Work in progress on the Africa region of ETSAP-TIAM: A South African perspective

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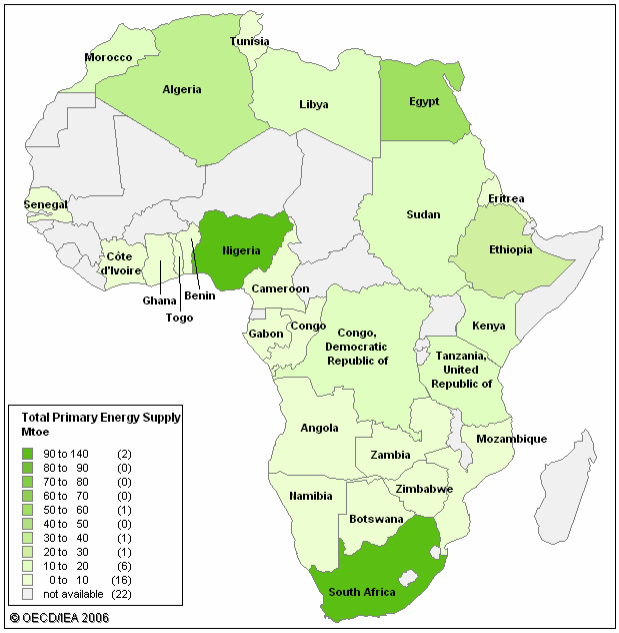
Objective

1. Critically look at Africa region of ETSAP-TIAM
2. Split Africa into South Africa and rest of Africa

Constraints

- No recent Africa study at ERC
- A detailed SA Markal model
- A recent study on fossil fuels in SADC region

Map Energy Indicators - Africa - Total Primary Energy Supply



Total Primary Energy Supply: Indigenous production + imports - exports - international marine bunkers ± stock changes

Some Africa and SA indicators

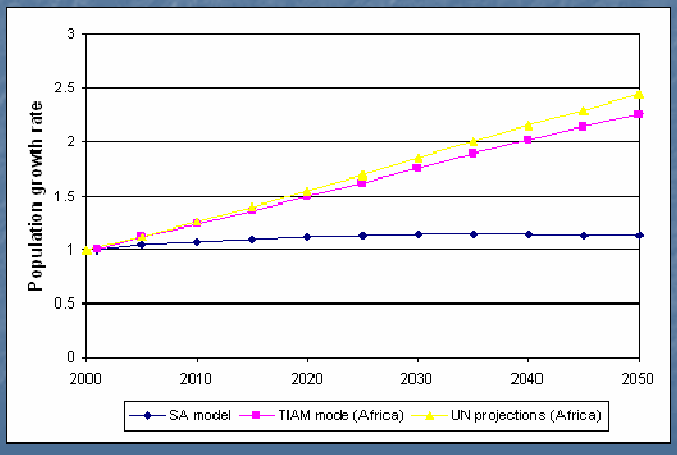
2004 indicators	Africa	SA	fraction (SA)
Population (million)	872	45	5.2%
Area (000 km2)	28,000	1,220	4.4%
GDP (b 2000$)	1,997	151	7.6%
TPES (Mtoe)	586	131	22.4%

The method:

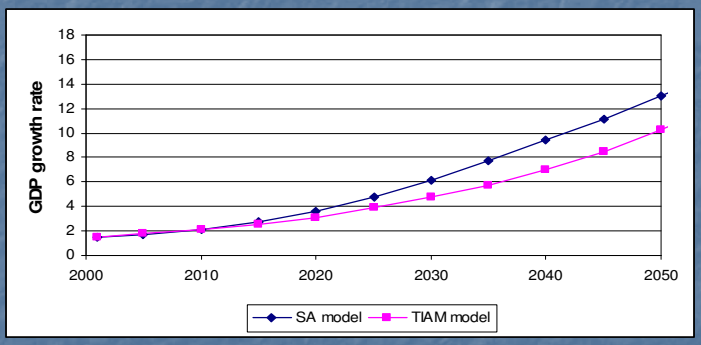
- Look at some of the basic assumptions
- Do a sector by sector comparison of both models
- Look for potentially problematic areas

  (Method only useful for sectors where SA is important)

Drivers: Population



Drivers: GDP



TIAM-Africa structure

- TIAM structure very detailed (except agriculture)
- Residential split for some services: urban-rural. SA model also has a low-high income split and electrified – nonelectrified split.

Demand: Residential

	Africa (all of residential)	SA (all of residential)
Coal	0.15	0.09
Biomass	23.25	0.31
Electricity	1.00	1.00
LPG	0.93	0.02
Kerosene	0.69	0.17
Natural Gas	0.37	0.03
Absolute amount of electricity used (PJ)	325	124
Total amount of energy used (PJ)	8585	201

Relative fuel use in the residential sector normalised to electricity use

Demand: Commercial

	TIAM Africa	SA
Coal	0.20	0.32
Biomass	0.63	0
Electricity	1.00	1.00
LPG	0	0.20
Kerosene	0.01	0
Natural Gas	0.02	0.02
Heavy	0	0.05
Diesel	0.18	0
Heat	0	0
Geothermal	0	0
Solar	0	0
Absolute amount of electricity used (PJ)	150	64
Total amount of energy used (PJ)	312	100

Relative fuel use in the commercial sector normalised to electricity use

Demand: Industrial

	TIAM AFRICA	SA
Coal	0.95	1.49
Biomass	2.21	0.21
Electricity	1.00	1.00
LPG	0.08	0.00
Kerosene	0.00	0.00
Heavy	0.51	0.13
Diesel/biodiesel	0.55	0.05
Gas	0.19	0.06
Absolute amount of electricity used (PJ)	650	412
Total amount of energy used (PJ)	3641	1205

Relative fuel use in the industrial sector normalised to electricity use

Demand: Transport

	TIAM AFRICA (PJ)	SA (PJ)
LPG	8.39	0.00
Gasoline	1150	348.75
Aviation Gas	31	0.88
Jet Fuel	310	76.33
Diesel/Bio-diesel	900	195.35
HFO	274	
Electricity	23	20.72
Total	**2700**	**642**

Power Sector

	TIAM	SA model
	(GW)	
Gas turbines	32.4	0.6
Coal	37.3	32.8
Nuclear	1.8	1.8
Hydro and pumped storage	19.1	2.3
Wind	0.1	0.0
Biomass	1.1	0.1
Total	**91.7**	**37.6**

Resources

	TIAM Africa (PJ)	SA model (PJ)	SA as % of Africa
Coal	8236	2484	30.2%
Crude	12948	819	6.3%
Biomass	19588	76	0.4%
Uranium	152	284	186.44%

In Summary

- Preliminary view:
  - Structure and data seems ok
- Splitting away SA will improve
  - Power sector
  - Industry and commercial sector

Way forward

- Demand and drivers
- Reserves

- Split region into SA and rest of Africa
- Assess impact
- Look into other potential splits

- Source some extra funding to continue work