



Energy Trading in the SAPP

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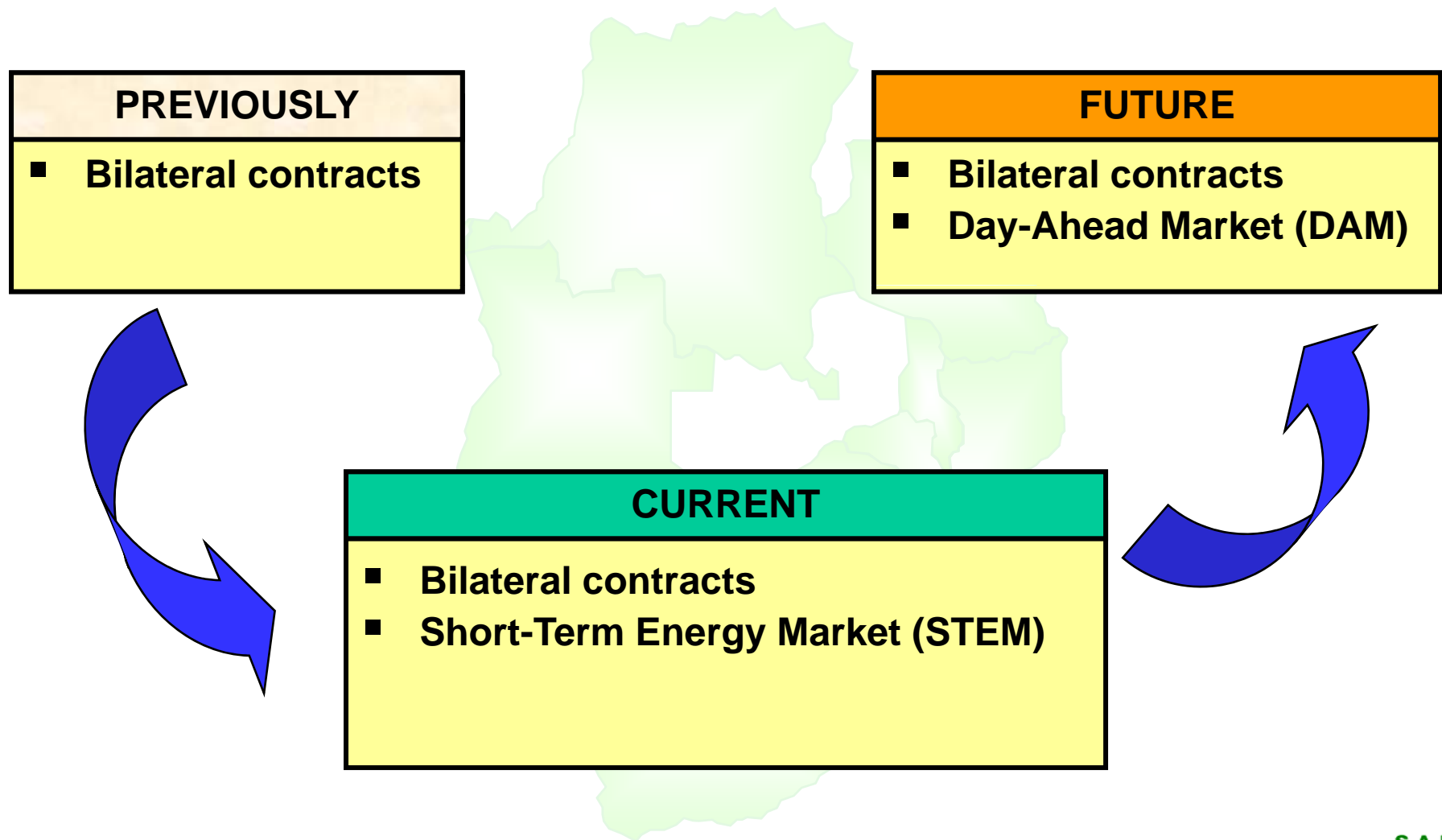
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1. INTRODUCTION

- ❑ Some countries in the SAPP have **excess** Generation Capacity, whilst others have **deficit**:
 - ➔ The result is energy flow between member countries in form of energy trading.

- ❑ Northern network is predominantly **hydro** and the Southern **thermal**:
 - ➔ A good generation mix that mitigates drought
 - ➔ Members share in the resulting benefit.

2. TRADING ARRANGEMENTS



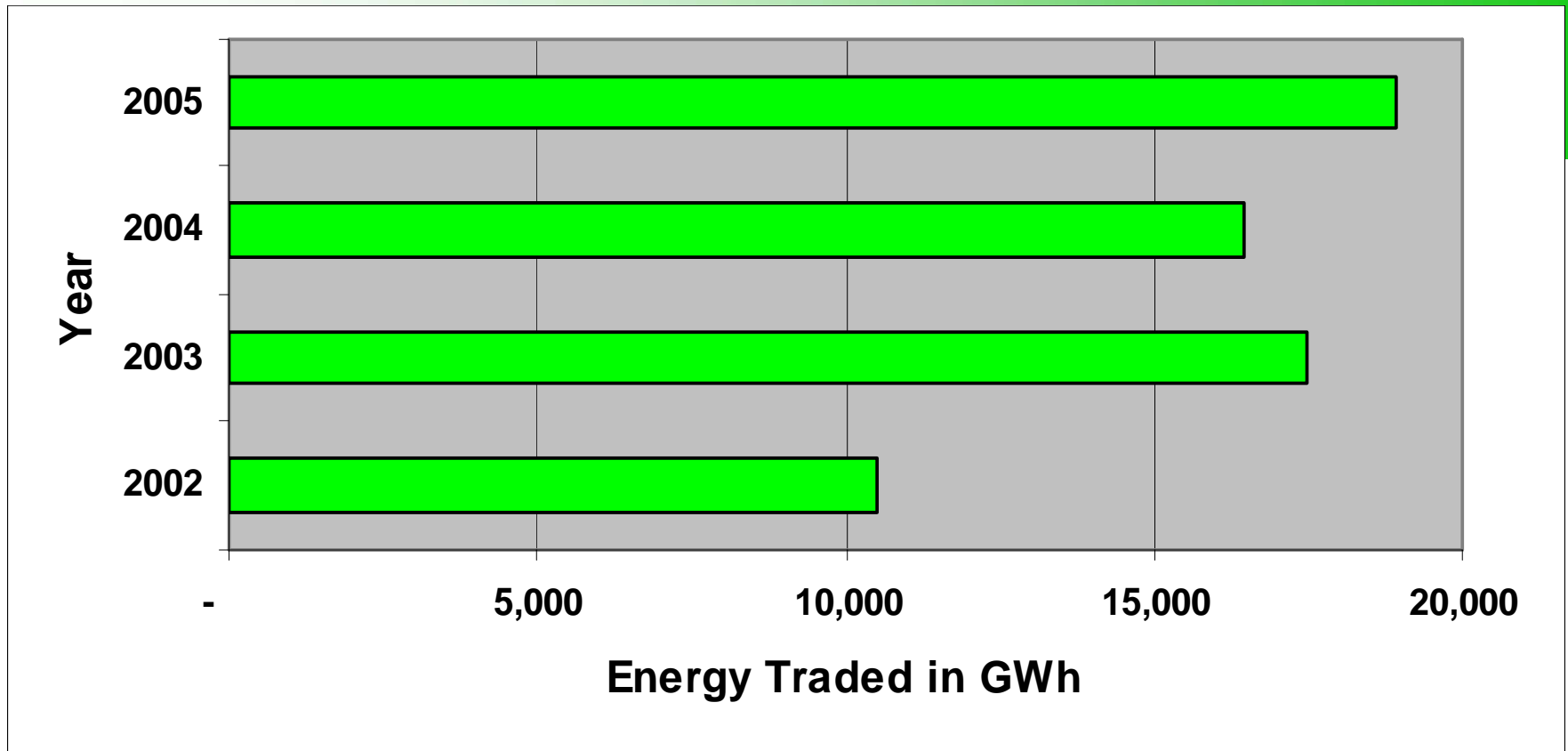
- ❑ **Bilateral contracts** takes up **90-95%** of energy trade and covers peak and off-peak periods.

- ❑ In April 2001, SAPP introduced the short-term energy market (**STEM**) as a precursor to full competition.
 - ➔ STEM now caters for **5-10%** of energy trade
 - ➔ Daily and hourly contracts
 - ➔ Off-peak periods

- ❑ From 2003, SAPP started the development of a full competitive market:
 - ➔ Day-ahead Market (**DAM**), and
 - ➔ Ancillary Services Market
 - ➔ Balancing Mechanism

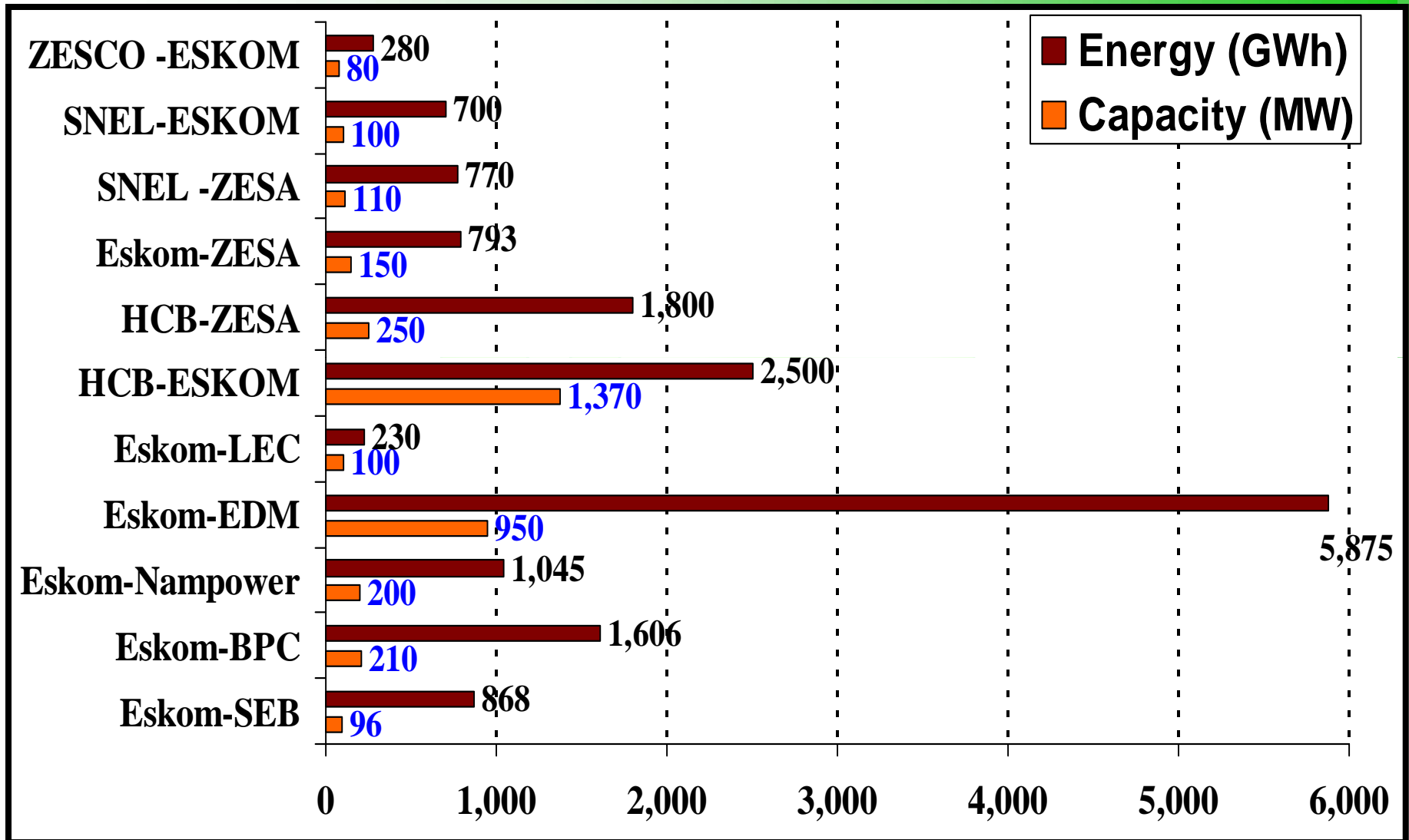
3. *BILATERAL TRADING*

- ❑ The bulk of cross border trading in electricity is governed by fixed co-operative **bilateral agreements**.
- ❑ Long-term bilateral agreements generally cover a period from **one** to over **five** years.
- ❑ The agreements provide for assurance of security of supply but are not flexible to accommodate varying **demand profiles** and **prices**.
- ❑ The pricing of electricity depends on the consumption period; **Peak** and **off-peak**.



- ❑ *Bilateral trading has been increasing year by year.*
- ❑ *Demand in the SAPP is rising by 3% annually.*
- ❑ *Small reduction in 2004 – rehabilitation projects*

Bilateral Contracts - 2005



HCB supply (hydro) - 1770 MW, Eskom supply (thermal) - 1706 MW



❑ Pricing of Bilateral contracts

- ➔ The parties agree to both capacity and energy charges.
- ➔ The prices are negotiated by both parties.
- ➔ Wheelers are notified and are a party to the agreement.

❑ Billing

- ➔ Direct billing from seller to buyer.
- ➔ Billing is on **schedules** and not on **actual**.

❑ Metering and settlement

- ➔ Actual meter readings done on monthly basis.
- ➔ Inadvertent energy management follows.

4. THE SHORT-TERM ENERGY MARKET

Documentation

The SAPP documents that govern the STEM are:

- ❑ Legal Agreement
- ❑ STEM Book of Rules:
 - Trading Rules
 - Financial Rules

Participation

- ❑ Participation is open to all **Operating Members** and **IPPs**.
- ❑ Participants are levied **1%** administration fee.

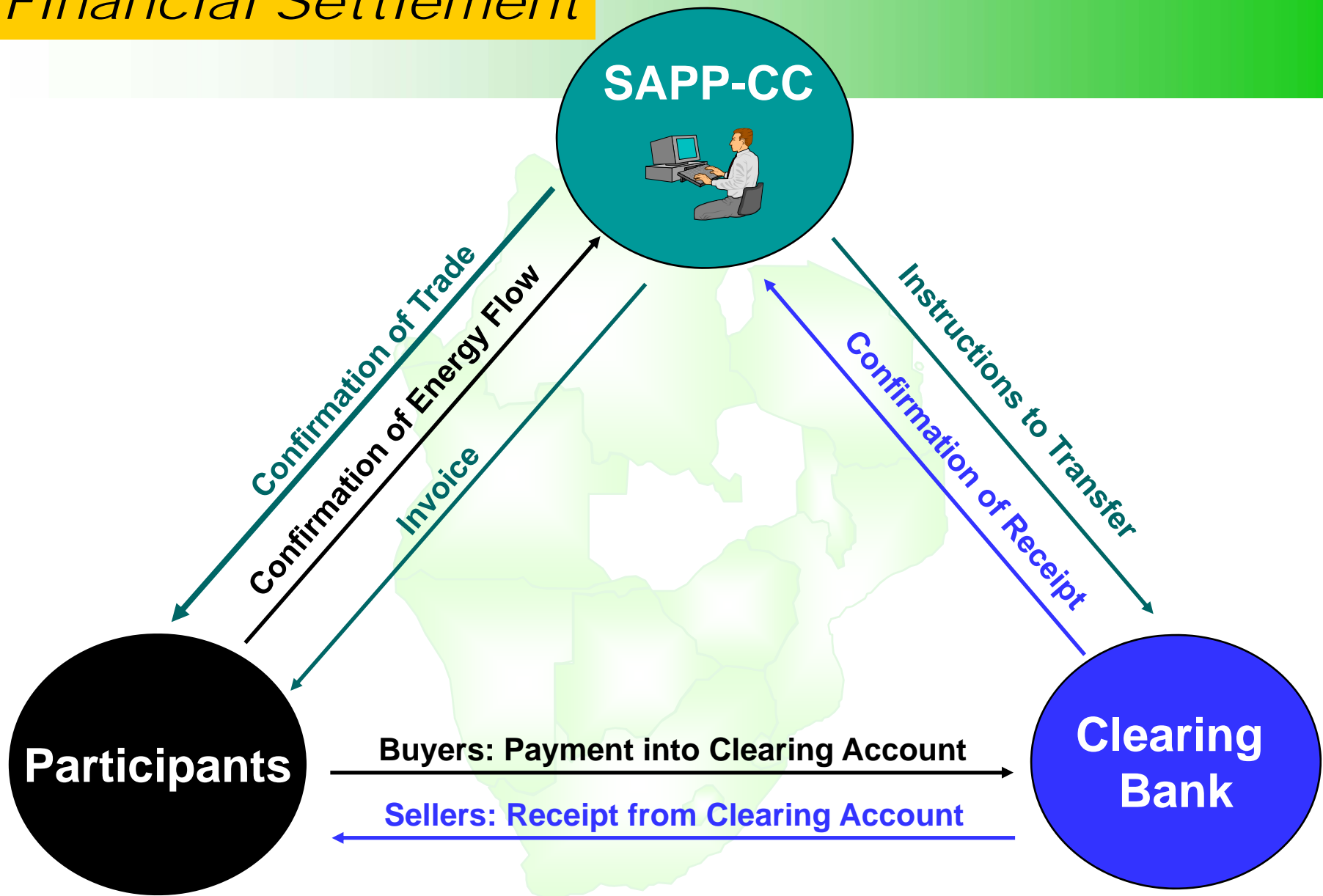
STEM Design Principles

- i. Transmission rights** – Bilateral contracts have first priority of transmission over STEM contracts.
- ii. Security requirements** - Participants lodge sufficient security before trading commences.
- iii. Settlement** - Accounting on daily basis with monthly billing for all transactions in **USD** or **ZAR**.
- iv. Allocation method** - Allocation based on available transmission capability and fair competitive bidding.
- v. Type of contracts:** Daily and hourly firm contracts.

STEM Trading Timeline

- ➔ ***At 08:30 HRS, a day before trading***
 - SAPP-CC publishes USD to ZAR exchange rate.
- ➔ ***Any time before 09:30 HRS, a day before trading***
 - Participants submit offers & bids to SAPP-CC.
- ➔ ***At 09:30 HRS, a day before trading***
 - The market close.
 - SAPP-CC matches offers & bids for any future trading day;
- ➔ ***At 12:00 HRS, a day before trading***
 - SAPP-CC publishes the results to all Participants.
- ➔ ***After 12:00 HRS, a day before trading***
 - Members negotiate for Post-STEM bilateral trade
 - Financial settlement follows.

Financial Settlement



❑ Pricing of STEM Contracts

- ➔ Participants send bids and offers to the SAPP-CC.
- ➔ SAPP-CC matches bids and offers.
- ➔ The prices are set based on matching sellers price.
- ➔ STEM contracts

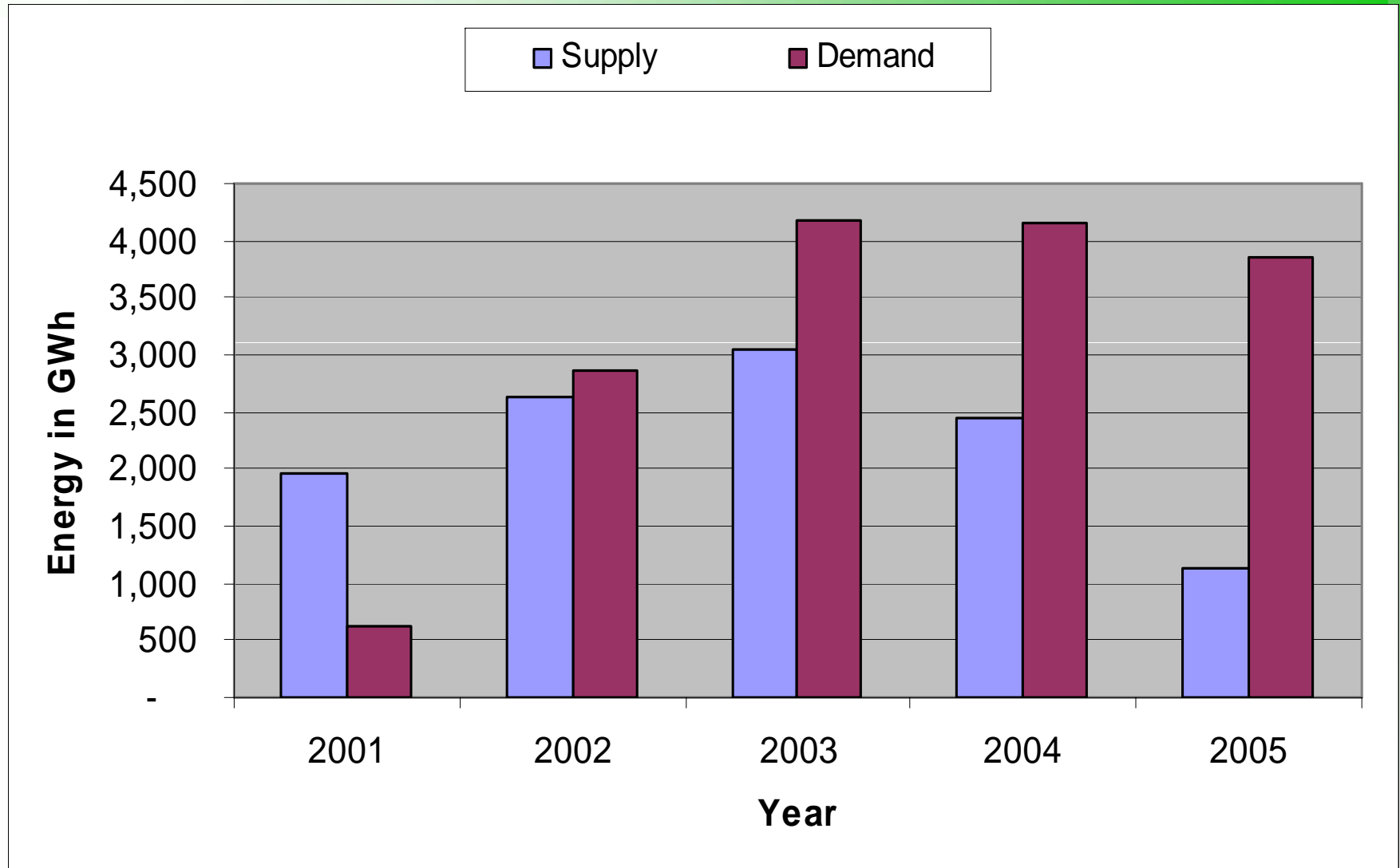
❑ Billing

- ➔ The SAPP-CC bills participants on a daily basis.
- ➔ Billing is on **schedules** and not on **actual**.

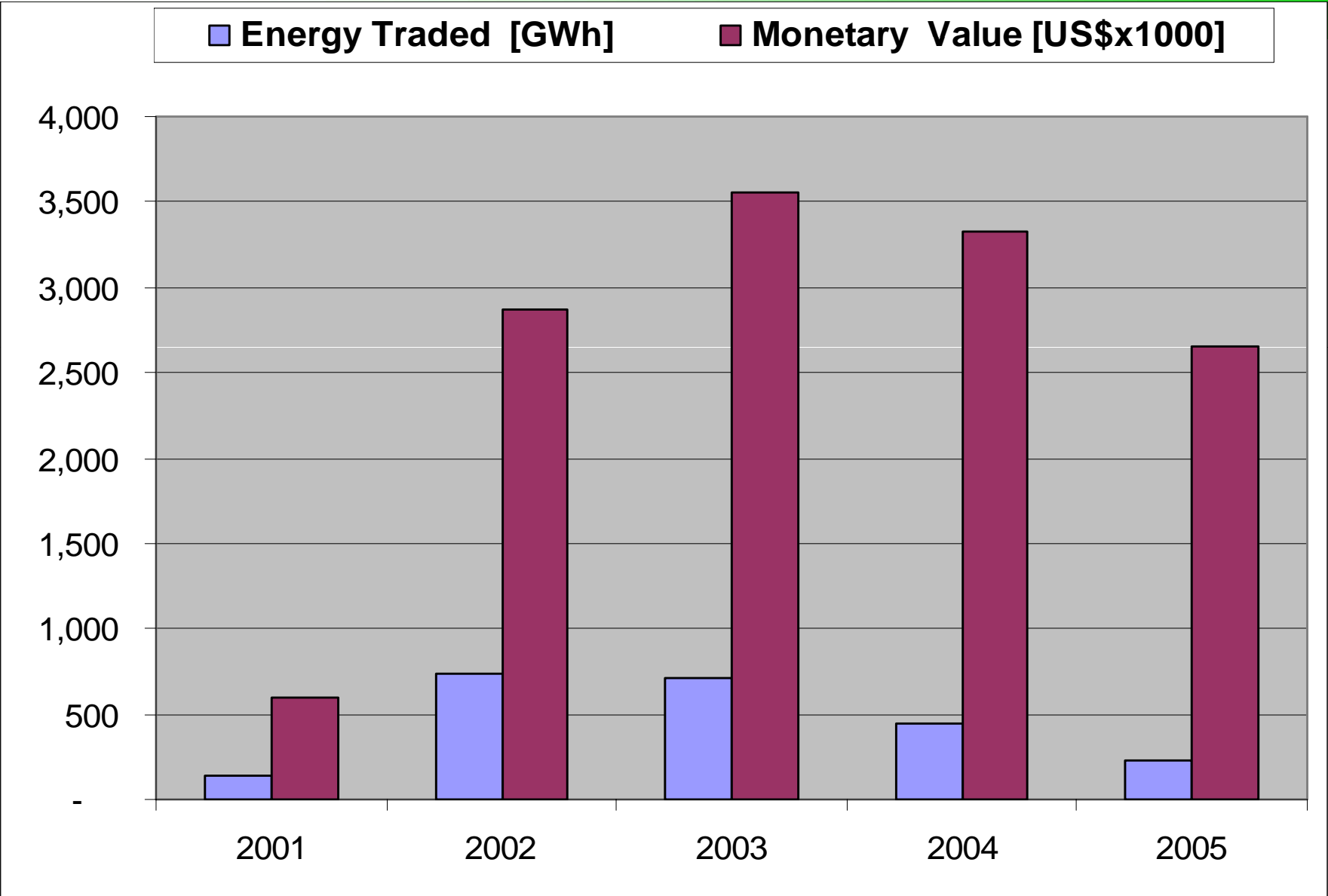
❑ Metering and settlement

- ➔ Financial settlement on daily basis.
- ➔ Penalties indicated where applicable.
- ➔ Inadvertent EM is part of overall settlement.

STEM TRADING: *Supply & Demand*



STEM TRADING: Energy Traded & Cost



SAPP TRADING MECHANISMS

BILATERAL CONTRACTS

- In existence for over **30 years**
- Caters for **90-95%** of trading
- Period: **1- 3** years, renewable.
- Price range: **1.5 – 4.0** Usc/kWh
- Mostly **Peak**

SHORT-TERM

- Established in **2001**.
- Caters for **5-10%** of trading
- Period: **Hourly & daily** contracts.
- Price range: **0.75 – 2.50** Usc/kWh
- Mostly **off-peak**

5. THE SAPP COMPETITIVE MARKET

GOALS of the SAPP DAM design:

- ❑ Establish an **efficient** and **competitive** marketplace
- ❑ Ensure that **consumers** benefit from the market

METHODOLOGY:

- ❑ Development of **consistent** market mechanisms.
- ❑ Efficient **price signals** for the procurement and transmission of electricity.
- ❑ Assurance of **fair** and **open access** to the transmission system.
- ❑ **Optimization** of generation & transmission capacity.

DAM Design Principles

1. Market type

- ❑ Auction type market
- ❑ Participants bid into market for all **24 hrs** of next/future day.

2. Bidding

- ❑ Participants submit both **purchase & sale** bids.
- ❑ Types of bids: **Single hour** and **Block** bids.

3. Bid areas

- ❑ Multiple bid areas with configurable transmission capacities between areas.

4. Price calculation

- ❑ At defined time, market closes & Market Clearing Price (MCP) calculated.
- ❑ MCP is price where **supply** equals **demand** without taking transmission constraints into consideration.

5. Congestion Management

- ❑ Calculated contract flow between bid areas computed & compared with available transmission capacity for spot trade.
- ❑ In case of congestion, **market splitting** performed, and local area prices calculated.

6. Auction results

- ❑ Participants receive **area prices** with associated volume. Multiple currencies.

DAM Trading Timeline

- ➔ **08:30 HRS**
 - Usage of the bilateral contracts registered by participants.
 - Calculation of available transmission capacity performed.
 - Opening of the market for delivery day X.
- ➔ **09:30 HRS** Market is closed for delivery day X.
- ➔ **10:00 HRS** Price calculation
- ➔ **12:00 HRS** Distribution of prices and schedules
- ➔ **12:30 HRS** Participants receive price information & schedules.
- ➔ **13:00 HRS** Deadline for complaints
- ➔ **14:00 HRS** A report about the contracted volume per Balance Responsible Party is sent to System Operators.
- ➔ **24.00 HRS** Delivery start for Day-ahead contracts for hour 1

6. CONCLUSION

The SAPP experience on energy trading and market development has been that:

- ❑ The market principles should be **transparent** and as **simple** as possible.
- ❑ **Local content** and **conditions** should be key considerations in market planning and development.
- ❑ Trade volumes are strongly influenced by **trust & relationships** amongst participants: As trust & better relationships develop, volume increase.
- ❑ **Patience** is key to success in market model development.

SAPP believes that the creation of a competitive market would:

- ❑ Help to optimise the use of regional resources
- ❑ Assist in determining the correct electricity price in the pool
- ❑ Send signals for investments and real time utilization of existing assets; transmission, generation and consumption.
- ❑ Enable the demand side to respond to the supply side price signals.
- ❑ Designing a market is not simply a matter of copy and paste exercise, but **hands on experience** is necessary to know possible solutions of practical problems.

THANK YOU

