

CREG

Plan

- Characteristic features of the European market design/ Terminology
- Legislative context
- Regulators
- ERGEG
- Regional initiatives
- CW regional initiative
- Action Plan
- Priority topics

2

Characteristic features of the European market design/ Terminology

- Nominations: indications given to the TSOs of the schedules for generation and demand (MW) in the morning for the following day (Physical transmission right)
- BRP: Balance Responsible Party: a market players (very often, generators) who is responsible for maintaining the balance of generation and demand in real time
- Balancing mechanism: operations made by the TSO in order to maintain the control area in balance and the settlement of the imbalances to BRP on the basis of a tariff for imbalance
- Intraday: possibilities of trade provided by the TSOs inside the different countries and across borders during the current day

Characteristic features of the European market design/ Terminology

- Electricity power exchanges (PXs) allow the trade of electricity for each hour of the following day at marginal price
CW region 4 PXs: Belpex, APX, PowerNext and EEX
- Market coupling: the coupling of existing PXs in order to increase competition and liquidity: ex TLC between APX, Belpex and PowerNext
- Market splitting (NordPool) in the Nordic region where one PX covers several countries and where the market may be splitted in different price zones in case of congestion
- Explicit allocation of transmission capacity: auctions for transmission capacity only (without energy); mainly for long term capacity allocation
- Implicit allocation of transmission capacity when the allocation combines the capacity and the energy. Normally more efficient than explicit auctions for the day ahead time frame

Electricity directive 2003/54/EC

- The Electricity directive 2003/54/EC is the key European legislation to establish the Internal Market of Electricity
 - Has been transposed in national laws
 - Covers the whole organization of the Internal market
- This Directive establishes common rules for the generation, transmission, distribution and supply of electricity.
- It lays down
 - the rules relating to the organisation and functioning of the electricity sector,
 - access to the market,
 - the criteria and procedures applicable to calls for tenders and the granting of authorisations and the operation of systems.

Regulation (EC) 1228/2003

- The Regulation on cross-border trade in electricity 1228/2003/EEC sets rules for transmission of electricity between Member States.
 - The regulation entered into force 1 July 2004. It is directly applicable Community law.
- Mainly covers rules for cross border exchanges in electricity and improving competition within the internal electricity market

Regulation (EC) 1228/2003

- In particular, provides the general principles for congestion management:
 - Be market based,
 - Gives efficient economic signals,
 - Precises conditions for transaction curtailment,
 - Require the maximisation of cross-border capacity,
 - Ask for nominations and their netting,
 - Specify the treatment of congestion revenues for guaranteeing the allocated capacity, for network investments and for tariff reduction

7

New Congestion management guidelines

Officially the : COMMISSION DECISION of 9 November 2006 amending the Annex to Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges in electricity

Entered into force 1st December 2006

Specify into more details:

- The principles to be applied for congestion management, and tackle partially the issue of loop flows
- The role of the regulators
- Define regions where congestion management should be coordinated and commonly organised
- Sets the timetable for market operations
- Transparency conditions,
- The use of congestion income

8

Regulators

- Article 23 of the Electricity directive 2003/54/EC describes the tasks of the regulatory authorities. In particular:
 - Regulators shall be wholly independent from the interests of the electricity industry.
 - Regulators shall at least be responsible for ensuring non-discrimination, effective competition and the efficient functioning of the market,
 - Regulators shall monitoring in particular:
 - (a) the rules on the management and allocation of interconnection capacity,
 - (b) any mechanisms to deal with congested capacity within the national electricity system;
 - (c) the time taken by transmission and distribution undertakings to make connections and repairs;
 - (d) the publication of appropriate information by transmission and distribution system operators concerning interconnectors, grid usage and capacity allocation;
 - (e) the effective unbundling of accounts, to ensure that there are no cross subsidies between generation, transmission, distribution and supply activities;
 - (f) the terms, conditions and tariffs for connecting new producers of electricity to guarantee that these are objective, transparent and non-discriminatory;
 - (g) the extent to which transmission and distribution system operators fulfil their tasks;
 - (h) the level of transparency and competition.

Regulators

- Article 23 also indicates that:
 - The regulatory authorities shall be responsible for fixing or approving, prior to their entry into force, at least the methodologies used to calculate or establish the terms and conditions for:
 - (a) connection and access to national networks, including transmission and distribution tariffs. These tariffs, or methodologies, shall allow the necessary investments in the networks to be carried out in a manner allowing these investments to ensure the viability of the networks;
 - (b) the provision of balancing services.

CEER/ERGEG

- The Council of European Energy Regulators (CEER) is a not-for-profit organisation in which independent national regulators of electricity and gas voluntarily cooperate to protect consumer' interests and to facilitate the creation of a single, competitive, efficient and sustainable internal market for gas and electricity in Europe.
- The European Regulators' Group for electricity and gas (ERGEG) is an Advisory Group of independent national regulatory authorities. ERGEG was established on 11 November 2003, pursuant to Directive 2003/796/EC, to assist the Commission in consolidating the Internal Market for electricity and gas. Its Members are the heads of the national energy regulatory authorities in the 27 EU Member States.

Electricity Regional Initiative (ERI)

- Launched the 27th of February 2006 by the European Regulators Group for Electricity and Gas (ERGEG)
- Goal: identify and remove barriers to competitive markets in the seven region where market integration will be fostered
- Constitutes an intermediate steps towards the implementation of the (European wide) Internal (Electricity) Market
- Ensures the convergence and coherence between the different regions

Regional initiatives

Baltic



Northern



Central-East



Central-South



South-West



FUI



Central-West



13

Electricity Regional Initiative (ERI)

- Each region,
 - Sets up:
 - Regional Coordination Committee (RCC) grouping the regulators of the region
 - Implementation Group made of Regulators and TSOs and eventually PXs
 - Defines an Action Plan,
 - Organises also Stakeholders Group (SG) meetings
- Website:
 - http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_INITIATIVES/ERI

14

Regional initiatives: typical priority topics

- Harmonisation of long term auction rules
- Method for the calculation of cross-border capacities
- Flow based allocation and day-ahead market coupling
- Transparency
- Cross-border balancing (real time)

Regional initiatives

- At a glance, issues currently tackled (green) in the different regions (beginning 2008)

REM	Congestion Mgt.	Transparency	Balancing
Baltic	Not relevant		
Northern			
Central-South			
Central-East			
South-West			
Central-West			
FUI			

CW Electricity Regional Initiative

- Set the CW Regional Co-ordination Committee (RCC) assembling representatives of the five regulators BNetzA (Germany), CRE (France), CREG (Belgium), NMa (The Netherlands) and ILR (Luxembourg)



- The CREG has the leadership of the CW RI
- Website:

http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_INITIATIVES/ERI/Central-West

17

Action Plan: elaboration

- Based on a stakeholders consultation organized the 20th June 2006 which allows the identification of priority topics
- Adopt a work method for the priority topics:
 - Study/proposal made by the TSOs
 - Consultation of stakeholders/market players
 - Decision/agreement of the Regulators
 - Implementation
- Action plan of the CW region published in February 2007

18

Action plan: priority topics

- Harmonization and improvements of the long-term explicit auctions
- Implementation of a day-ahead flow-based market coupling
- Implementation of cross-border intraday and balancing trade
- Common calculation for cross-border capacities
- Maximization of the amount and of the utilization of cross-border capacities
- Regional transmission capacity investment plan
- Transparency
- Regional market monitoring

Action plan: harmonisation and improvement of LT auctions rules

- Rules to be applied between TSOs and market players for cross-border exchanges of long term transmission rights
- Today, different sets of rules are applied inside the region
- Those rules have to be “reviewed” by the regulators
- In particular, the CREG has an approval competency

Action plan: harmonisation and improvement of LT auctions

- Improvements concern:
 - Netting of LT nominations for the calculation of day-ahead cross border capacities
 - Conditions for suspension which should be clearly explained,
 - Firmness of transmission rights,
 - Limitation of liabilities,
 - Compensation in case of curtailments,
 - “Use-it-or-get-paid-for-it” instead of the old “use-it-or-lose-it” principle
- The CASC company was recently created at the level of the CW region for the operation of the auctions
- Harmonised proposal of auction rules received in June 2008, which is still considered insufficient by the regulators
- Implementation: foreseen 2009

Action Plan: FBMC

- Stands for « Flow Based Market Coupling »
 - Kirchhoff laws
 - Loop flows
 - Impact of loop flows
 - FBMC principle
 - FBMC: current developments
 - FBMC: progress

Kirchhoff

Electricity flows follow Kirchhoff laws:

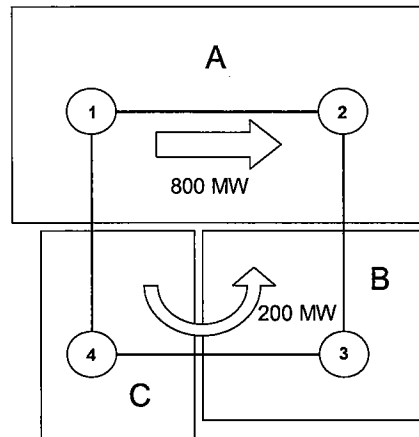
In a meshed network of nodes and links, an electricity transfer between two nodes will follow all possible paths between the two nodes, and the path with the lower resistance (the “shortest electrical” path) will carry the most important part of the transfer.

Allocation of flows depends of the resistance (impedance), and not of the capacity of the line.

Kirchhoff

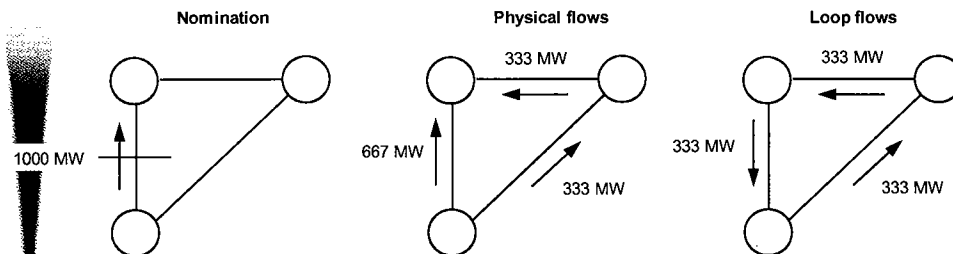
Direct consequences of Kirchhoff’s laws and the development of interconnection networks:

What is happening inside a country (transfer of 1000 MW from 1 to 2) influences flows between other countries



➡ This law of physics shows the necessity of a regional approach

Loop flow: origin of the terminology



- The comparison of
 - the nominations on the border
 - and the observed physical flows
 may be explained through the presence of an apparent “loop flow”
- Loop flows correspond to the physical flows on the borders where there is no nomination.

25

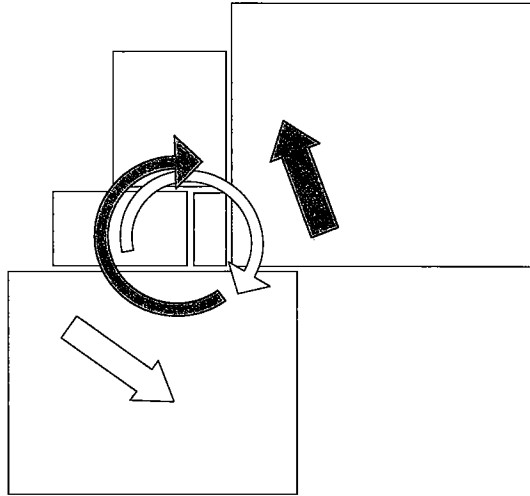
Impact of loop flows on cross border (CB) capacities

- First difference: only CB capacities are calculated: there is no calculation of internal transmission capacities
- CB capacity is defined as the remaining CB transmission capacity of a system already loaded with internal exchanges (base case)
- In the current method of calculation, internal transactions have priority on commercial CB flows
- Loop flows generated inside a country have full priority on commercial CB flows

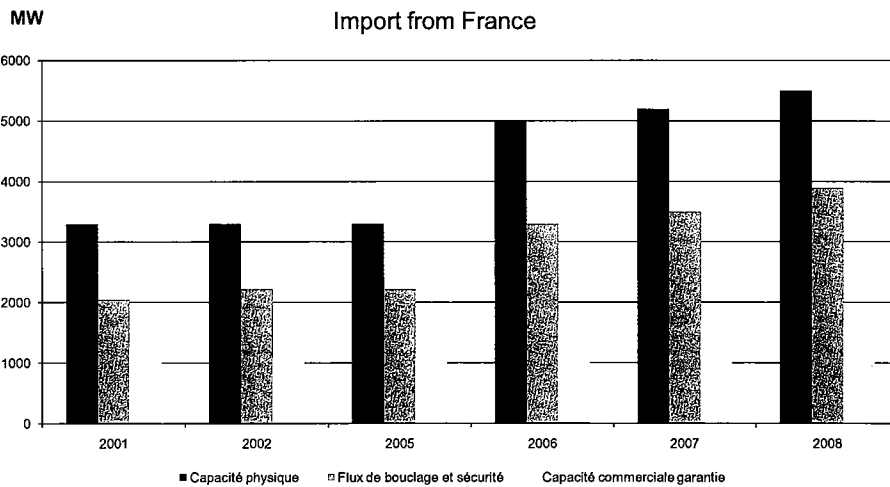
26

Impact of loop flows on the Belgian French border

- Loop flows generated by internal transfers
- Summer conditions:
 - loop flows generated by France and Germany are oriented in the same direction
 - reduce the import capacity at the F-B border
- Typical import figures:
 - 3300 MW in winter conditions,
 - 1600 MW in summer conditions



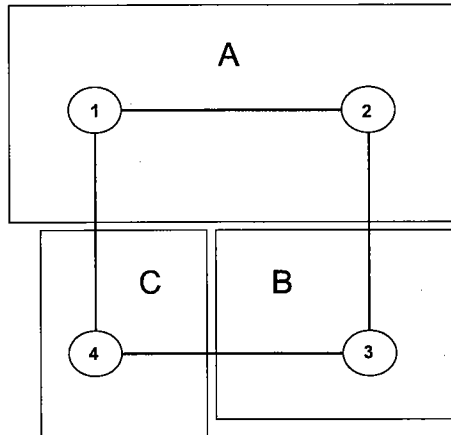
Impact of loop flows: reduction of CB capacities



loop flow
↓ security

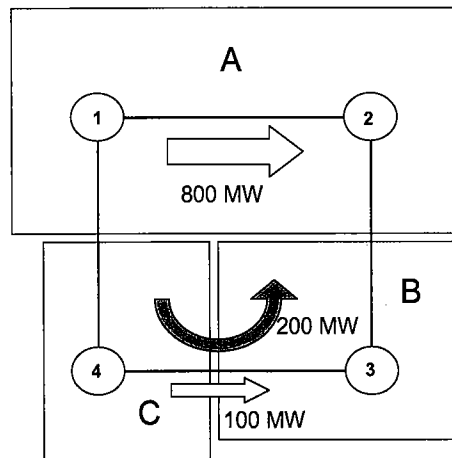
FBMC principles: terminology

- For some applications, the detailed physical network is replaced, for simplicity reasons, by a simplified, synthetic network made of
 - Nodes (or zones)
 - Bottlenecks linking nodes
- Example used below with:
 - four nodes,
 - four bottlenecks (BC) or links between nodes,
 - three countries, one large A, with two nodes 1 & 2 or price zones, and two smalls, B & C
- The initial loading of the system pre existing to the capacity allocation is called below the base case or the reference case



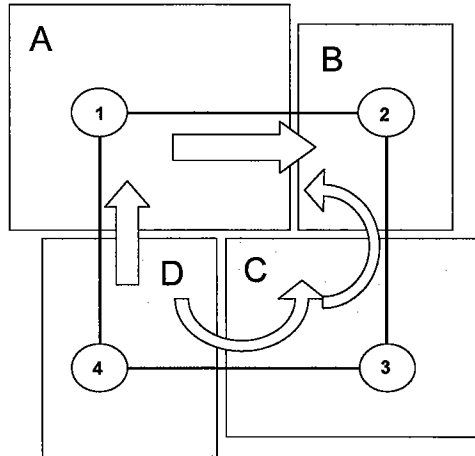
FBMC principles: consequences of Kirchhoff laws

- Congestion:
 - May occur not only inside the country at the origin of the flows
- Which transfer should have priority?
 - Internal 1=>2 ?
 - Cross-border 4=>3?
 - Or two internals?
- Well designed FBMC should give a market based answer to these questions



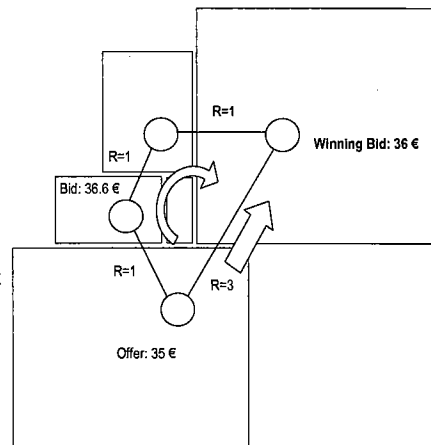
FBMC principles

- FBMC = a practical way to choose between electricity transfers:
 - Taking into account network constraints
 - And the economic value of the transfer
- More precisely, FBMC optimise regional cross border flows
 - Within network security constraints
 - in order to maximise the regional socio-economic welfare
- Socio-economic welfare:
 - difference of the sum of the volume of accepted demand bids multiplied by their bid price minus the sum of the volume of accepted generation offers multiplied by their offer price
 - $= (\text{SUM} (BV * BP)) - (\text{SUM} (OV * OP))$
- This sound principle of FBMC may have surprising results with the current implementation design (see below)



FBMC principle: lever effect on prices

- Current implementation of FBMC: synthetic network with 4 countries in a loop
- Due to the difference in size of the 4 countries, impedance between the centrum of France and Germany should be much more higher than the others
- If the network is nearly congested
- If there is one offer for selling power at 35 € in F
- If bids for buying power are in competition in B at 36.6 € and in G at 36 €
- The bid at 36 € in G will be selected by the FBMC welfare maximisation algorithm because it makes a more efficient use of the network
- Occurrence of "non intuitive result" : flows are going from the high price zone towards the low price area
- Risk of discrimination and reduced competition for market players in small countries



FBMC Importance

- Currently, a trilateral market coupling TMC method is in place between France, Belgium and the Netherlands
From January till August 2007, the borders with France and the Netherlands were congested 15% of the time in day ahead while physicals flows were going in the opposite direction
- With other words, we are limiting without reason cross-border transfers of Belgium and other cross- border and internal transfers during a minimum of 15 % of the time
- FBMC should reduce this figure
- Comment: being non flow based, this goal is impossible to achieve for the TMC

FBMC: Current developments

- Based on 4 zones and around 1000 critical branches

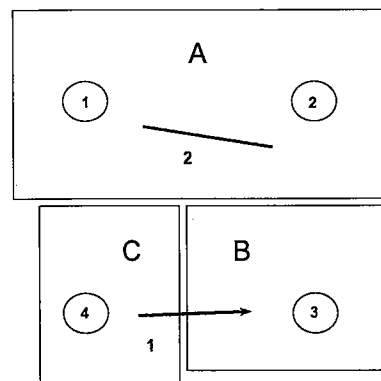
Network constraints are taken into account on the basis of a PTDF matrix

- Lines: critical branches (flowgates)
- Column: zones (countries,...)
- Estimated size: 200 lines * 5 columns

PTDF Matrix
Place of injection

Critical branches	Country A	Country B	Country C
1	0...0,5		0,8
2			
3			
4			
1000			

Place of take: assumption country B



- Each element represent the % of the flow that is going through a given line for a given injection (or take)

FBMC progress

- Requirement of the new CM guidelines (3): allocation of capacity shall be regionally coordinated and deal efficiently with loop flows
- Memorandum of Understanding (MOU) signed in June 2007 for the implementation of a FBMC in the region
- Represent a lot of work for TSOs, PXs and regulators in 2008
- Orientation study (general principles) completed in February 2008
- Implementation study (for allowing an implementation) completed in August 2008
- Big achievements: centralised process, with the corresponding exchange of data (recall that all TSOs in the region are not (yet) totally unbundled)
- Interim solution for market coupling (non flow based) foreseen end 2009
- Critical issues are the calculation of CB capacities and the quality of the price signal on PXs

Action plan: Intraday trade and cross-border balancing

- Bilateral interim mechanisms:
 - Already implemented between France and Germany (first-come first served)
 - Currently under implementation on the borders of the Netherlands (first come first served and pro-rata)
- CW regulators shall launch before the end of this year a consultation document on the design of the regionally coordinated intraday mechanism, which should consider an implicit continuous trade approach
- Regional intraday trade not expected before 2010
- Cross-border balancing will follow

Action Plan: Transmission capacity calculation

- Requirement of the new CM guidelines (3.5): coordination on capacity calculation shall include the use of a common transmission model dealing efficiently with loop flows
- For day ahead calculations: involved in the FBMC priority topic; current developments are examining the use of a common transmission model
- For long term capacity calculations; CW TSOs have recently indicated that a common transmission model will be used for the determination of 2009 CB capacities

Action plan: Transparency

- Detailed Transparency report of the regulators was published in November 2007
- Indicates how the articles concerning transparency of the new CM guidelines should be implemented
- Foresee a phased implementation of transparency in 2008 and 2009
- Critical issues:
 - Demand forecast
 - Ex-ante and ex-post network availability
 - Ex-ante availability of large generation units

Action plan: cross border capacity maximisation

Regulators are examining schemes for incentivising TSOs for maximising cross border capacities

- No clear response from TSOs
- Transferred to ERGEG ENM (Electricity Network and Markets) Task Force

Action Plan: Regional transmission capacity investment plan

- Considering that the high voltage network is highly meshed in the CW region,
- Investments made in a specific country may have little benefit for the country itself but are beneficial for the region as a whole
- Goal: identify structural congestions and the need for additional investments
- Priority topic under the leadership of the Pentilateral Energy Forum

