

# *Comparing South Africa's electricity prices*

*Presentation to BUSA Energy Steering Committee*

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**Lungiswa Energy**

National Economic Development  
and Labour Council



# Introduction

*“If I were to ask you to open two novels, and compare the circumstances of each protagonist, asking you to choose who is “better,” you may find this ridiculous. You may tell me these characters have been forged in two different worlds, around different people, and they each have their own inherent purposes. They’re traveling different paths, and they’ll traverse their paths at different speeds, as their meant to. Great. So as such, never again compare yourself to another.”*

— Daniel V Chappell

- The Business Constituency of the National Economic Development and Labour Council (NEDLAC) has commissioned Lungiswa Energy to undertake an international price comparison of Eskom’s prices.
- International price comparisons are often posited by both service providers and customers as a useful exercise to support their views that prices are either low or high. And therein lies the issue with international price comparisons who is undertaking the comparison. Depending on one’s point of view, one can find a list of comparators or a point in time or a set of prices that will support one’s view. It therefore matters a lot who you are comparing, what you are comparing and when you are comparing it.
- The comparison of one simple indicator (i.e. the price) ignores the multitude of other factors that determine the price such as the cost, economic, social and geographic circumstances of that country/comparator. Even if one were to take these factors into account, the impact of other historic circumstances such as colonialism and Apartheid are rarely considered or can even be measured.



**Despite these challenges, there are ways to improve the objectivity and reliability of the results of international price comparisons.**

# Extensive analysis of prices, subsidies and support provided to large users

To overcome the issues with international price comparisons, we have taken a multi-pronged approach:

## 1. Price comparison:

- Across comparator countries including US and EU
- Comparison over time
- Analysis of multiple datasets

## 2. Support provided to energy intensive users

- Length of contract
- Special pricing or price mechanism
- Direct subsidies

## 3. Subsidies in the SA ESI industry

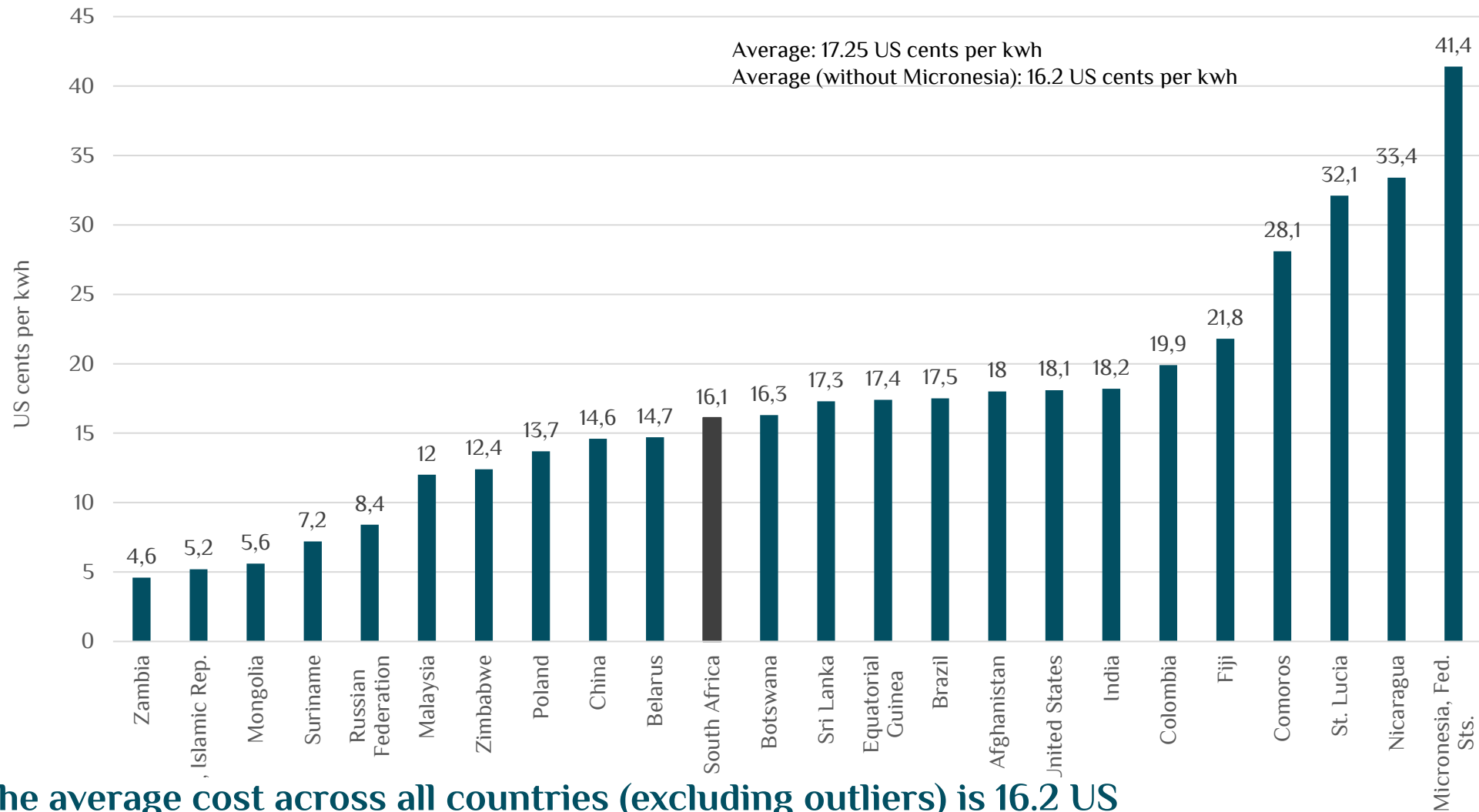
- Municipal subsidies
- Eskom subsidies

## 4. Electricity cost for large users

- Comparison of annual cost of Megaflex and municipal large user tariffs compared to select EU countries

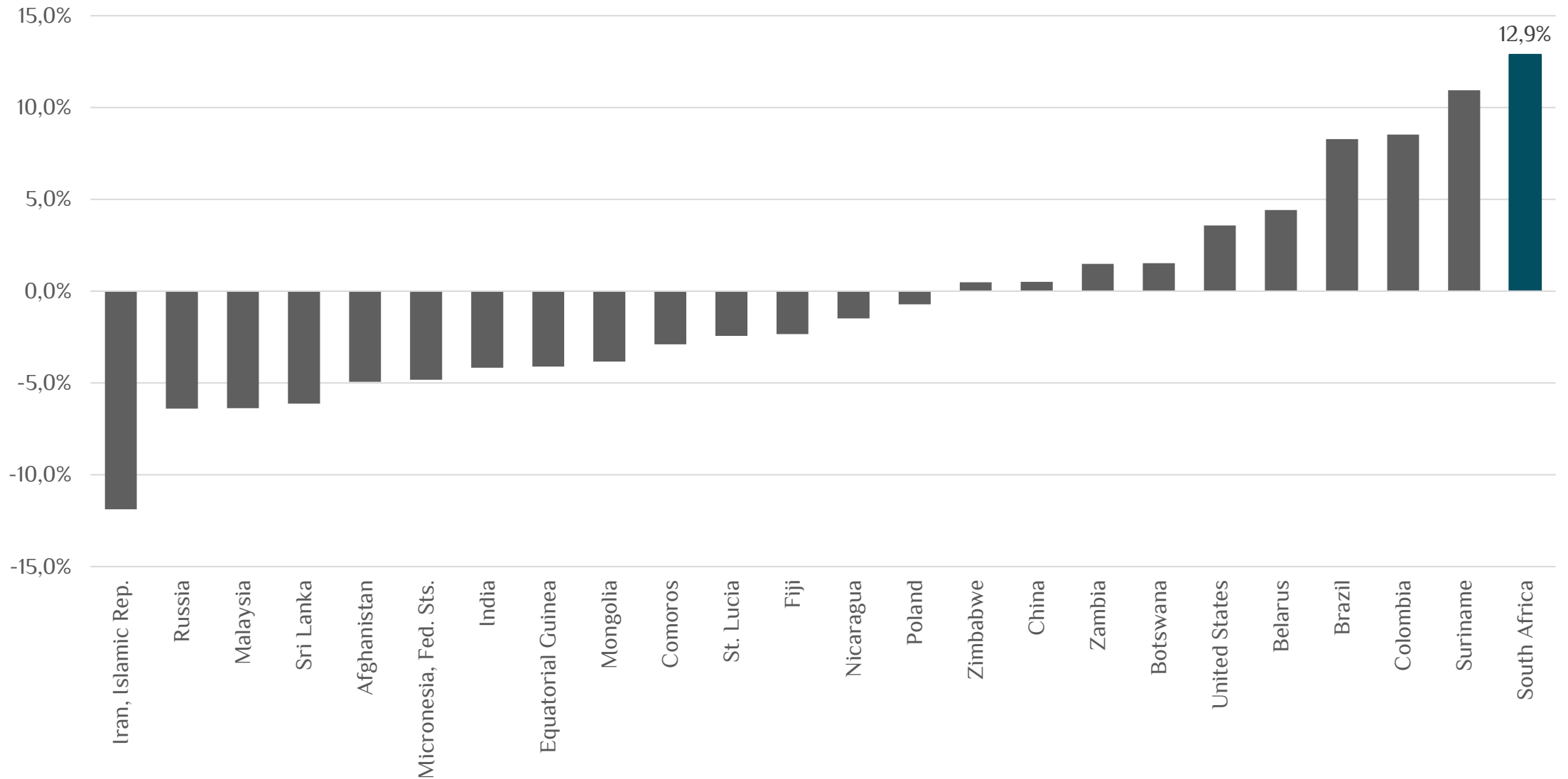
ESI – Electricity supply industry

# World Bank Doing Business Report 2020 – Comparator countries



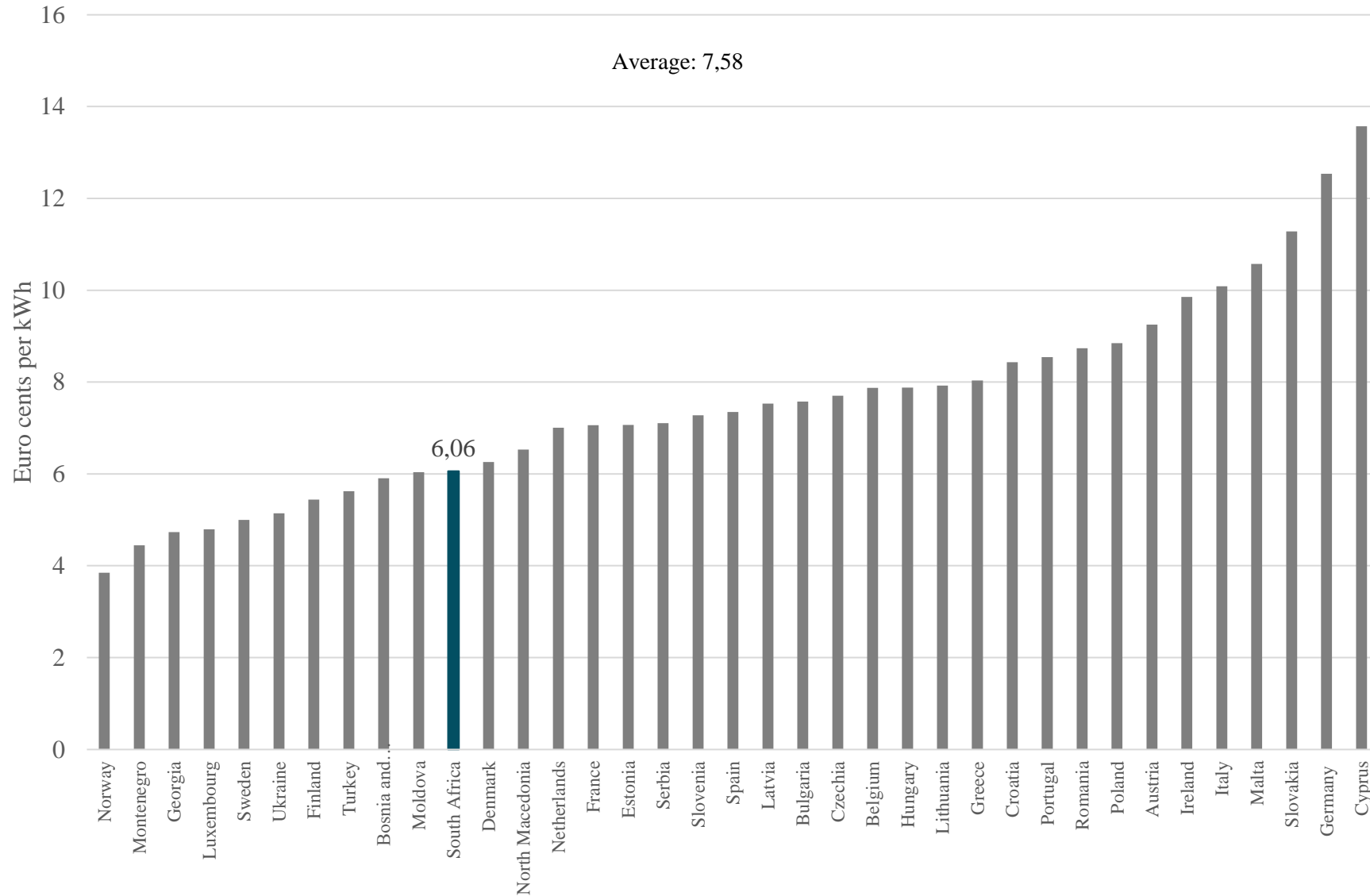
- The average cost across all countries (excluding outliers) is 16.2 US cents per kWh and South Africa is below this average at 16.1 US cents per kWh.
- South Africa ranks 11 out of 24 countries included in the analysis.

# World Bank Doing Business Report 2020 – Comparator countries over time



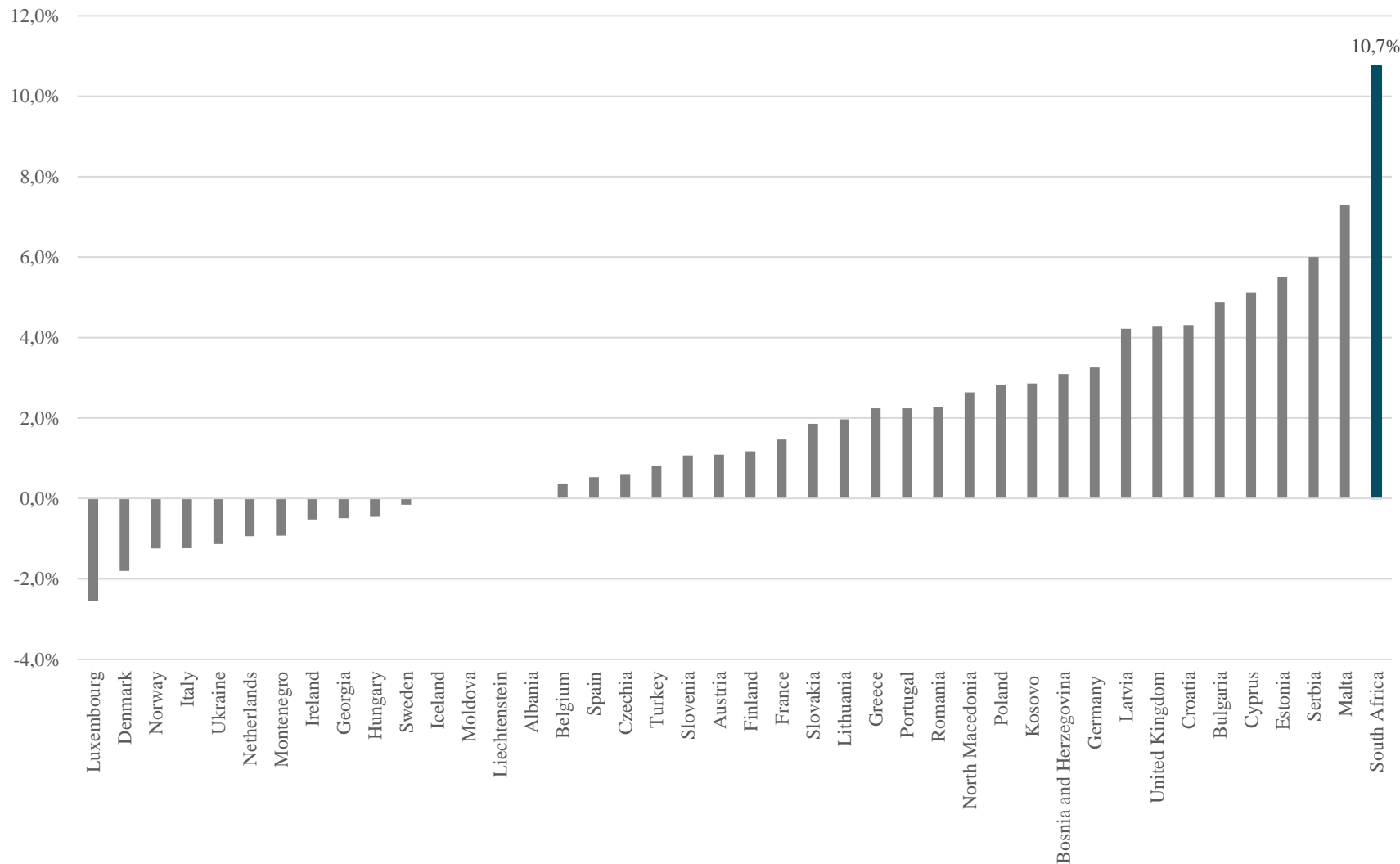
- **South Africa: Average price increase of 12.9% between 2015 and 2020**
- **Comparators: Most countries experienced negative average price changes**

# EU Band IE compared to SA mining customers - FY20/21



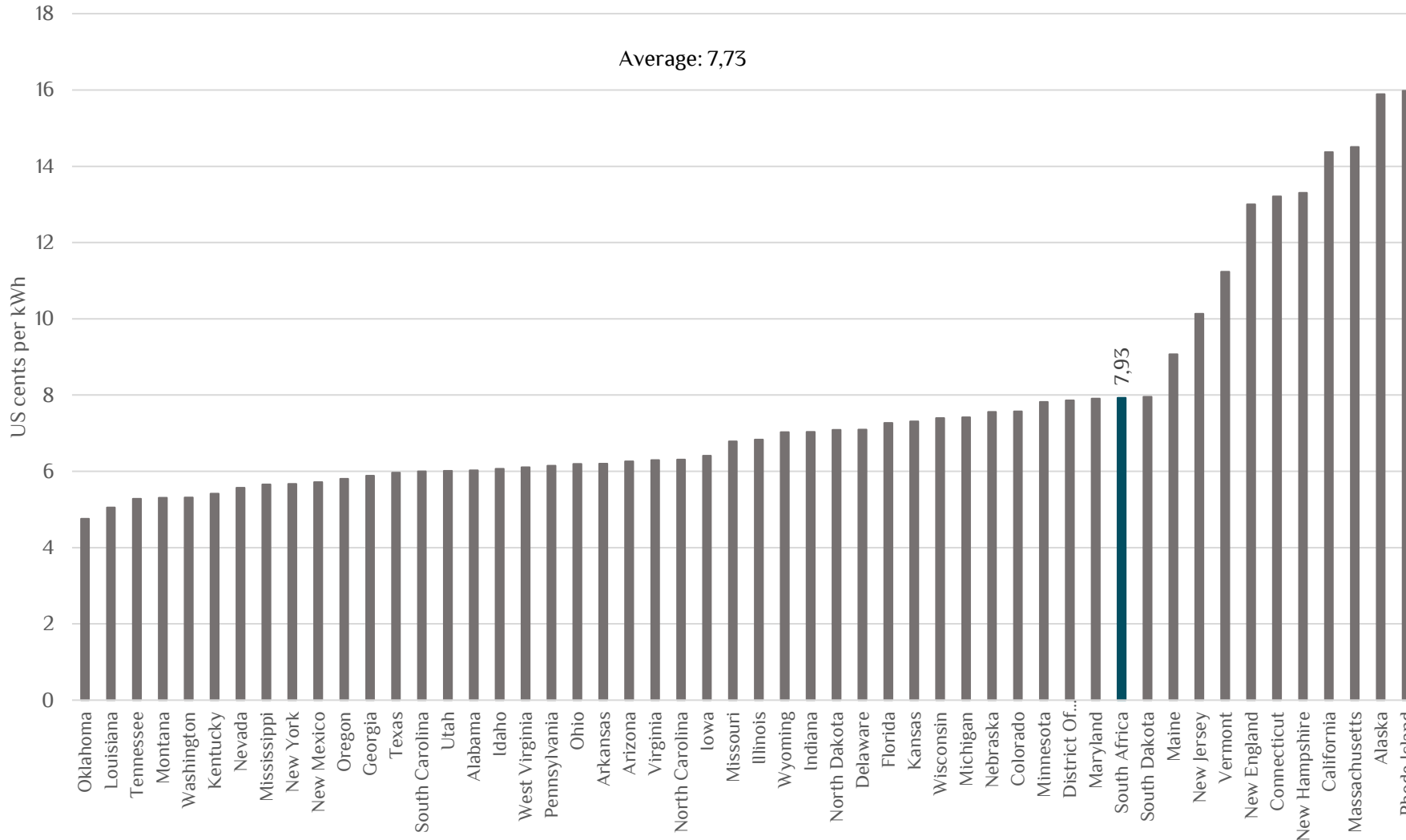
- In FY20/21, South Africa 6.06 Euro cents; Below the average of 7.28 Euro cents
- It ranked 11 out of 37 comparators

# EU Band IE compared to SA mining customers – average price increase FY07/08 – FY20/21



- South Africa ranked 1<sup>st</sup> in FY07/08 to 11<sup>th</sup> in FY20/21
- South Africa had average price increase of 10.7% compared to European countries with below 6% increases and some countries experiencing price decreases

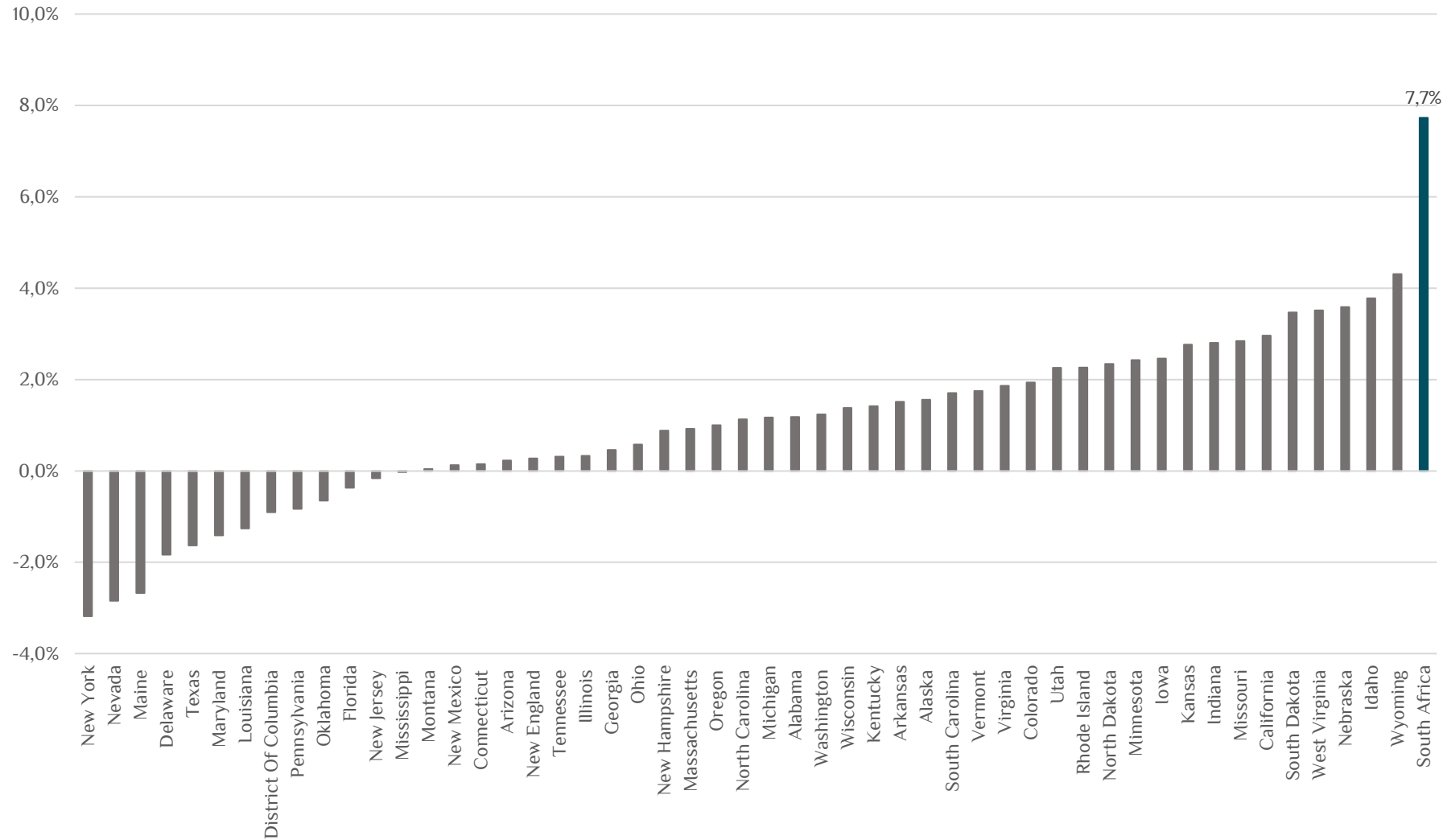
# US Industrial customers compared to SA industrial, mining and agriculture customers – FY20/21



- In FY20/21, South Africa was 7.93 US cents, above average of 7.73 US cents for all comparators
- It ranked 41 out of 53 comparators



# US Industrial customers compared to SA industrial, mining and agriculture customers – average price increase (FY07/08 to FY 20/21)



- South Africa ranked 1<sup>st</sup> in FY07/08 to 41<sup>st</sup> in FY20/21
- Average price increase of 7.7% compared to comparators which experienced price increases below 4% with some states experiencing price decreases

# Summary of international price comparison

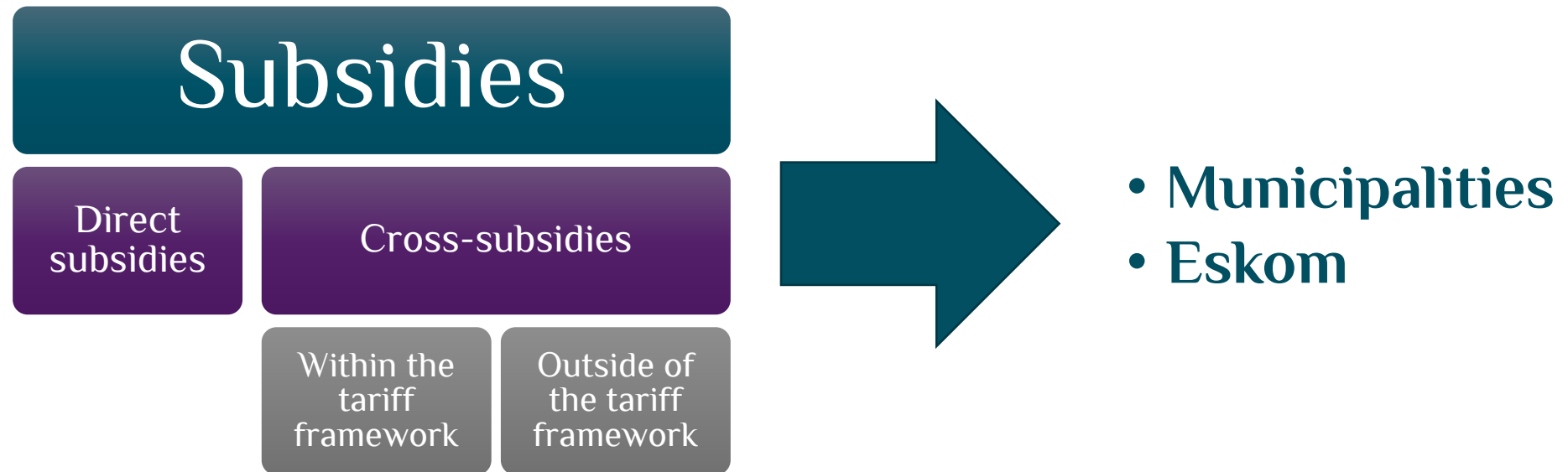
	Measure	Price or cost	Rank	Price trend - Rank	Price trend – Average % change
World Bank Doing Business dataset	US cents per kWh based on assumed monthly consumption for a warehouse 2020 (based on data for 2019)	South Africa - 16.1 US cents per kWh All countries: Below average of 16.7 US cents per kWh	94 out of 184		
		Comparator countries only: Below average of 16.2 US cents per kWh	11 out of 24	Ranked 4th in 2015 to 11th in 2020	South Africa: 12.9%; Comparators: Most countries experienced negative average price changes
European average prices	Euro cents per kwh based on the average price for different consumption bands April 2007 to March 2021 (Eskom FY 07/08 to FY20/21)	Agriculture customers – South Africa: 10 Euro cents; Below the average of 11.52 Euro cents	18 out of 40	Ranked 2 <sup>nd</sup> in FY08/09 to 18 <sup>th</sup> in FY20/21	South Africa: 9.5%; Comparators: Below 4% increase with some states experiencing price decreases
		Commercial customers - South Africa: 7.85 Euro cents; Below the average of 11.52 Euro cents	8 out of 40	Ranked 1 <sup>st</sup> in FY08/09 to 8 <sup>th</sup> in FY20/21	South Africa: 10.8%; Comparators: Below 4% increase with some states experiencing price decreases
		Industrial customers: South Africa: 4.79 Euro cents; Below the average of 8.56 Euro cents	2 out of 39	Ranked 1 <sup>st</sup> in FY07/08 to 2 <sup>nd</sup> in FY20/21	South Africa: 8.9%; Comparators: Below 4% increase with some states experiencing price decreases
		Mining customers: South Africa: 6.06 Euro cents; Below the average of 7.28 Euro cents	11 out of 37	Ranked 1 <sup>st</sup> in FY07/08 to 11 <sup>th</sup> in FY20/21	South Africa: 10.7%; Comparators: Below 6% increase with some states experiencing price decreases
US average price per state	US cents per kwh based on the average price for different customer categories April 2007 to March 2021 (Eskom FY07/08 to FY20/21)	Industrial customers: South Africa: 7.93 US cents; Above average of 7.73 US cents for all comparators	41 out of 53 comparators	Ranked 1 <sup>st</sup> in FY07/08 to 41 <sup>st</sup> in FY20/21	South Africa: 7.7%; Comparators: Below 4% increase with some states experiencing price decreases
		Commercial customers: South Africa: 8.96 US cents; Below average of 10.96 US cents for all comparators	12 out of 53 comparators	Ranked 1 <sup>st</sup> in FY07/08 to 12 <sup>th</sup> in FY20/21	South Africa: 8.4%; Comparators: Below 4% increase with some states experiencing price decreases

## 2. Support provided to energy intensive users

- Analysis is constrained by the availability of accurate, well-research and reliable data and information
- The list of countries and examples used are not necessarily appropriate comparators to South Africa
- Factors to consider:
  1. Many of these countries have access to cheap and abundant energy resources used to generate electricity;
  2. There is often government ownership or involvement in energy intensive industries as well as electricity generation;
  3. The electricity markets in these countries are mature, well-developed and competitive electricity markets
  4. Many of these countries are wealthy countries which have sufficient financial resources and capacity to provide significant support to energy intensive industries.

	Long term contracts	Special prices or mechanisms	Subsidies related to environmental policies
South Africa	Short term Negotiated price agreements; Long -term Negotiated price agreements - up to 10 years	Lower tariffs than the standard tariff level and structure; Prices can be linked to commodity prices or exchange rates	Exemption from the carbon tax for Eskom until December 2023 – equivalent to R 11 billion saving; Tax-free allowances for companies
Norway	Long term agreements of a duration of between 7 and 10 years	Electricity pricing linked to commodity prices and/or exchange rates	Norway granted 45 companies around USD 62 million in compensation for EU-ETS in 2018.
Germany	Long term agreements procured on a bilateral basis on the OTC market		Germany granted around 100 applicants from the iron, steel and non-ferrous metal industries over USD 108 million in compensation for increased electricity prices due to the EU ETS.
Iceland	Many long-term agreements – the longest being 40 years	Special pricing linked to international commodity prices or CPI/PPI for the United States.	
Quebec-Canada		Special pricing mechanisms either linked to commodity price/exchange rates or price reduction programme linked to investment or other commitments. Prices can be between USD 0.01 to 0.02 per kWh lower or as much as USD 0.06 per kWh	
China		Energy intensive users can negotiate lower prices with private generators. It is estimated that prices can be USD 0.01 per kWh lower than that for other industries.	

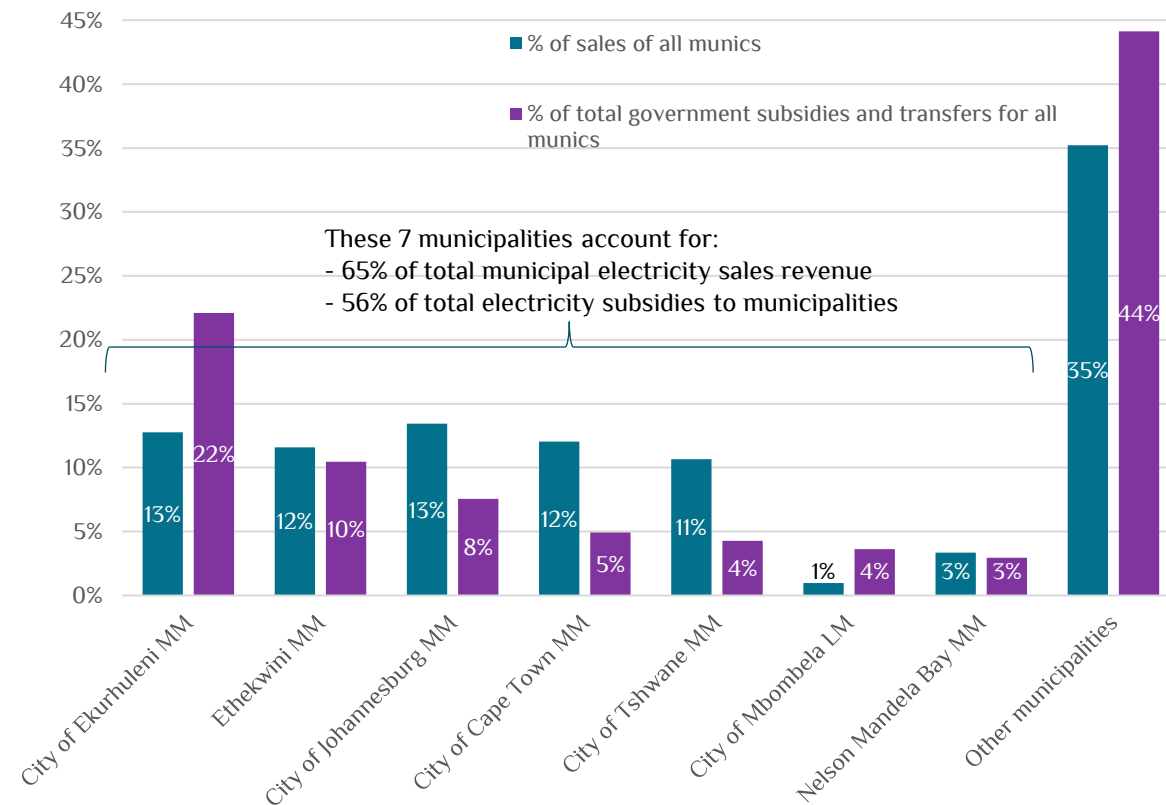
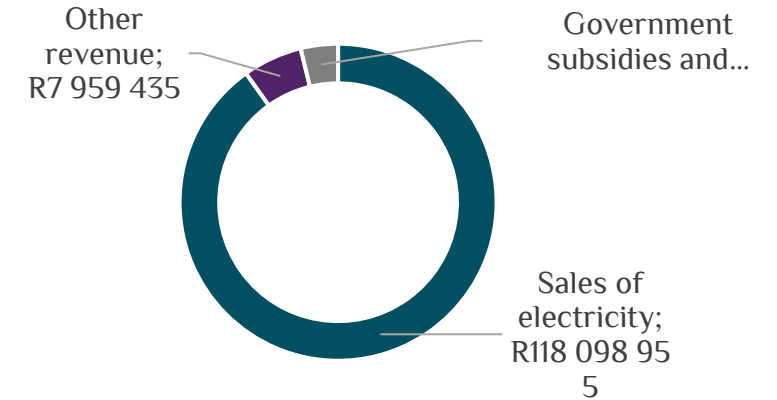
### 3. Subsidies and cross-subsidies in the South African ESI



- The extent of cross-subsidies within the municipal tariff framework is not analysed as the data is not available.

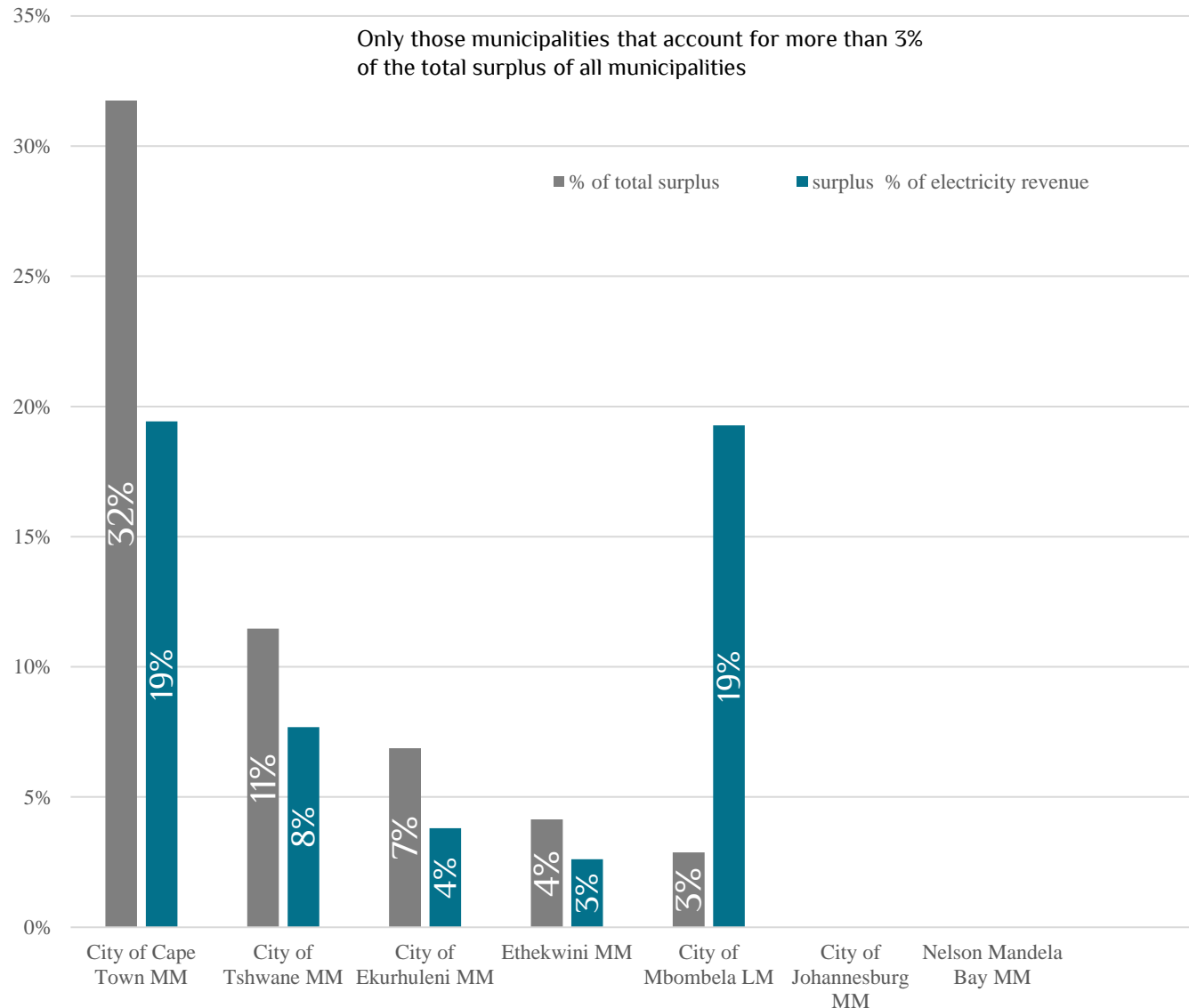
# Direct subsidies to munics to cover capital and operational costs

- Municipalities receive significant subsidies and transfers from the government to cover the costs of service provision including electricity services - to cover capital investment in and operational costs.
  - Government subsidies/transfers – R 5 billion FY20/21 – 38% of total funding for electricity
  - Sales of electricity – R 188 billion (90%)
  - Other revenue – R 8 billion (6.1%)
- Of the over 257 municipalities, only 7 municipalities account for 56% of the total government subsidies for electricity but account for around 65% of total municipal electricity sales.
- Interestingly, the Ekurhuleni municipality receives 22% of the total municipal subsidy for electricity but only accounts for 13% of electricity sales.
- It is therefore apparent that most municipalities fund municipal electricity services primarily through electricity sales.



The municipal financial year runs from July to June.  
 See: Statistics SA, Statistical release P9114, Financial census of municipalities for the year ended 30 June 2021, 28 July 2022 (StatsSA, Statistical release P9114)

# The extent of municipal cross-subsidies to cover other municipal services



- Municipalities use the revenue from the sale of electricity to subsidise other municipal services. Within the municipal finance framework, this is termed a “surplus” and can be understood to be ‘subsidy’ from electricity customers to customers of other municipal services.
- Across all munics a surplus of R 9 billion was generated for FY20/21 (6.9% of total electricity revenue).
- For the City of Cape Town almost a third of its electricity revenue is a surplus, (20% of the total surplus for all munics). The other large municipalities including Tshwane, Ekurhuleni and eThekwini account for 11%, 7% and 4% of the total municipal surplus respectively but it accounts for smaller portion of their electricity revenue
- The City of Joburg and NMBM munics do not generate any surplus from their electricity sales – this suggests electricity tariffs/prices do not include a ‘subsidy’ to cover the costs of other services.
- The munics that generate significant revenue surpluses may be compensating for the relatively lower share of government subsidies they receive

The municipal financial year runs from July to June.

See: Statistics SA, Statistical release P9114, Financial census of municipalities for the year ended 30 June 2021, 28 July 2022 (StatsSA, Statistical release P9114)

# A special note on Eskom and direct subsidies

- In February 2019, Tito Mboweni, the then Minister of Finance, announced a R 69 billion equity investment in Eskom to assist in servicing its debt and other operations.
- NERSA disallowed the inclusion of the equity investment. Effectively, NERSA treated the government equity injections as a ‘subsidy’ by reducing the overall allowable revenue and resulting price increase. (But NERSA was required to allow the equity injection as per the High Court decision).
- Further, government as a shareholder of Eskom deserves a return on its capital investment as permitted by the MYPD methodology. However, Eskom has for several years applied for (and been allowed) a negative or ‘below the permitted’ WACC (and resulting return) on its regulatory asset base.
- The rationale for such an approach arguably for both Eskom and NERSA is the desire to reduce the electricity price increases and as such make the price increase more palatable to the general public and businesses. It could be argued that the lower than permitted return for the shareholder on the equity invested is a form subsidy. However, this is poor and opaque manner of subsidizing electricity costs and should not be determined by Eskom.

# The extent of Eskom cross-subsidies

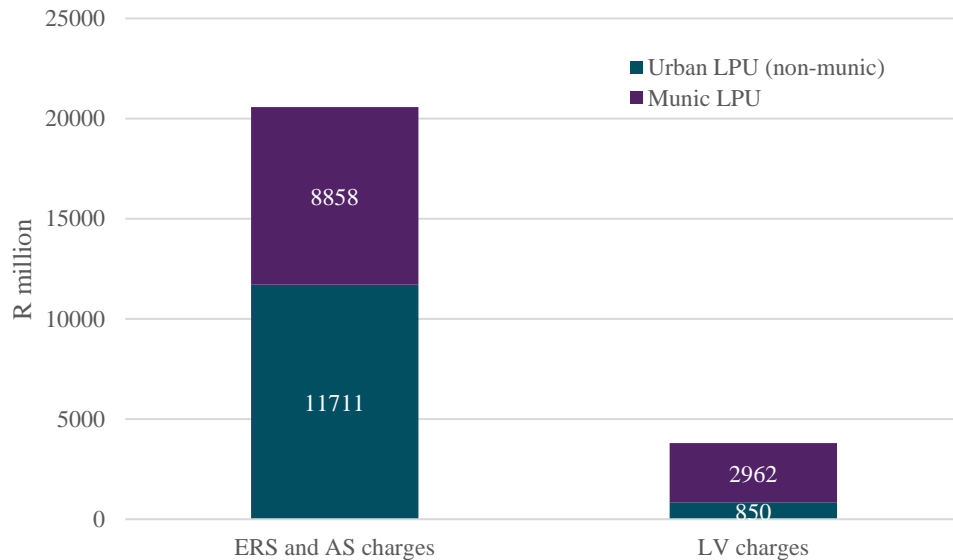
There are 2 types of cross-subsidies within the Eskom tariff framework:

## Inter-tariff subsidies

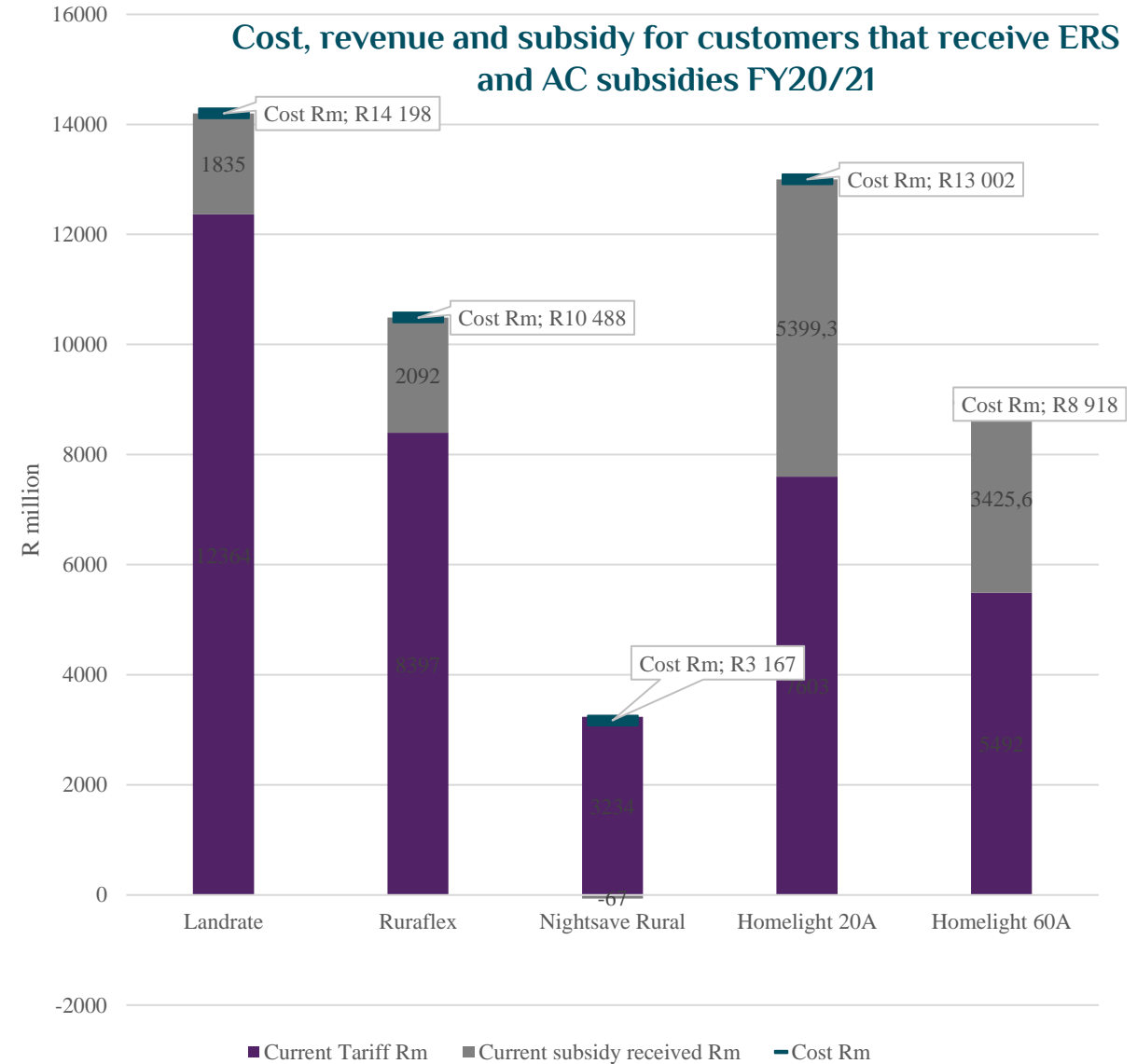
- These are subsidies that are paid by some tariffs (or customers) to other tariffs (or customers).
- Electrification and rural network subsidy charge which is applied to all urban Large Power User (LPU) tariffs
- Affordability charge applied to only the non-municipal urban LPU tariffs.

## Intra-tariff

- This occurs where one charge subsidises another charge within the same tariff category.
- The example of this is in the network charges in the Megaflex tariff where customers on high voltage services subsidise those on low voltage services. This is called the urban low voltage subsidy charge.



Value of cross-subsidies



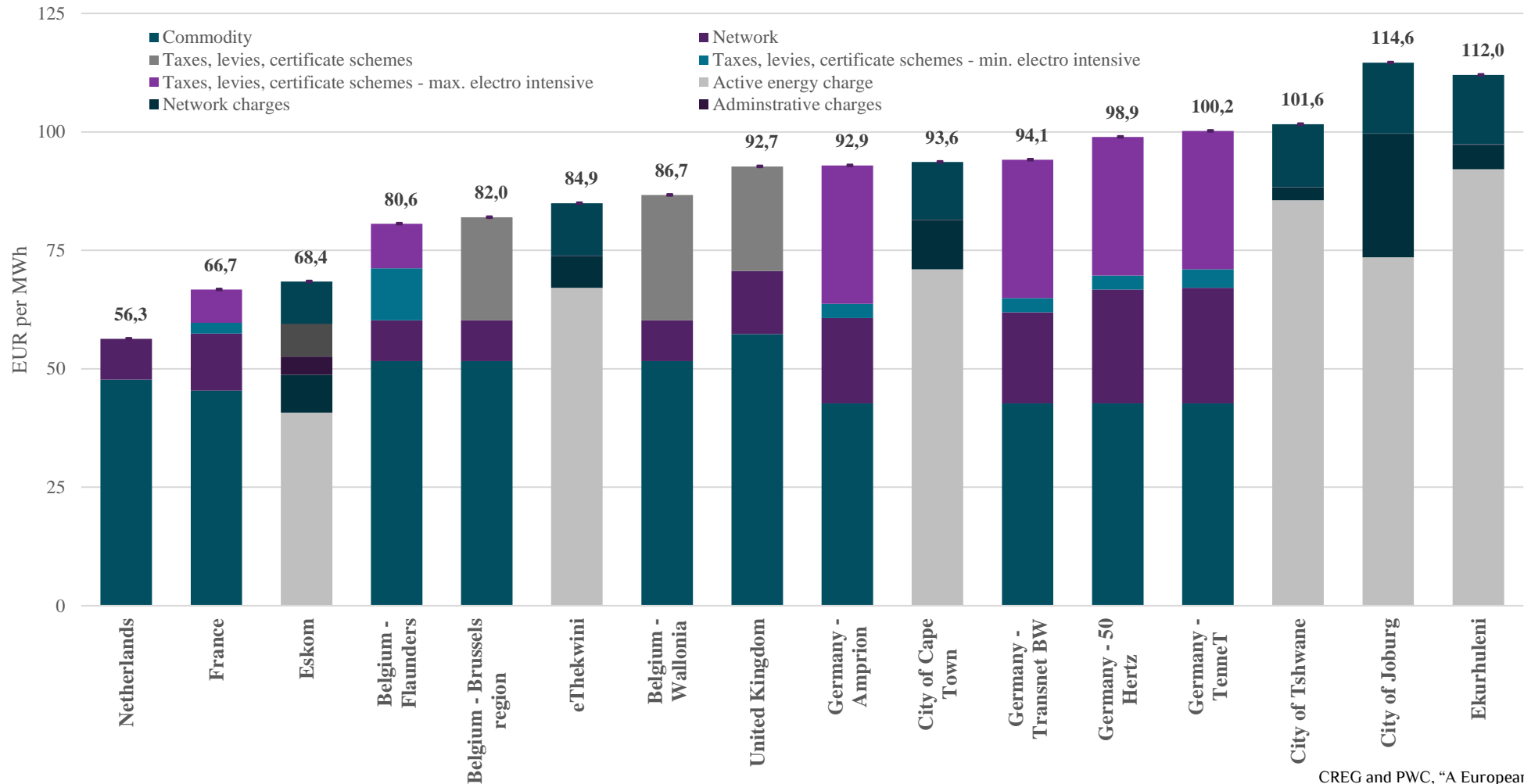
■ Current Tariff Rm ■ Current subsidy received Rm ■ Cost Rm





# 4. Electricity cost comparison for large energy users

- Based on study by CREG and PWC (April 2019)
- Comparison of cost of electricity supply for hypothetical large industrial electricity consumer for selected EU countries
- Comparison is not based on a set of appropriate comparators to Eskom and the SA munics



- Eskom, the eThekwini and the City of Cape Town compare well against the EU countries. Both Eskom and eThekwini's average price is below the average of EUR 89.1 per MWh.
- Eskom ranks 3rd with a total average price of EUR 68.4 per MWh, eThekwini ranks 6th with an average price of EUR 84.9 per MWh and the City of Cape Town ranks 10th with an average price of 93.6 per MWh. The City of Tshwane, City of Johannesburg and Ekurhuleni rank as the most expensive of the comparators in the analysis.

CREG and PWC, "A European comparison of electricity and gas prices for large industrial consumers", 25 April 2019 (CREG/PWC report)

# Summary

- Generally, the cost of electricity supply from Eskom for businesses compares well against international comparators. However, it is clear that the Eskom's price increases are considerable higher than those experienced in the international countries included in the analysis.
- Energy intensive users (such as in the aluminum sector) in international jurisdictions receive significant assistance with respect to the cost of electricity. However, there is often government ownership of both intensive industries and electricity generation, access to large scale cheap electricity generation such as hydro power and countries are often wealthy countries with well-developed, mature and competitive electricity markets.
- Although, there are significant transfers from national government to munics, the majority of revenue for electricity comes from electricity sales.
- The large munics except for City of Joburg and NMBM did not generate a 'surplus' from electricity sales in FY 20/21 – implying no cross-subsidy from electricity to other munic services
- There are cross-subsidies within the Eskom tariff framework which amounted to around R 24 billion in FY 20/21.

Additional slides

# Approach

- There are three important questions to be answered when undertaking an international price comparison or arguably any comparison exercise. *What to compare? Who to compare? When to compare?*

## What to compare?

- Electricity prices are quite complex. They are made up of various prices and tariffs which may be fixed or vary by time of use or consumption, different price, or tariff structures for different customer categories.
- Therefore, one could compare the actual prices and tariffs charged to customers or average tariffs/prices across all customers or a customer category.
- *We have adopted a multi-pronged approach by analysing multiple datasets.*

## Who to compare?

- One approach to undertaking a more meaningful price comparison exercise is to limit the comparison to countries that are similar in circumstances for the country overall and the industry in question.
- An objective way to do this is to look at various indicators that reflect the performance of the country and that industry relative to others.
- *We have identified a group of comparator countries based on various indicators.*

## When to compare?

- Recent global events such as the covid-19 pandemic and the war in Ukraine have had significant economic and specifically, inflationary impacts on many countries across the world.
- This has had a knock-on effect on electricity prices through its impact on oil and gas prices (where electricity production is gas or diesel-fired). Therefore, the point at which the prices are compared also matters.
- *We have compared prices at different points in time and over time.*

# Who to compare?

- We identified six indicators that reflect the key features South Africa as a country and the state of its electricity supply industry as well as the cost of generating and supplying electricity. These indicators
  - (i) GDP per capita;
  - (ii) share of coal in electricity generation,
  - (iii) access to electricity as a percentage of population,
  - (iv) Gini coefficient,
  - (v) population density and
  - (vi) reliability of supply and transparency of tariffs index.
- Importantly, a few countries were added to the list that did not meet the criteria for inclusion based on the indicators. These countries were countries of interest and included China, Malaysia, United States, India and Russia.

Chosen based on the indicators:	Country of interest:
Afghanistan	China
Belarus	Malaysia
Botswana	United States
Brazil	India
Colombia	Russia
Comoros	
Equatorial Guinea	
Fiji	
Iran, Islamic Rep.	
Micronesia, Fed. Sts.	
Mongolia	
Nicaragua	
Poland	
Sri Lanka	
St. Lucia	
Suriname	
Zambia	
Zimbabwe	

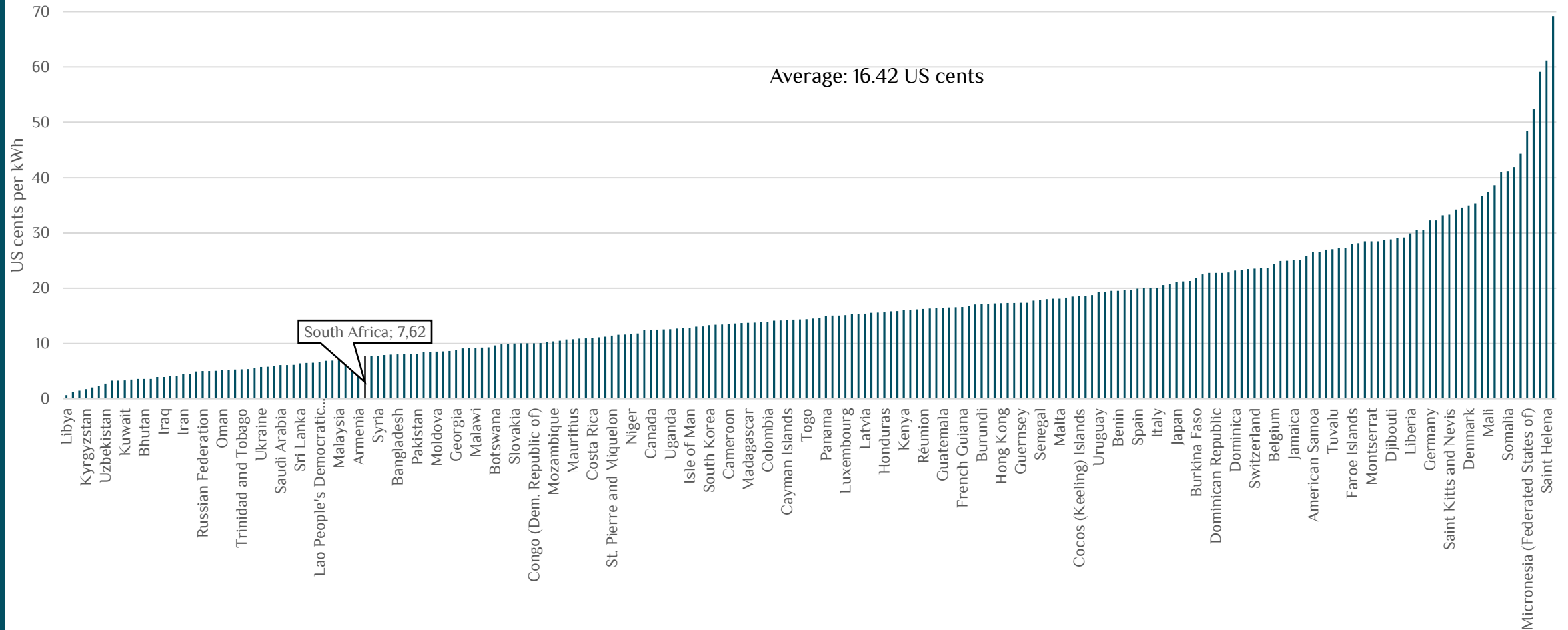
# World Bank Doing Business Report 2020

- The World Bank has since 2004 published annual studies reviewing the regulations that impact on companies' ability to conduct business in various countries. The latest study was published in 2020 (based on 2019 data) and the data from this report is used in this analysis.
- The report provides quantitative indicators on business regulations and other aspects pertinent to business operations which can be compared across 190 countries.
- The study collects and analyses various indicators related to a business' ability to obtain an electricity connection and the cost of getting electricity. These indicators include a business's ability to obtain an electricity connection, the cost of electricity for businesses and the reliability of supply and transparency of tariffs.
- The World Bank study measures the cost of electricity for a business based on the *total cost of obtaining an electricity connection and an assumed monthly electricity consumption*.
- The total cost is then expressed as a per kWh cost. The cost for all countries is expressed in US cents per kWh.
  - It is assumed that the cost of an electricity connection is for a new customer and all the associated fees and costs to obtain an electricity connection is included.
  - The assumed monthly consumption is based on a warehouse that operates 30 days a month for 8 hours a day and at 80% capacity utilisation of the equipment. This equates to a monthly electricity consumption of 26,880 kWh.

# Global average electricity tariffs 2021

- The Global average electricity tariffs compares average electricity tariffs across various countries based on data collected during 2021.
- The dataset provides the average tariff for 1 kWh of electricity in 230 countries.
- The data was gathered from various sources including electricity suppliers, governmental and other data sources. Data was collected on the ‘per kWh’ tariffs for each country.
- Multiple data points (tariffs) for each country was collected and the ‘average’ electricity tariff is calculated as the median of all the available tariffs for each country.
- Taxes such as value-added tax and other taxes where applicable are included in the tariff.
- However, the average tariff does not include connection and other once-off charges. (shortcoming of the dataset).
- Essentially, this data “shows the average price of available electricity tariffs, not the average price an average customer pays”.

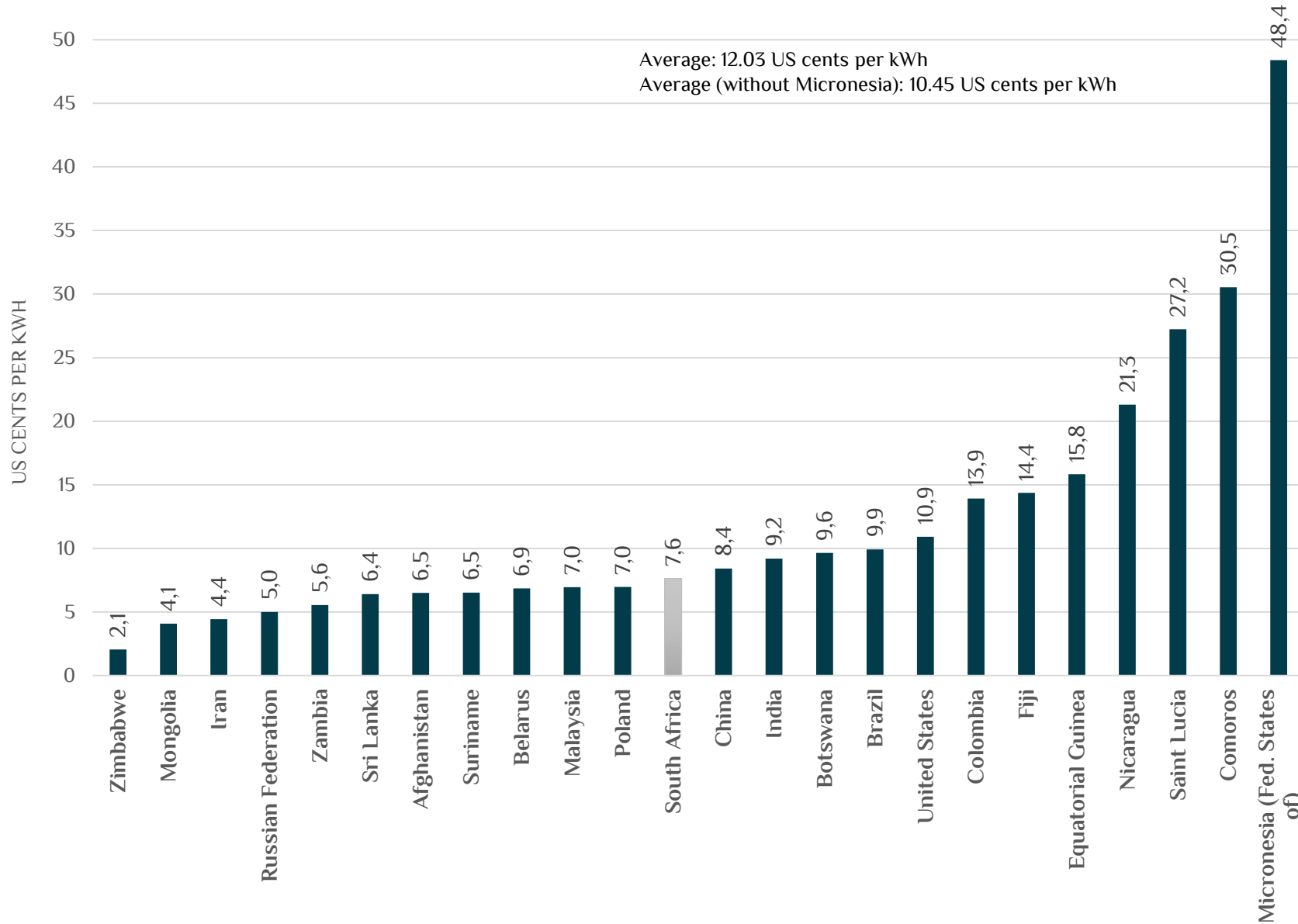
# Global average electricity tariffs 2021 – All countries



- The average cost across all countries is 16.42 US cents per kWh and South Africa is significantly below this average at 7.62 US cents per kWh.
- South Africa ranks 42 out of 230 countries.
- The relatively better performance of South Africa in this comparison may be due to electricity tariffs structures and consumption patterns.



# Global average electricity tariffs 2021 – Comparator countries



- South Africa ranks 12 out of the 24 comparator countries.
- The average tariff for South Africa is 7.62 US cents per kWh is below the average of 12.03 US cents per kWh
- Zimbabwe and Zambia have lower average tariffs compared to South Africa.
- Botswana's average tariff is around 2 US cents per kWh higher than South Africa.
- Columbia's average tariff is significantly higher than South Africa's (82% higher – 13.9 US cents compared 7.62 US cents).

# Average electricity price per kWh for European countries

- Eurostat – the statistical office of the European Union – publishes data on average electricity prices for household and non-household consumers on a bi-annual basis for member and other associated countries such as Turkey and Georgia.
- Data was analysed for FY 20/21 and from FY2007/2008 and FY 2020/2021
- We have used the average electricity price data for non-household consumers.
- The European average electricity price per kWh for non-household consumers is provided for several consumption bands.
- The Eskom average price data on the other hand is available for different customer categories - local-authorities, residential, commercial, industrial, mining, agriculture, traction, international and internal.
- We have only analysed and compared average electricity prices for agriculture, commercial, industrial, and mining customers.
- To match these customer categories to the European consumption bands, we calculated the average consumption in MWh for each of the categories.

Band	Consumption range
Band 1A	Less than 20MWh
Band 1B	Between 20 MWh and 500 MWh
Band 1C	Between 500 MWh and 2 000 MWh
Band 1D	Between 2 000 MWh and 20 000 MWh
Band 1E	Between 20 000 MWh and 70 000 MWh
Band 1F	Between 70 000 MWh and 150 000 MWh
Band 1G	More than 150 000 MWh

	Total sales volume (MWh)	No of customers	Average consumption (MWh)	EU band
Agriculture	5461000	79115	69	Band 1B
Commercial	9696000	52880	183	Band 1B
Industrial	40881000	2649	15433	Band 1D
Mining	26991000	945	28562	Band 1E

# United States average electricity cost per state

- United States Energy Information Administration publishes data on the average retail price of electricity for all 50 states as well as the District of Columbia and New England.
- The data is available for various categories of customers including residential, industrial, commercial, transportation and other.
- Data was analysed for FY 2020/2021 and from FY2007/2008 and FY 2020/2021
- Eskom also calculates average electricity prices for industrial and commercial customers. However, the US definition of industrial customers also includes mining and agriculture whereas Eskom lists these categories separately.
  - Therefore, to compare the Eskom average price data with that for the US states, we combined the total revenue for Eskom's industrial, mining and agriculture customers and divided it by the total sales volume for these customer categories to calculate an average price that was comparable to the US industrial customer data.

# Contact us



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