



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA



REVIEW OF SOUTH AFRICA'S APPLIANCE ENERGY CLASSES AND IDENTIFICATION OF THE NEXT SET OF ELECTRICAL EQUIPMENT FOR INCLUSION IN THE NATIONAL STANDARDS AND LABELLING PROJECT: NEW ELECTRICAL APPLIANCES

Industry Stakeholder Workshop: Computers

3 April 2019

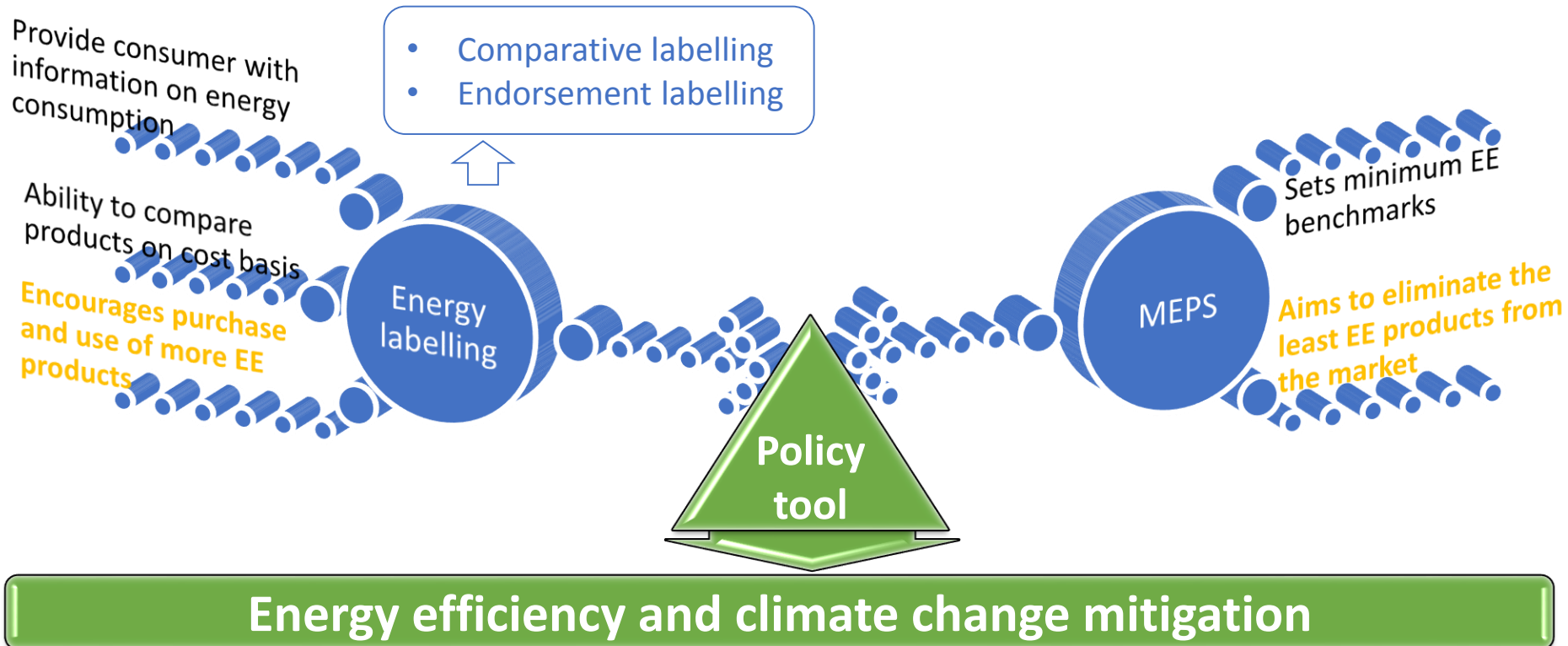


Agenda

1. Policy tools considered
2. Scope of work and boundaries
3. Screening process
4. Methodology
5. International MEPS trends
6. SA analysis
7. Recommendations
8. Open discussion

1. Policy tools considered

Energy labelling and MEPS



Policy options to improve energy efficiency

- Two main policy options considered are energy labelling and Minimum Energy Performance Standards (MEPS)
- These are typically enacted through government legislation and regulations
- When is labelling most effective?
 - When consumers purchase products and pay the energy bills
 - When products are on display at purchase and can be compared
 - Where there is a wide range of energy efficiency on the market
- Labelling creates *market pull* to encourage suppliers to offer more efficient products to the market

Policy options to improve energy efficiency

- When is MEPS most effective?
 - When product purchasers do not pay energy bills (can be different parts of a company, landlord and tenant)
 - When products are not on display for sale (purchased on specifications or from catalogues)
 - When there is a significant range of efficiency available (internationally) but this is not always present on the local market
- MEPS is a *market push* to ensure that all products offered for sale meet a minimum efficiency level

2. Scope of work and boundaries

Study objectives (as per TOR)

1. To identify a new set of electrical equipment (residential or commercial) to which compulsory minimum energy efficiency MEPS and/or labelling could be introduced
2. To recommend timelines for implementation of improved and new minimum energy performance levels for the next set of electrical equipment
3. To conduct an impact assessment analysis of the proposed mandatory requirements for each appliance on consumers, retailers, South African manufacturers, and importers
4. To quantify the potential energy and greenhouse gas emission savings that could be achieved through new MEPS and/or labelling over a 10 and 30-year period

Project Scope (UNDP and DOE)

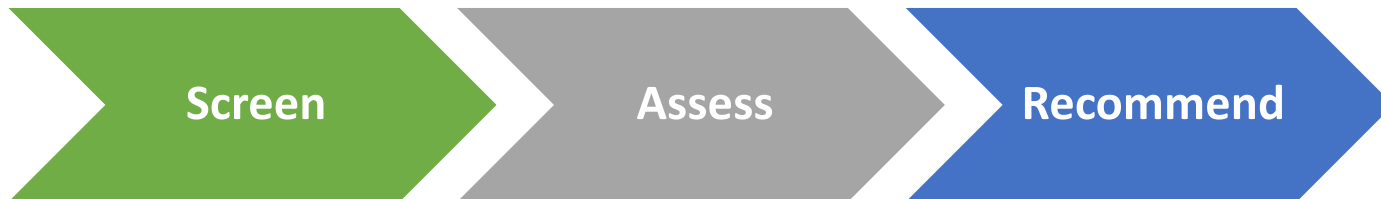
1. Purpose:

- Identify new electrical appliances that could be considered for a Standards & Labelling Programme

2. Key considerations:

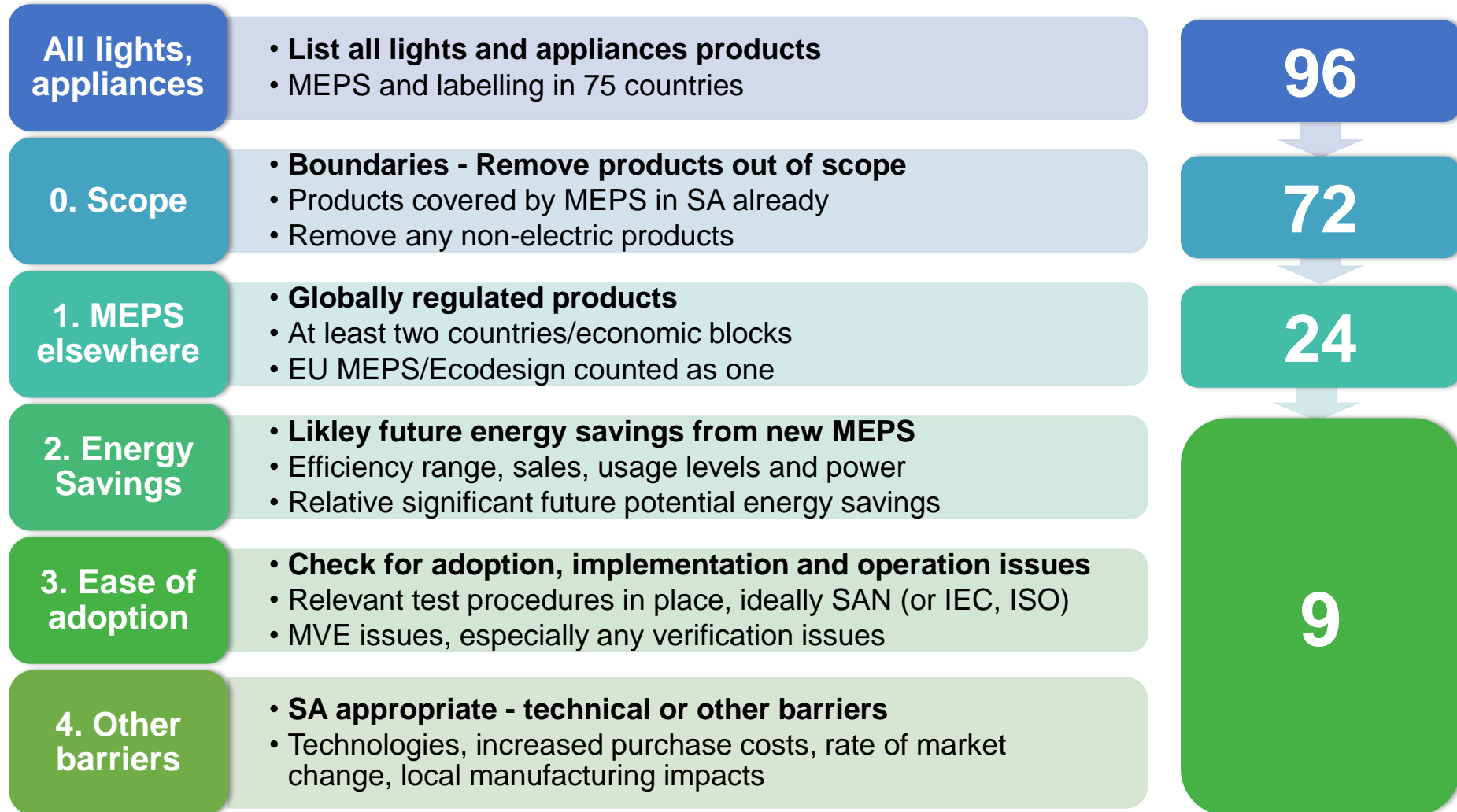
- 4-10 products (residential and commercial)
- Must include distribution transformers
- Main goal – reduce electricity usage and GHG emissions

3. Approach:



3. Screening

Screening process



Shortlisted electric equipment



Heating and
cooling equipment

Chiller systems



Household
appliances

None



Office equipment
and electronics

Computers
Televisions
External Power Supplies



Other equipment
(mostly commercial
and industrial)

Motors - 3 Phase
Pool Pumps
Refrigerators – Commercial
Distribution Transformers

Note: Large ACs (>7.1kW) to be covered in a separate study

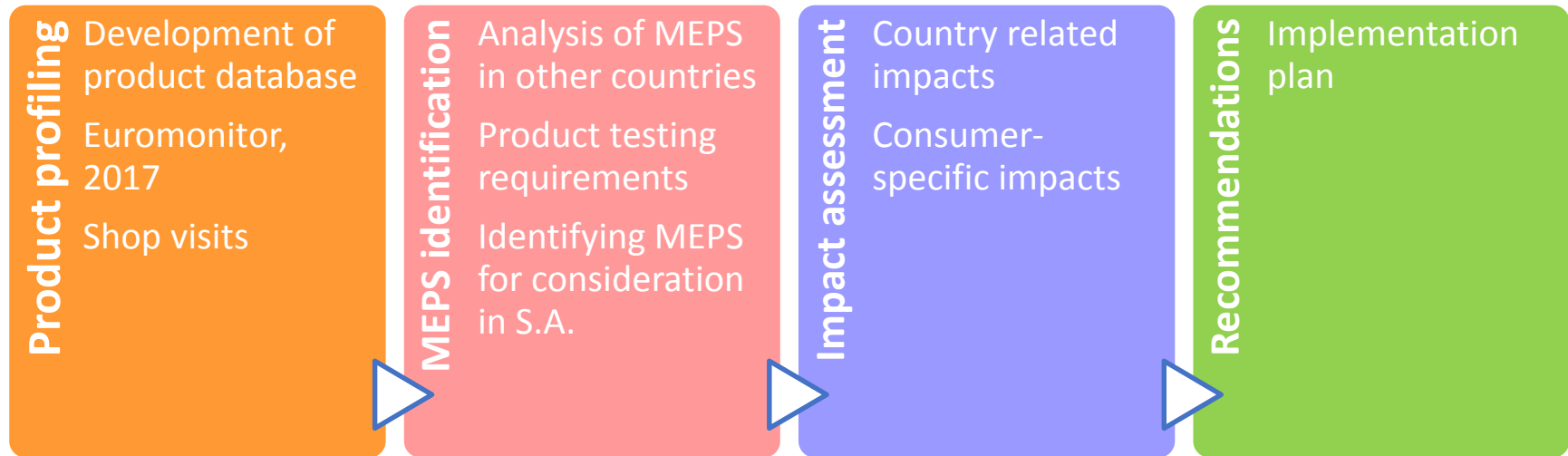
4. Methodology

Methodology

1. Data sources:

- In-house developed database of electric appliances (web crawling, brochures, etc.)
- Euromonitor, 2017
- Shop visits

2. Approach:



Data sources

- International sales databases
 - Euromonitor, 2017
 - EU Energy Star Certified Computer Database
- International MEPS programs covered – Europe and Australia

- Field data collection
 - Online shops
 - Shop visits



In-house product database:

- 17 laptop brands and 8 desktop brands
- 700 laptop computer models
- 129 desktop models
- Contact details, prices, model description, battery and specifications, processor and memory specifications, display size, etc.

Brand type	Types of Desktop PCs supplied	Battery & Power specifications	Description
Acer Aspire Z1	Aspire Z1 Intel Celeron J3060 (Model AZ1-612) * also in this series (Model AZ1-602)	- Power supply 45 W	- 1.6 GHz; Dual-core - 19.5" display
Acer Aspire Z3	Aspire Z3 Intel Core i3-6100T (Model AZ3-715) * also available Intel Core i3-4160T, i3-7100T	- Power supply 90 W	- 3.2 GHz; Dual-core - 23.8" display
Acer Aspire ZC	Aspire ZC Intel Core i3-5005U (Model AZC-705) Aspire ZC Intel Pentium N3700 (Model AZC-700)	- Power supply 90 W - Power supply 65 W	- 2 GHz; Dual-core - 21.5" display - 1.6 GHz; Quad-core - 19.5" display
Acer Aspire S 24	Aspire S24 Intel Core i5/i7 processors (Model S24-880) Veriton Z Intel Core i7-4765T	n/a	- IPS technology - 2 GHz; Quad-core
Supplier	Supplier type	Contact details	Source
Acer SA	Manufacturer	0861 223772	https://www.acer.com/ac/en/ZA/content/home
Hewlett & Packard (HP)	Manufacturer	011 069 5400 011 709 7707	http://www8.hp.com/za/en/products/laptops/index.html#view=grid&page=1
Dell SA	Manufacturer		http://www.dell.com/p/laptops-ec.aspx?c=za&l=en&s=dhs&~ck=mn
Asus SA	Manufacturer		https://www.asus.com/za/Laptops/
Lenovo SA	Manufacturer		https://www3.lenovo.com/za/en/laptops/c/Laptops
Packard Bell	Manufacturer		http://www.packardbell.com/pb/en/ZA/content/home

5. International MEPS trends

International Review of MEPS for computers

- Energy Star used widely around the world (endorsement label)
- MEPS in limited countries: Australia, New Zealand, Europe, Japan (**not US**)
- Australia and NZ use Energy Star V5.0 (ES5)
- Europe uses the same approach as ES5 but with tighter levels
- Approach provides a power allowance for each product type and for features provided
- A few other countries have MEPS but very parochial approaches – not recommended

Computer categories

Category	Description
A	All desktop computers and integrated computers that do not meet the definition of Category B, Category C or Category D below shall be classified as Category A
B	Desktop computers and integrated computers with: a) two physical processor cores; and b) greater than or equal to two gigabytes (GB) of system memory.
C	Desktop computers and integrated computers that have greater than two physical processor cores and are configured with a minimum of one of the following two characteristics: a) greater than or equal to two gigabytes (GB) of system memory b) a discrete GPU.
D	Desktop computers and integrated computers that have greater than or equal to four physical processor cores and are configured with a minimum of one of the following two characteristics: a) greater than or equal to four gigabytes (GB) of system memory b) a minimum of a category G3 GPU.
D High End	Computer with not less than four processor cores and with: a) A discrete GPU \geq G5 with a data width (frame buffer) \geq 192 bits. b) System memory \geq 6GB, at least two channels of memory. c) \geq two PCIe slot single-ended points of \circ —8 or \circ —16 configuration. d) A power supply unit \geq 500 W nameplate output rating.

6. SA analysis

Product Overview



Desktop Computer



Laptop Computer

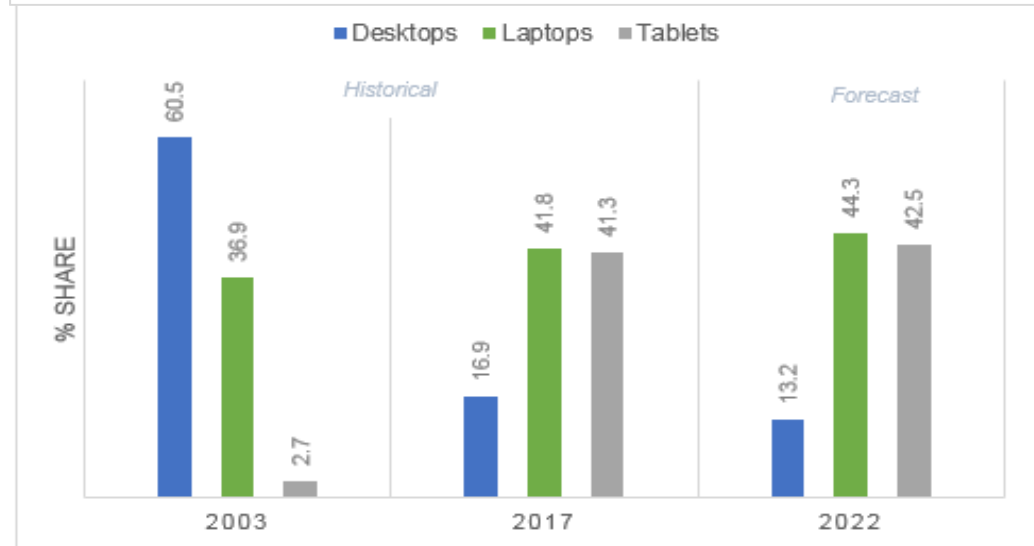
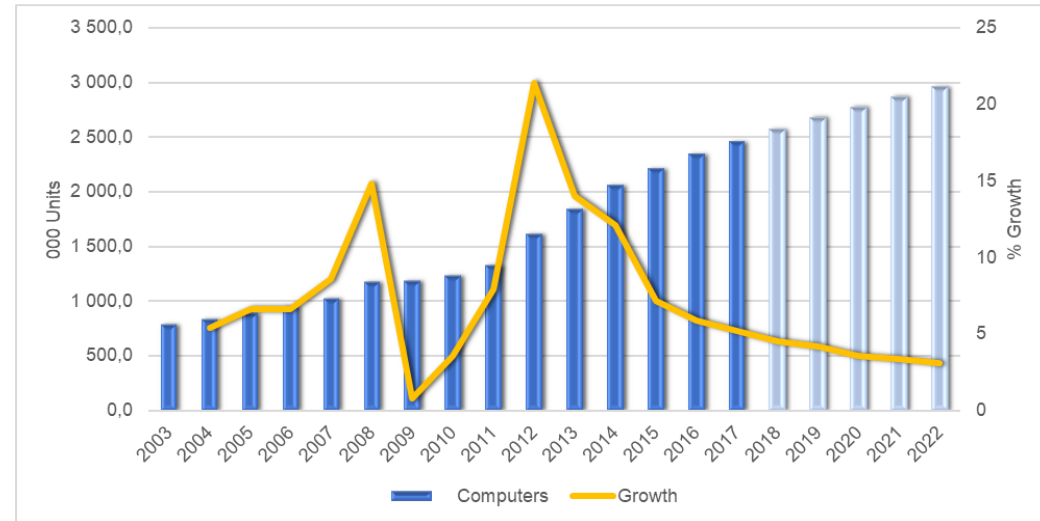


Tablet Computer

- Many **different shapes and sizes**
- **Defining scope** needs to be done carefully
 - Growing demand for alternatives (tablets and smart phones (lower energy))
 - Desktops declining in home use, laptops common
- **Key features of laptops:**
 - **Battery life:** ranges from 3.5 hours to 27 hours
 - **Wattage (Adapter):** ranges from 24W to 330W (i.e. 24W, 30W, 33W, 45W, 65W, 90W, 120W, 130W, 135W, 150W, 180W, 200W, 230W, 240W, 250W, 330W)
 - **Voltage:** 100 – 240V
 - **Frequency:** 50/60Hz
 - **Energy efficiency certification:** Some of Energy Star certified.
- **Very rapid changes in technology** over past 3 decades – likely to continue

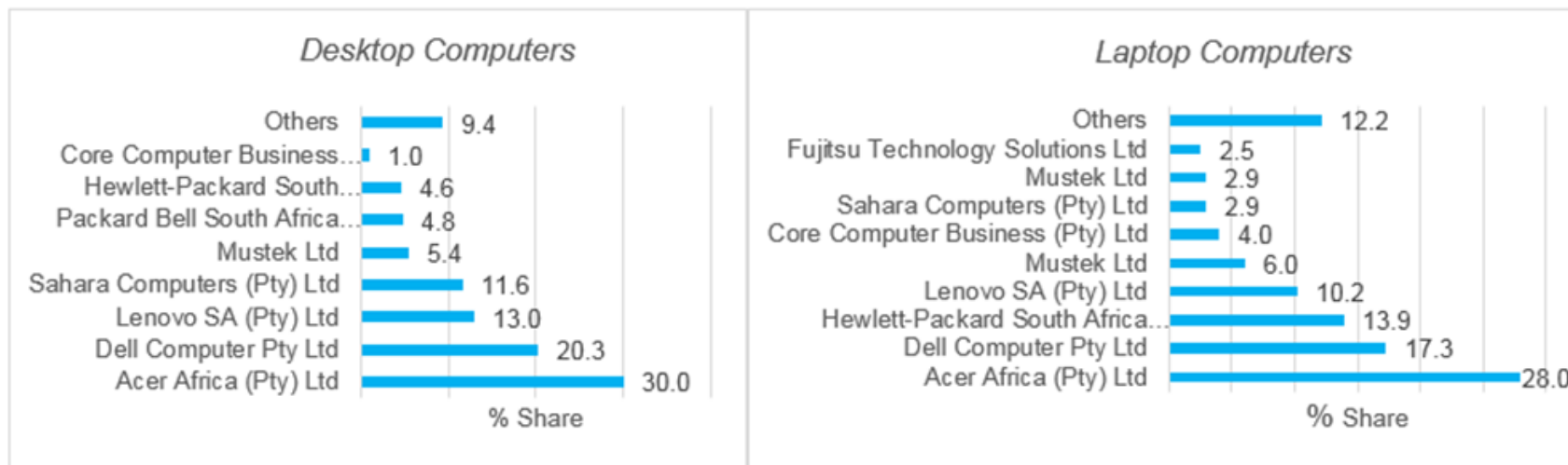
Market overview – demand and usage in SA

- Very common:
 - Home: variable
 - Businesses: 40-45 h
- 2.5 m units retailed in 2017
(Euromonitor, 2017)
- By 2022, 2.9 million
(Euromonitor, 2017)
- Projected to grow @ CAGR of 3.8%



Market Overview – supply in SA

- 15 laptop and 18 desktop brands available



Source: Euromonitor, 2017

- Energy star rated computer appliances available
- No locally manufactured units identified
- Average prices:

Computer type	Average unit price in 2017
Desktop Computers	R3 850
Laptop Computers	R10 579
Tablet Computers	R3 742

Impact Analysis – Assumptions

- Total desktop and laptop sales (business plus retail) of 1.7 million and 1.4 million units respectively in 2017 (Euromonitor, 2017)
- Average product life of 6 years
- Market share by category: as per in-house product database
- The 8 categories modelled reflect the 8 categories mirrored in Australian and European regulations for computers
- The assumed usage and time by mode is drawn from Australian and European sources
- The idle power BAU is derived from Energy star V5.0, and the idle power MEPS is derived from Energy star

Impact Analysis – Assumptions

Category	Market share	Sector split		Assumed time by mode			Idle power		Hours of operation	
		Res	Non-res	Off mode	Sleep mode	Idle mode	BAU	MEPS	Res (hrs/yr)	Non-res (hrs/yr)
<i>Desktop Category A</i>	0%	0.2	0.8	55%	5%	40%	30.5W	23.3W	1752	3504
<i>Desktop Category B</i>	21%	0.2	0.8	55%	5%	40%	36.1W	27.6W	1752	3504
<i>Desktop Category C</i>	0%	0.2	0.8	55%	5%	40%	52.6W	40.2W	1752	3504
<i>Desktop Category D</i>	23%	0.1	0.9	55%	5%	40%	67.8W	51.9W	1752	3504
<i>Desktop Category D High End</i>	11%	0.05	0.95	55%	5%	40%	77.1W	59.0W	1752	3504
<i>Laptop Category A</i>	0%	0.4	0.6	60%	10%	30%	11.0W	8.4W	1314	2628
<i>Laptop Category B</i>	0%	0.4	0.6	60%	10%	30%	17.9W	13.7W	1314	2628
<i>Laptop Category C</i>	45%	0.4	0.6	60%	10%	30%	34.4W	26.3W	1314	2628

Impact Analysis – Energy Savings

$$E_{TEC} = \left(\frac{8760}{1000} \right) * (P_{off} * T_{off} + P_{sleep} * T_{sleep} + P_{idle} * T_{idle})$$

- Individual savings:

Category	kWh/y (ES V5.0)	GPU add kWh/y	Assumed time by mode			Idle Hours per year	Annual energy consumption (kWh)			Annual energy savings (kWh)
			Off	Sleep	Idle		ES V5.0	BAU	MEPS EU	
<i>Desktop Cat A</i>	148	0	55%	5%	40%	3504	125.8	106.9	81.8	25
<i>Desktop Cat B</i>	175	0	55%	5%	40%	3504	148.8	126.4	96.7	30
<i>Desktop Cat C</i>	209	46	55%	5%	40%	3504	216.8	184.2	140.9	43
<i>Desktop Cat D</i>	234	95	55%	5%	40%	3504	279.7	237.7	181.8	56
<i>Desktop Cat D_{HE}</i>	234	140	55%	5%	40%	3504	317.9	270.2	206.7	64
<i>Laptop Cat A</i>	40	0	60%	10%	30%	2628	34	28.9	22.1	7
<i>Laptop Cat B</i>	53	12	60%	10%	30%	2628	55.3	47	35.9	11
<i>Laptop Cat C</i>	88	37	60%	10%	30%	2628	106.3	90.3	69.1	21

- Total annual MEPS savings - 110.7 GWh

7. Recommendations

Celebrate **Development** Diversity

Recommendations for Computers

- **Tier 1** European MEPS level (10% below Energy Star V5.0) **in 2020**
- **Tier 2** European MEPS level (35% below Energy Star V5.0) **in 2022**
- This is a 5 year lag on the European timetable
- Need other regions to set benchmarks for new MEPS (more stringent levels or different approaches) in the future

7. Discussion and questions?

Thank you

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