The Role of Power Pools in Regional Energy Integration

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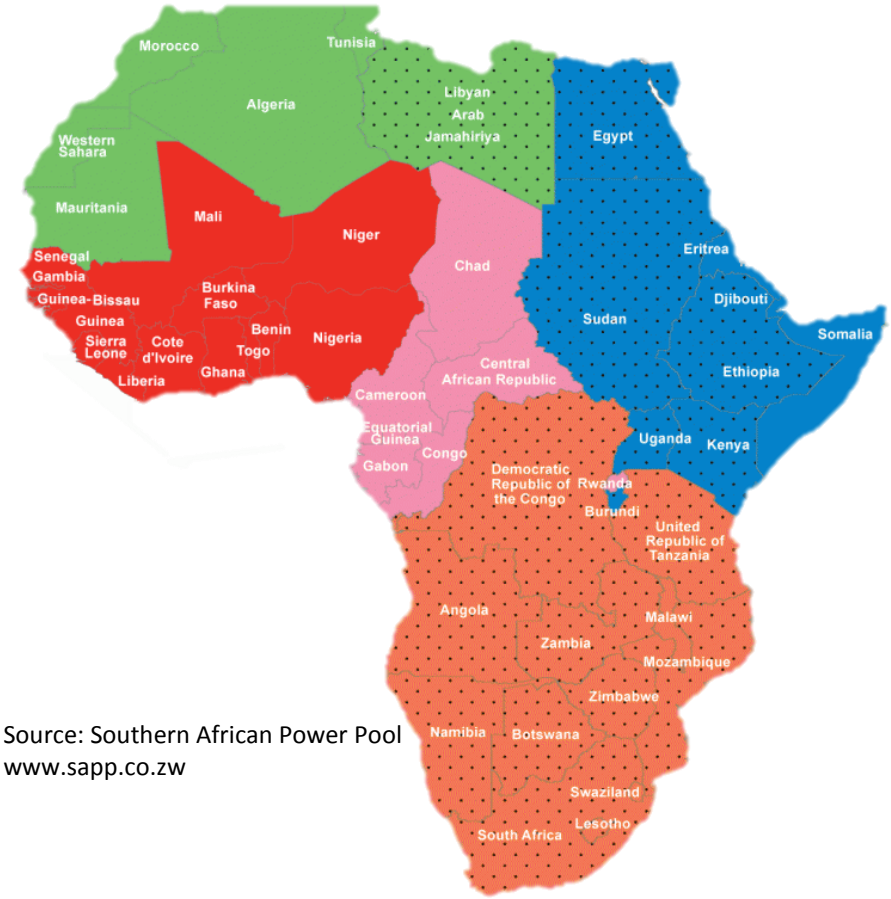
Introduction Power Pools

A group of two or more utilities that coordinate their operation and planning

Introduction African Power Pools



Source: Southern African Power Pool
www.sapp.co.zw

COMELEC	29.6 GW
WAPP	12.1 GW
CAPP	1.8 GW
EAPP	35.8 GW
SAPP	56.6 GW

"[Power pools are] the best strategy to deal with…Africa's energy problems"

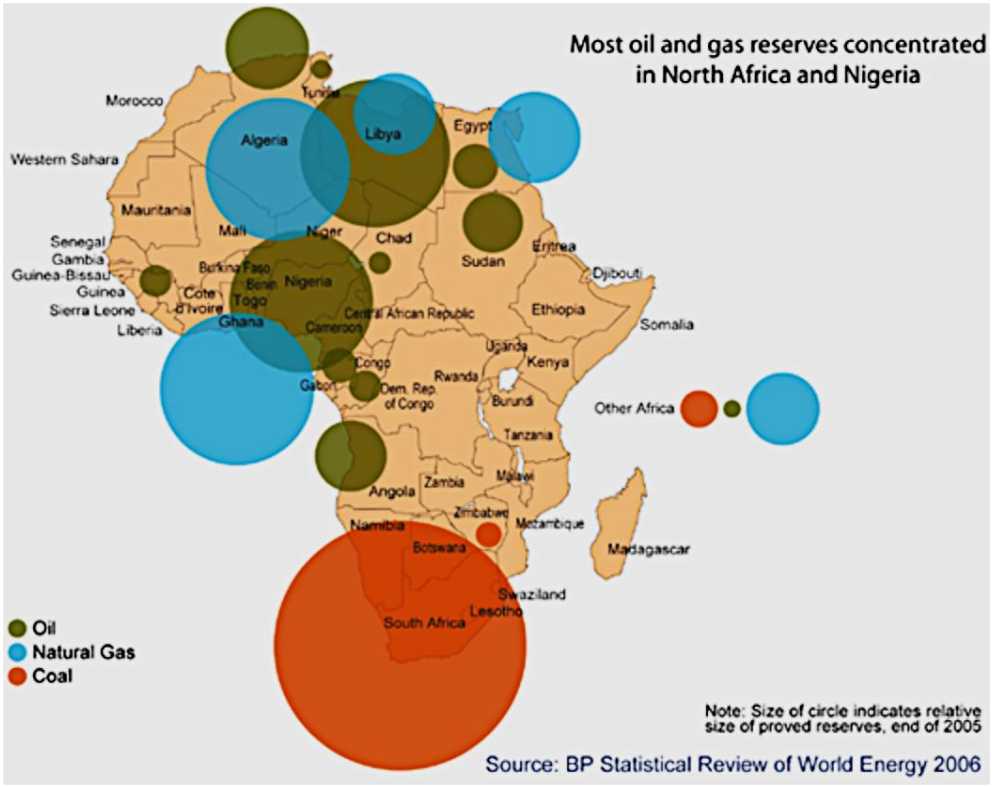
- UN Economic Commission for Africa, 2005

Why Power Pools?

- Economic efficiency
  - Better **utilization of the most efficient generators**
  - Capture **economies of scale** for new projects
  - Increase **competition** at wholesale and retail levels
- Security of supply
  - Increase **diversity of primary energy sources**
  - Larger systems are **more robust** against contingencies
- Typically part of a broader regional integration effort

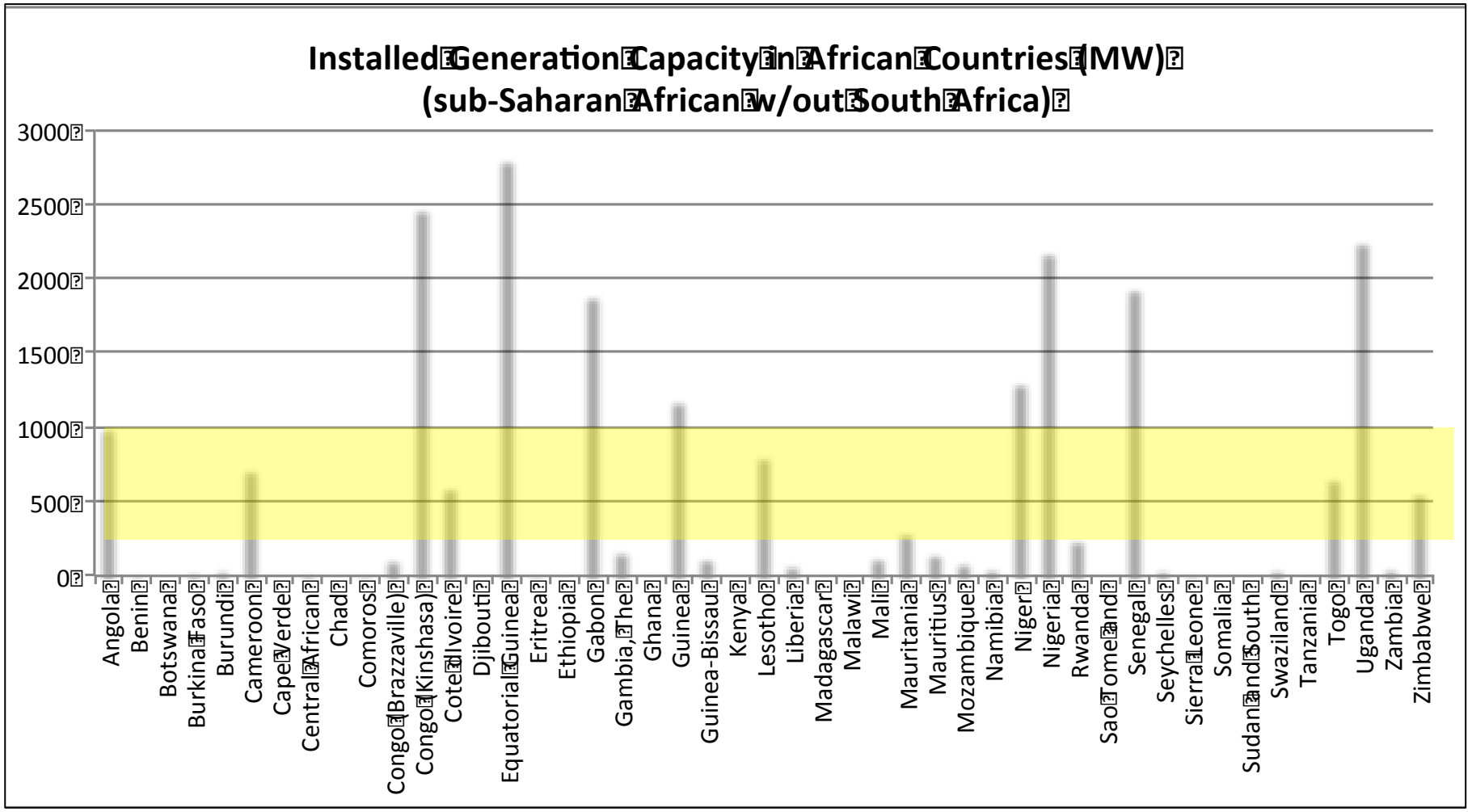
World Bank (2008); Olmos (2013); RECI E7 (2000)

Why Power Pools? Resource Sharing



BP Statistical Review of World Energy (2006); Transboundary Freshwater Dispute Database (2000)

Why Power Pools? Economies of Scale

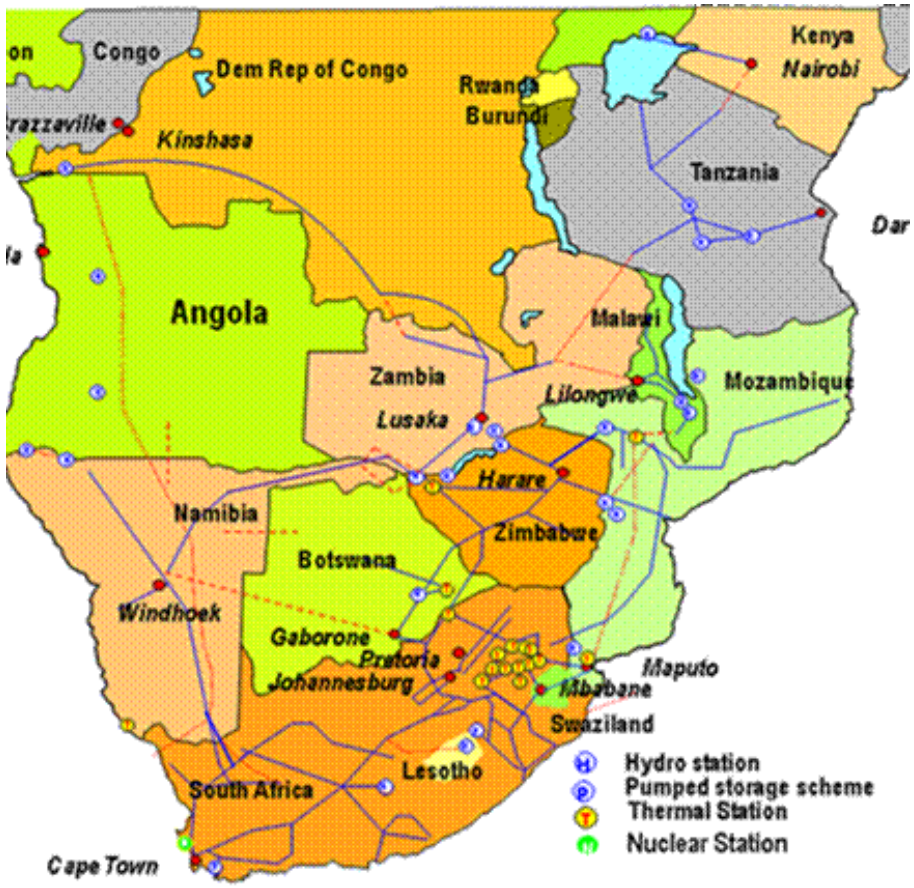


IEA (2014); PIDA (2010)

SAPP Overview

Southern African Power Pool (SAPP)

- 12-member organization in operation since 1995
- 56 GW total installed capacity
- Trades make up ~3% total consumption
- Bilateral Contracts dominate trade (> 95%)



Source: Southern Africa Power Pool
http://www.sapp.co.zw/sappgrid.html

SAPP Challenges

- Attracting investment for new generation and transmission infrastructure
- Increased competition
- Regulatory capacity

  - Market structure
  - Regulatory structure
  - Transmission regulation

} Greater Regional Integration

Challenges Market Structure

- Who gets to participate?
  - Vertically integrated public utilities
  - Updated SAPP rules allow IPPs to join as members
  - IPP frameworks in place or being adopted by all members
- How do they participate?
  - Single buyer model
  - Long-term bilateral contracts
- Is there a conflict between competition and long-term bilateral contracts?

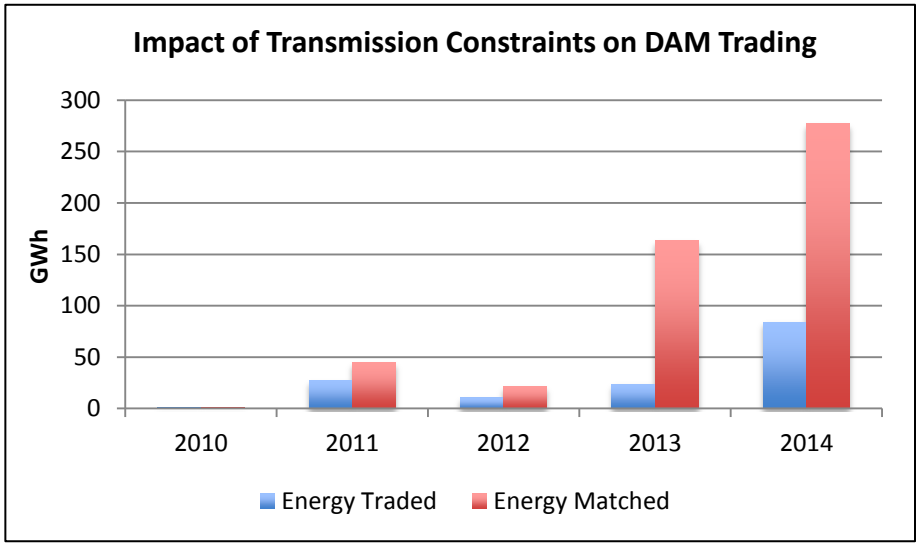
Challenges Regulatory Structure

- Regional Electricity Regulators Association (RERA)
  - Association of national regulators
  - No authority to establish or enforce rules
- RERA in the process of transitioning from an association to an **authority**
- Regional grid code is still not established
- Both regional and national regulators need **clearly defined responsibilities and training**

Challenges Transmission Regulation

Insufficient transmission capacity is perhaps the largest challenge currently facing the SAPP

- For generation companies
- For transmission companies
- For market participants



Merchant lines -> Regulated lines

SAPP Opportunities

- Regional coordination can result in huge savings
  - Potential savings range from $15-48 billion over 20 years in 2009 regional expansion plan
- Attract private sector investment in new infrastructure
- Develop regional expertise in market operations and regulation

Thank you for your attention

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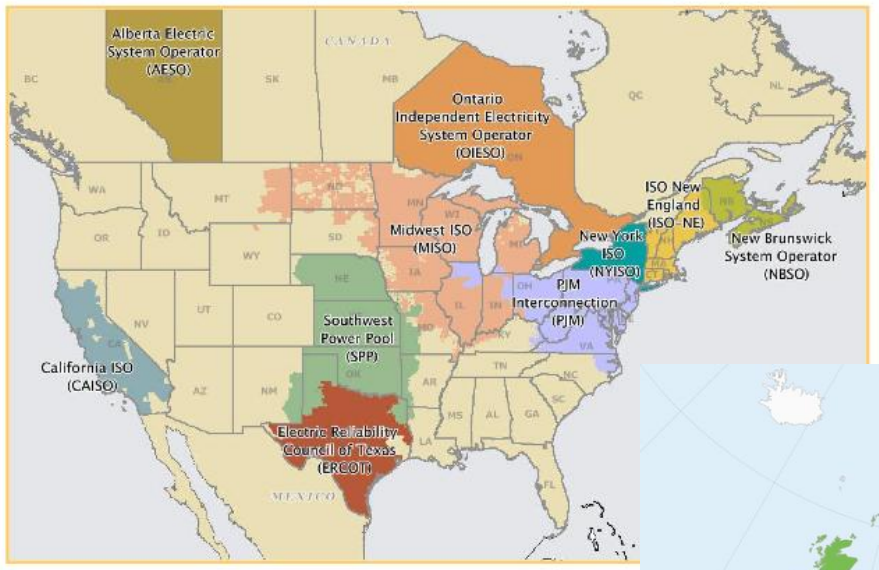
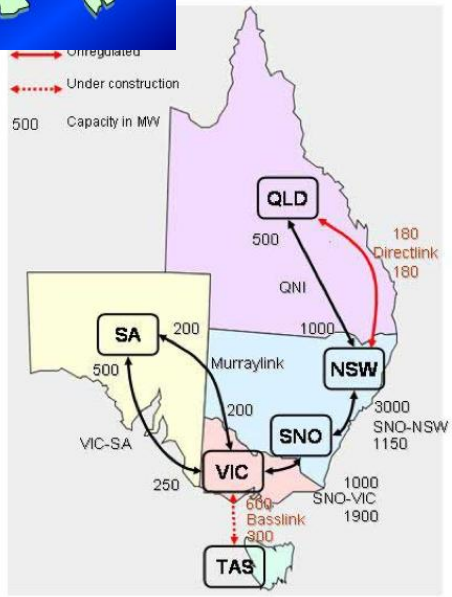
Introduction

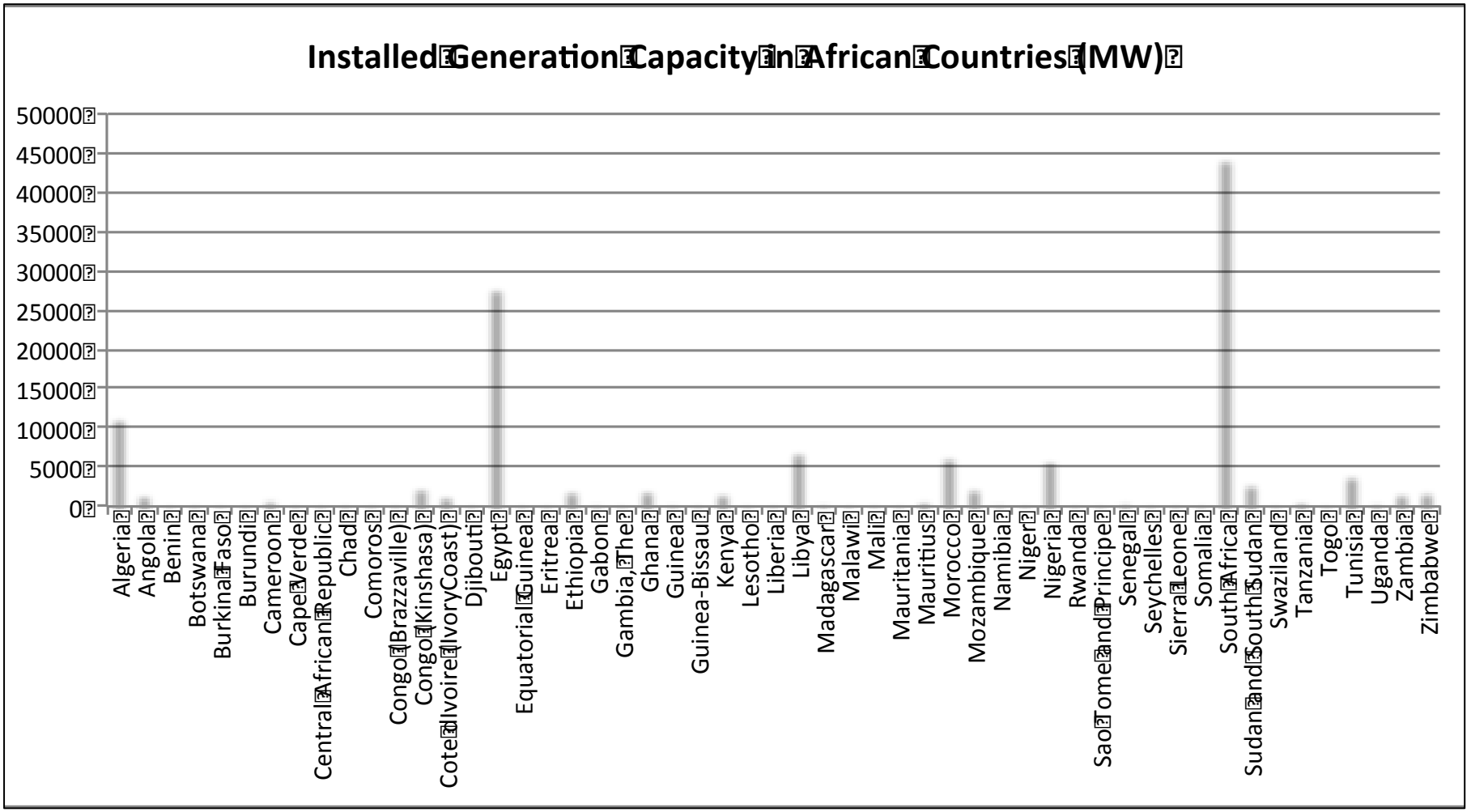
Power Pools





FERC (2014); D. Batten, G. Grozev (2006); Proyecto SIEPAC; Conca (2015)

Why Power Pools? Economies of Scale



IEA (2014)

The Challenge

Regions must have:

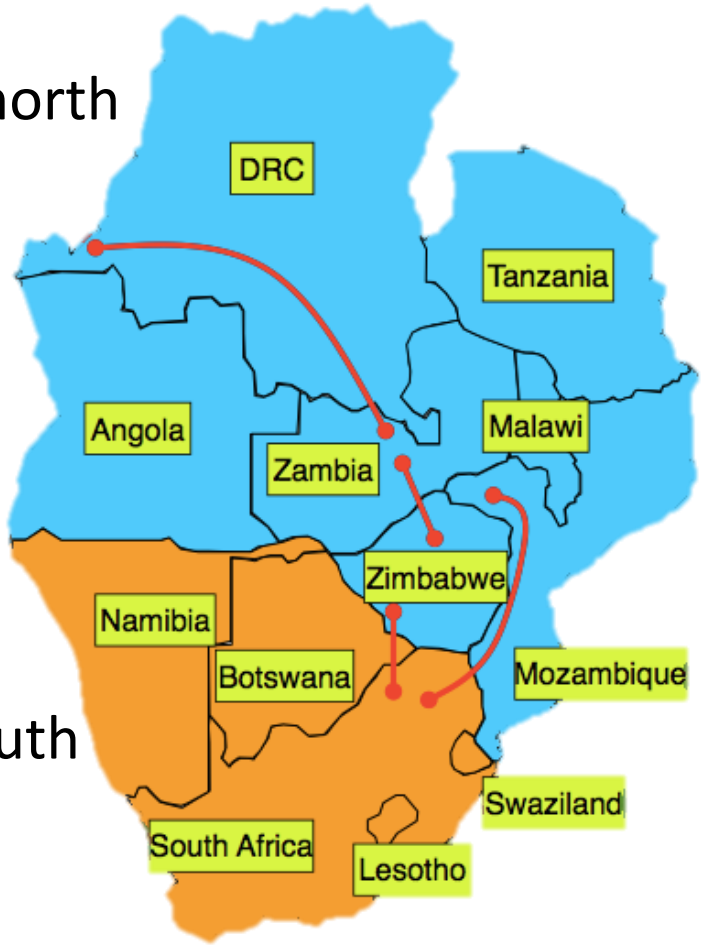
- Fairly developed grid infrastructure
- Adequate generating capacity
- Legal framework for cross-border trading
- Regional institutions and regulations

Change in mindset from a *national* to a *regional* mentality

SAPP Development

Hydro-rich north

Coal-rich south



Source: Southern African Power Pool
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- 1990s DRC and South Africa had excess capacity
- 1992 major drought threatened supplies in the north
- Existing trading arrangements
  - Long-term bilateral contracts
  - Short-term (over the counter) bilateral contracts
  - Day-Ahead Market and Post Day-Ahead Market

Challenges Transmission Regulation

- Transmission investments
  - Merchant lines -> Regulated lines
  - RERA needs a method to identify and allocate costs to beneficiaries
- Access to the network
  - Future grid code should include open access mandate for pool use
- Network pricing
  - RERA needs a method for network pricing for new and existing lines that
    - allocates costs according to beneficiaries
    - does not depend on commercial transactions
    - is applied ex ante