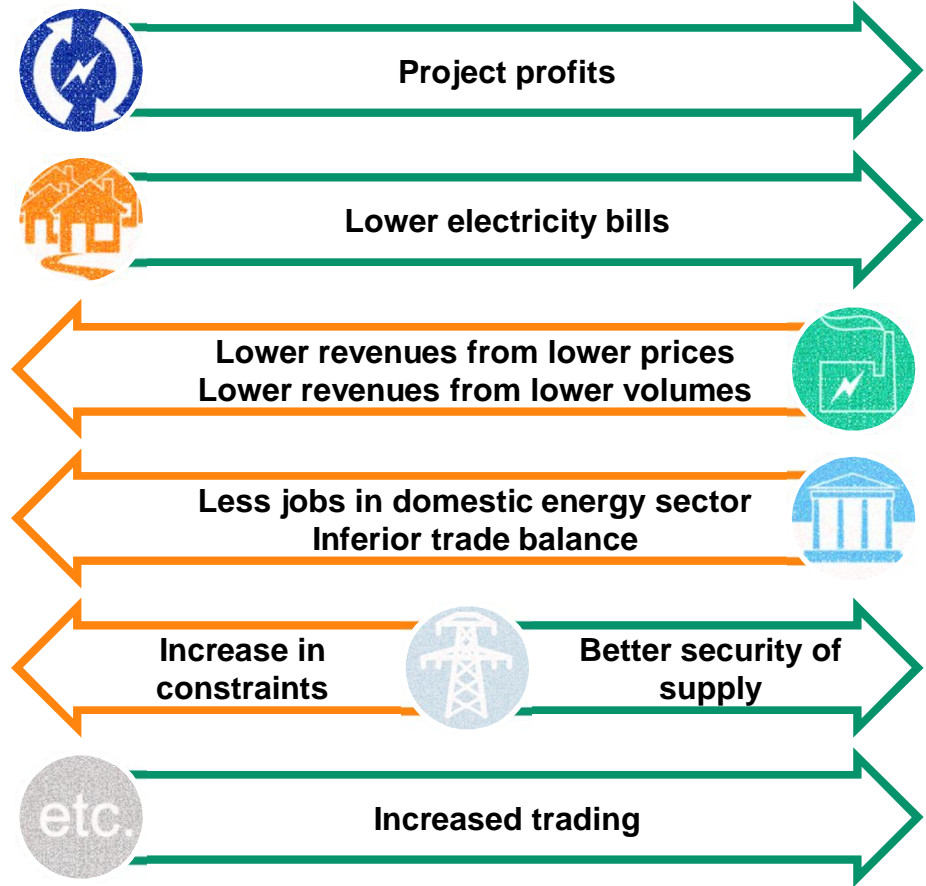
Others:
Increased trading
Retail benefits

DIVERGENCE OF OBJECTIVE CREATES DIFFICULTIES

Which benefits and costs to each of the stakeholder groups are incorporated in the business case and economic need case?



Example:



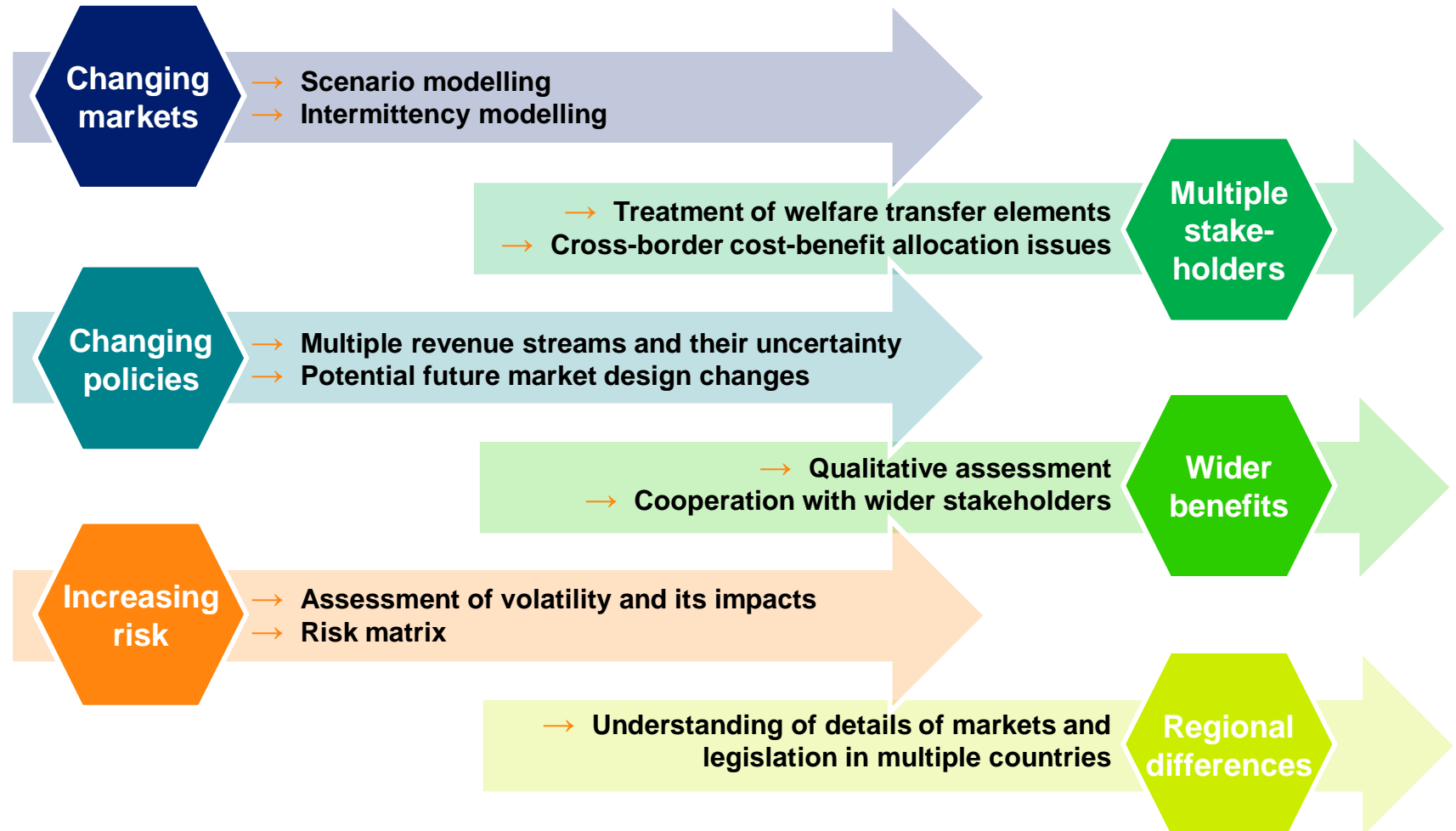
INCREASING DIFFICULTIES TO CONSTRUCT BUSINESS CASES

Because of the changing landscape of the European electricity markets, 'no-brainer' projects are rare



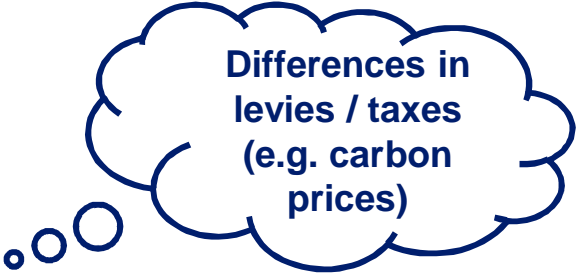
HOW TO ADDRESS THESE DIFFICULTIES

How Pöyry has looked at cross-border transmission projects in the past and how that view is evolving with the changing markets



FOCUS ON LIVE ISSUE: DISTORTION OF METRICS

A range of current market and policy arrangements can have a distorting effect on the interpretation of costs and benefits of interconnectors



Differences in levies / taxes (e.g. carbon prices)

- What effect do different carbon prices have on cross-border flows and the value of flows?
- How does the GB treasury view the lost tax gains?



Capacity markets

- How do capacity markets affect prices in markets?
- Are there arbitrage opportunities by participating in different capacity markets?



Access to cross-border intra-day markets

- How does increased participation in intra-day markets affect the value of cross-border transmission?
- Can cross-border transmission projects realise the theoretically high value of their flexibility?

EXAMPLE – CAPACITY MARKET REVENUES

Allowing interconnectors to participate in capacity markets can present a significant upside to the project

Example: NSN Interconnector between Norway and Great Britain:

Assumptions

- Interconnectors allowed to participate in capacity markets in all future years
- Flat capacity price in Great Britain (€45/kW)
- Cable de-rated to 70% of its capacity

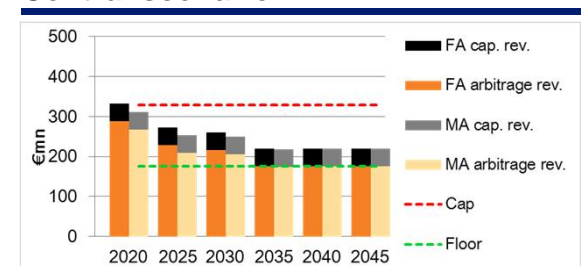
Results

- Capacity revenues of ~€44m for the 1,400MW interconnector cable (real 2013 money) in all scenarios

Impact

- Represents an increase of 15-25% over electricity market arbitrage revenues in the Central scenario, and an even greater share in the Low scenario (45-85% increase)
- Difficulties when connecting countries with and without capacity mechanisms (distorted electricity price signals)
- Difficulties with planning for and rewarding the 'right' amount of 'capacity value' for the interconnector

Central scenario



Note: Analysis based on Pöyry study conducted for Ofgem in 2014, available here:

https://www.ofgem.gov.uk/sites/default/files/docs/2014/12/791_ic_cba_independentreport_final.pdf

SUMMARY

Key conclusions from this session:

Cross-border transmission can contribute to various objectives

Complexities make constructing business and economic cases difficult

Changing markets and future developments pose additional difficulties

Business cases need to specifically address complexities and risks



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