SASOL'S DEVELOPMENT OF A NEW GREENHOUSE GAS EMISSIONS OUTLOOK FOR SOUTH AFRICA: ASSUMPTIONS AND DATA

1. Objective

I. Establish likely profile of future RSA greenhouse gas (GHG) emissions.
II. Compare emission profiles to proposed Peak, Plateau and Decline (PPD) *trajectory* set out by the Department of Environmental Affairs (DEA).
III. Assess the likely trajectory of emissions growth using existing data and is not intended to provide specific step changes in the data profile.
IV. Establish whether the GHG emission trajectory is below the current PPD set out by the DEA.

2. Overview

The DEA published RSA's projected GHG emissions and PPD trajectory is explained in the report titled "*Defining South Africa's PPD emission trajectory",* released in August 2011. Using the information contained in the above-mentioned report, an analysis was undertaken to determine the impacts of the following key developments on RSA's GHG projections into the future:

I. Latest DEA 2010 GHG inventory of 518 million tons {which is lower than the predicted Business as Usual (BAU) in 2010}.
II. Electricity accounts for almost half of RSA's GHG emissions and Stats SA's recently published data show a decline in electricity production since 2010 (implying that corresponding GHG emissions can also be assumed to decline during this period). This trend is expected to continue for a period of time as indicated in Figure 1 below.

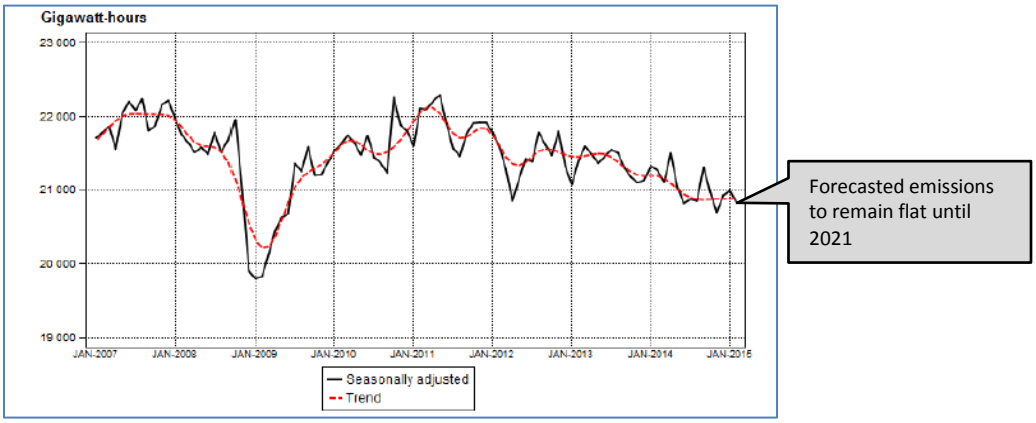

Figure 1: Summary of electricity generation in South Africa (Source Stats SA: Statistical release P4141)

3. Data Sources and assumptions

Using the following data sources, projections of GHG emissions into the future were developed:

I. Projected BAU GHG growth rates as provided by the DEA in the aforementioned 2011 report.
II. Current GHG emissions as indicated in the RSA 2010 inventory at 518 Mt which was used as a starting point for the emission projections.
III. Stats SA data which indicates declining electricity generation since 2010 (refer to Figure 1 above).
IV. Statements by Brian Molefe indicate that Medupi and Kusile will achieve full production by 2022.
V. Further, it is assumed that electricity production will remain relatively flat until 2022 (decline will be arrested by new facilities coming online) as the current fleet production is gradually replaced by new units from Medupi and Kusile. Therefore it is assumed that electricity emissions will remain flat from 2010 to 2021 as generation capacity is stabilised with the introduction of Medupi and Kusile in 2022.
VI. Growth in the other energy, industrial, transportation and Agriculture, Forestry and Other Land Use (AFLOU) sectors are assumed not to increase due to the impact of the electricity sector. It is assumed that the other sectors will also be unable to grow in emissions without the availability of electricity.
VII. Overall GHG emissions are assumed to remain flat with increases occurring post 2021 when all units from new facilities will be online.
VIII. Even with the start-up of units from Medupi earlier than 2021, the average electricity growth rate is expected to remain relatively muted unless the current Eskom fleet availability improves.
IX. Thereafter GHG emissions growth after 2022 is as per the BAU rates laid out by the DEA's previous projections in the 2011 report indicated above.
X. These assumptions are valid as at May 2015 and any new developments have not been included in this analysis.

4. Conclusions

The projected RSA GHG emissions are expected to remain below the PPD for the next few years based on this high level assessment. More accurate input data is required to determine the exact cross-over point but with the current assumptions it is likely to be realised before 2020 at the very earliest.

The impact of reduced electricity generation and increased pricing has and continues to negatively contribute to slower economic growth in South Africa, inevitably driving the economy towards improved energy efficiency. This has and continues to have the effect of slowing growth in GHG emissions to far lower levels than previously anticipated.

It should be noted that further work on these assumptions are on-going.

5. **Data Table** (Referenced to Slide 14*:* Sasol presentation to the Davis Tax Committee -12 May 2015: *http://www.taxcom.org.za/docs/New_Folder2/Sasol%20carbon%20tax%20presentation%20to%20DTC.pdf*)

Year	GHG Inventory	PPD UL	No electricity & industrial growth until 2022	No electricity growth until 2022	Implementation of the IRP moderate decline case
1990	350				
1991	358				
1992	365				
1993	373				
1994	380				
1995	387				
1996	393				
1997	400	398			
1998	407	409			
1999	413	420			
2000	420	431			
2001	433	442			
2002	440	453			
2003	446	464			
2004	458	475			
2005	471	486			
2006	482	497			
2007	499	508			
2008	518	519	518	518	518
2009	530	530	518	518	518
2010	547	547	518	518	518
2011	545	550	518	523	518
2012	564	553	518	528	518
2013	585	556	518	533	518
2014	611	559	518	538	518
2015	628	562	518	544	518
2016	653	565	518	550	518
2017	678	568	518	555	518
2018	703	571	518	561	518
2019	723	574	518	568	518
2020	749	583	518	574	518

2021	767	589	518	581	518
2022	794	595	536	601	511
2023	819	601	553	620	519
2024	846	607	571	641	530
2025	872	614	589	660	535
2026	899	614	607	681	541
2027	922	614	623	698	547
2028	950	614	642	719	555
2029	980	614	662	742	562
2030	1005	614	679	761	574
2031	1025	614	692	776	576
2032	1055	614	713	799	584
2033	1089	614	735	825	595
2034	1121	614	757	849	603
2035	1157	614	781	876	614
2036	1186	601	801	898	620
2037	1216	588	821	921	626
2038	1243	575	839	941	625
2039	1267	562	856	959	620
2040	1298	549	877	983	620
2041	1331	536	899	1008	616
2042	1365	523	922	1034	615
2043	1398	510	944	1059	611
2044	1432	497	967	1084	608
2045	1467	484	991	1111	603
2046	1500	471	1013	1136	598
2047	1533	458	1035	1161	591
2048	1567	445	1058	1186	585
2049	1603	432	1083	1214	578
2050	1639	428	1107	1241	575