

Enhancing Regional Power Trade in Central Asia

Energy Sector Coordinating
Committee Meeting
April 2-3, 2014
Bishkek, Kyrgyz Republic

Hans-Arild Bredeesen, Yuriy Myroshnychenko,
World Bank



Central Asia Regional Economic Cooperation Program

World Bank



BACKGROUND

- CAPS was designed and successfully functioned for decades as a stand alone self-sufficient system
- At present, only three out of five CA countries are part of CAPS, while power trade volumes dropped by a factor of 10 in the past 25 years
- Consequences: wasteful use of natural resources, suboptimal operation of power sector assets, winter power shortages
- Several studies (Mercados, Fichtner) have confirmed economic benefits of power trade/cooperation in the CA region (hundreds of millions USD)
- At the ESCC meeting in Almaty on 10 September 2013, the participating countries confirmed interest in enhancing power trade and supported a WB initiative aimed to promote it



World Bank



UTILIZING THE VALUE OF REGIONAL DIFFERENCES

Seasonal trade



Ancillary Services



- Reduction in electricity production costs
- Reliability and quality of supply
- Environmental benefits
- Rational use of natural resources and optimal operation of power equipment



Central Asia Regional Economic Cooperation Program

World Bank



BARRIERS TO REGIONAL POWER TRADE IN CENTRAL ASIA – REAL AND PERCEIVED

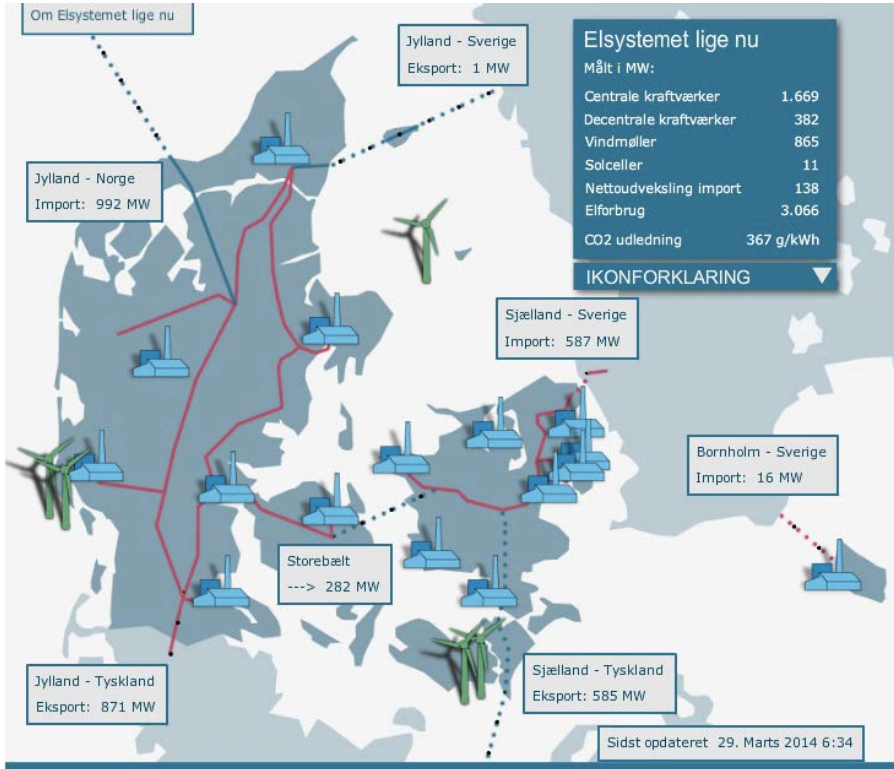
- Uneven market development per country
- Exposure of national power market to regional market
- Energy deficit in winter
- Established interests hampering development of cross-border power trade
- Inflexible/low tariffs

CONDITIONS FOR CROSS-BORDER TRADING

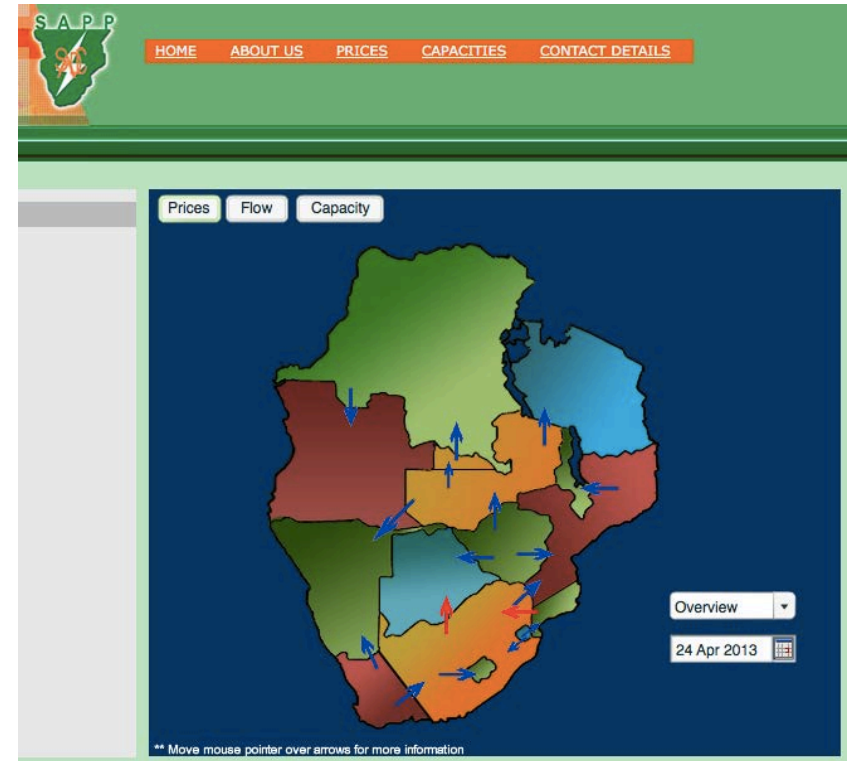
- Local control with benefits of regional cooperation
- Firm contracts (price/volume) including price for imbalances
- Commercial metering systems
- Transparency of and access to data on contracted and actual volumes

TRANSPARENT AND ACCESSIBLE INFORMATION ON POWER FLOWS

Denmark



Southern African Power Pool



Central Asia Regional Economic Cooperation Program

World Bank



OPTIONS FOR CROSS-BORDER TRADING

Bilateral trading arrangements between TSOs

- Bilateral contracts are in use in CAPS, but could be further developed to be based on market principles and reflect :
 - Cost of ancillary services
 - Hourly pricing and volumes (no netting)

Bilateral trading between market participants

- Form the basis for open bilateral cross-border trade
- Requires coordination of access to the cross-border transmission capacity (PTRs)
- Procurement of capacity organized as long-term auctions (annual, seasonal, monthly)

Cross-border short term implicit trading

- This is the most sophisticated but the most efficient solution for buyers and sellers
- Delivers a transparent coordination mechanism

National control – regional cooperation

Market Participants

Bidding

Hour	Power	Price
1	10	10
2	20	20
3	30	30
4	40	40
5	50	50
6	60	60
7	70	70
8	80	80
9	90	90
10	100	100
11	110	110
12	120	120
13	130	130
14	140	140
15	150	150
16	160	160
17	170	170
18	180	180
19	190	190
20	200	200
21	210	210
22	220	220
23	230	230
24	240	240

Results/Settlement

Hour	Power	Price
1	10	10
2	20	20
3	30	30
4	40	40
5	50	50
6	60	60
7	70	70
8	80	80
9	90	90
10	100	100
11	110	110
12	120	120
13	130	130
14	140	140
15	150	150
16	160	160
17	170	170
18	180	180
19	190	190
20	200	200
21	210	210
22	220	220
23	230	230
24	240	240

National Market Operator 1

Bidding process

- Bid validation process
- Aggregated net purchase curve
- Market coupling
- Export of data - NEC - (Block bids)

Create NEC

Scheduling

- Schedule process
- Control of bids
- Market balance control
- Distribution
- Settlement and collateral
- TSO report process
- Schedules
- Area net exchange

Flow on ICs • Prices

Regional Implicit Price Calculation

3

NEC NM2 + NEC NM1 + ATC_{all}

CAPS Service provider

TSOs

Calculation of TC for all interconnections

National Market Operator n

Single buyer (no national market)

Demand

Optimal production

MW

Create NEC

Results/Settlement

Hour	Power	Price
1	10	10
2	20	20
3	30	30
4	40	40
5	50	50
6	60	60
7	70	70
8	80	80
9	90	90
10	100	100
11	110	110
12	120	120
13	130	130
14	140	140
15	150	150
16	160	160
17	170	170
18	180	180
19	190	190
20	200	200
21	210	210
22	220	220
23	230	230
24	240	240

2

3

1

1 ATC_{all ICs}

2 NEC NM1

3 Prices all areas
Flow all ICs

1 ATC_{all}

3 Flow_{all ICs}

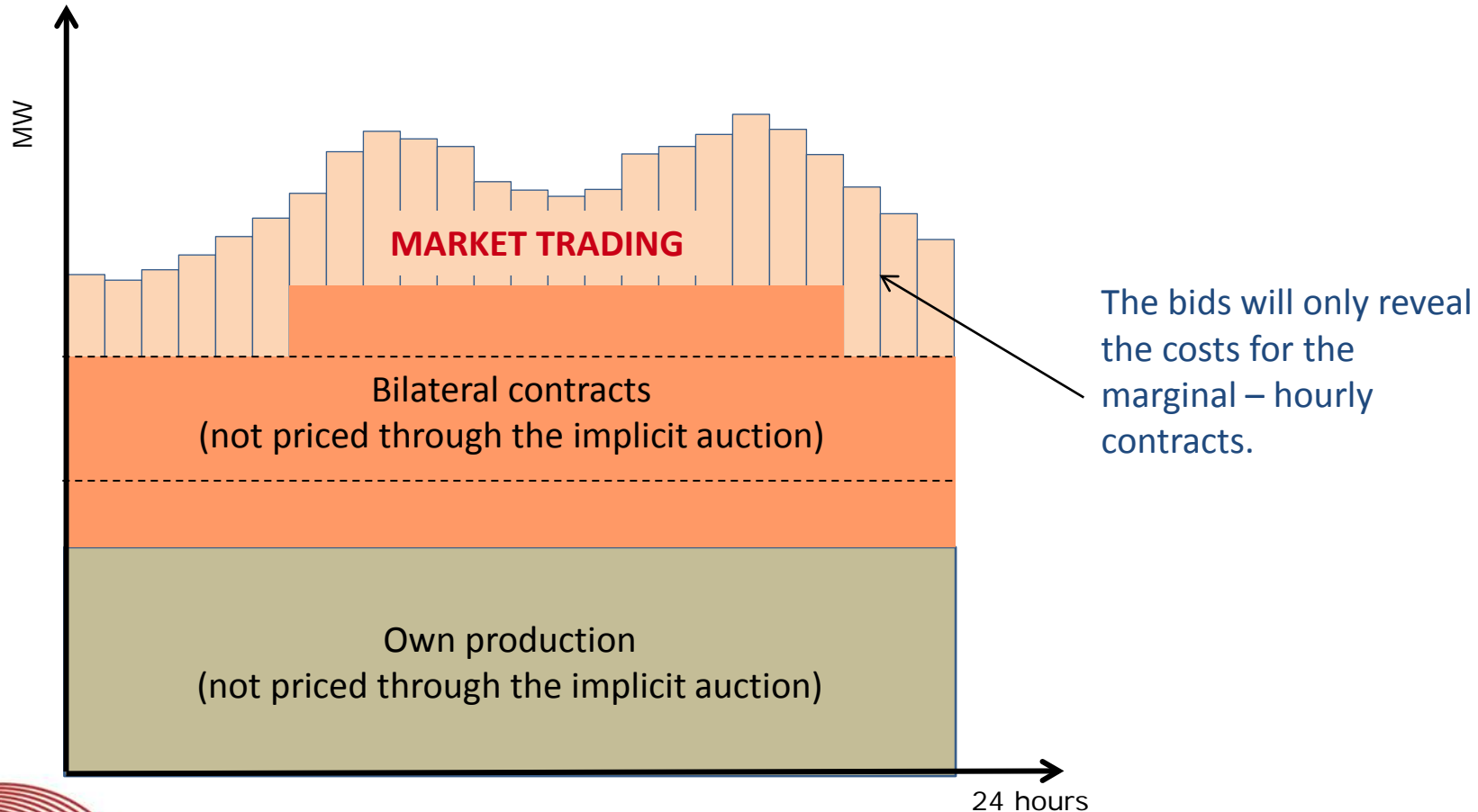
2 NEC NM2

3 Prices all areas
Flow all ICs

World Bank

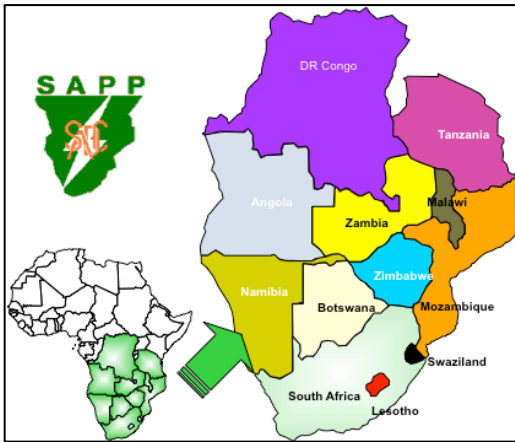


TRADING THE MARGIN IN THE IMPLICIT AUCTION

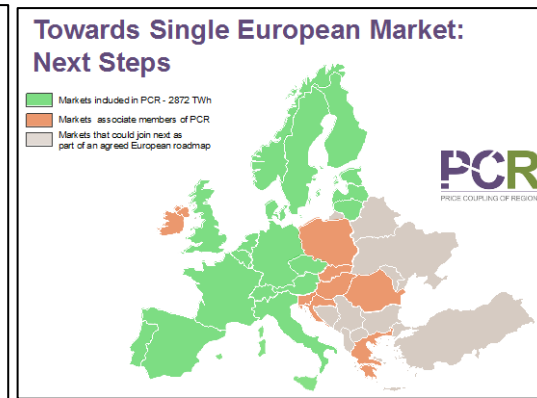
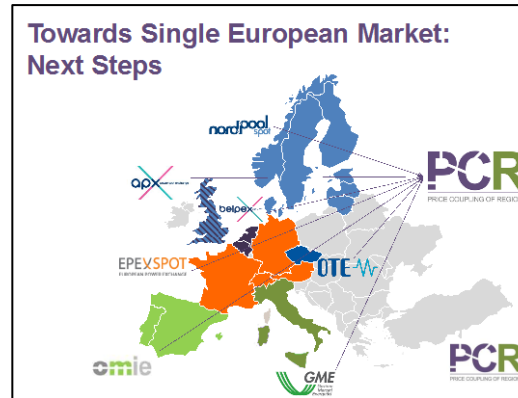


INTERNATIONAL EXPERIENCES OF POWER MARKETS

Southern African Power Pool



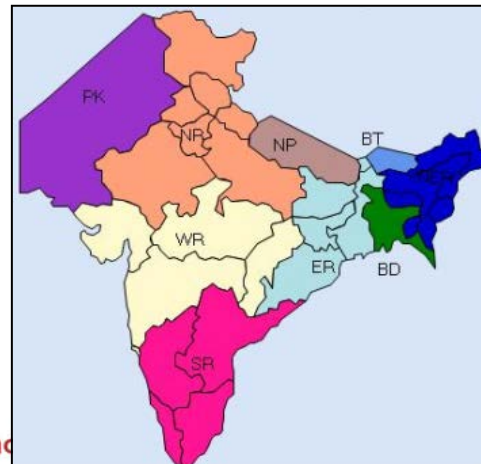
European target model



Central America



India

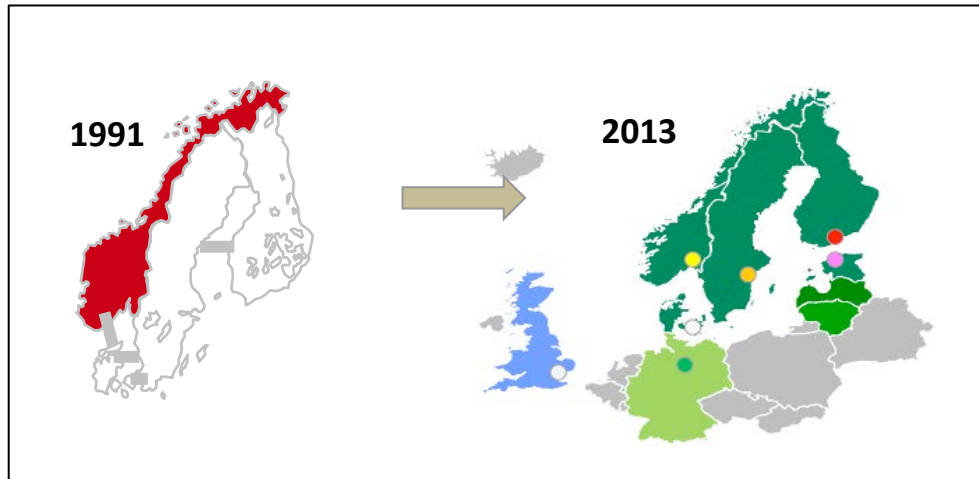


South-east Europe



INTERNATIONAL EXPERIENCES OF POWER MARKET DEVELOPMENT

Two different approaches: Nordic and Central America



Stepwise development

- Number of participating countries
- Market penetration

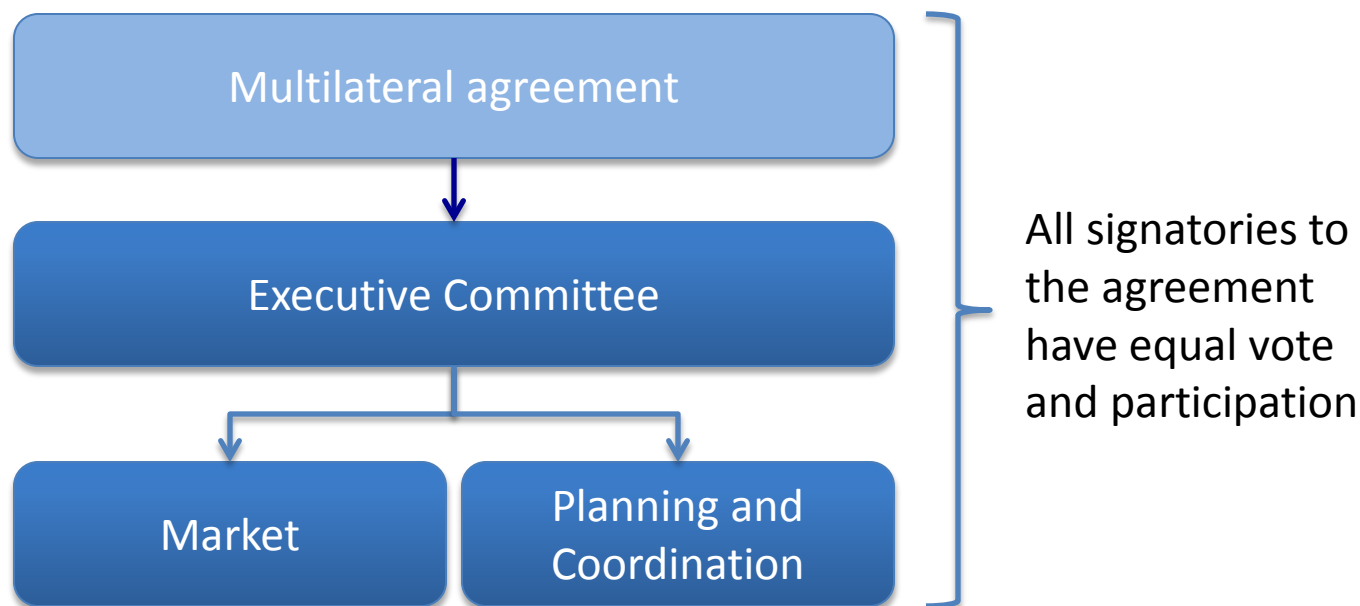


Central Asia Regional Economic Cooperation Program

World Bank



ORGANIZATION OF COORDINATION



Functions:

- Coordinating, monitoring and facilitating cross-border trade and operational activities
- Coordinating regional initiatives for transmission and generation projects
- Register schedules of all cross-border trades from bilateral and market contracts
- Assist the national TSOs with coordination services
- Option: Operate the regional market(s)
- Manage the regional metering management services



Central Asia Regional Economic Cooperation Program

World Bank



4 OPTIONS TO IMPLEMENT COORDINATION

- **Regional coordination center**
 - Located within CA region
 - International references: SAPP, Nord Pool Spot
 - Located outside of CA region
 - International reference: The Energy Community in Vienna for the SEE region
- **Multilateral agreement between CA countries**
 - Joint procurement of required systems and services and decentralized operation;
 - International reference: TLC and European Target model
 - Buy the required services from a 3rd party;
 - International references: GB Virtual HUB (Great Britain), Czech-Slovak-Hungarian Market Coupling



OUTCOMES OF CONSULTATIONS AND NEXT STEPS

- **Topics of interest for next step discussions**
 - Regional electricity metering management system
 - Unscheduled flows
 - Transmission and transit tariff
 - Cross-border pricing for energy and capacity
- **Regional power trade seminar**
 - Build on bilateral discussions with each participating country to fully understand the local and regional conditions
 - Will cover trade, operation and coordination, nationally and regionally
- **Develop and sign an MOU**



Central Asia Regional Economic Cooperation Program

World Bank



Thank you



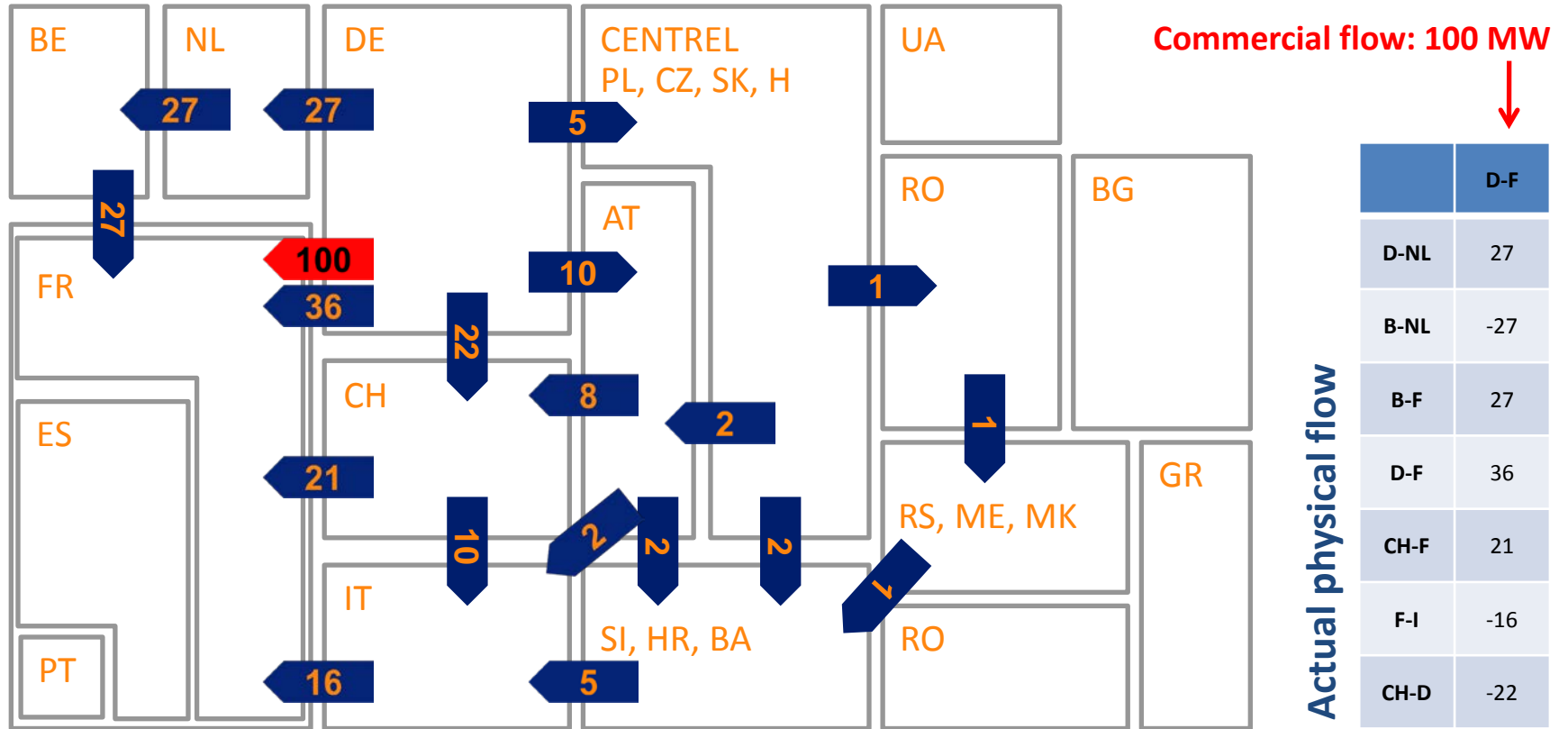
Central Asia Regional Economic Cooperation Program

World Bank



LOOP FLOW

AN EXAMPLE FROM THE EUROPEAN MARKET



Source: ENTSO-E study 2007



Central Asia Regional Economic Cooperation Program

World Bank

