



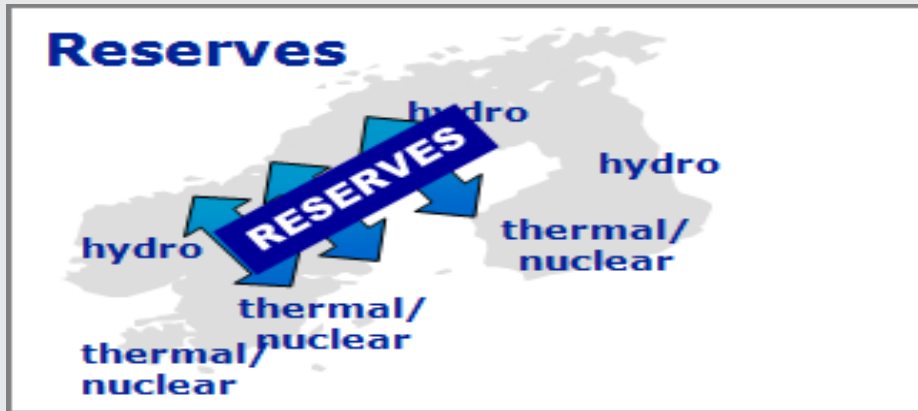
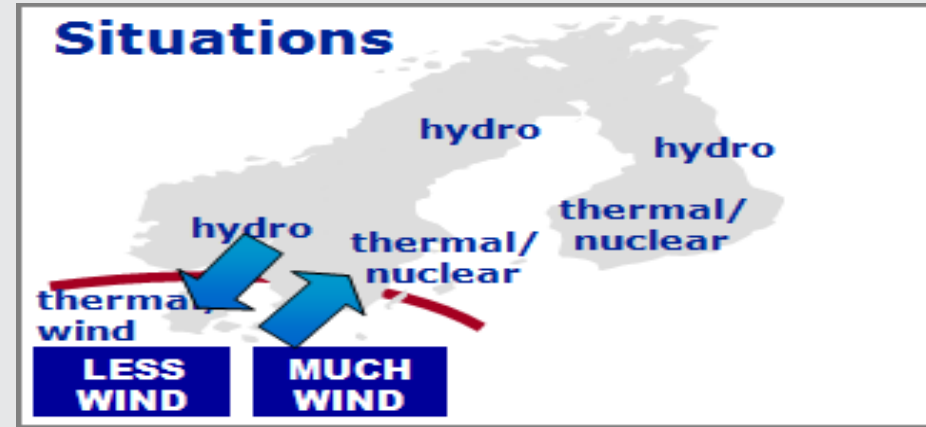
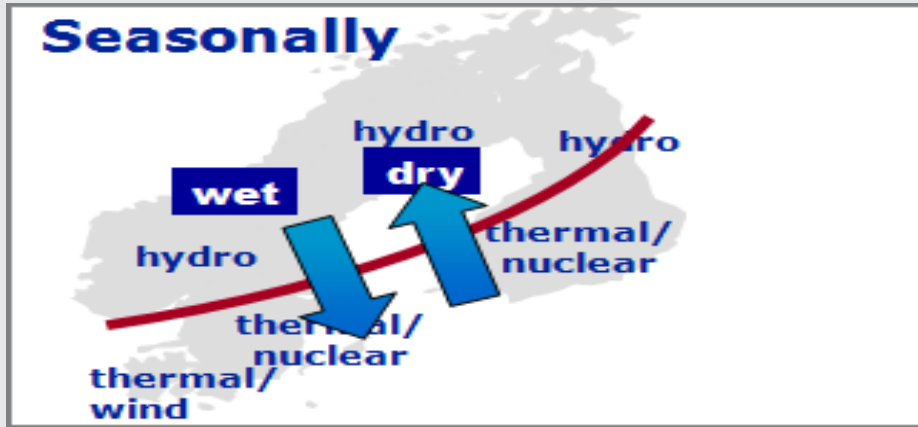
# Cross-border market operations

Inputs from Nord Pool Consulting

Tokyo, September, 2016

# Nordic market summary

# Utilizing the Value of Differences in a Region



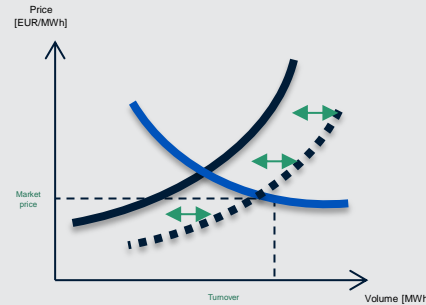
- ➔ Complementary production
- ➔ Security of supply
- ➔ Cost synergies
- ➔ Climate challenge

# Day Ahead price formation in practice

## Factors affecting the **supply** for electricity:

- Fixed costs of production
- Variable costs of production
- Plant startup and shutdown costs
- CO2 allowance prices
- Weather
- Hydro situation

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## Factors affecting the **demand** for electricity:

- Retail volumes and delivery obligations:
  - Weather
  - Open deliveries, etc.
- Industrial consumers:
  - Fixed costs
  - Variable costs
  - Startup and shutdown costs
  - Flexibility of processes

## TRANSMISSION CAPACITY

### Available Transmission Capacity (ATC):

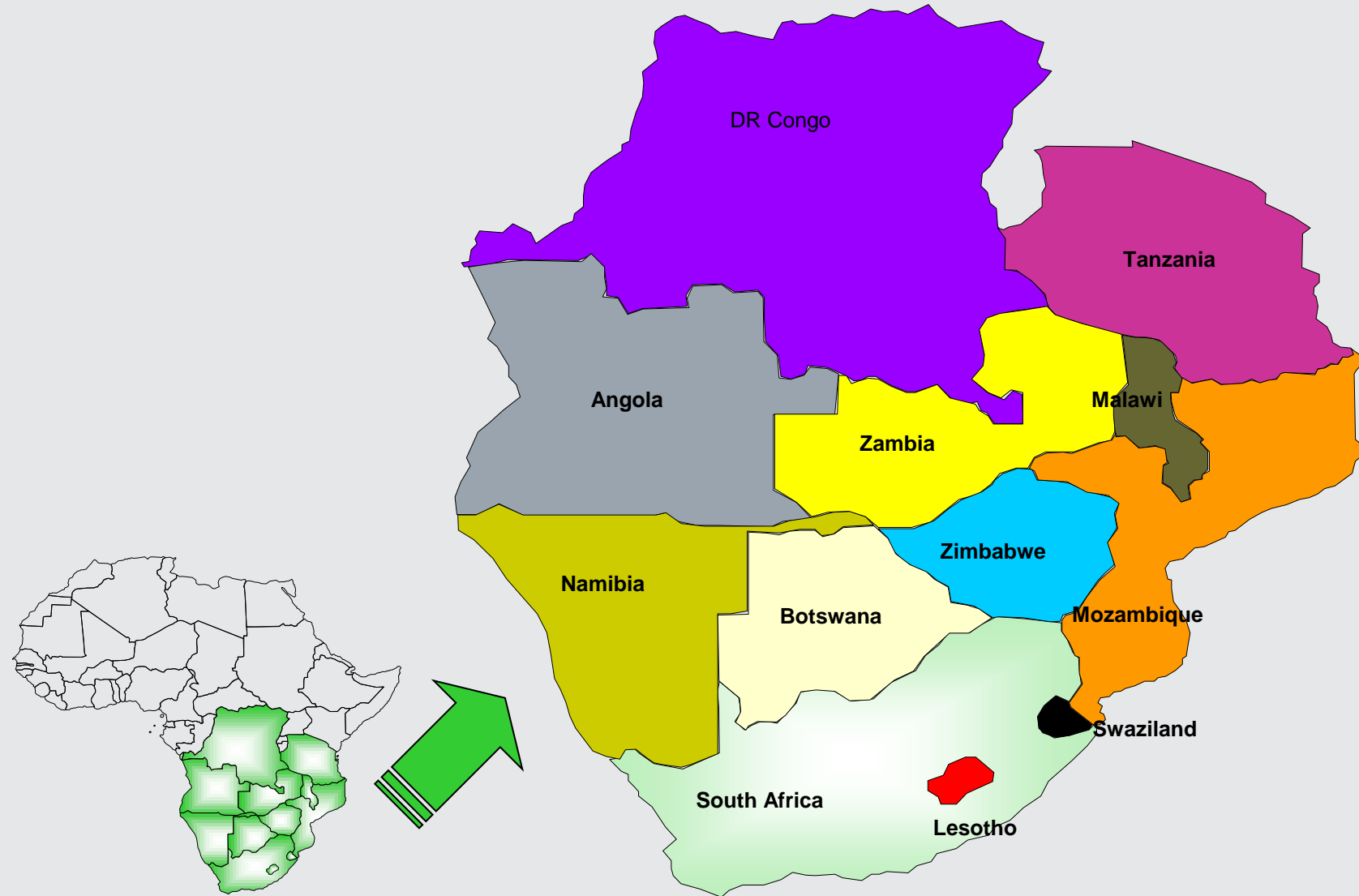
- Existing interconnectors
- Unavailability of interconnectors (faults, etc.)

# **The Southern African Power Pool: A Nordic Model in Africa**

# SAPP Market Area

SAPP consists of the following members:

- ▶ 12 SADC Member Countries
- ▶ 16 SAPP Members
- ▶ 280 Million people
- ▶ Installed Generation Capacity - 62 GW
- ▶ Available Generation Capacity - 47 GW
- ▶ Peak Demand - 55 GW
- ▶ Consumption - 400TWh



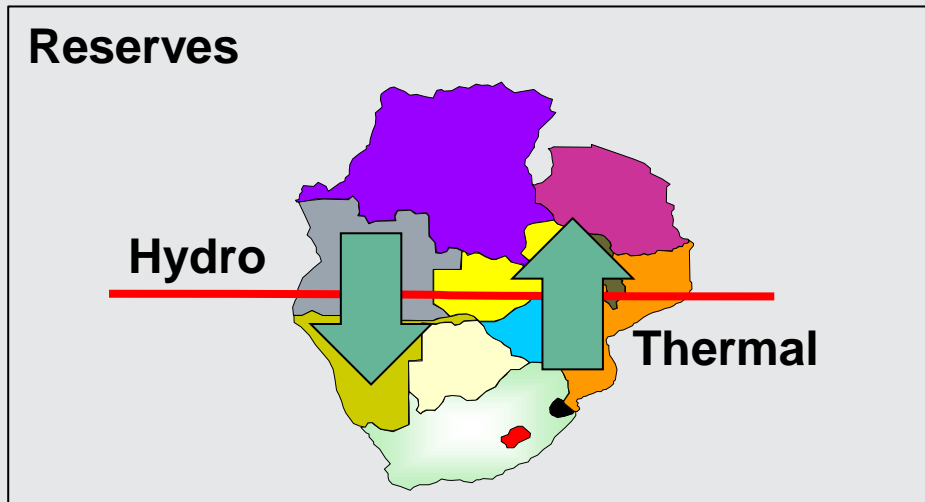
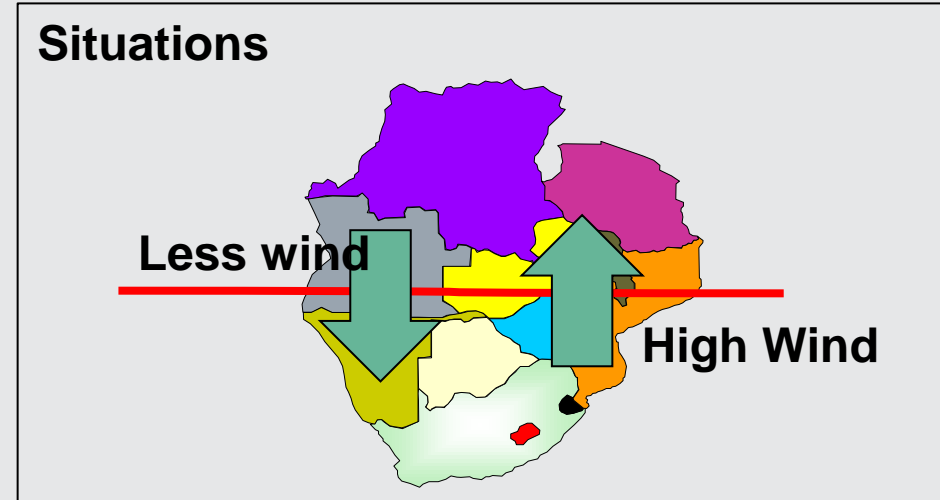
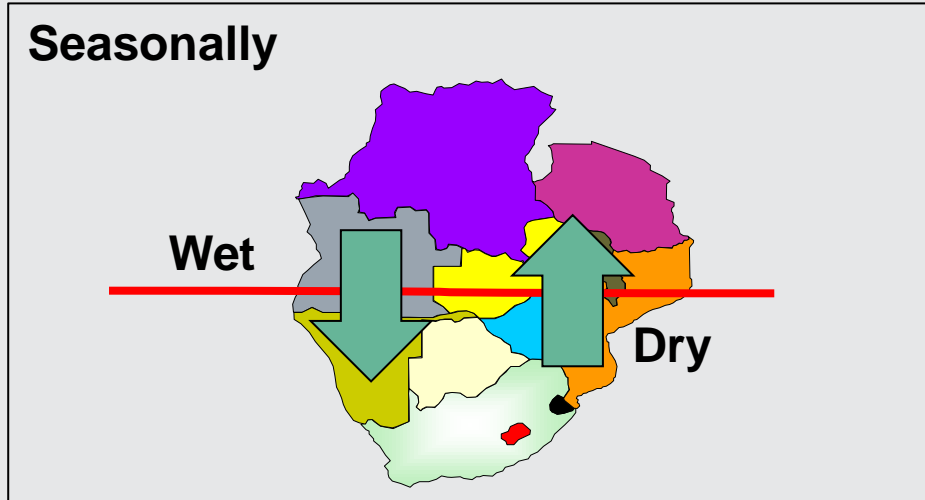
# Regional Power Market Preconditions

The aim for SAPP was to enable national power capacity merging into regional market in order to further optimize social welfare and increase security of supply.

- ▶ More power resources will be more available in a large region than nationally
- ▶ The market will facilitate more efficient management of marginal available production and transmission resources
- ▶ A regional power market has proven to add value to the common interconnected power market
- ▶ The slogan for the market integration in SAPP can be summarized as

**“National control – regional cooperation”**

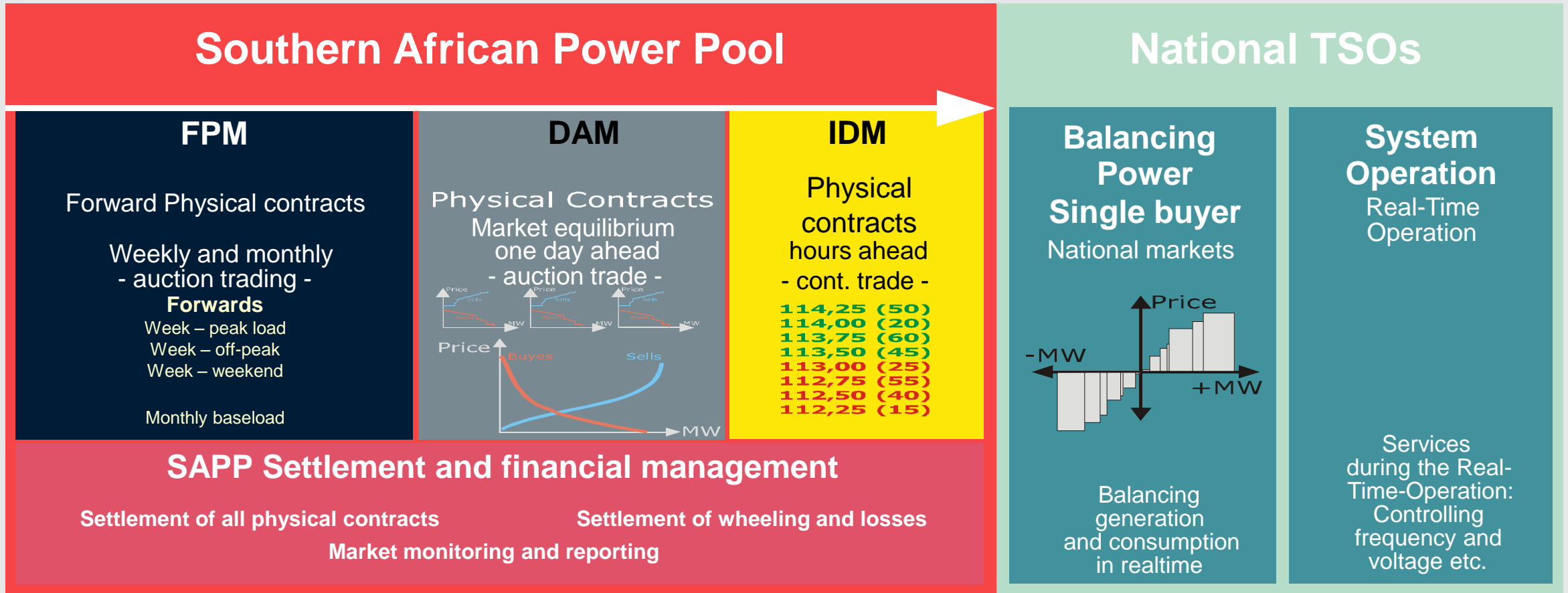
# Utilizing the Value of Differences in a Region



- ➔ Complementary production
- ➔ Security of supply
- ➔ Cost synergies
- ➔ Climate challenge

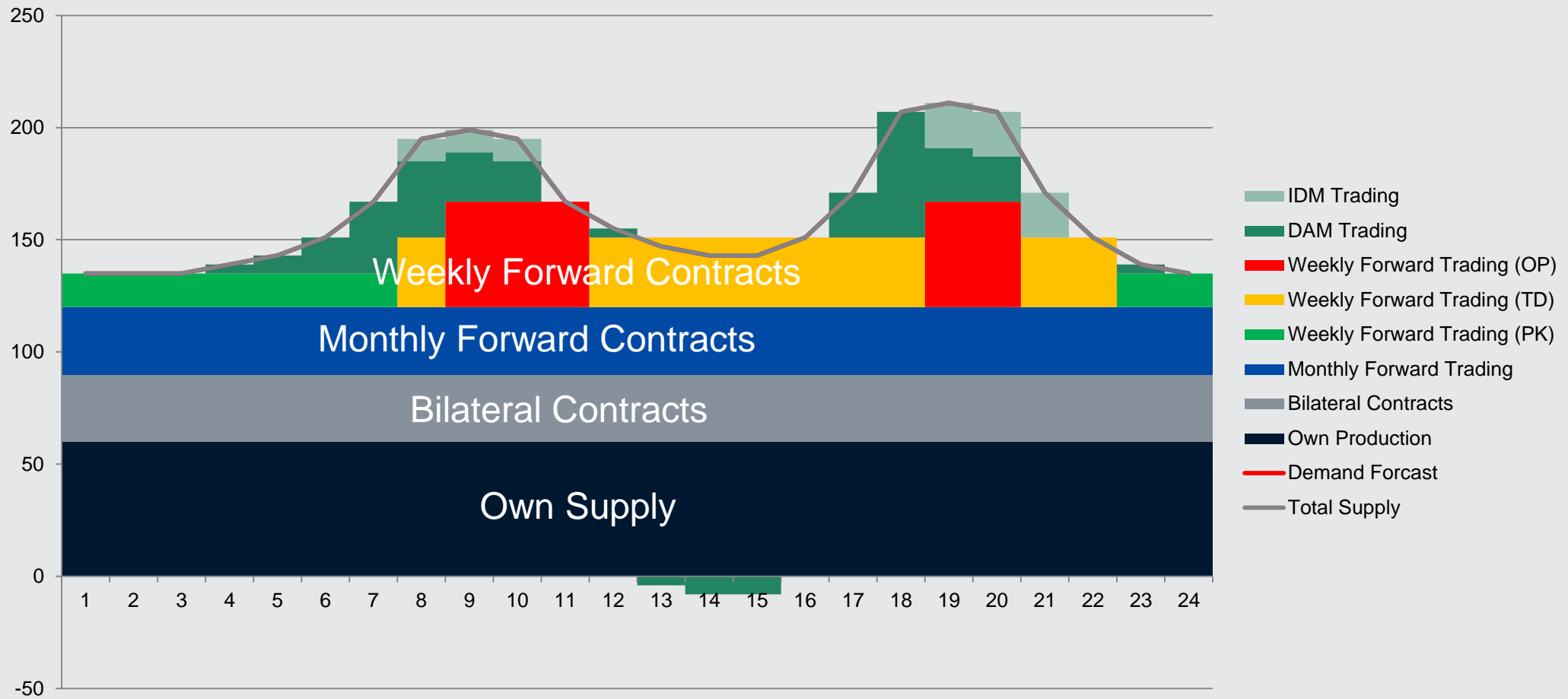


# SAPP Market concept



# Role of Different Markets in Supply

## Balancing on the Day – Hourly Contracts



# SAPP Markets

## Balance Responsibility

- ▶ Market Participants need a DAM and IDM in order to be able to balance their expected generation/consumption with contracts transparency

## Market Information

- ▶ Distribution of all relevant information publicly that can have impact on the market prices available through the Market Operator – SAPP

## Portfolio bidding & Self-dispatch

- ▶ The participants manages their own assets

The auction market manage both trading and transport of traded power by the implicit auctioning of Available Transmission Capacity between the market areas

# SAPP Markets and Members Opportunity

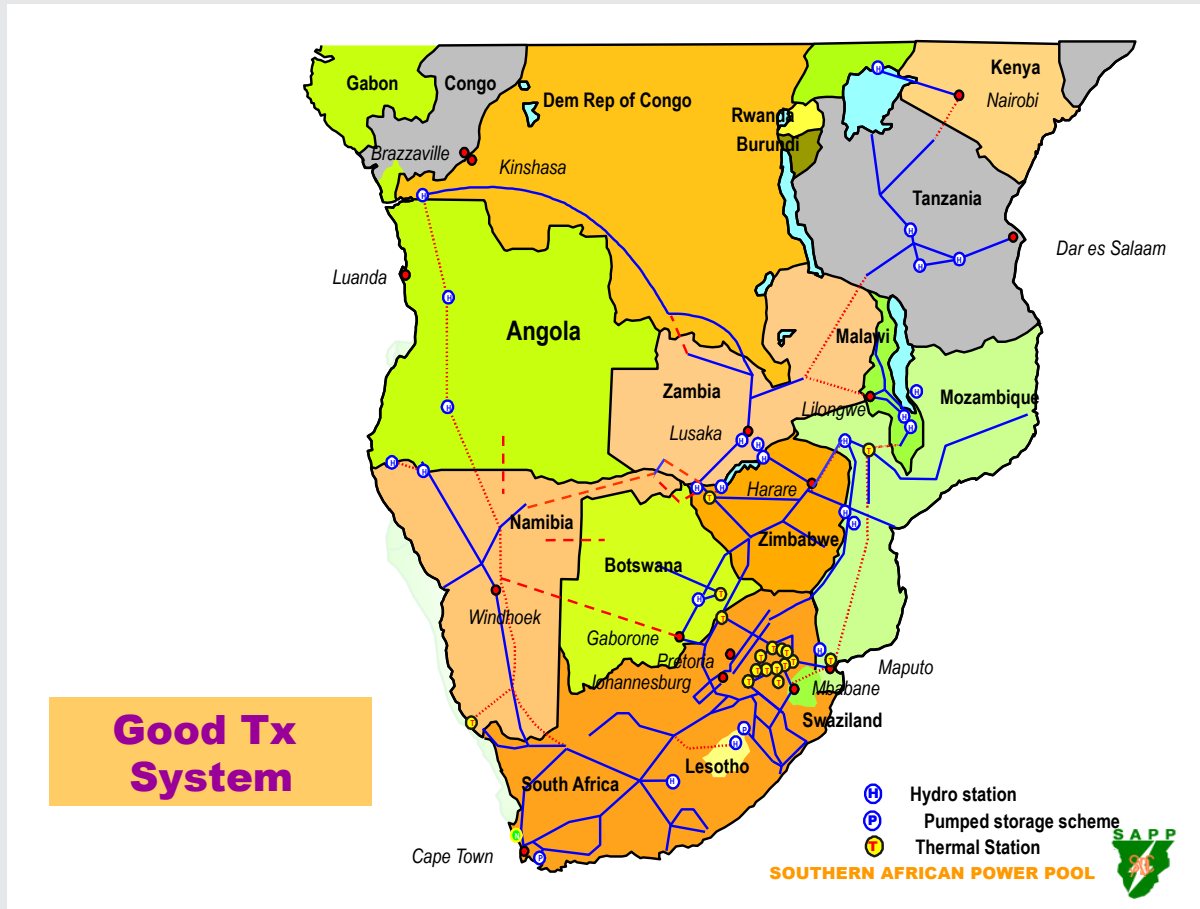
Use own infrastructure flexibility

- ▶ In the production assets
- ▶ In the consumption
- ▶ In the interconnections transmission capacity

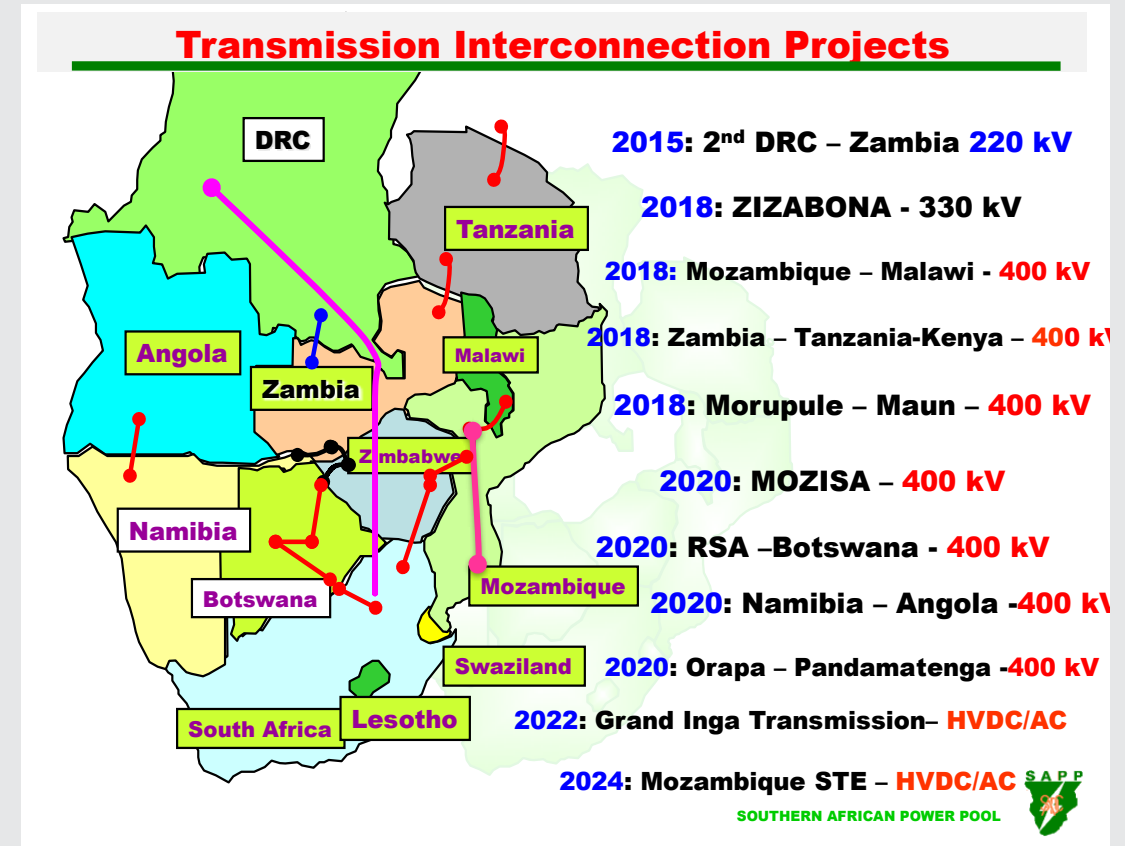
Buy in the market when prices is low and sell when price is high

- ▶ Utilize regional differences
- ▶ Save fuel for later production
- ▶ Reduce industrial consumption

# The importance of interconnections – also for SAPP



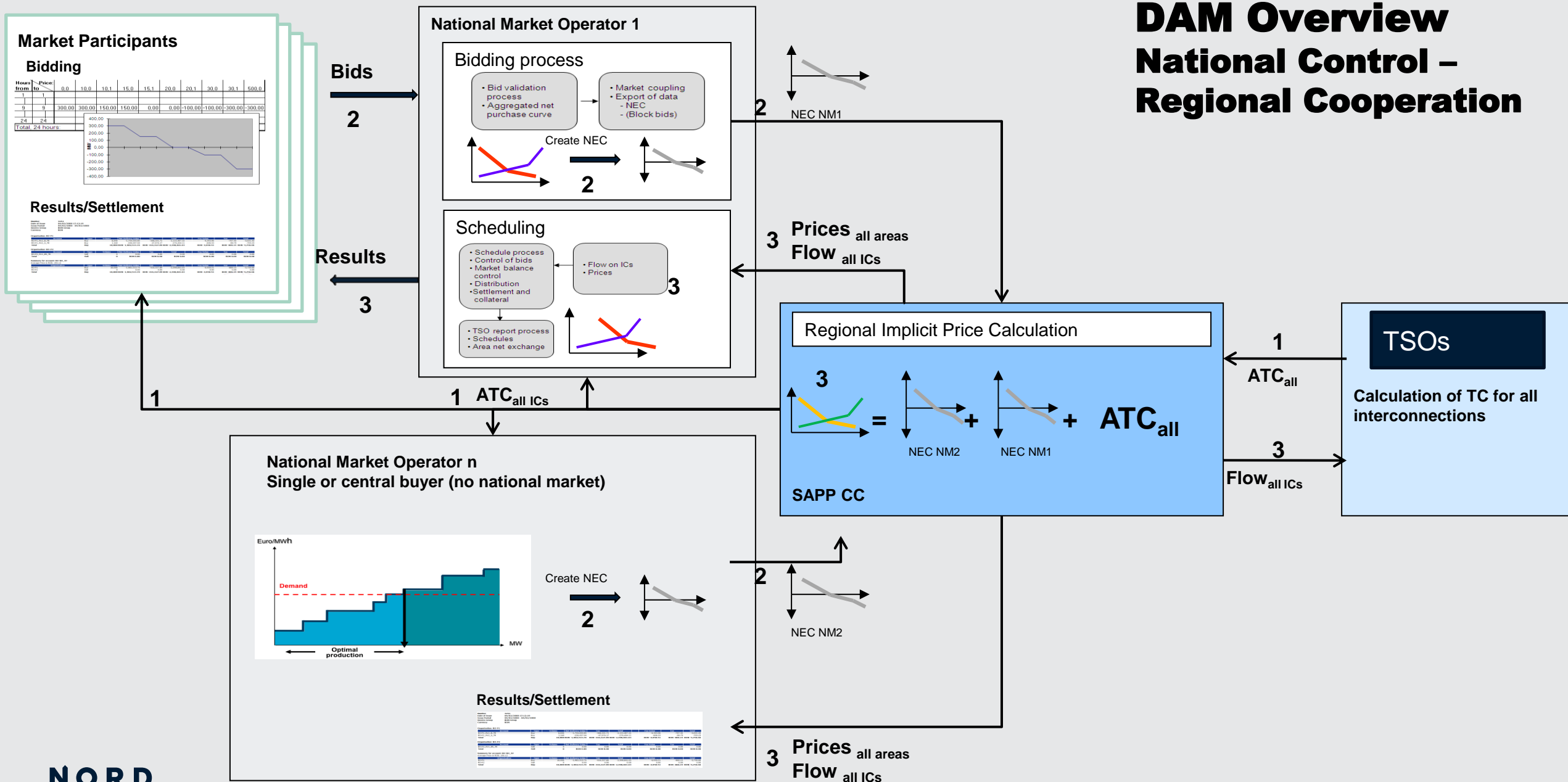
Current



**The Nordic/EU market model has proven to be a flexible tool to integrate national markets in regional setups**

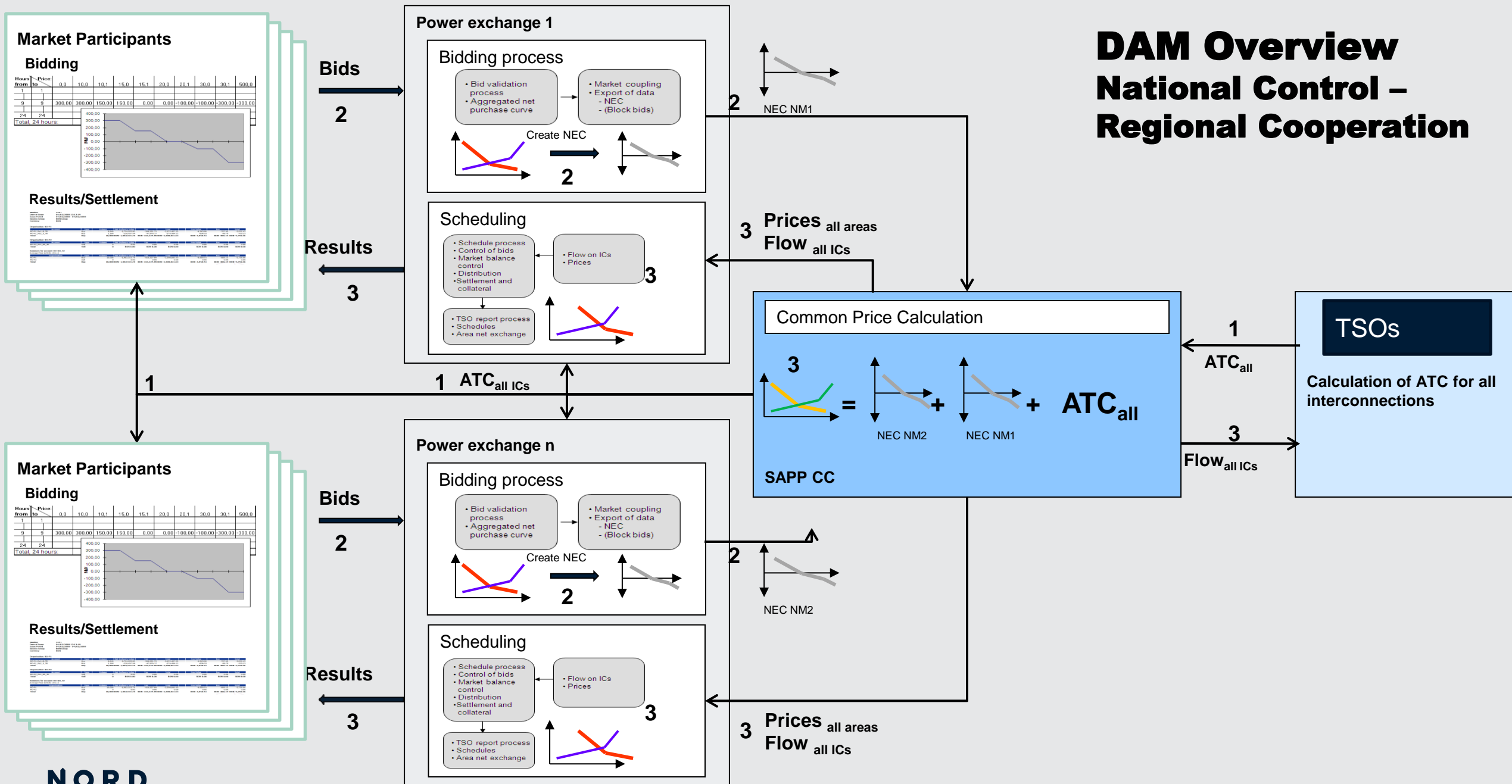
# DAM Overview

## National Control – Regional Cooperation



# DAM Overview

## National Control – Regional Cooperation







# Thank you!

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**NORD  
POOL**

# Profile Hans-Arild Bredesen

Hans-Arild has more than 20 years of experience from international projects in the energy sector based on his work with the Nord Pool model

Consultant

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Education and Experience

- BSc in Computer Science from Høgskolen I Østfold, Norway
- Involved in the electricity deregulation process since 1992.
- Technical project manager for the market systems at Nord Pool
- Product manager for wholesale energy market participant systems for the Nordic market.
- Wide international experience from key roles in the development of strategies for trading, scheduling and settlement systems for PXs and TSOs in California, Ireland, India, Romania, Turkey, Ukraine, Southern Africa and South-east Europe.

Selected Project References

- Implementation of the Southern African Power Pool
- Start of service power exchanges in Croatia and Bulgaria
- Setting up a national power exchange in India
- Implementing a Wholesale Market Opening for SEE (South East Europe)
- High level design for the Albanian Power Exchange
- Author of “Power to the People”

