

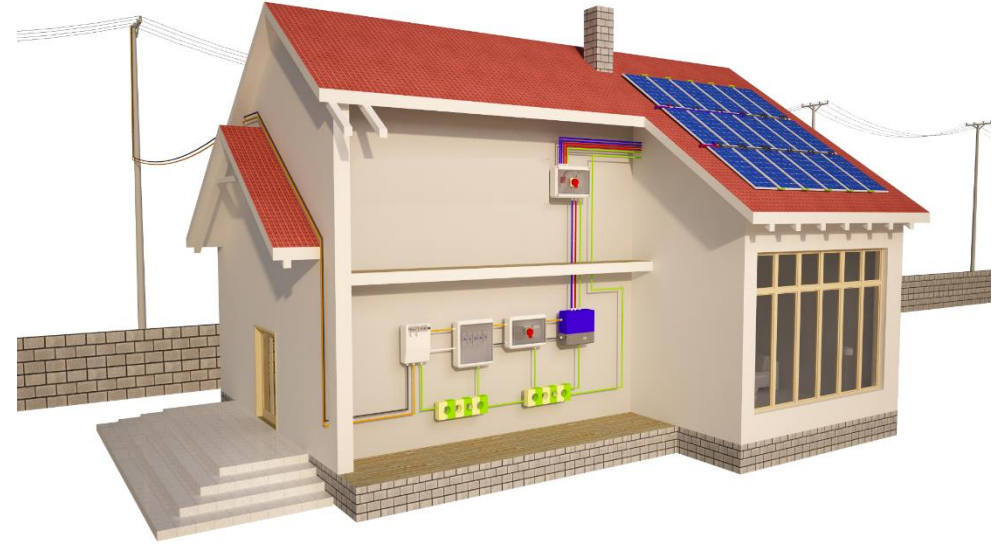
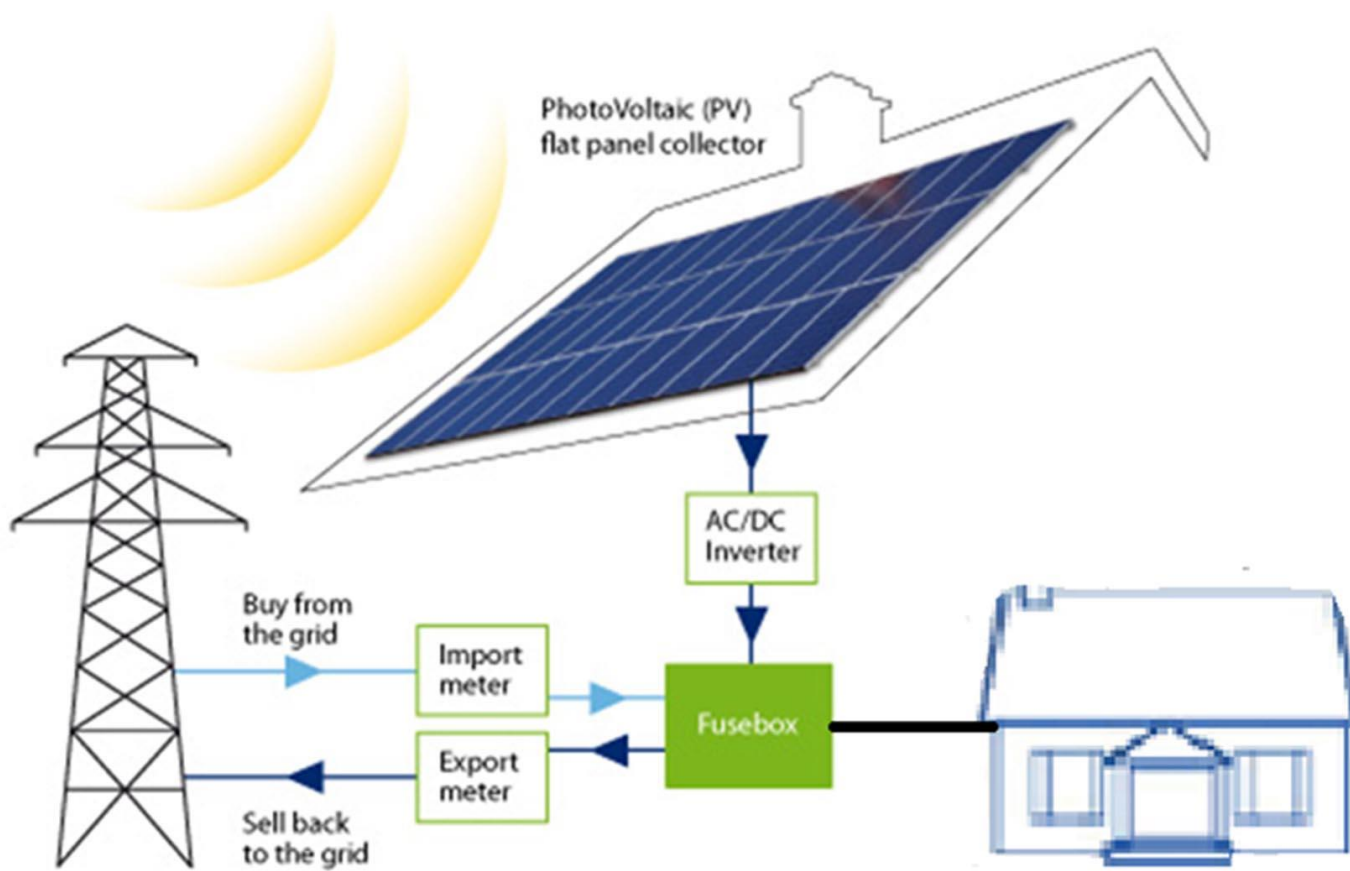
How rooftop PV can enhance energy security for households across SADC

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What is grid-tied rooftop PV?



Less than one third of the SADC region's population has access to electricity

- Benefits of RE technologies to countries:
 - Increase access
 - Secure and reliable electricity
 - Social and economic development
- Rooftop PV can assist in enhancing energy security.
 - SSEG = power generation under 1 MW; electricity generated is also consumed
 - Energy security = uninterrupted availability of energy sources at an affordable price
- Structure of paper:
 - Access across SADC and relationship to economic development
 - International experience
 - SSEG potential in SADC
 - Regulatory and policy best practice

Electricity and development (1)

- Access to electricity and outages across SADC

Table 1: Access to electricity across SADC

	Total population (millions)	Population without access to electricity	Proportion	Average number of outages per month
Malawi	15.8	14.7	93%	no data
Madagascar	22.4	20.5	92%	6.7
Lesotho	1.9	1.7	91%	4.1
DRC	69.8	61.5	88%	12.3
Angola	19.8	16.2	82%	4.7
Tanzania	47.9	36.3	76%	8.9
Zambia	15	11.3	75%	5.2
Namibia	2.2	1.6	73%	0.6
Mozambique	25	16.4	65%	1.6
Zimbabwe	13.4	7.2	54%	6.7
Botswana	2.2	1	48%	4.1
Swaziland	1.1	0.4	41%	1.8
South Africa	54	7.6	14%	0.9
Seychelles	0.1	0	2%	no data
Mauritius	1.3	0	0%	1.2
Total SADC	292	196.6	67%	

Did you know?

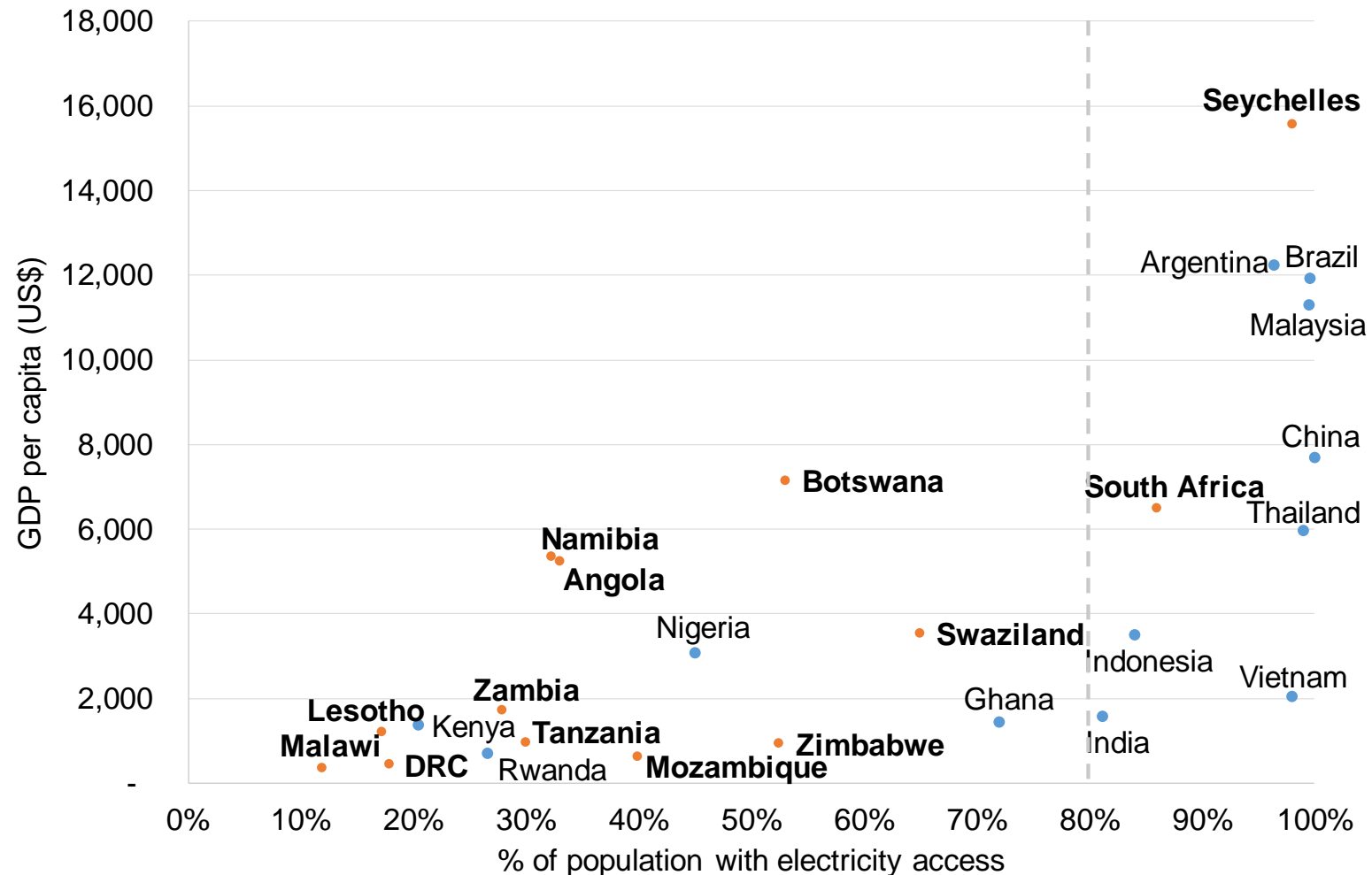
It is estimated that in SSA businesses lose 8.3% of annual sales due to electrical outages

Lack of reliable electricity supply has significant impact on productivity and growth

Electricity and development (2)

- Relationship between electrification and GDP/capita

Figure 1: Percentage of population with electricity access versus GDP per capita (US\$)



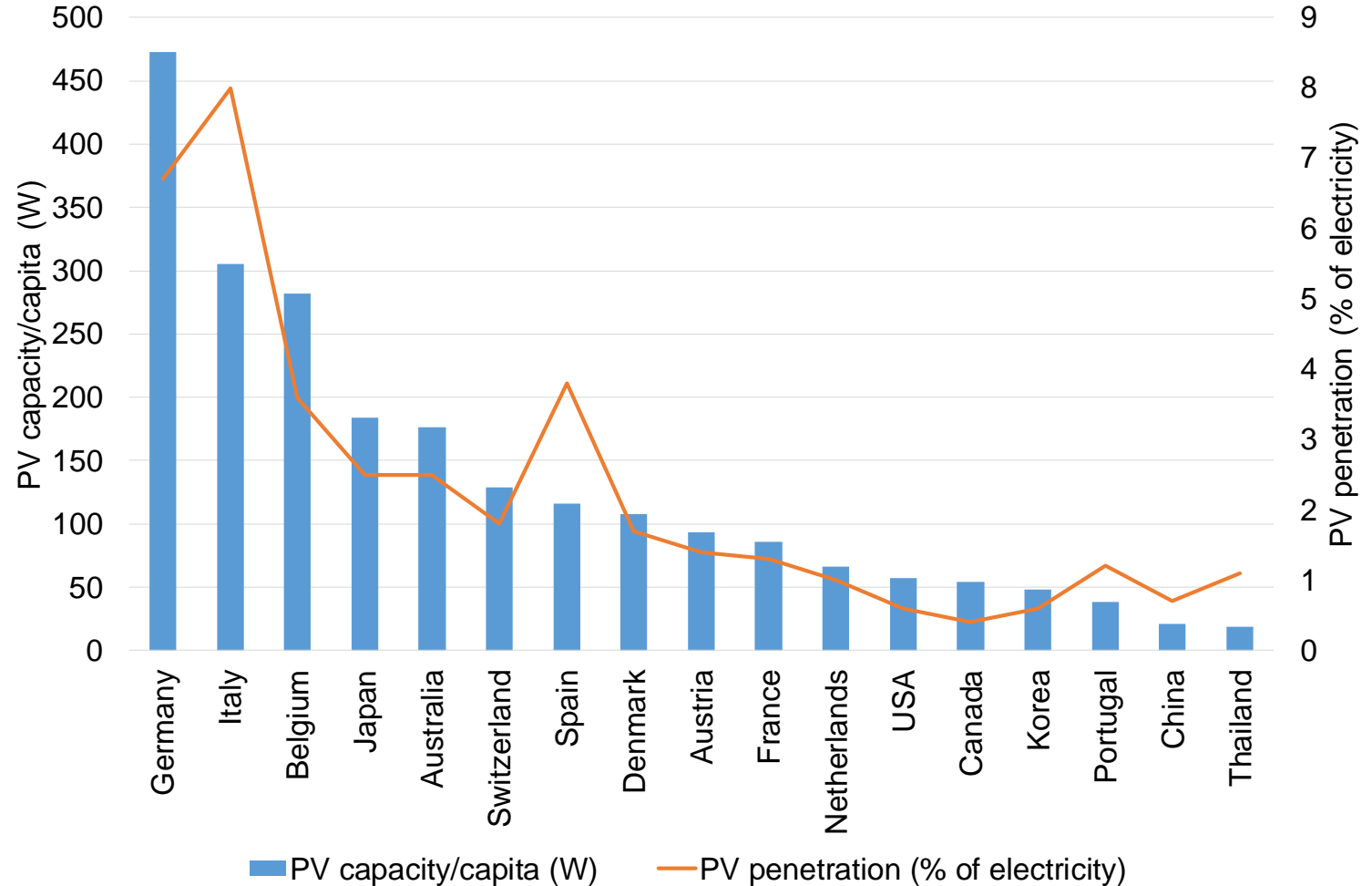
Development of rooftop PV globally

- Traditional energy systems = linear and static
- Transformation is required, with multiple options for access
 - Grid extension
 - Diversification of energy mix
 - Mini-grids
 - **Rooftop PV systems** – stand-alone or **grid-tied**
- Alternative policy approaches:
 - ❑ Scale of the projects
 - Utility/third-party driven programmes
 - **Customer-driven programmes**
 - ❑ Types of incentive policies
 - Helping investors to reduce the investment threshold
 - Improving the PV investment return e.g. Net-metering/ Net-FiT policies

History of rooftop PV industry

- Originated in the US in 1980's then spread to Europe
- Currently SSEG policies in 103 countries
- Global leader is Germany

Figure 3: Solar PV capacity/capita and PV penetration

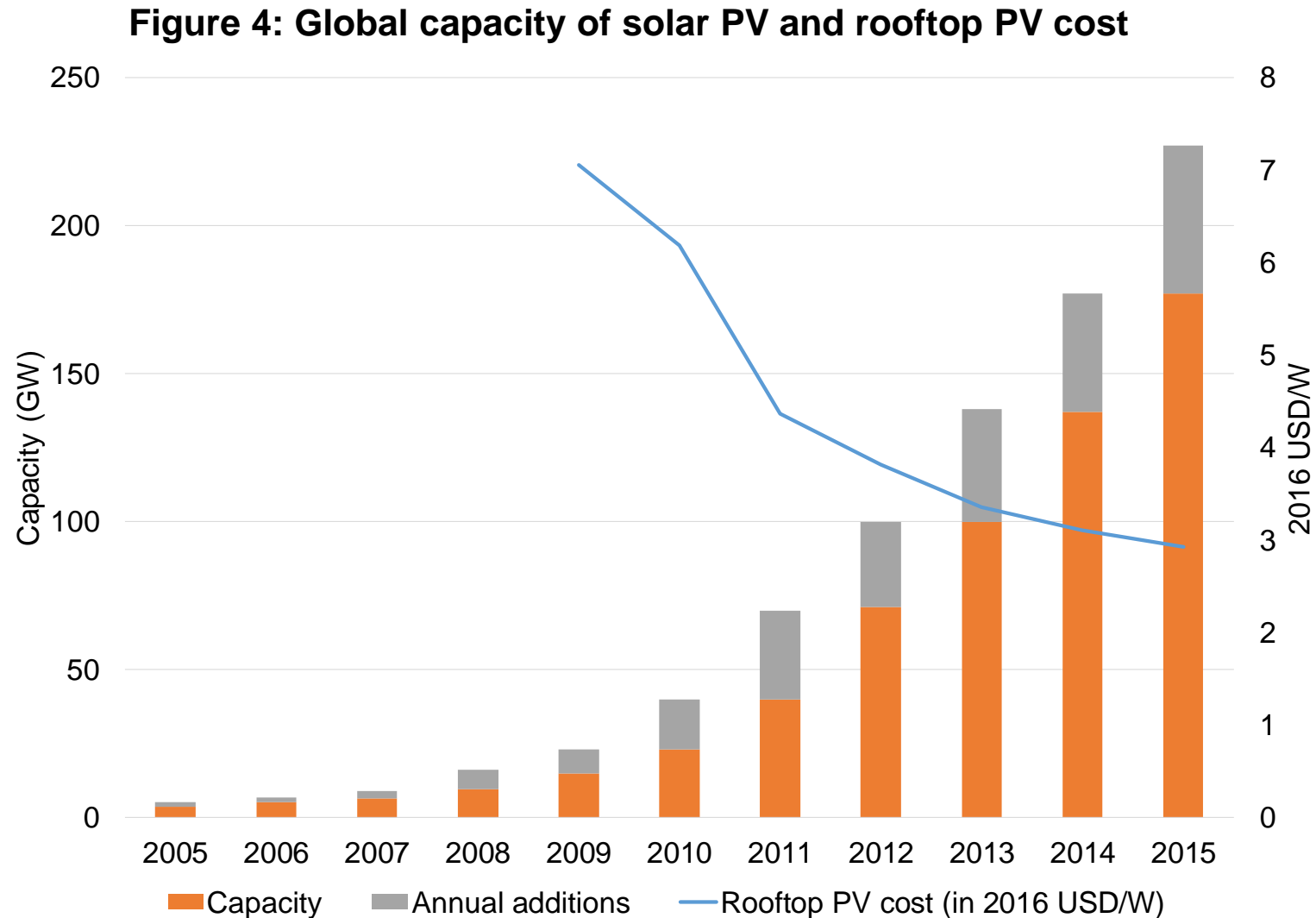


South African case study

- Increased interest in SSEG:
 - Decrease in PV prices
 - Increase in electricity prices
 - Electricity supply crisis of 2008
- Over 200 MW installed over thousands of installations.
- 184 municipalities licenced to on-sell electricity:
 - 25 keep track of existing installations
 - 18 have an official application programme
 - 12 have approved SSEG tariffs in place
- Electricity revenue NB for municipalities, leading to concerns over SSEG uptake
- Thus SSEG tariff design is critical

Global solar PV capacity installed

- Decrease in prices and exponential growth in uptake

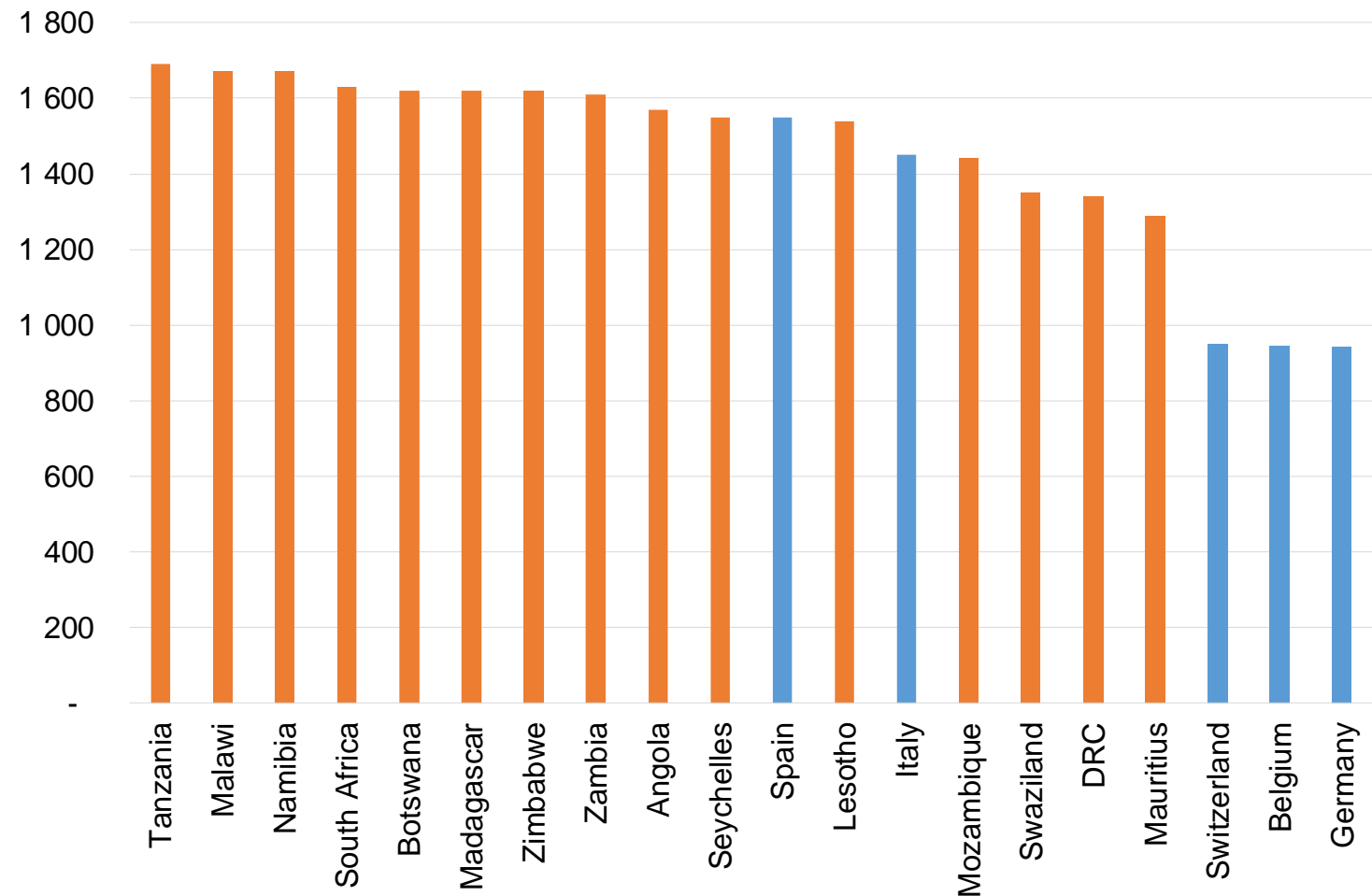


How rooftop PV can assist in solving the energy crisis in SADC

- Impact of a rooftop PV programme depends on:
 - Irradiation
 - Technical potential of system
 - Economics of programme
- SADC has excellent solar resources



Figure 4: Average annual electricity production from a 1 kW system (kWh)



Policies in place in SADC countries

- Situation in SADC – RE and SSEG

Table 2: Renewable energy and SSEG policies in place in SADC member states

		SSEG policy	
	Renewable energy policy	Feed-in Tariff	Net-metering
Angola	X	X	
Botswana	X	X	
DRC	X		
Lesotho	X		X
Madagascar	X		
Malawi	X	X	
Mauritius	X	X	
Mozambique	X	X	
Namibia	X	X	X
Seychelles	X		
South Africa	X		X
Swaziland	X		
Tanzania	X	X	
Zambia	X		
Zimbabwe	X	X	X

Best practice and conclusion

- Policy support is key – uptake dependent on policies and incentives
- Leading countries experience:
 - Financial incentives
 - PV electricity grants
 - Laws to encourage uptake
 - Investment programmes
- RE = greater energy security + greener future
- Rooftop PV is attractive – decreased prices, improved technology, electricity at point of consumption i.e. reduced transmission and distribution costs
- Enabling policies in SADC
 - Recently introduced
 - THUS future research into effectiveness of incentives necessary