

# Regional Integration in Southern Africa: A Platform for Electricity Sustainability

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Trade & Industrial Policy Strategies (TIPS)

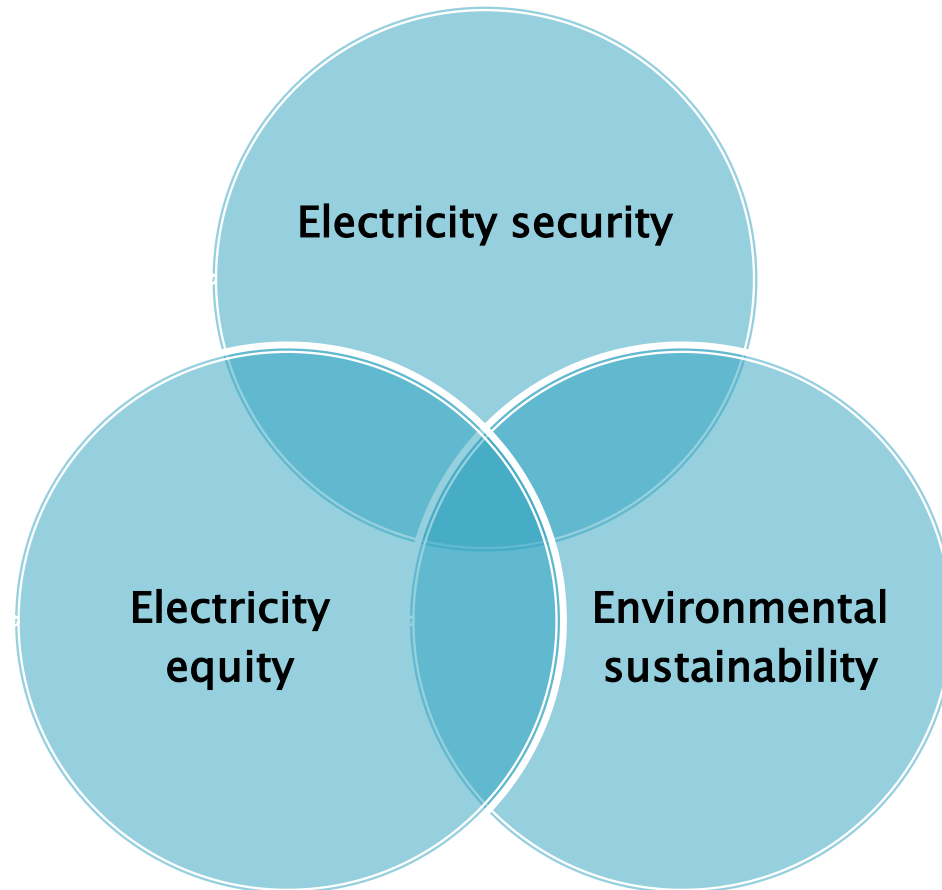


# Outline

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- ▶ **The state of play**
  - Matching demand and supply
  - Achieving an affordable access to modern electricity
  - Ensuring resilience and efficiency
  
- ▶ **The role of regional integration**
  - Harmonising policies, frameworks and regulations
  - Building common institutions and technical infrastructure
  - Fostering the development of human capabilities
  
- ▶ **Conclusions**

# 1. Introduction

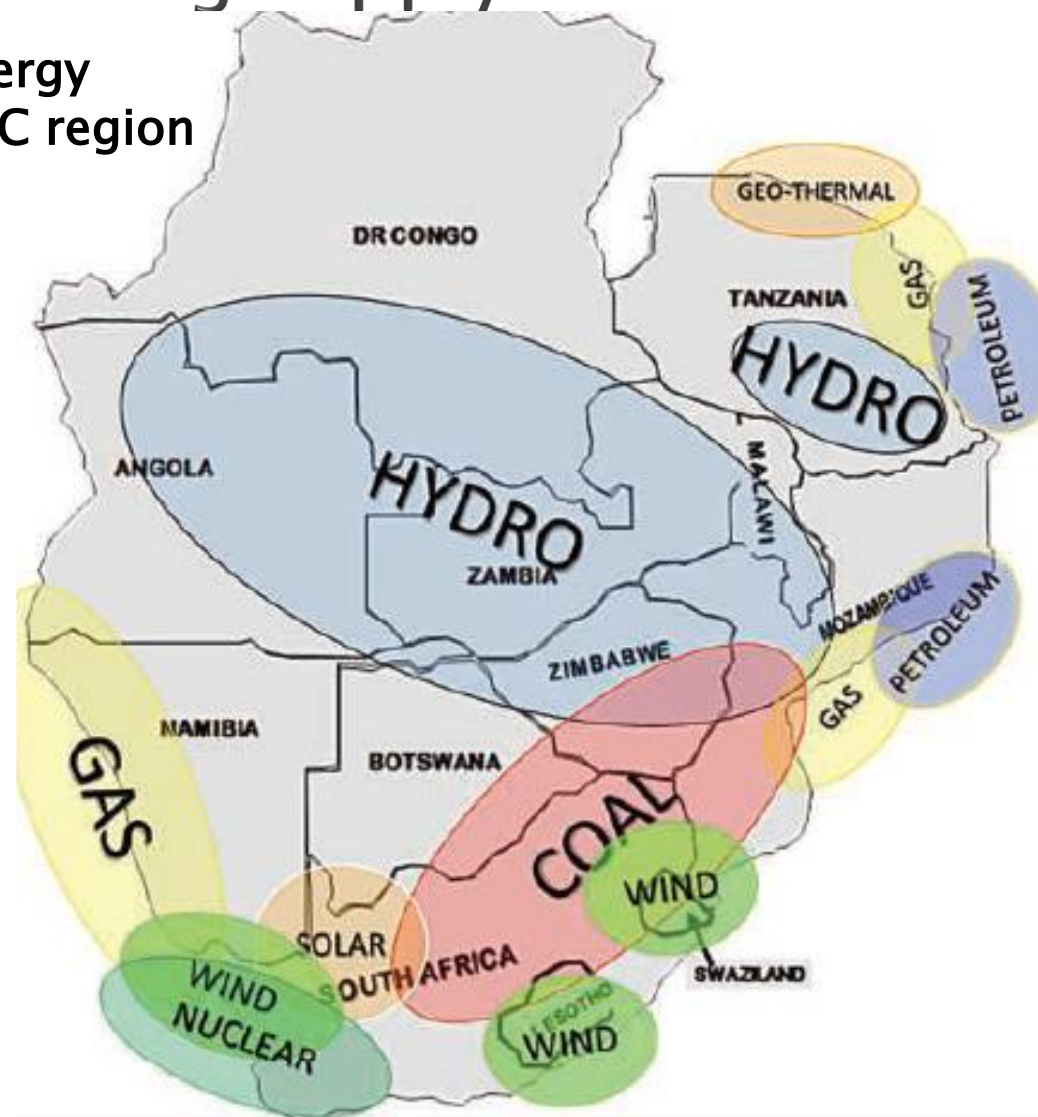
The three dimensions of electricity sustainability



*Source: Authors' composition, inspired by WEC, 2013 and IEA, 2016*

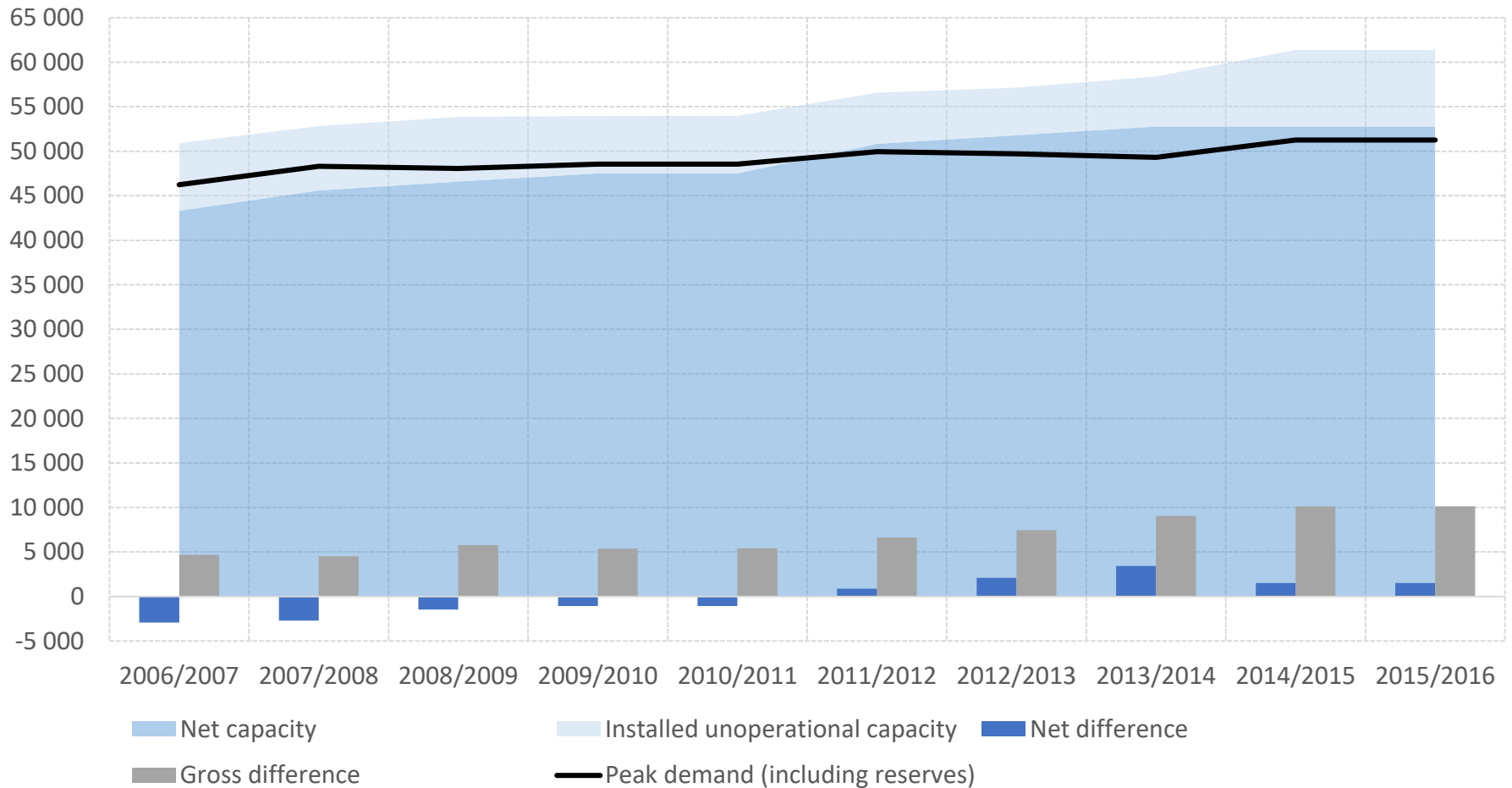
## 2. The state of play: Matching supply and demand

Illustration of the energy resources in the SADC region



# 2. The state of play: Matching supply and demand

Installed capacity and net capacity over the peak demand and reserve requirements for SAPP countries

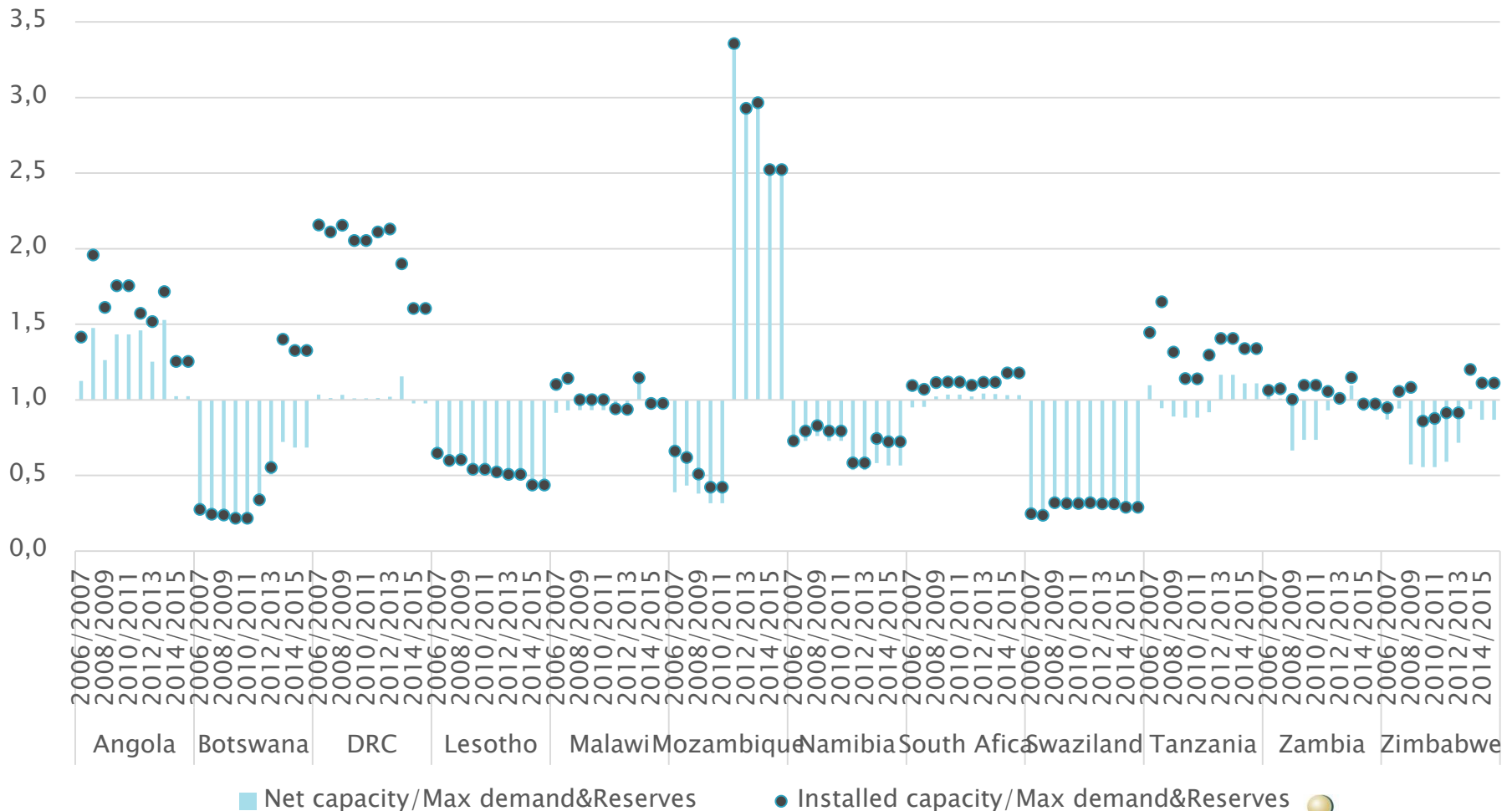


Source: Authors' composition, based on data from SAPP Annual Reports



# 2. The state of play: Matching supply and demand

Ratios of installed capacity and net capacity over the peak demand and reserve requirements for SAPP countries



■ Net capacity/Max demand&Reserves

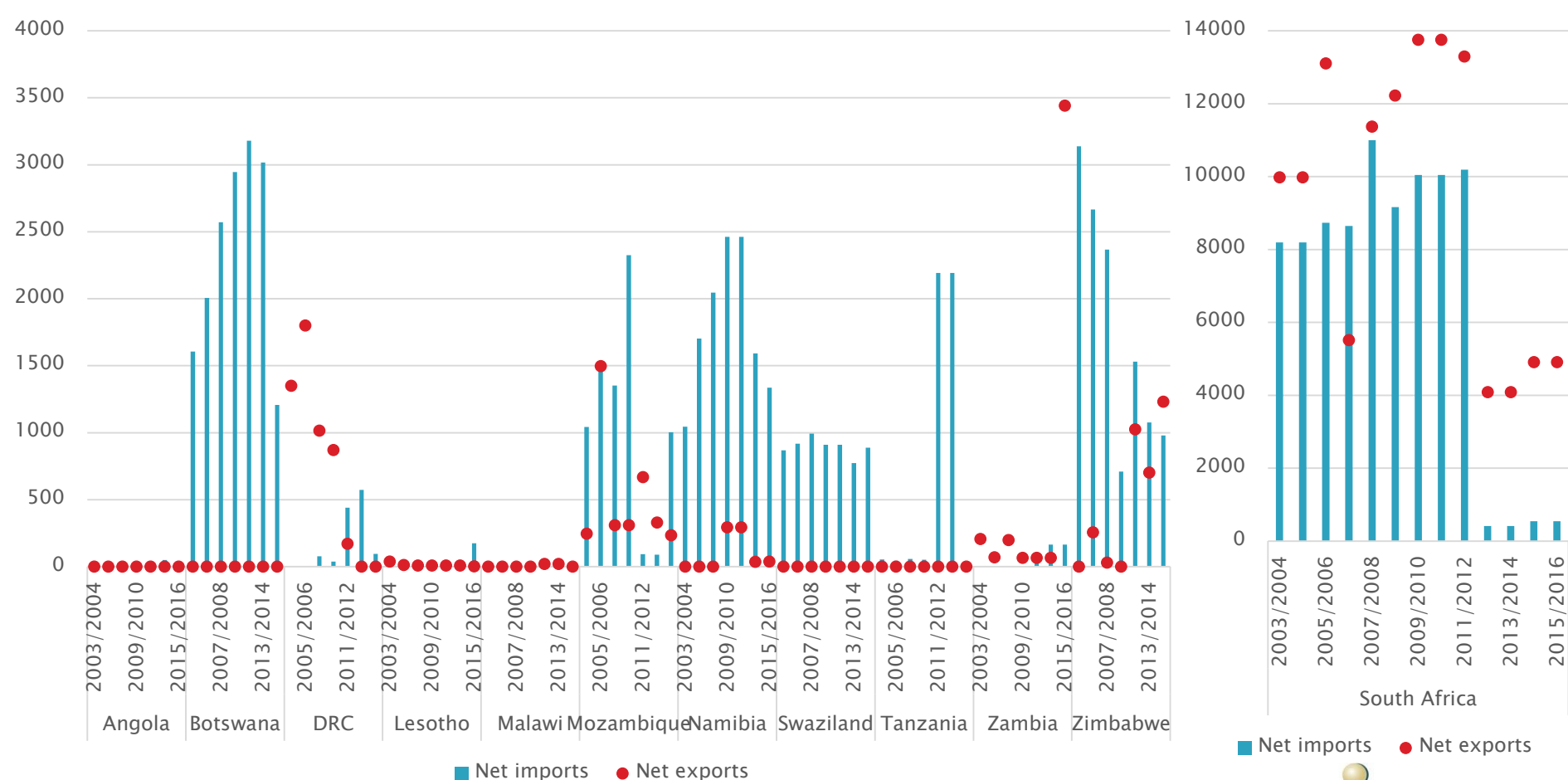
● Installed capacity/Max demand&Reserves

Source: Authors' composition, based on data from SAPP Annual Reports



# 2. The state of play: Matching supply and demand

Net imports and exports from 2003/2004 to 2015/2016  
for SAPP countries (in GWh)



Source: Authors' composition, based on data from SAPP Annual Reports



## 2. The state of play: Matching supply and demand

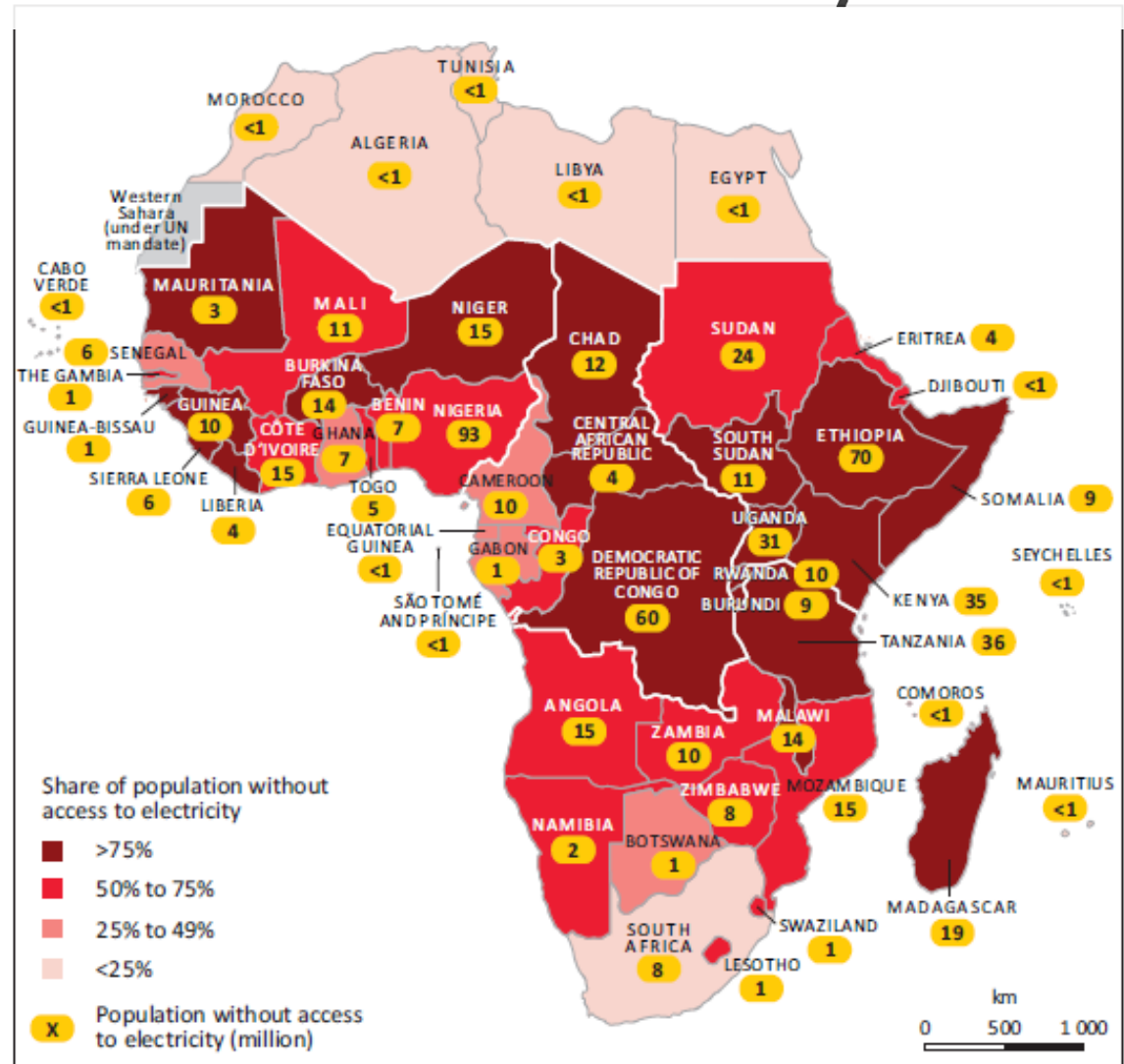
**Table 1: Committed generation projects planned from 2016-2022 in SAPP countries (in MW)**

Country	2016	2017	2018	2019	2020	2021	2022	Total
Angola	930	2 545	267	0	0	0	0	3 742
Botswana		120			300			420
DRC	458		150					608
Lesotho								0
Malawi	10	6	72	22	1 006			1 116
Mozambique	360			600	400	600	1 500	3 460
Namibia	40		190			800		1 030
South Africa	1 624	999	2 167	1 445	2 167	723	1 528	10 653
Swaziland				12			300	312
Tanzania		900	1 040	250	1 000			3 190
Zambia	300		27	441	1 450	230	1 200	3 648
Zimbabwe	200		420	837	1 860		1 200	4 517
<b>Total</b>	<b>3 922</b>	<b>4 570</b>	<b>4 333</b>	<b>3 607</b>	<b>8 183</b>	<b>2 353</b>	<b>5 728</b>	<b>32 696</b>



# 2. The state of play: Achieving an affordable access to modern electricity

Population without access to electricity in Africa (in volume and share of total population)

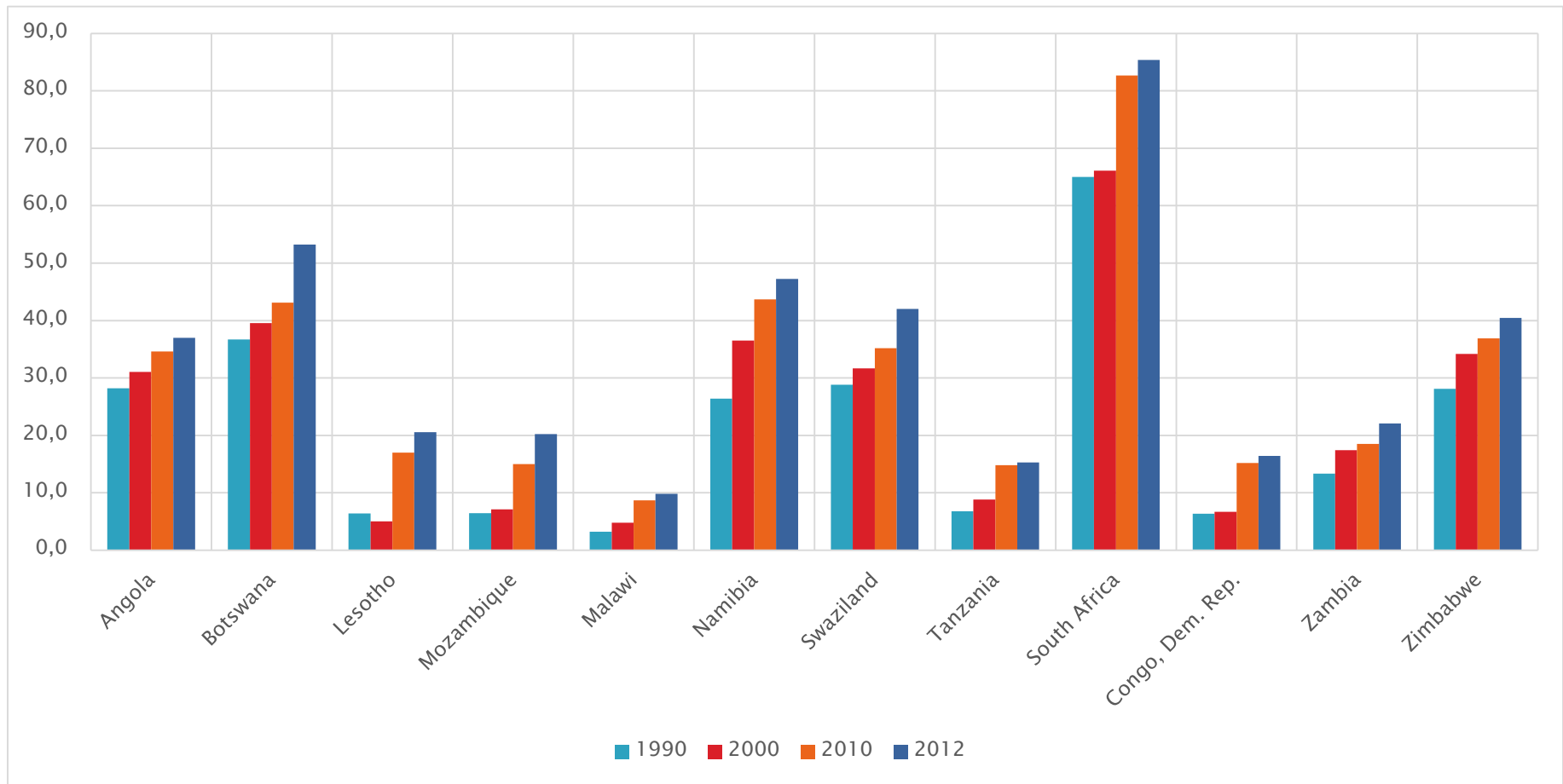


Source: IEA, 2016



## 2. The state of play: Achieving an affordable access to modern electricity

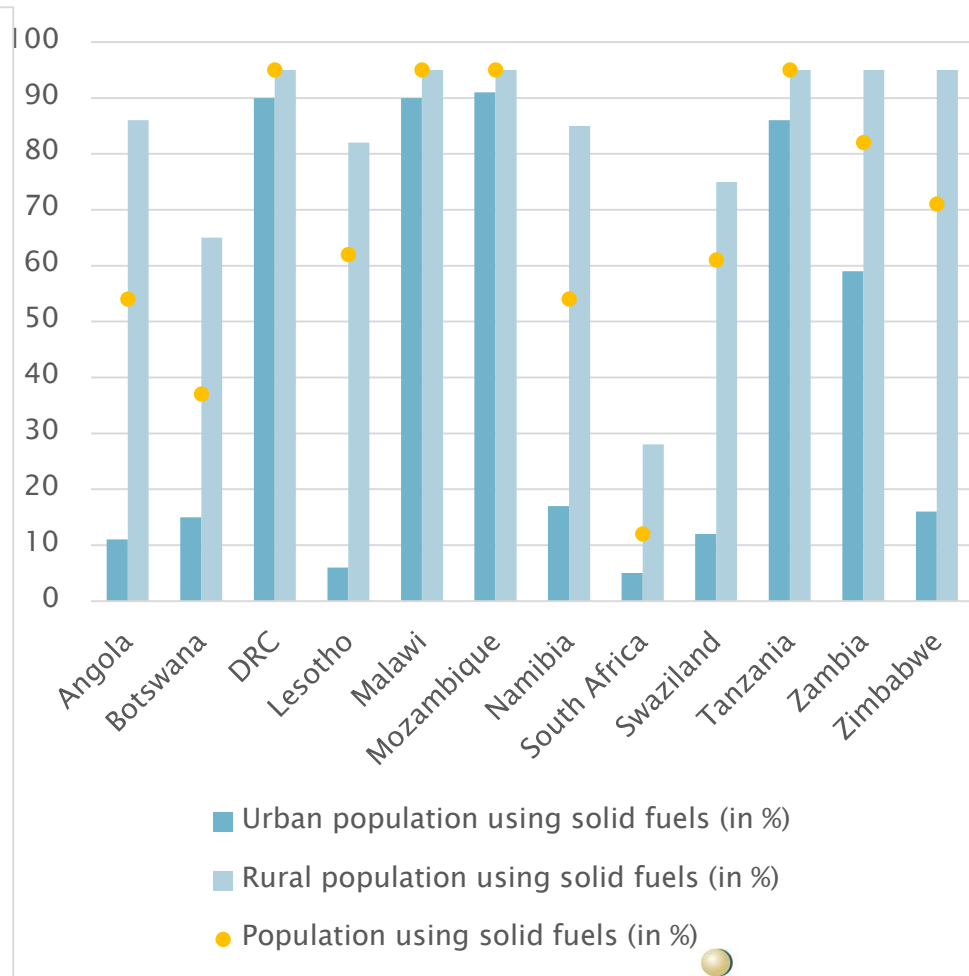
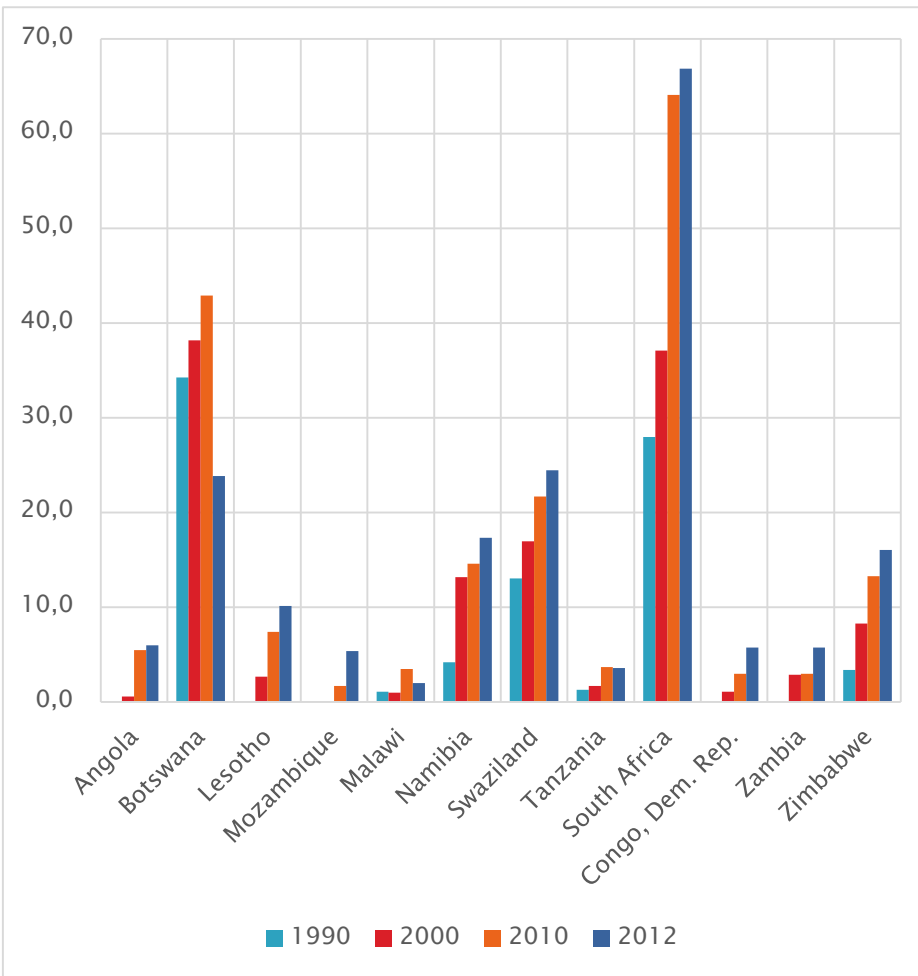
Access to electricity in SAPP countries  
(in % of population) from 1990 to 2012



# 2. The state of play: Achieving an affordable access to modern electricity

Access to electricity in SAPP countries (in % of rural population) from 1990 to 2012

Use of solid fuels in SAPP countries (in %)

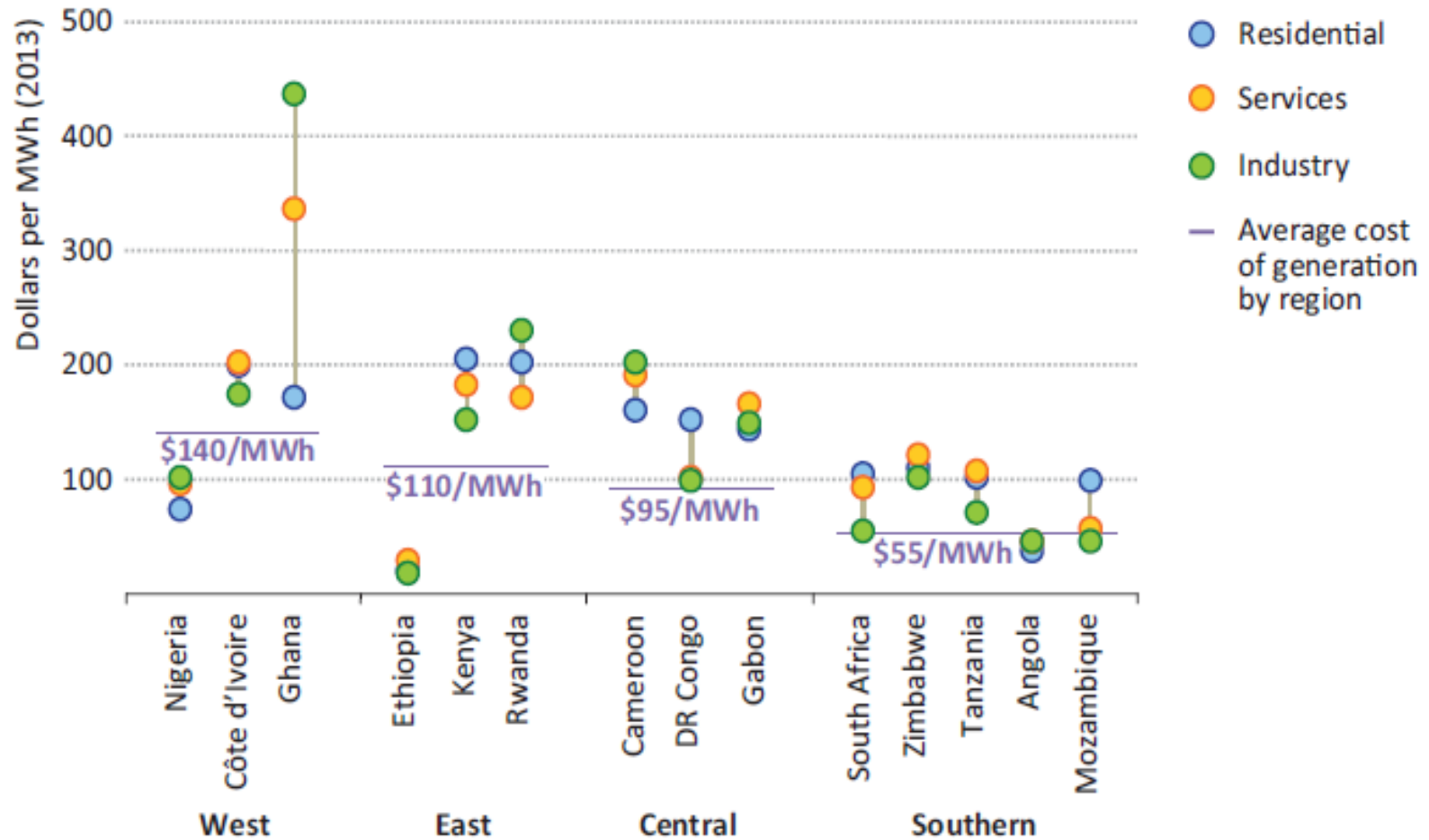


Source: Authors' composition, based on data from the IEA



## 2. The state of play: Achieving an affordable access to modern electricity

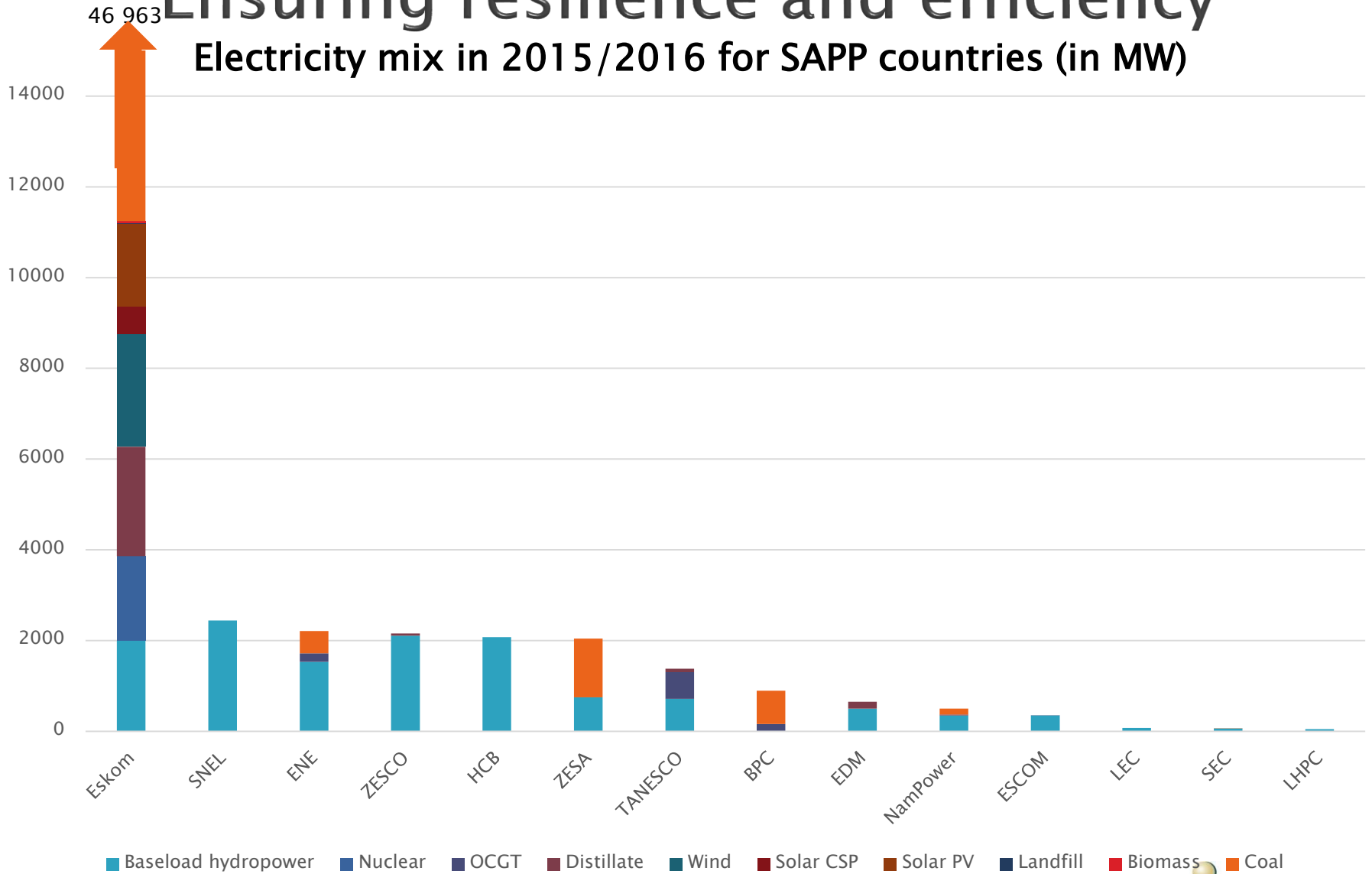
Figure 10: Grid electricity prices by end-use sector in selected countries in 2013



# 2. The state of play:

## Ensuring resilience and efficiency

Electricity mix in 2015/2016 for SAPP countries (in MW)

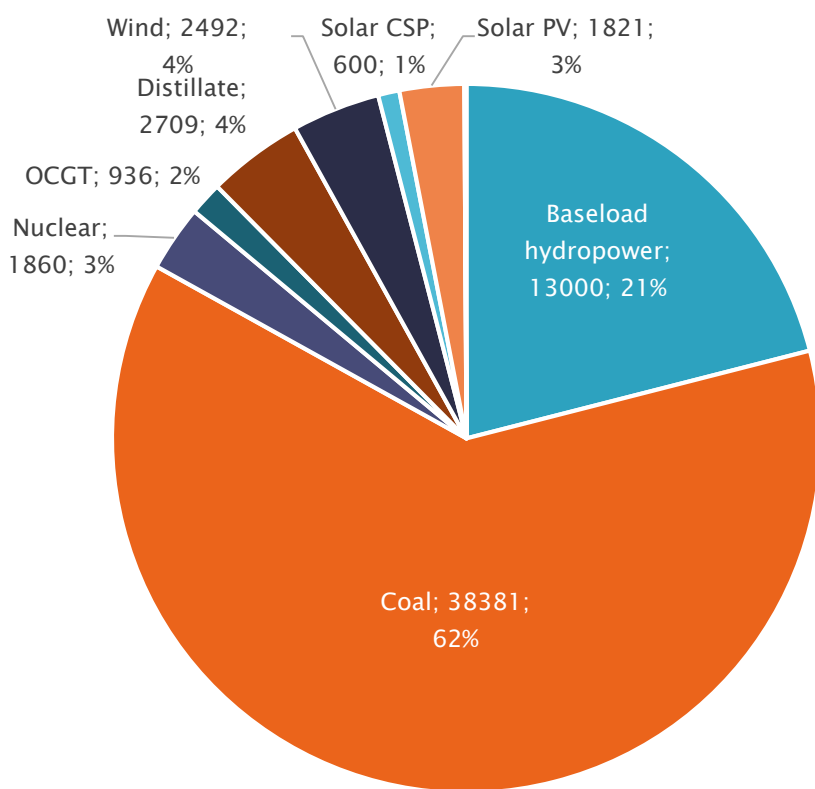


Source: Authors' composition, based on data from SAPP Annual Reports

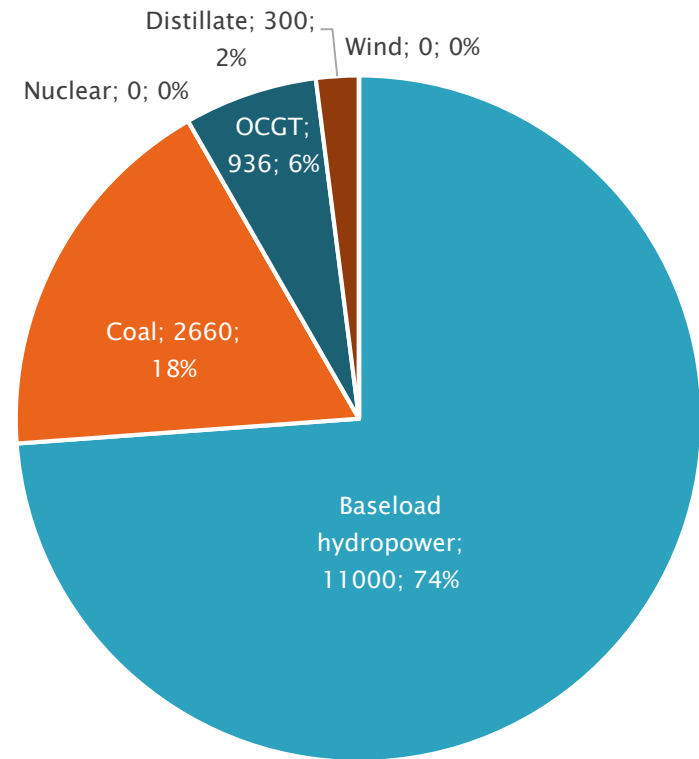


# 2. The state of play: Ensuring resilience and efficiency

Electricity mix in SAPP countries in 2015/2016 (in MW and %)



*SAPP countries*

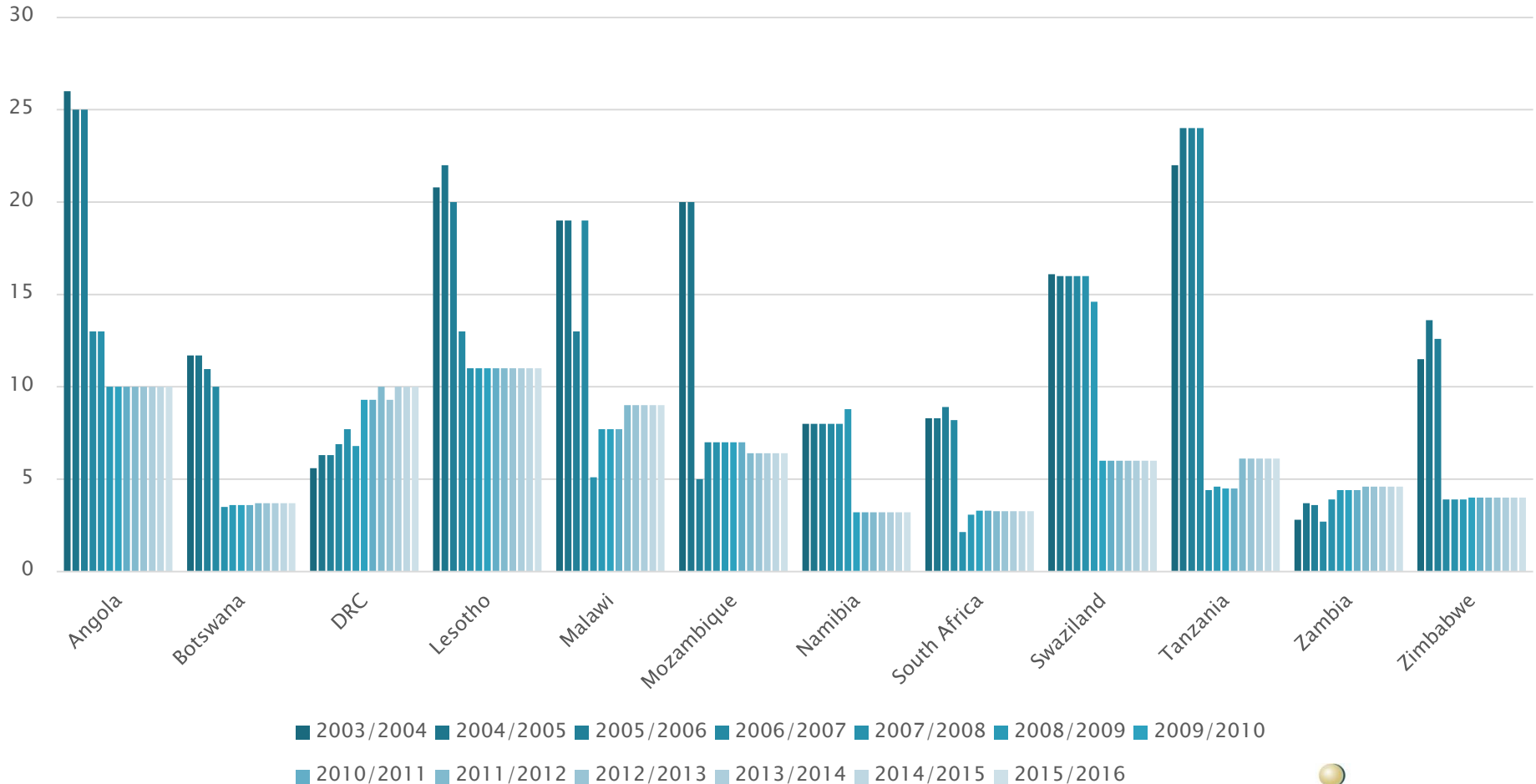


*SAPP countries, excl. SA*

Source: Authors' composition, based on data from SAPP Annual Reports

# 2. The state of play: Ensuring resilience and efficiency

Transmission losses from 2003/2004 to 2015/2016 for SAPP countries (in %)

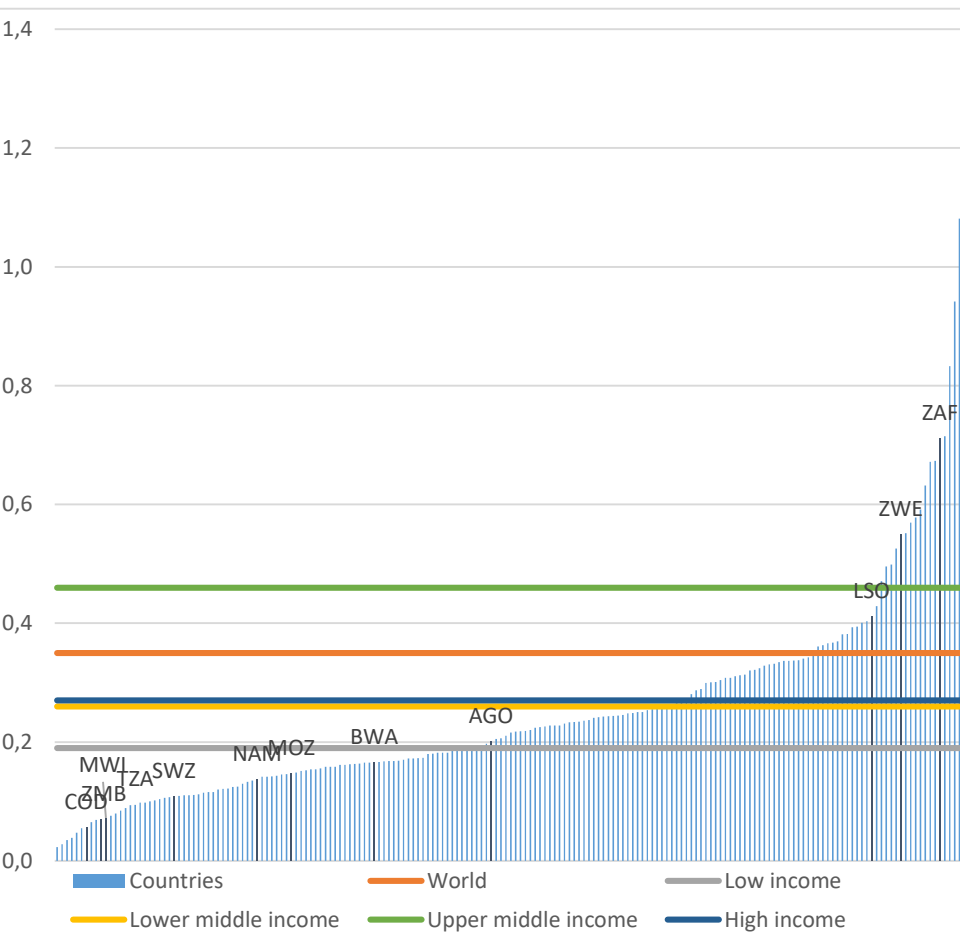


Source: Authors' composition, based on data from SAPP Annual Reports

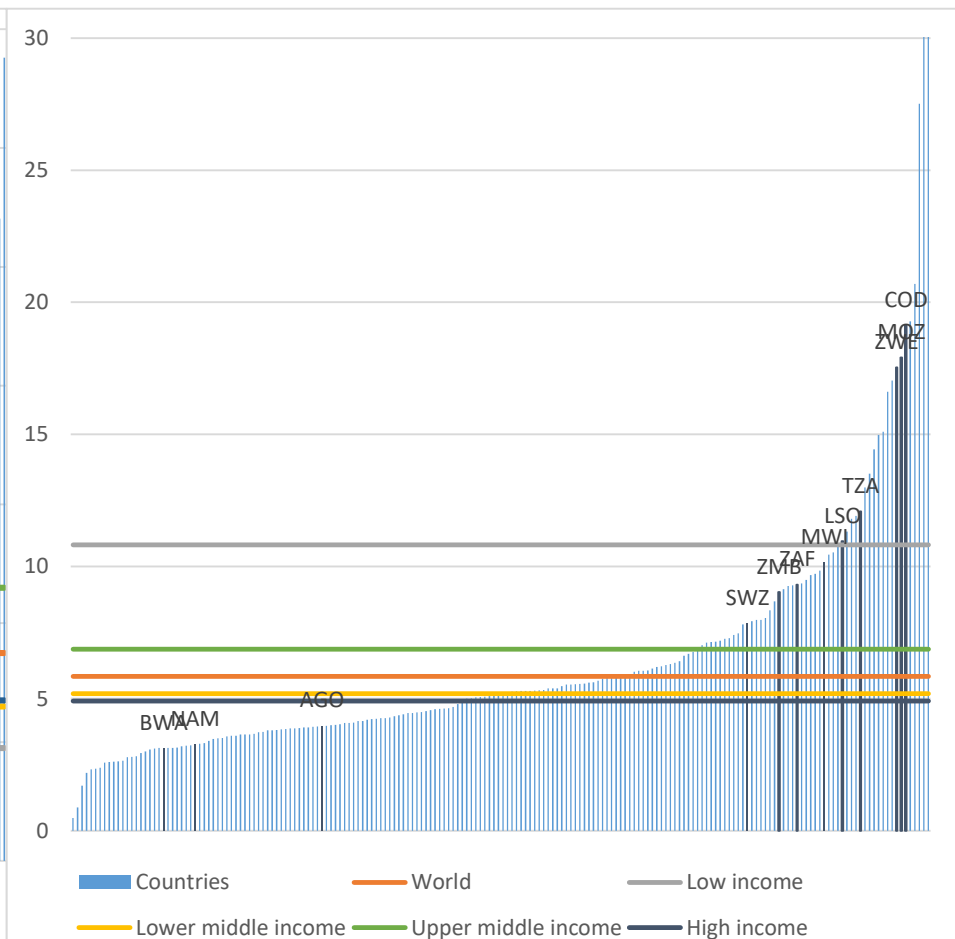


# 2. The state of play: Ensuring resilience and efficiency

CO2 emissions per country  
(in kg per 2011 PPP USD of GDP)



Energy intensity per country  
(in MJ per 2011 PPP USD of GDP)





## 2. The state of play: Key take-aways

There are key takeaways when looking back at the three dimensions, i.e. electricity security, electricity equity and environmental sustainability:

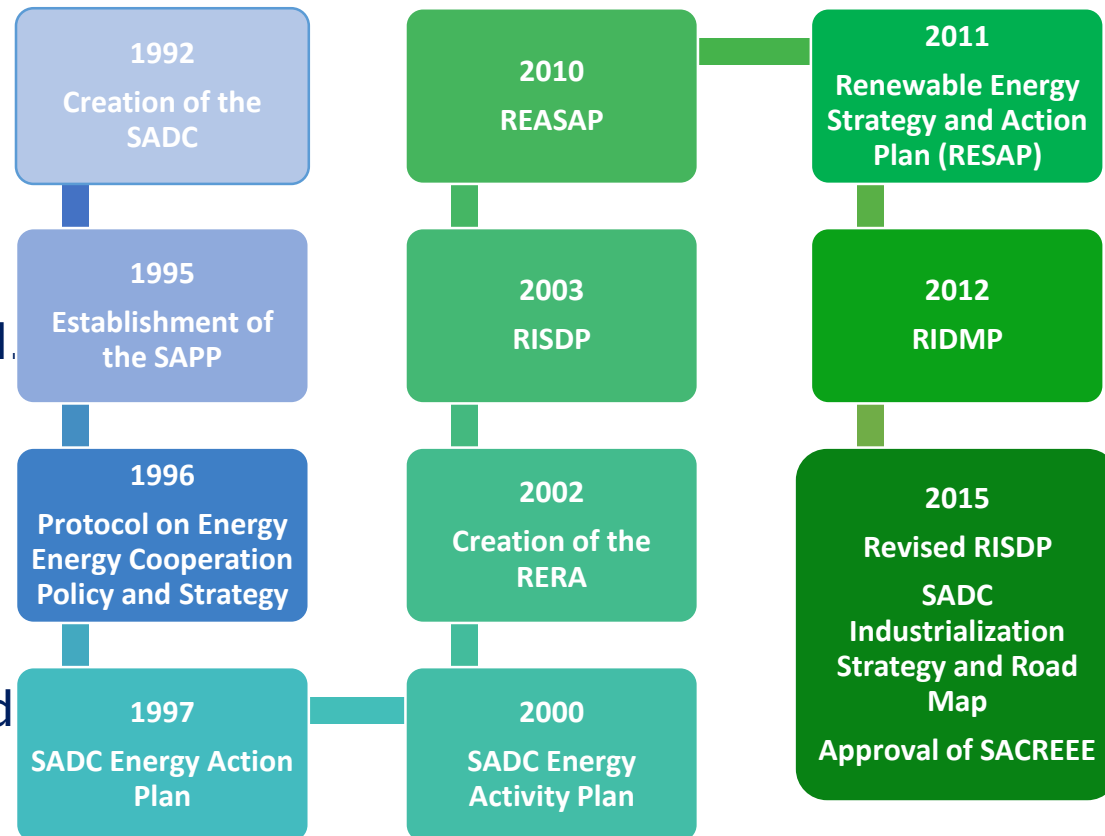
- 1) **The region experiences more supply than demand**, however there are tremendous imbalances at the national level. In addition, despite more projects planned to increase supply, **access to electricity remains a problem**, particularly in rural areas
- 2) **The SAPP remains the worst performing power pool** on the continent in terms of equity. The region faces a conundrum, with **electricity prices too low to make the sector viable but at the same time too high for the population**
- 3) **The lack of diversity in the energy mix**, resulting in inefficiencies, coupled with **high transmission losses**, further **hampers resilience and environmental sustainability**

# 3. The role of regional integration: Harmonising policies, frameworks and regulations

- ▶ **Energy regulation is still nascent in the region** and lacks independence, capacity and skills
  - ▶ Energy policy appears fundamentally inadequate, with long-term planning being largely outdated in time and best practice, and lagging in implementation.
  - ▶ **Energy policy is not integrated at the regional level:** more a collection of national situations than an integrated regional framework.
  - ▶ Concerns on the physical security of transmission infrastructure and contract security.
- ▶ The RERA was launched in 2002, with the following objectives:
    - Capacity building and information sharing
    - Facilitation of ESI policy, legislation and regulations
    - Regional regulation cooperation
  - ▶ RERA developed “regulatory guidelines” for cross-border deals
  - ▶ While noteworthy, these guidelines have no formal legal status and remain voluntary.
  - ▶ Focus on large-scale/long-term transactions, perpetuating and further entrenching the domination of long-term, bilateral transactions

# 3. The role of regional integration: Harmonising policies, frameworks and regulations

- ▶ The SADC has developed numerous regional plans and strategies in the energy space to attempt to remedy the situation
- ▶ Common implementation frameworks are furthermore being progressively developed.
- ▶ The implementation of such plans, strategies and frameworks remains however problematic.
- ▶ The SADC has limited clout to fast-track implementation and ensure adopted initiatives are adequately resourced and funded.



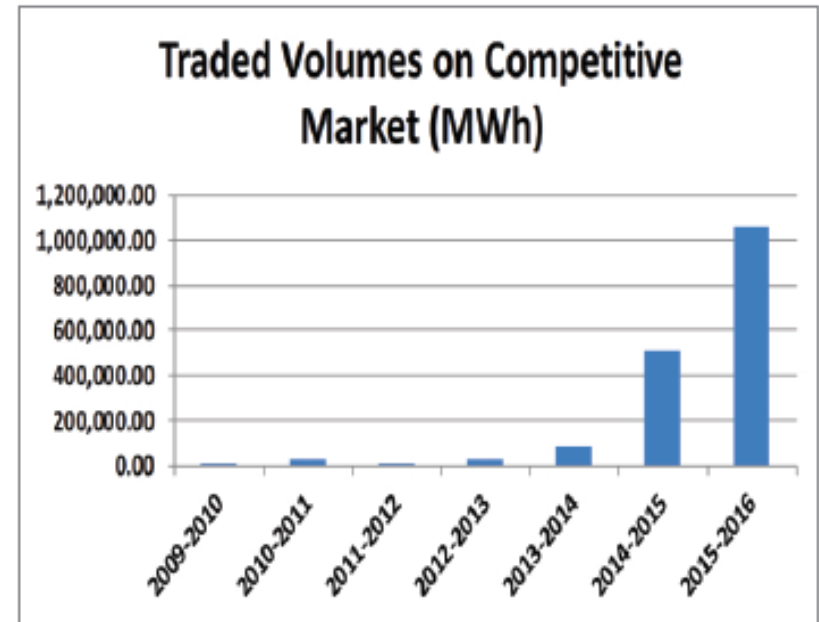
### 3. The role of regional integration: Harmonising policies, frameworks and regulations

- ▶ Going forward, the implementation of the plans and frameworks arises as the priority for the region from a policy and regulatory perspective.
- ▶ Necessary regional planning and upward, development-focused harmonisation of the policy frameworks
  - But forego pre-conceived ideas on market structures and tariff methodologies
- ▶ Calls for strengthening of the role and functions of the regional institutions to allow them to have more authority on issues of energy development in region
- ▶ Need for SADC to play a stronger role in effectively securing funding for local-level sustainable energy projects in the region
- ▶ Creation of effective linkages between the energy and industrial development frameworks in the region

# 3. The role of regional integration: Building common institutions and technical infrastructure

- ▶ Notable progress has been made in developing the regional electricity infrastructure since the creation of the SAPP in 1995
- ▶ The role of regional trading mechanisms however remains limited.
- ▶ Furthermore, when turning to the region, countries tend to favour a bilateral approach, striking long-term supply agreements.

Total energy traded on the DAM and PDAM from 2009/2010 to 2015/2016



Source: SAPP, 2016

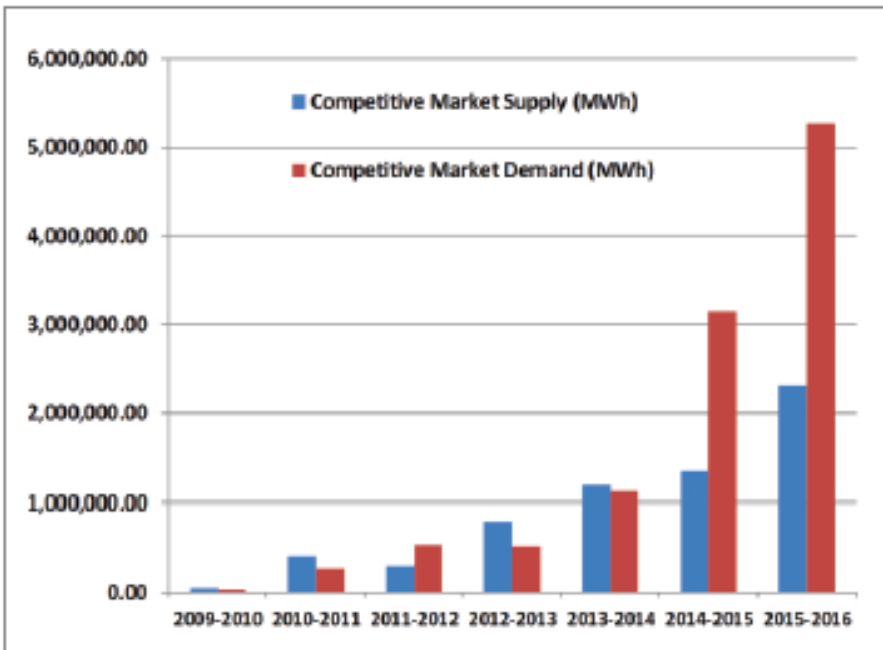
Share of energy traded	2013/2014	2014/2015	2015/2016
On the competitive market	0.9	6	14
Bilaterally	99.1	94	86



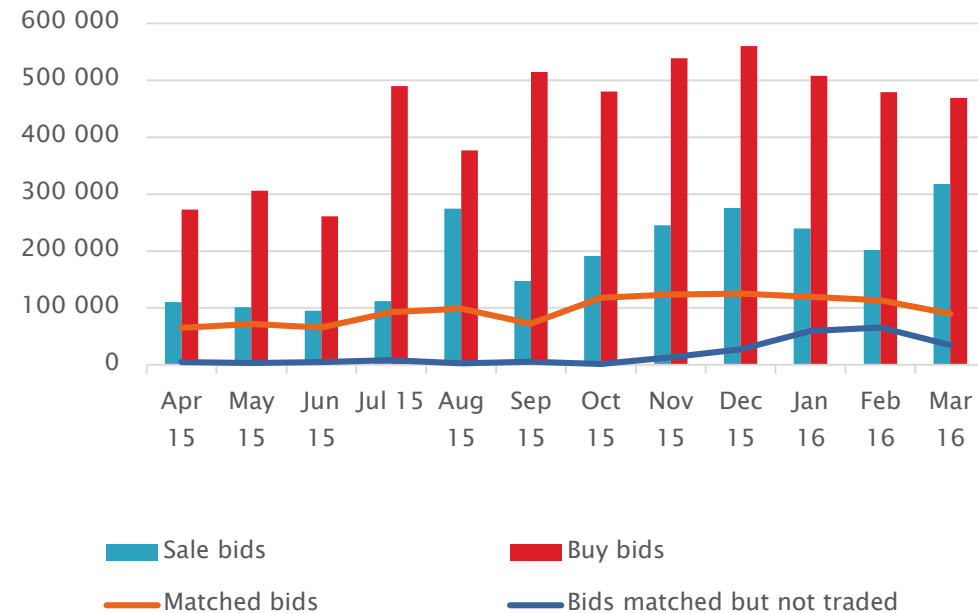
# 3. The role of regional integration: Building common institutions and technical infrastructure

- ▶ Excess of demand vs. supply reflecting the issues around electricity security
- ▶ Structural constraints due to infrastructure limitations

Demand and supply trends on the competitive market from 2009/2010 to 2015/2016



Bids submitted and matched on DAM in 2015/2016 (in MWh)



Source: SAPP, 2016

Source: Author's composition, based on data from SAPP 2016 Annual Report



### 3. The role of regional integration: Building common institutions and technical infrastructure

▶ Going forward, need to overcome the national deadlocks through regional and local action

- ▶ Pursue planned cross-border projects, with a focus on connecting Angola, Malawi and Tanzania to the regional grid and enhancing key backbone links.
- ▶ Further investigate the role of super-grids, which consist of HVDC transmission networks.
- ▶ Pursue the deepening of the regional mechanisms. The limited but growing role of regional trade (compared to bilateral deals) is promising.

▶ Support the local rollout of smart and micro-/mini-grids, particularly in support of rural electrification and local economic development

▶ Move towards increased representativity of the regulatory framework to ensure inclusive growth

# 3. The role of regional integration: Fostering the development of human capabilities

- ▶ The **policy mandate** to create a regional market for skills and competences is clear
- ▶ **Some capacity building and experience sharing** is organised at the regional level
- ▶ Most SADC's frameworks, plans and strategies emphasise the need to **build data and information databases** and repositories

- ▶ Little progress has been made to develop **national and regional skills and knowledge.**
- ▶ Most capacity building programmes target existing human resources in the sector, higher education institutions and decision-makers.
- ▶ **Very little investment in building the capacity of communities** or building a network of community practitioners, especially those engaged in the delivery of decentralised electricity systems.
- ▶ **Information and data**, on energy like many other topics, remains very scarce and of poor quality in the region.



# 3. The role of regional integration: Fostering the development of human capabilities

- ▶ Need for a regional cooperative framework to develop the 'human infrastructure' at all levels

- ▶ Development of regional knowledge programmes (harmonisation of regional curricula; mutual recognition of certifications)
- ▶ Establishment of regional educational, training institutions
- ▶ Creation of a regional free movement area
- ▶ Facilitation of enhanced cooperation between R&D institutions on energy issues.
- ▶ Increased action-orientated capacity building to develop new initiatives at the local and regional levels
- ▶ Lesson drawing activities from successful stories and failures (iterative process)
- ▶ Foster data- and information-related initiatives (one-stop information system, platforms to reach communities)
- ▶ Improve mapping and diagnostic tools to answer the needs of populations in terms of energy sustainability

## 4. Conclusion

- ▶ **The road to electricity sustainability in Southern Africa remains long and difficult.**
- ▶ The deepening of regional energy integration offers a platform to fast-track progress towards electricity sustainability.
- ▶ **Existing initiatives provide the necessary building blocks** for regional integration to meaningfully help countries meet their energy challenges.
- ▶ Ultimately, regional integration however remains conditioned on the **willingness and engagement of member countries and national institutions** as well as robust, inclusive and transparent governance systems.
- ▶ The task at hand is evidently complex and ambitious, but the **long-term benefits** associated with **sustainable development-focused regional integration** are at the core of Southern Africa's prosperity.

Thank you! Looking forward to your inputs



# Trade & Industrial Policy Strategies

Supporting policy development  
through research and dialogue

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