THE CHANGING ARGUMENTS FOR CROSS-BORDER ELECTRICITY TRANSMISSION
Benedikt Unger, 11 May 2015
SECTORS & SERVICES OF PÖYRY PLC

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PÖYRY MANAGEMENT CONSULTING IS EUROPE’S LEADING MANAGEMENT CONSULTANCY SPECIALISING IN THE ENERGY SECTOR

- Cutting-edge understanding of practical implications of low carbon futures
- Highly respected and influential in both Governmental (EU and national) and private sector circles
- 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:
  - Düsseldorf
  - 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

- **Existing**
  - IceLink: 1,200MW, Iceland
  - HVDC Moyle: 500MW, Northern Ireland
  - Greenlink: 500MW, Republic of Ireland
  - FAB Link: 1,400MW, France

- **Planned**
  - NorthConnect: 1,400MW, Norway
  - Viking Link: 1,000MW, Denmark
  - BritNed: 1,000MW, Netherlands
  - Nemo: 1,000MW, Belgium
  - Eleclink: 1,000MW, France
  - HVDC Cross-Channel: 2,000MW, France
  - IFA2: 1,000MW, France
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.
- **External support**: Public support, e.g. grants, subsidies, revenue floors, etc. This is reliant on the project presenting a benefit to society overall.

**Business model / business case**

**Economic need case**
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

Different stakeholders can benefit from cross-border transmission projects.
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:

- Project profits
- Lower electricity bills
- Lower revenues from lower prices
- Less jobs in domestic energy sector
- Inferior trade balance
- Better security of supply
- Increased trading
- (Mis-)Aligned interests

etc.
INCREASING DIFFICULTIES TO CONSTRUCT BUSINESS CASES

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

- Multiple stakeholders
- Changing markets
- Changing policies
- Wider benefits
- Regional differences
- Increasing risk

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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

Changing markets

- Scenario modelling
- Intermittency modelling

Changing policies

- Multiple revenue streams and their uncertainty
- Potential future market design changes

Increasing risk

- Assessment of volatility and its impacts
- Risk matrix

Multiple stakeholders

- Treatment of welfare transfer elements
- Cross-border cost-benefit allocation issues

Wider benefits

- Qualitative assessment
- Cooperation with wider stakeholders

Regional differences

- Understanding of details of markets and legislation in multiple countries

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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

**Central scenario**

- 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

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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