Overview of Modelling of the coal and power sectors in SATIMGE

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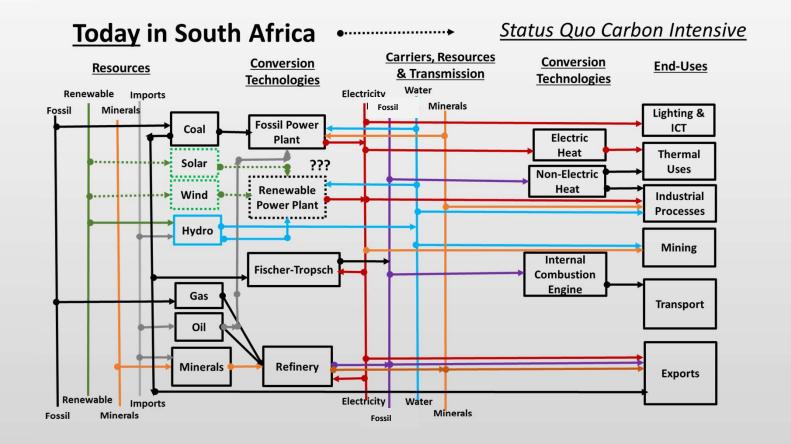


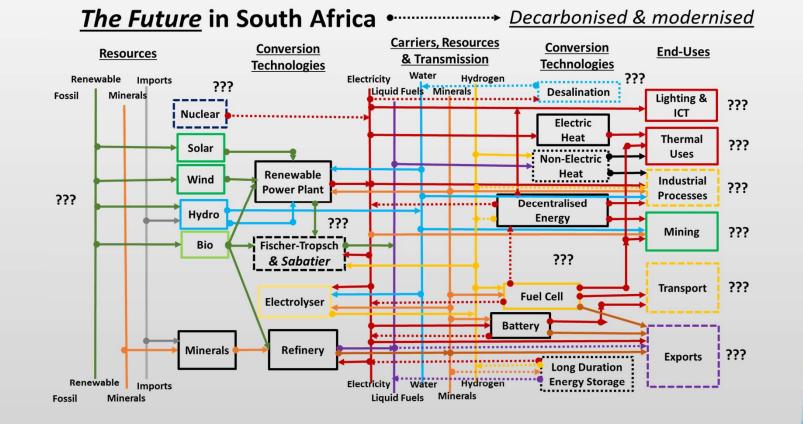
Overview of Presentation

SATIMGE: a framework for unpacking the transition

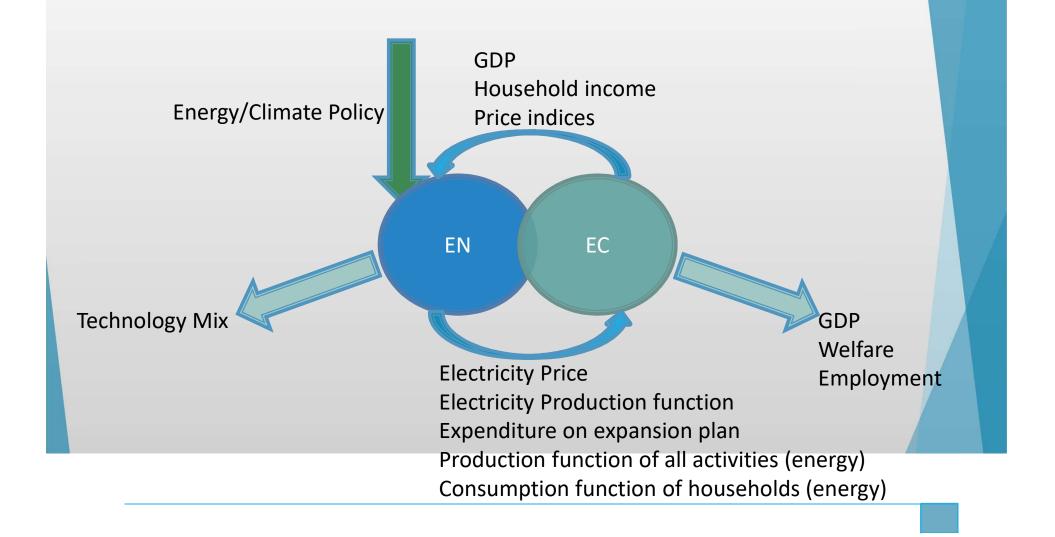
Unpacking coal and power sector

- 2 contrasting scenarios
- Conclusions

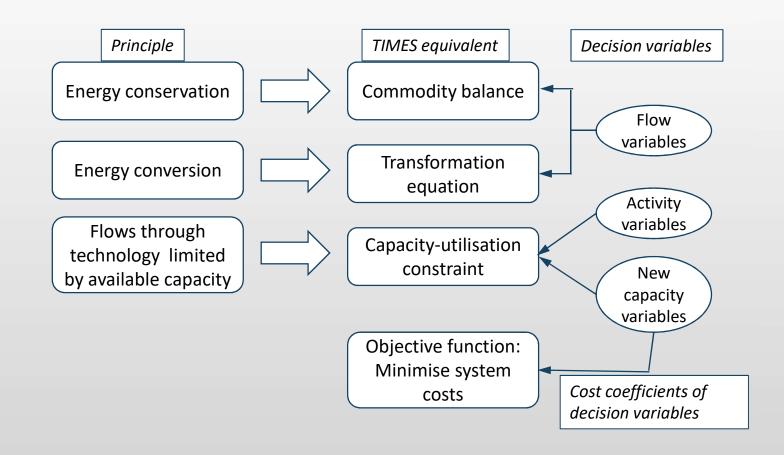




Linked Energy-Economic Modelling

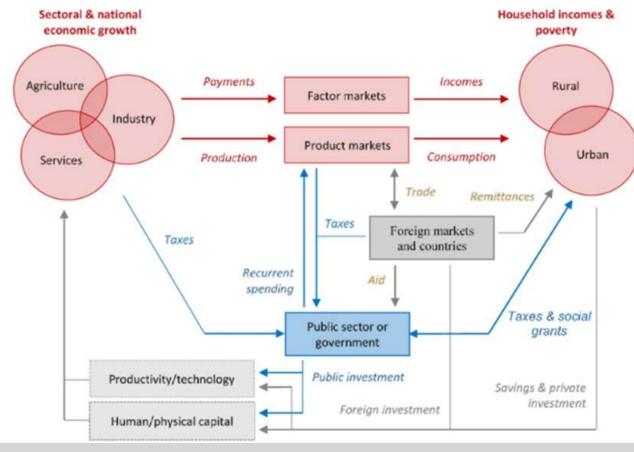


SATIM - Core equations/constraints



Ensures technical feasibility of scenarios

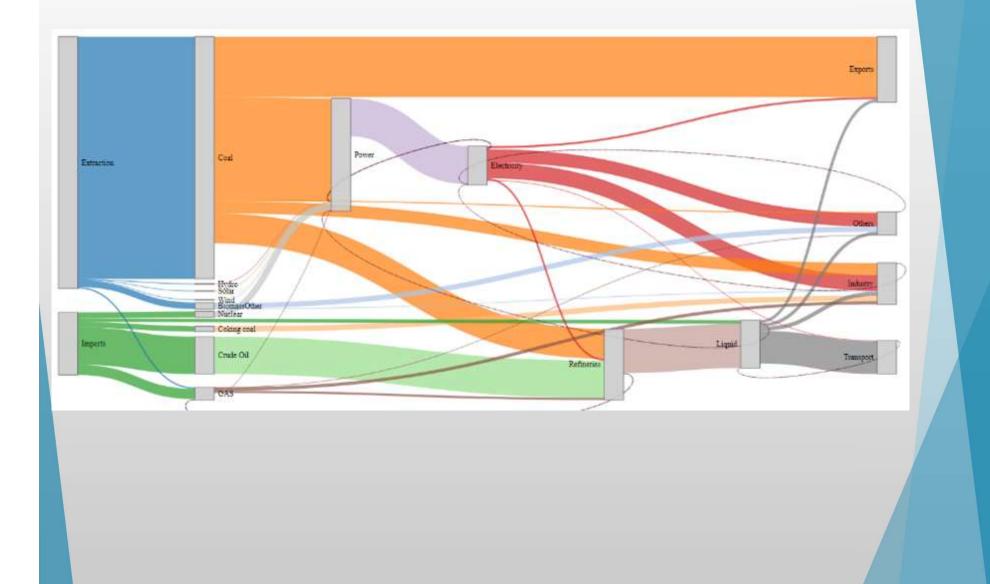
General Equilibrium Model for South African CGE model with detailed Energy (eSAGE)



Input/Output Table / Social Accounting Matrix at the core ensures sector linkages

Ensures macro-economic constraints

Unpacking Energy: Energy use in 2012



Unpacking Coal: Coal contracts (1)

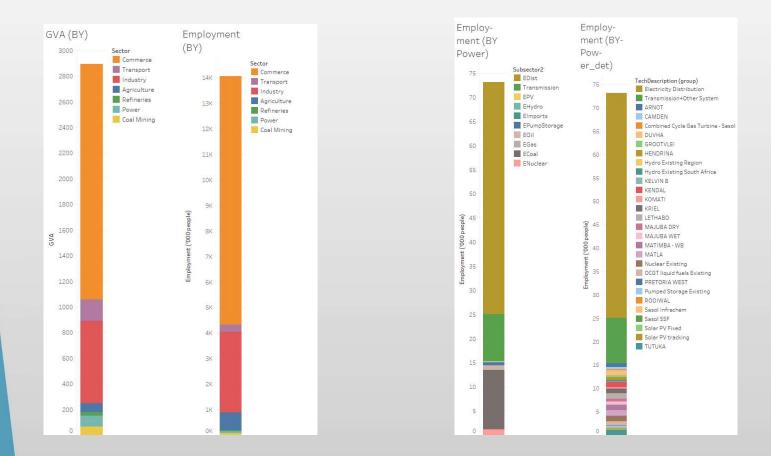
Extraction of Coal low grade - new - Dual Product Coal Washing - export grade coal CME Coal Washing - metallurgical coal	COA
Coal Washing - export grade coal	
Coal Washing - export grade coal	
	CME-R
	Refinery CTL Existing
Power Sector Coal low grade	
UPSCIE	Refinery CTL Boiler Existing
CLS Waterberg to central basin railway line option 1 (Sasol Infrachem
Extraction of Coal low grade - Sasol	Sasol SSF
CLE-A Conveyor of Coal from Arnot to Arnot Supply Sector Coal low grade	ROOIWAL
Arnot Ceal Mine CLEARN Read of Coal from Halfgewomen to Camden Of Coal from Halfgewomen to Camden PWRCLE	
Halfzewonnen Coal Mine CLEHFG	CAMDEN
- Mafube Coal Mine CLEMAP Conveyor of Coal from Middelburg to Duvha PWRCAM	ARNOT
Middelburg Coal Mine CLEMMS Road of Coal from Palesa Loopspruit to Groot/lei PWRARN	GROOTVLEI
Palesa Loopspruit Coal Mine CLEPLL Conveyor of Coal from Optimum Mine to Headrina PWRDUV	GROOTVLET
Ontimum Mine Cost Mine Cost Mine Cost Mine Cost Mine Cost Mine Cost of Cost from Tavistock Tweefontein dump reprocess to Duvha	
KK Pit 5 dumm reprocess Coal Mine CL FKKP	DUVHA
Tavistock Tweefontein dump reprocess Coal Mine wrt CLETVT Coal from Knutata to Kenaal PWRHEN	
Khutak Coal Mine CLEKHU Road of Coal from Taristock Tweefontein dump reprocess to Komati Other Strength of the Strengt	HENDRINA
	KENDAL
Koomfontein Čoal Mine CLEKOO Conveyor of Coal from Kriel to Kriel	
Kriel Coal Mine CLEKRI Road of Coal from Middelkraal to Kendal PWRKOM	KRIEL
Middellyzaa Coal Mine Road of Coal from NBC to Amot	KOMATI
Reed of Coel from Middelkraal to Majuba PWRKRI	
New Vaal Coal Mine CLENWV Conveyor of Coal from New Vaal to Lefnabo PWRLET	LETHABO
NBC Coal Mine CLENBC Pool of Coal from Delime to Mainba	
Delmas Coal Mine CLEDEL Read of Coal from Goedpersonder to Mainha	MAJUBA DRY
Goedgevonden Coal Mine CLEGDV Road of Coal from NBC to Tutuka PWRMAJ	
Gravpan Coal Mine CLEGRA Road of Coal from Gravpan to Majuba	MAJUBA WET
Leeuwpan Coal Mine CLELWP Road of Coal from Leeuwpan to Majuba	TUTUKA
Matla Coal Mine CLEMAT Conveyor of Coal from Matla to Matla	
Grootegeluk Coal Mine CLEGTK Conveyor of Coal from Grootegeluk to Matimba	MATLA
New Denmark Coal Mine CLENWD Conveyor of Coal from New Denmark to Tutuka PWRTUT	MATIMBA - WB
East Block Coal Mine CLEPS Read of Coal from text Demants or Future Coal Manual Coal Coal Manual Coal Coal Manual Coal	
Khanyisa & Intabane Coal Mine CLEKAI Road of Coal from Khanyisa & Intabane to Tutuka Grooteseluk Coal Mine	CLEGRO
Vanggatfontein Coal Mine CLEVGG Road of Coal from Vanggatfontein to Tutuka	

Unpacking Coal: Coal contracts (2)



10.

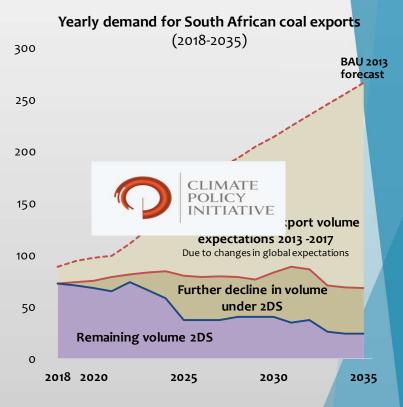
Unpacking the Economy: Value Added and Employment from Power and Coal in 2012



Looking forward: Two contrasting scenarios

Similar to last 2 scenarios presented by Faaiqa:



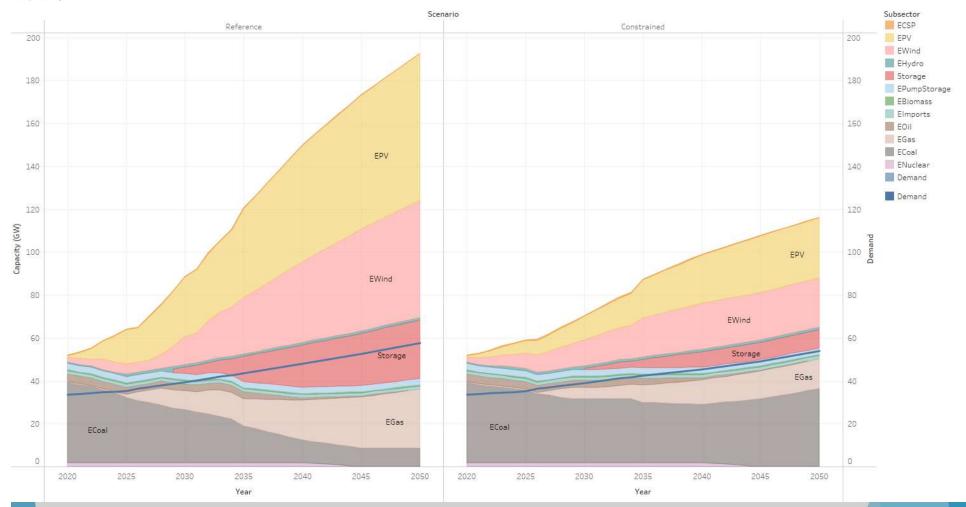


Reference Scenario: Unconstrained

Constrained Scenario: Wind and PV new build constrained to 1GW/year

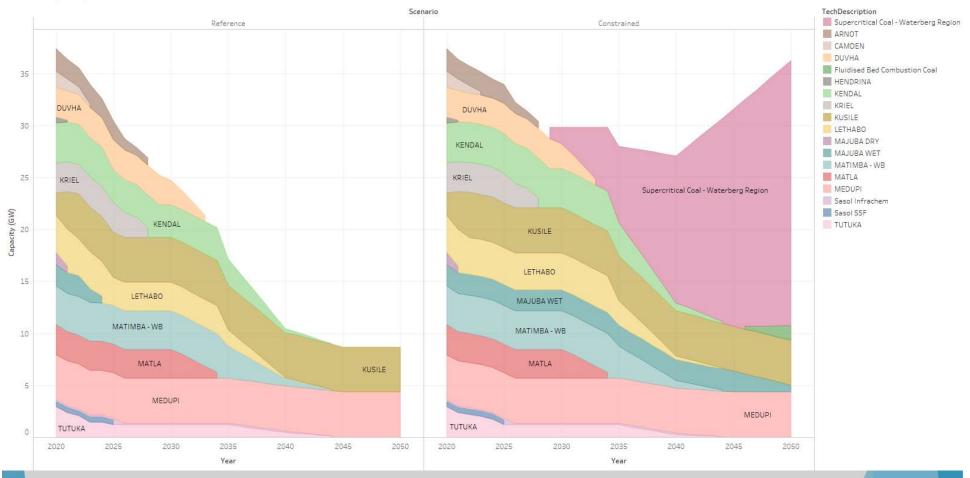
Looking Forward - Electricity Supply: Capacity

Capacity



Looking Forward - Electricity Supply: Coal Capacity

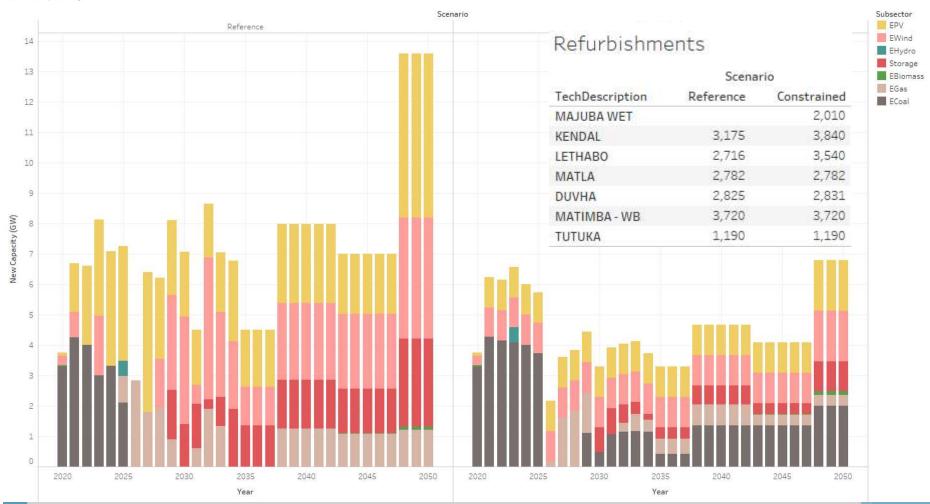
Capacity (coal)



No new coal in Reference

Looking Forward - Electricity Supply: New Capacity

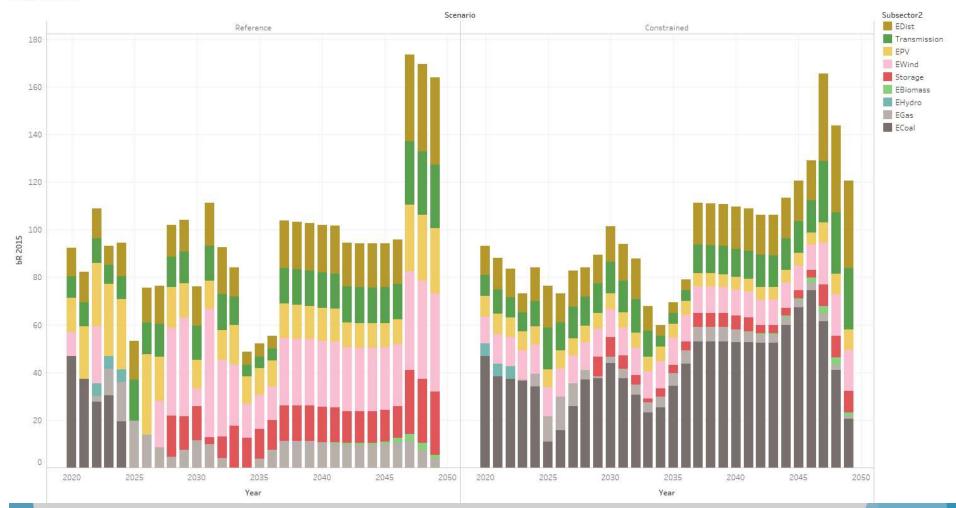
NewCapacity



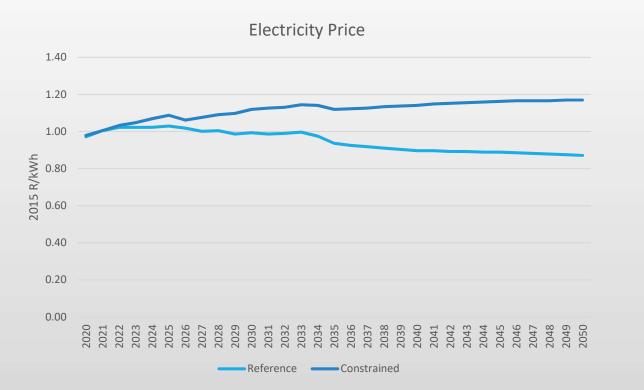
IGW constraint on PV and wind in constrained scenario

Looking Forward - Electricity Supply: Investment

Investment



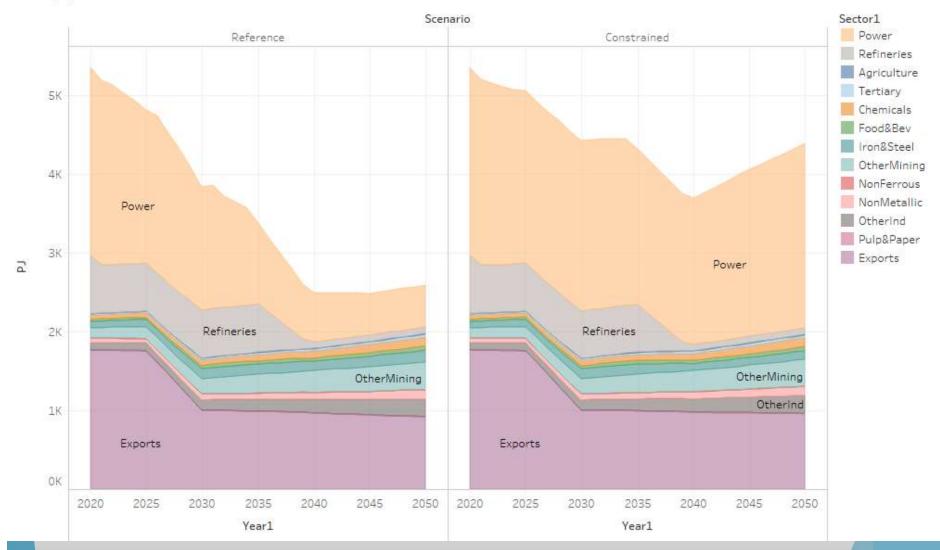
Electricity Price



17.

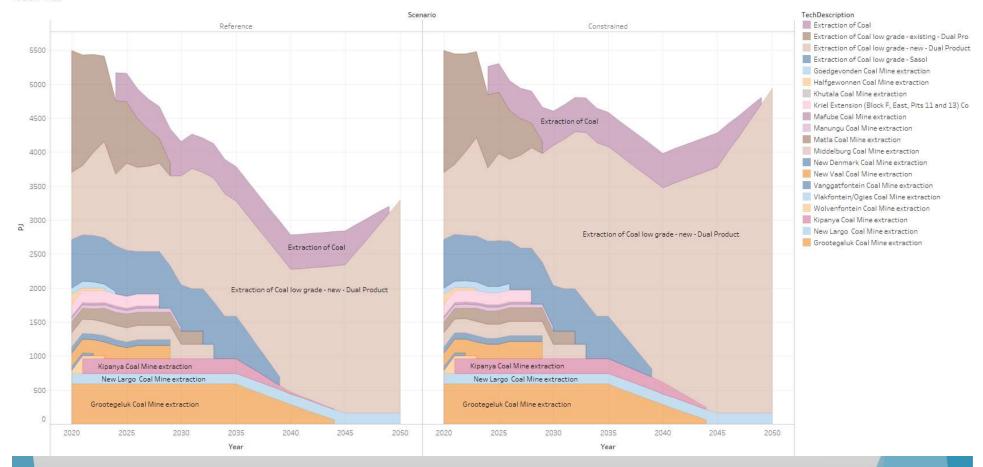
Looking Forward: Coal Demand

Coal(5)



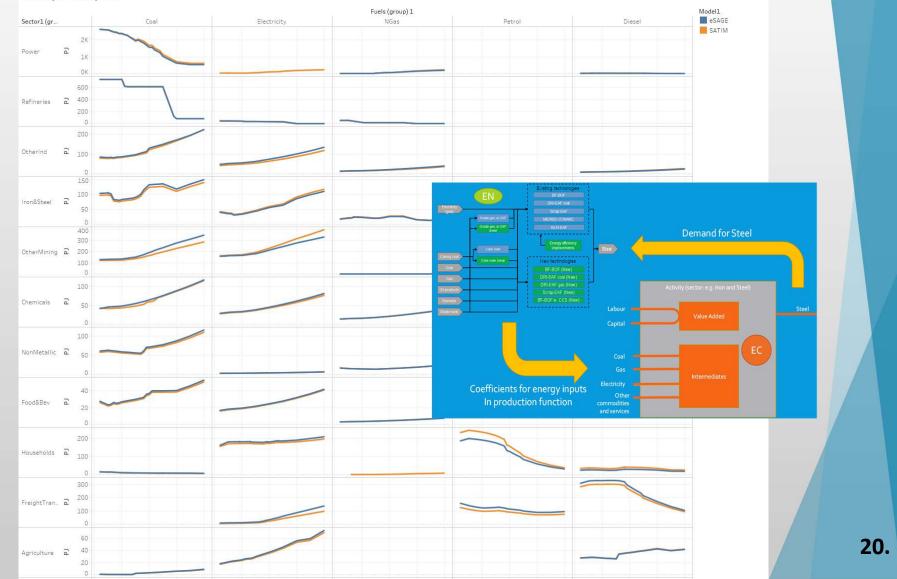
Coal Supply

CoalProd



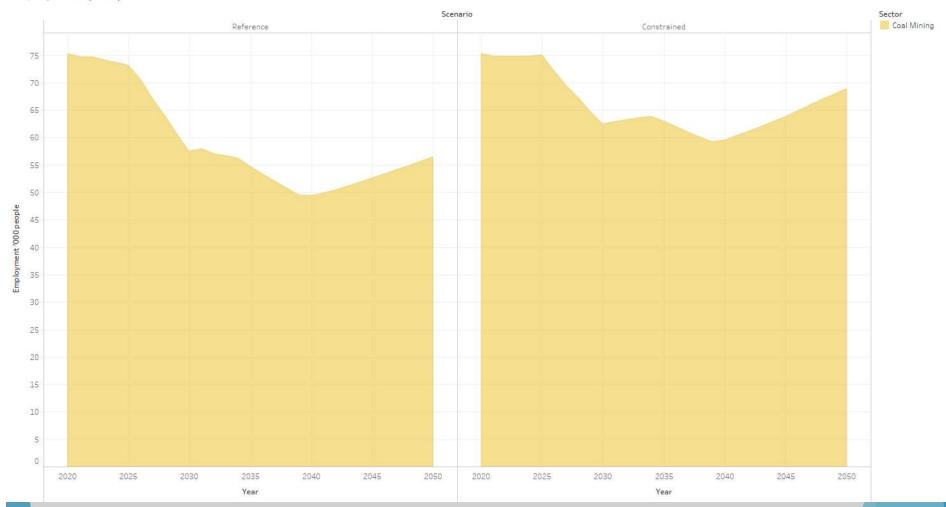
Linking CGE model to energy model necessary to capture technical change

TotalBySectorByFuel



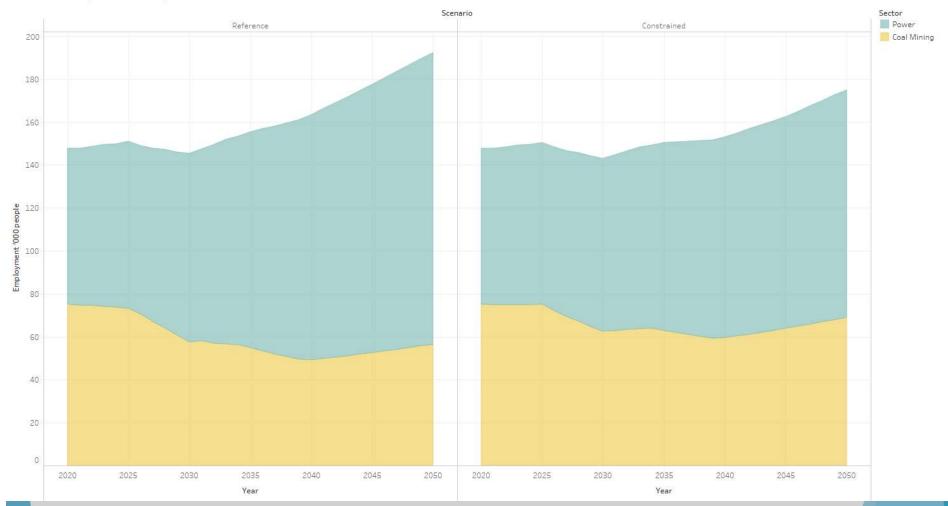
Looking forward: Employment in coal

Employment (Coal)



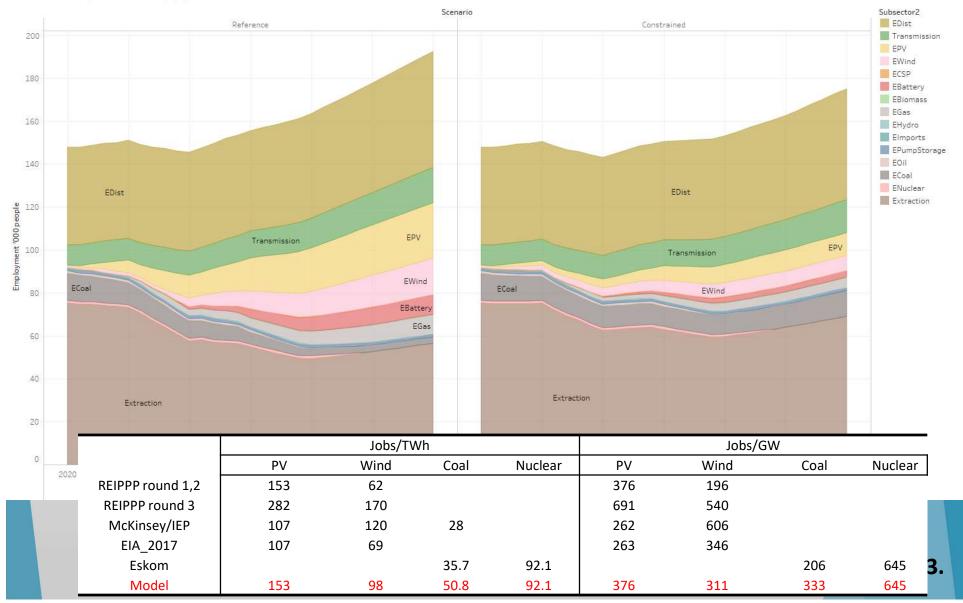
Looking forward: Employment in coal + power

Employment (Coal+Power)

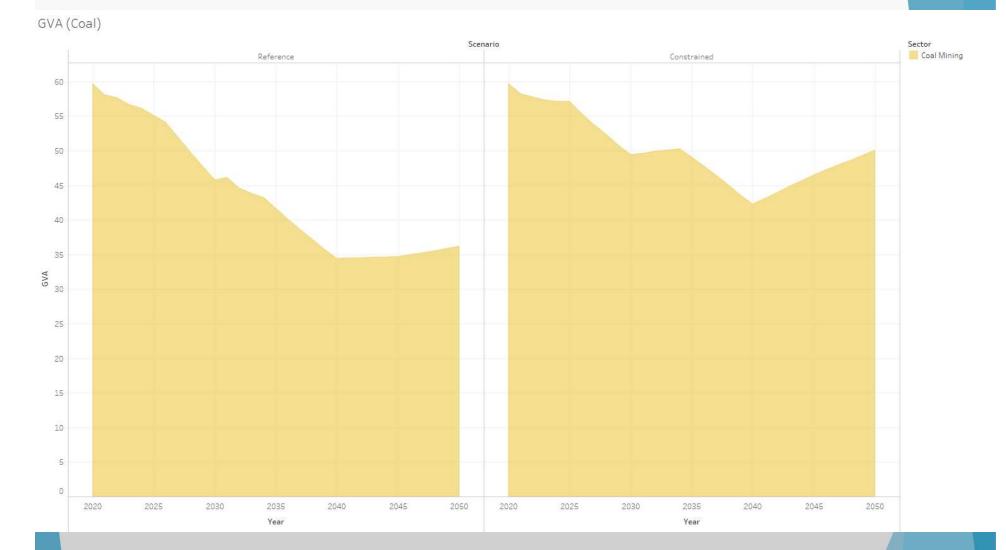


Looking forward: Employment in coal + power

Employment (Coal+Power) (2)

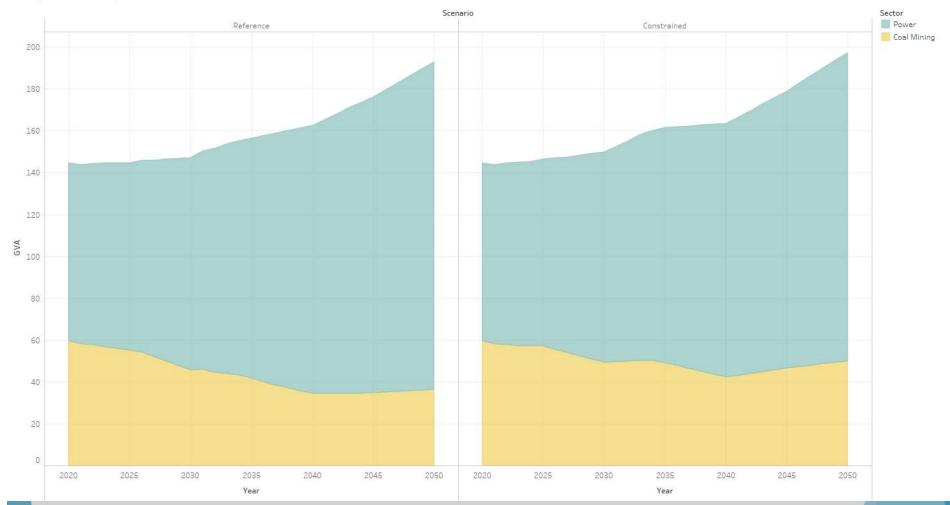


Looking forward: Value Added - coal

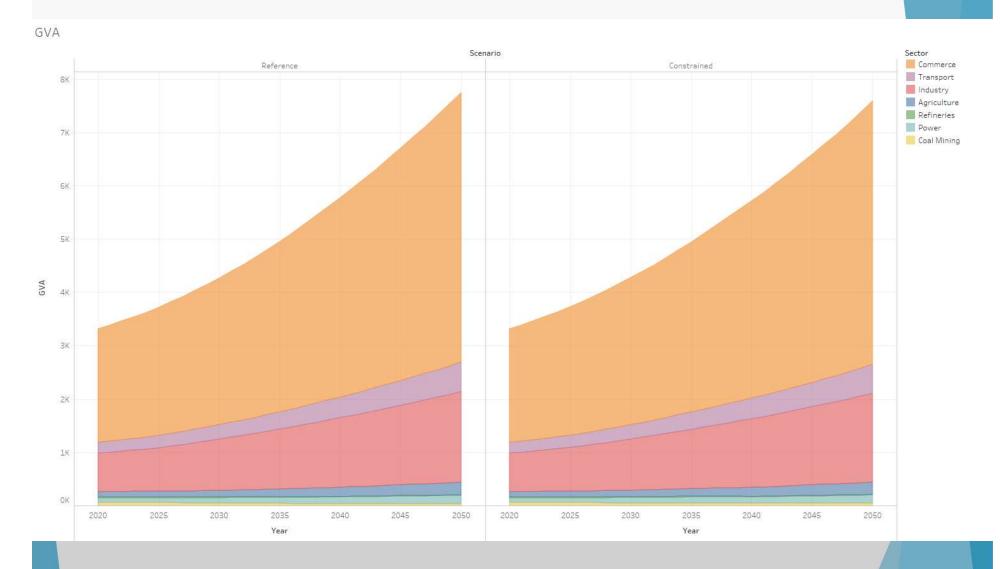


Looking forward: Value Added –

GVA (Power+Coal)

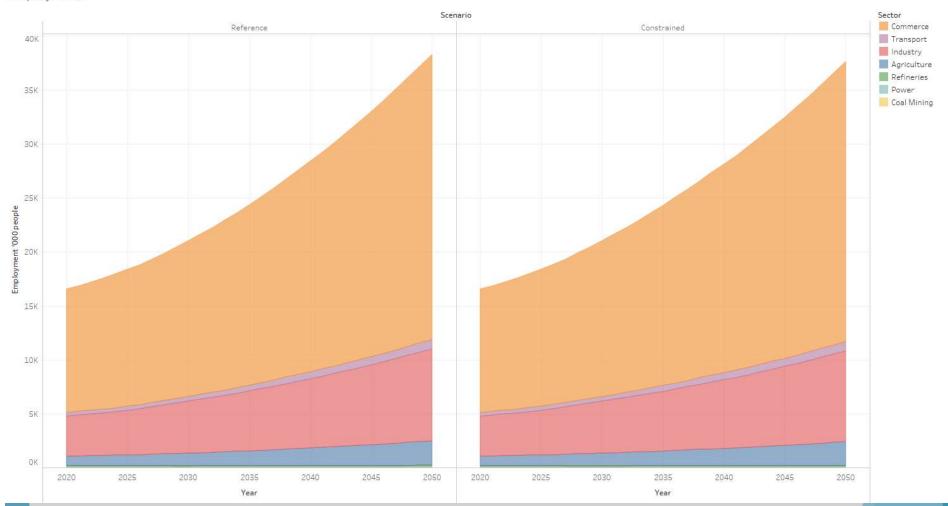


Looking forward: Total Value Added



Looking forward: Total Employment

Employment



Conclusion

- With rising costs, lower demand for exports, persisting with coal does not "save jobs" for South Africa at a macro level:
 - Jobs lost in coal and power more than made up elsewhere because of lower energy costs
- Framework presented that allows one to work at a detailed level some details captured so far:
 - Employment intensity of power plants
 - Coal mines for power sector
- More work needed to more fully capture the cost of transition:
 - Model assumes free geographic and sectoral movement of labour
 - Look in more detail at coal outside of power
 - Need to look spatially at what activities would do labour uptake where coal mines and power plants are closing
 - Need to dig into cost of transitioning the labour

Thank you!

We are open for collaboration and contributions for future work...

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