

# **Managing the coal transition for workers in South Africa: a scenario analysis of age & education profiles**

J. Schers (presenting), University of Cape Town / Expertise France  
and J. Burton, University of Cape Town



**ESRG**

ENERGY SYSTEMS RESEARCH GROUP  
University of Cape Town

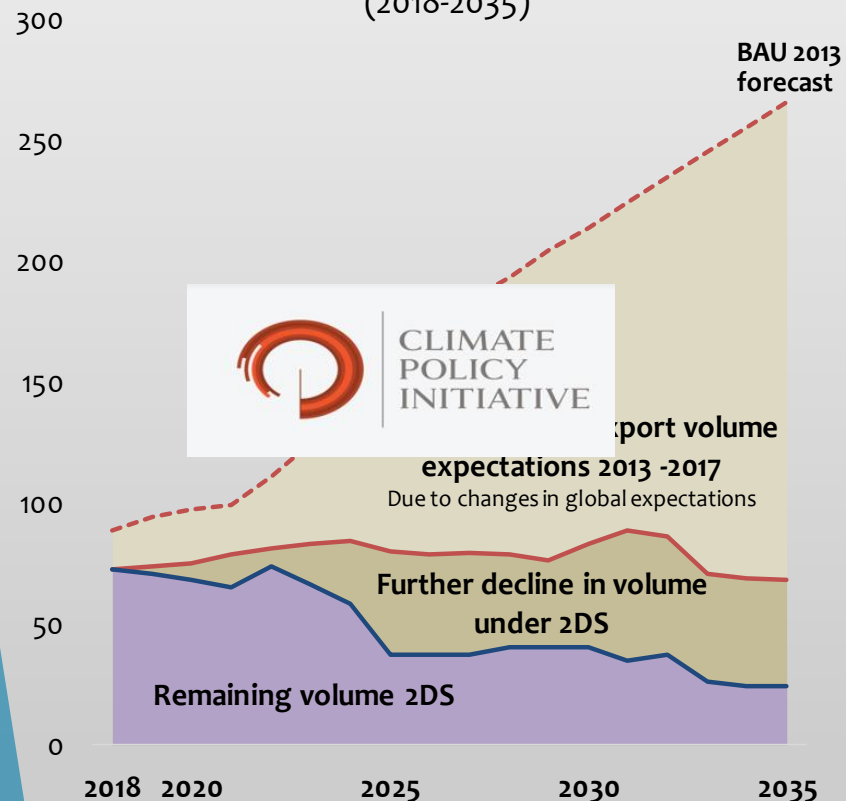


Digital Conference of the International Association  
for Energy Economics, 8 June 2021

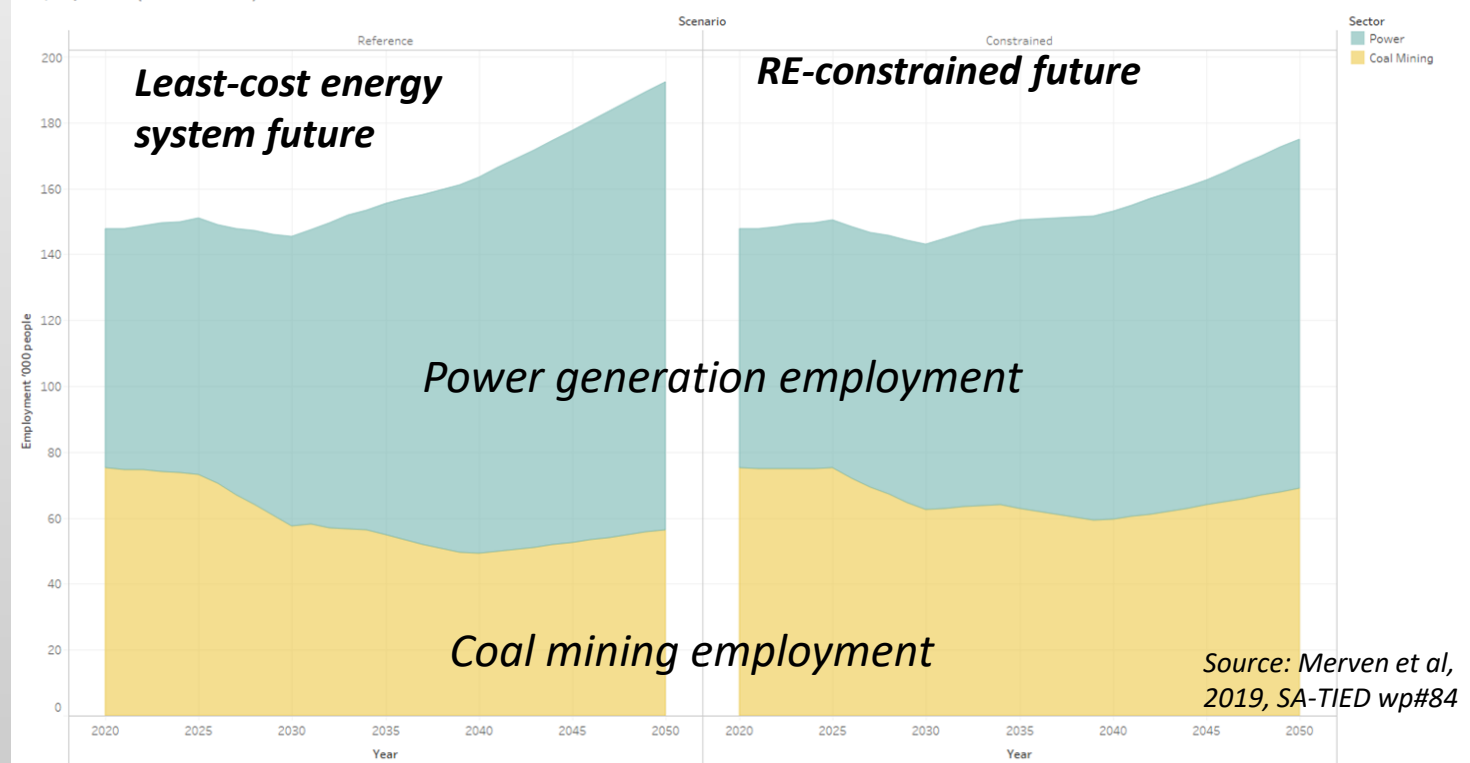
# Coal employment in a transition to clean energy

- ▶ Renewable Energy is now least-cost for new power generation in South Africa (IRP, 2019)
- ▶ RE leads to more jobs in energy, and in the entire economy (Source: Merven *et al*, 2019, SA-TIED wp#84)
- ▶ In export markets (mainly in Asia) demand for South African coal is also under pressure

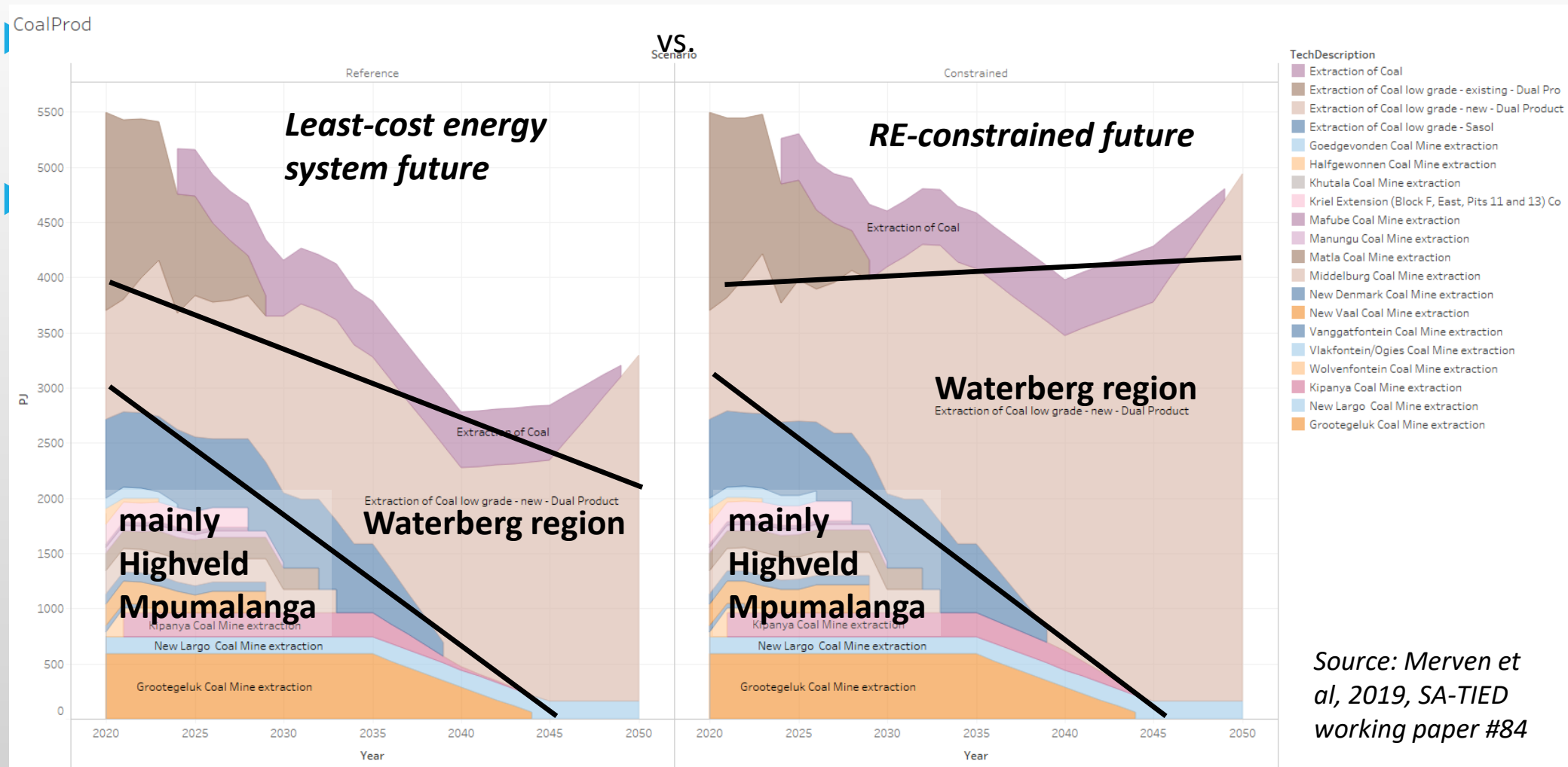
Yearly demand for South African coal exports  
(2018-2035)



Employment (Coal+Power)



# Counterfactual coal production projections by region

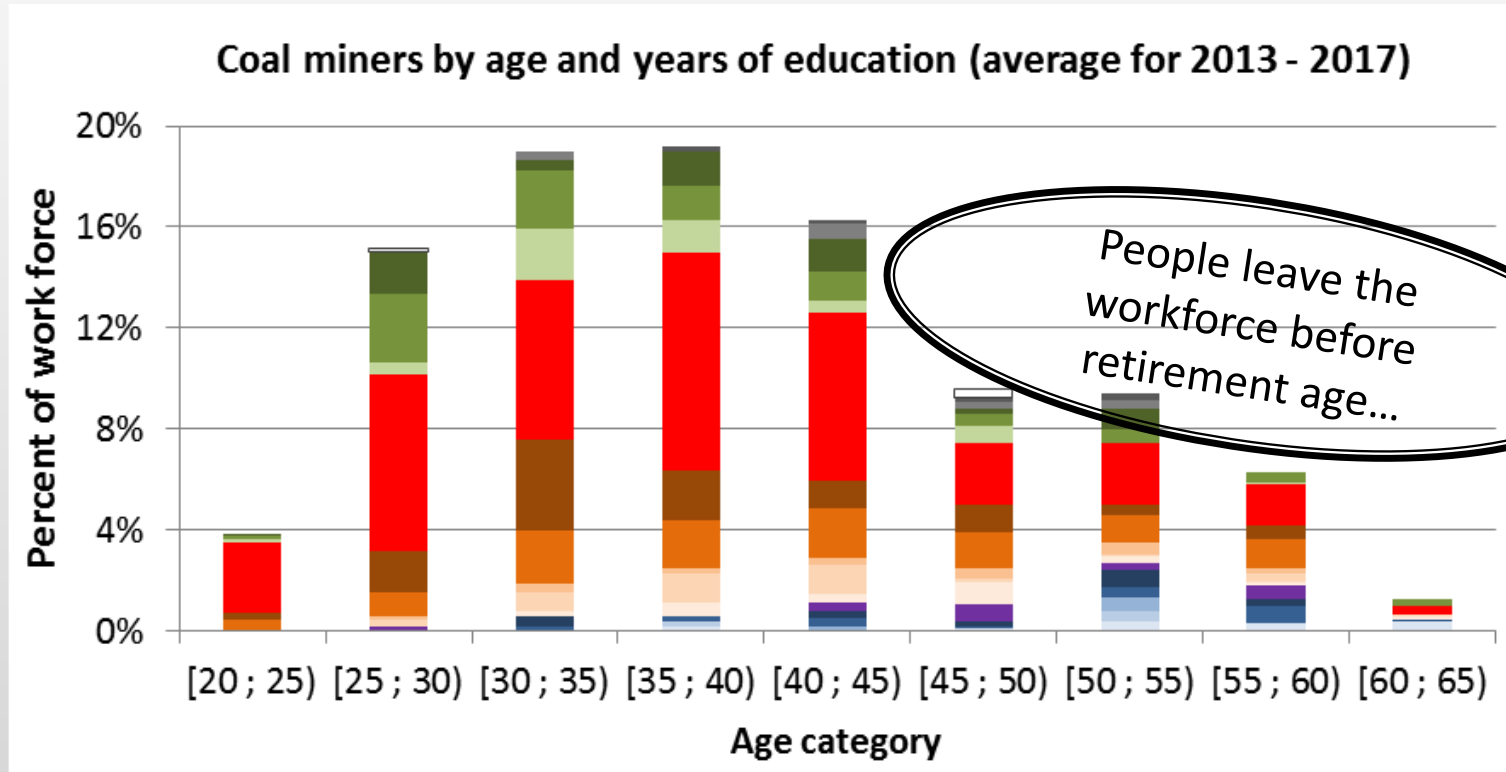


# Need for a just transition for South Africa's coal miners

- ▶ Coal mining concentrated in Mpumalanga province (Nkangala, and Gert Sibande District municipalities), directly responsible for 5% of the province's employment
- ▶ Coal mining and thermal power has also been as a successfully case of reappropriation of the economy by under Apartheid severely disadvantaged black South Africans
- ▶ South African government has only just begun developing policies for a just transition
- ▶ ILO guidelines (2015) for a Just Transition :
  - ▶ “Coherent policies across the economic, environmental, social, education/training and labour portfolios need to provide an enabling environment for enterprises, workers, investors and consumers to embrace and drive the transition towards environmentally sustainable and **inclusive** economies and societies.”
  - ▶ “These coherent policies also need to provide a just transition framework for all to promote the creation of more decent jobs, including as appropriate: **Anticipating** impacts on employment, adequate and sustainable social protection for job losses and displacement, skills development and social dialogue, including the effective exercise of the right to organize and bargain collectively.”

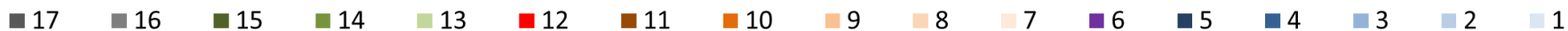
# Who are the coal miners ?

## What is our reference path for planning a just transition ?



Source:  
author's calculation,  
based on PALMS  
dataset, SALDRU  
(UCT) & StatsSA

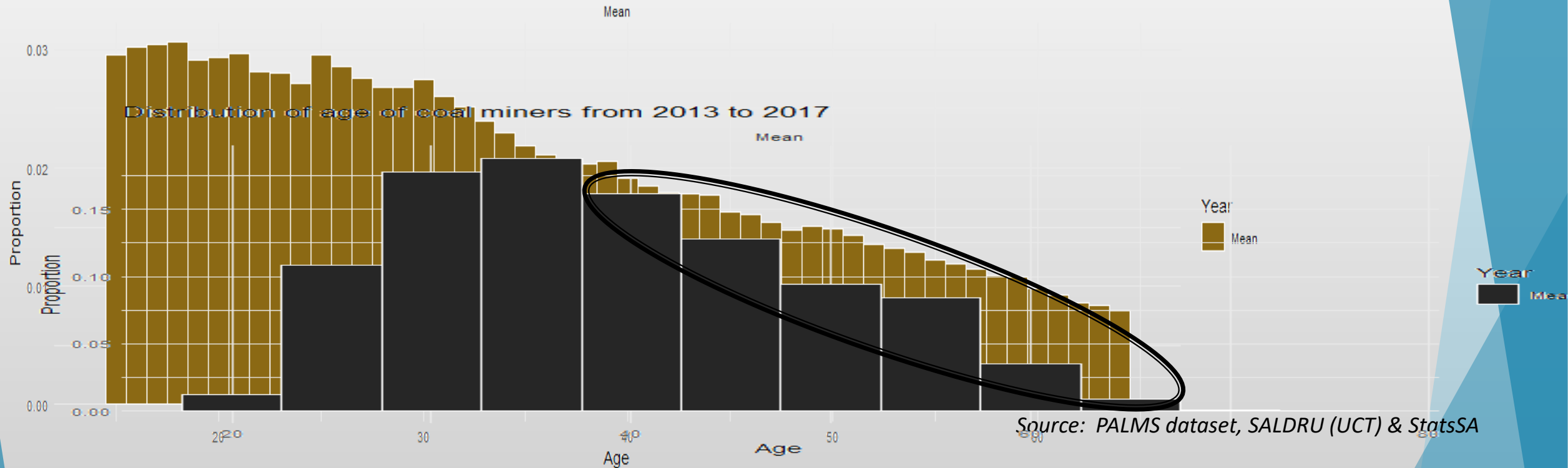
Yrs of education:



# Comparison of coal miners to working age population age profile

Coal miners still leave the workforce before retirement more than in other sectors

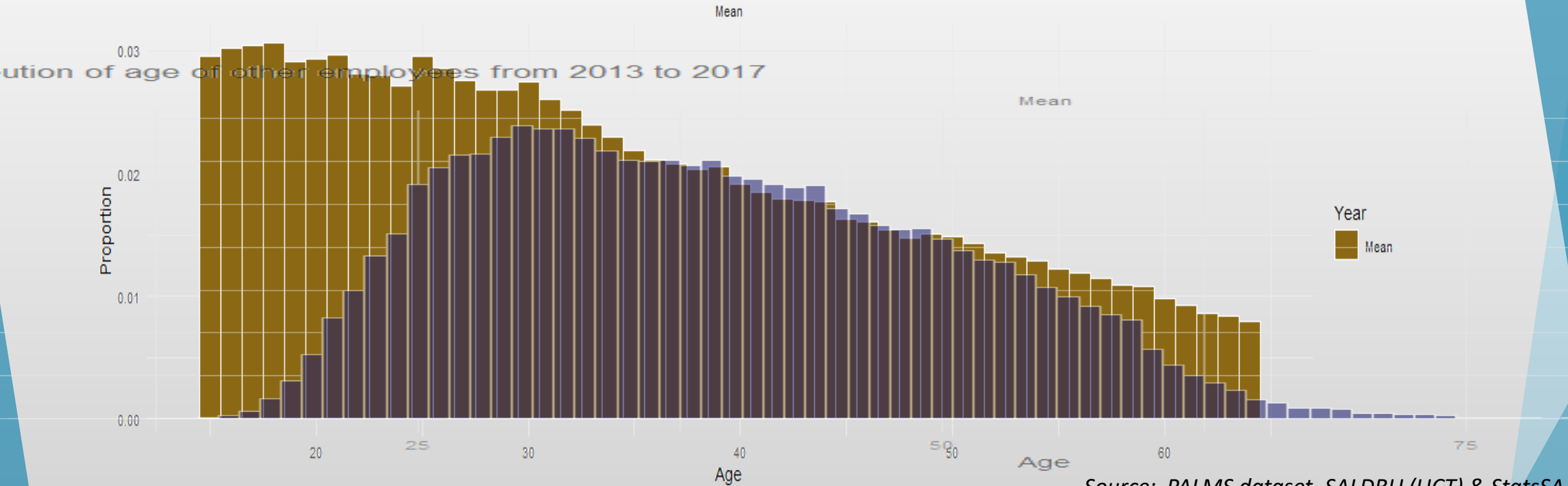
Distribution of age of working age population from 2013 to 2017



Source: PALMS dataset, SALDRU (UCT) & StatsSA

# This is less the case in other sectors in South Africa

Distribution of age of working age population from 2013 to 2017



Source: PALMS dataset, SALDRU (UCT) & StatsSA

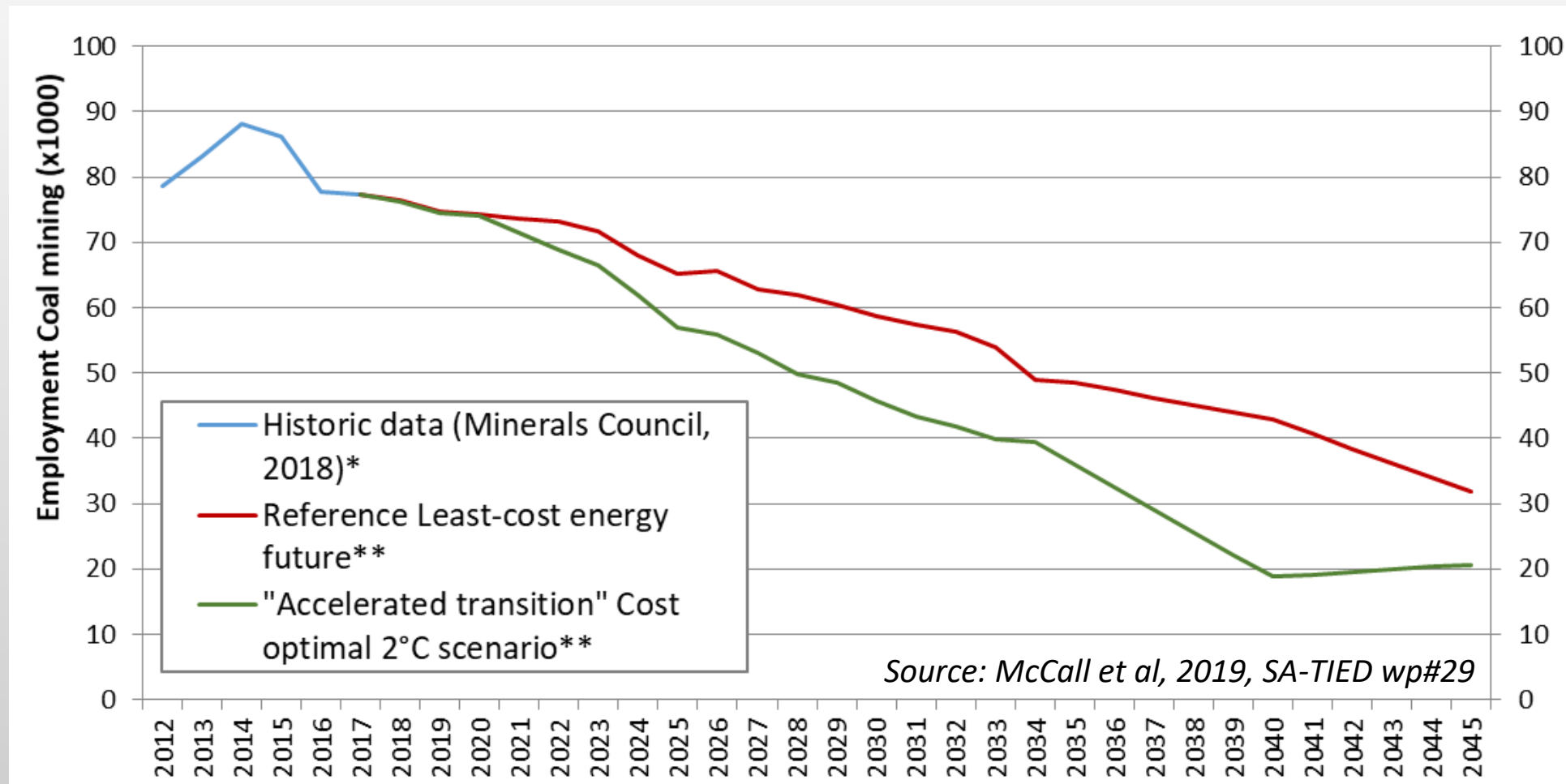
# At constant employment...

- ▶ We estimate, annually more than a 1000 new hires in coal mining ...
- ▶ Occupational health issues are a known but understudied topic in (coal) mining;
- ▶ Hence, the assumed net labour force decrease with age for coal mining:

	<u>5 years later ...</u>
0,0%	... of 30-34 years old left coal mining for unknown reasons
0,1%	... of 35-39 years old left coal mining for unknown reasons
7,2%	... of 40-44 years old left “
7,2%	... of 45-49 years old left “
19%	... of 50-54 years old left “
75%	... of 55-59 years old left “
100%	... of 60-64 years old retired



# Two scenarios for future demand for coal and future employment



# What can we say about prospects for finding a new job

Assumed relative chances of finding a job in South Africa based on PALMS data

Level of education	Post matric or University degree	as good as certain	as good as certain	average
	Matriculation	low	high	low
	Primary or uncompleted high school	very low	average	none
	Less than primary	very low	average	none
		under 30	30 to 44	45 and older
		Age		

# 5 year period job changes in coal mining under constant employment

		2021 to 2025	2026 to 2030	2031 to 2035	2036 to 2040	2041 to 2045
<b>Constant Employment</b>						
	<b>Employment at the end of period</b>	<b>74 144</b>	<b>74 144</b>	<b>74 144</b>	<b>74144</b>	<b>74 144</b>
	Retirements, at ...	987	1 174	1 433	1331	2 089
	Early retirements not BAU	-	-	-	-	-
	"BAU" people leaving the workforce	6 242	7 375	7 910	10432	11 213
	Additional job losses	-	-	-	-	-
	<u>Composition of (non retiring) work force leavers :</u>					
	Total	6 242	7 375	7 910	10 432	11 213
	<b>Not reemployable</b>	<b>3 612</b>	<b>3 534</b>	<b>3 339</b>	<b>3 788</b>	<b>3 881</b>
	<b>Low to very low chance of reemployment</b>	<b>1 812</b>	<b>2 137</b>	<b>2 924</b>	<b>4 167</b>	<b>4 735</b>
	<b>Average (or quite some) difficulty in finding reemployment</b>	<b>808</b>	<b>1 693</b>	<b>1 637</b>	<b>2 470</b>	<b>2 591</b>
	Little to no problem to find a new job	10	11	10	8	7
	<i>check</i>	0	0	0	0	0
	<b>New hires</b>	<b>7229</b>	<b>8549</b>	<b>9 344</b>	<b>11763</b>	<b>13 302</b>

# 5-year period job changes in coal mining under a Least cost energy future

- ▶ The big change is the lack of new hires, relative to Constant Employment

	2021 to 2025	2026 to 2030	2031 to 2035	2036 to 2040	2041 to 2045
<b>Least cost energy future reference scenario</b>					
<b>Employment at the end of period</b>	<b>65 255</b>	<b>58 769</b>	<b>48 469</b>	<b>42 826</b>	<b>31 877</b>
Retirements, at ...	987	1 145	1 398	1 267	1 988
Early retirements not BAU	-	-	-	-	-
<b>"BAU" people leaving the workforce</b>	<b>6 242</b>	<b>7 192</b>	<b>7 712</b>	<b>9 814</b>	<b>10 176</b>
Additional job losses	1 660	0	1 190	0	0
<u>Composition of (non retiring) work force leavers :</u>					
Total	7 902	7 192	8 902	9 814	10 176
<b>Not reemployable</b>	<b>3 890</b>	<b>3 447</b>	<b>3 545</b>	<b>3 573</b>	<b>3 565</b>
<b>Low to very low chance of reemployment</b>	<b>2 083</b>	<b>2 084</b>	<b>3 195</b>	<b>3 918</b>	<b>4 293</b>
<b>Average (or quite some) difficulty in finding reemployment</b>	<b>1 242</b>	<b>1 651</b>	<b>1 871</b>	<b>2 320</b>	<b>2 317</b>
Little to no problem to find a new job	687	11	292	3	1
<i>check</i>	0	0	0	0	0
<b>New hires</b>	<b>0</b>	<b>1851</b>	<b>0</b>	<b>5438</b>	<b>1 216</b>

# 5 year period job changes in coal mining under an Accelerated transition scenario

- ▶ A lack of new hires, and higher job losses in all re-employability categories

		2021 to 2025	2026 to 2030	2031 to 2035	2036 to 2040	2041 to 2045
<b>Accelerated Transition scenario</b>						
	<b>Employment at the end of period</b>	<b>56 968</b>	<b>45 600</b>	<b>35 884</b>	<b>18 763</b>	<b>20 668</b>
	Retirements, at ...	987	1 000	1 120	974	1 048
	Early retirements not BAU	-	-	-	-	-
	"BAU" people leaving the workforce	6 242	6 279	6 179	7 547	5 350
	Additional job losses	9 947	4 090	2 417	8 600	0
	<u>Composition of (non retiring) work force leavers :</u>					
	Total	16 189	10 369	8 596	16 147	5 350
	<b>Not reemployable</b>	<b>5 275</b>	<b>3 873</b>	<b>3 218</b>	<b>5 199</b>	<b>1 875</b>
	<b>Low to very low chance of reemployment</b>	<b>3 436</b>	<b>2 632</b>	<b>2 993</b>	<b>6 375</b>	<b>2 257</b>
	<b>Average (or quite some) difficulty in finding reemployment</b>	<b>3 408</b>	<b>2 401</b>	<b>1 839</b>	<b>3 983</b>	<b>1 218</b>
	Little to no problem to find a new job	4 070	1 463	547	589	0
	<i>check</i>	0	0	0	0	0
	<b>New hires</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8 305</b>

# Reducing retirement age by 10 years avoids more job losses than in Constant employment, but ... no new hires

		<u>Retirement at 55</u>				
		2021 to 2025	2026 to 2030	2031 to 2035	2036 to 2040	2041 to 2045
<b>Accelerated Transition scenario</b>						
	<b>Employment at the end of period</b>	<b>56 968</b>	<b>45 600</b>	<b>35 884</b>	<b>18 763</b>	<b>20 668</b>
	Retirements, at ...	987	0	0	0	0
	Early retirements not BAU	11 762	6 229	9 097	10 790	8 519
	"BAU" people leaving the workforce	1 388	1 745	1 745	1 540	666
	Additional job losses	3 039	3 394	0	4 791	0
	<u>Composition of (non retiring) work force leavers :</u>					
	Total	4 427	5 139	1 745	6 331	666
	<b>Not reemployable</b>	<b>953</b>	<b>1 256</b>	<b>584</b>	<b>1 502</b>	<b>150</b>
	<b>Low to very low chance of reemployment</b>	<b>974</b>	<b>1 311</b>	<b>734</b>	<b>2 473</b>	<b>337</b>
	<b>Average (or quite some) difficulty in finding reemployment</b>	<b>1 107</b>	<b>1 198</b>	<b>419</b>	<b>1 756</b>	<b>180</b>
	Little to no problem to find a new job	1 393	1 375	8	601	0
	<i>check</i>	0	0	0	0	0
	<b>New hires</b>	<b>0</b>	<b>0</b>	<b>1 125</b>	<b>0</b>	<b>11 091</b>

# New Economic Development is crucial for coal mining areas !

- ▶ **See Recommendations Coal Transitions project (e.g., Campbell & Coenen, 2017)**
- ▶ Early retirement ? - A solution for many and affordable, but not for everyone;
- ▶ Re-training ? - Probably more viable, but sufficient alternative jobs are needed;
- ▶ Stimulating green jobs in former coal-mining areas ? This requires investments:
  - ▶ *Ideas:* Re-purposing coal mines; more solar PV in Mpumalanga (CF 9% below best SA);
  - ▶ *Examples* Moving towards action: Mpumalanga's Green Economy Cluster (GreenCape);
- ▶ However, national policies and actions for a diverse and green economic development are required and already urgent for new jobs for the many and the young;
- ▶ Better, publicly available, data about coal mine worker characteristics is needed for analysis in support of such policies – Labour Force Survey data has a too low granularity.



# Recommendations Campbell and Coenen (2017)

For coal regions looking to build their economic resilience and transition beyond coal, the Coal Transitions project identified a number of strategies that can be effective if well executed. These include:

- **"Related diversification"**: developing industries that are related to existing economic activities and industries but do not depend on coal.
- **"Smart specialisation"**: supporting the growth of economic activities that build on an assessment of the region's strengths and competitive advantages. In coal regions, this could include existing power, rail or port infrastructure, land availability, cultural and industrial heritage, skills of the local workforce, existing industries with growth potential, etc.
- **Strengthening of local entrepreneurial networks**: creating or strengthening networks between higher education and training organisations, local companies and entrepreneurs, local government and organised labour, in order to identify and support the growth of suitable activities.
- **Improvement of local Infrastructure**: to boost the local economic attractiveness of the region, increase opportunities for economic linkages to other zones of economic activity and employment, increase the productivity and growth potential of local industries, and create opportunities for former coal workers to stay in their regions.
- **Improvement of "soft attractiveness factors"**: to support re-investment in the area, underpin land value and thus the wealth of the local community, and limit or reverse demographic outflows.
- **Location of public sector activities in the region**: to mitigate demographic decline, provide additional economic demand for the region, and support the development of new strategic industries.
- **Location of innovation or energy transition projects in the region**: often regions with a strong link to the energy sector are keen to retain this as part of their local identity, and they may possess the infrastructure to do so.

Source: Campbell and Coenen, 2017



ESRG

ENERGY SYSTEMS RESEARCH GROUP  
University of Cape Town

FORMAS



EXPERTISE  
FRANCE



## Protecting livelihoods and creating decent work

- Understanding the labour market
  - Sector Job Resilience Plans
- Setting a timeline for coal phase down
  - IRP in context of NDC and long-term goals
- Providing a bridge to pension or offering voluntary packages.
  - who pays? How much?
- Supporting workers who have appropriate skills willing to retrain to take on alternative roles in the company.
- Developing regional worker transfer programmes to support the direct transfer and on-the-job retraining of workers to move to an alternative local job. - who pays? How can this be coordinated?
- Redeploying: offering employees who may struggle to find work in other roles or sectors the option to transfer their skills to alternative coal-based sites with the company
- Establishing integrated multi-purpose retraining programmes
  - who coordinates SLPs, SED/ED spend, LED initiatives?



**COAL TRANSITIONS**

[www.coaltransitions.org](http://www.coaltransitions.org)

**Thank you for your attention !**

**the floor is yours for questions and comments**

**Contact: [jules.schers@gmail.com](mailto:jules.schers@gmail.com)**



**ESRG**

ENERGY SYSTEMS RESEARCH GROUP  
University of Cape Town

FORMAS



EXPERTISE  
FRANCE

# Selected references

Hartley, F., Burton, J., Cunliffe, G., McCall, B., Caetano, T., Ntuli, N., Fourie, R., Chiloane, L. (2019): Future skills and job creation through renewable energy in South Africa – Assessing the COBENEFITS of decarbonising the power sector. Energy Research Centre, University of Cape Town (UCT), and Council for Scientific and Industrial Research (CSIR), Pretoria

Bischof-Niemz, T. & Creamer, T. (2018) South Africa's Energy Transition: A Roadmap to a Decarbonised, Low-cost and Job-rich Future. Routledge

Spencer, T., Colombier, M., Sartor, O., Garg, A., Tiwari, V., Burton, J., Caetano, T., Green, F. et al. (2018): "The 1.5°C target and coal sector transition: at the limits of societal feasibility", Climate Policy, 18(3): 335–51, DOI:10.1080/14693062.2017.1386540

Strambo, C., Burton, J. and Atteridge, A. (2019): "The end of coal? Planning a 'just transition' in South Africa", Stockholm: Stockholm Environment Institute

Nicholas, S. & Buckley, T. (2019) South African Coal Exports Outlook. Institute for energy economics and financial analysis. [http://ieefa.org/wp-content/uploads/2019/09/South\\_Africa\\_Coal\\_Exports\\_Outlook\\_Sept-2019.pdf](http://ieefa.org/wp-content/uploads/2019/09/South_Africa_Coal_Exports_Outlook_Sept-2019.pdf)

Huxham, M., Anwar, M. and Nelson, D. (2019): "Understanding the impact of a low carbon transition on South Africa", Climate Policy Initiative Energy Finance

Kerr, A. Lam, D. and M. Wittenberg. Post-Apartheid Labour Market Series 1993-2019 [dataset]. Version 3.3. Cape Town: DataFirst [producer and distributor], 2019. DOI: <https://doi.org/10.25828/gtr1-8r20>

McCall, B., Burton, J., Marquard, A., Hartley, F., Ahjum, F., Ireland, G. and Merven, B., 2019. Least-cost integrated resource planning and cost-optimal climate change mitigation policy: Alternatives for the South African electricity system. Energy Research Systems Group, University of Cape Town

Campbell, S., Coenen, L. (2017), Transitioning beyond coal: Lessons from the structural renewal of Europe's old industrial regions, CCEP Working Paper 1709, November 2017. Crawford School of Public Policy, Australian National University



**ESRG**

ENERGY SYSTEMS RESEARCH GROUP  
University of Cape Town



EXPERTISE  
FRANCE