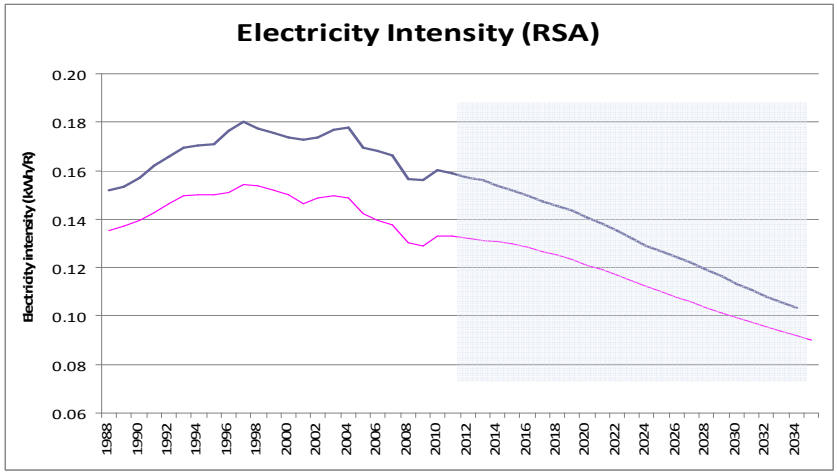
D3,4: Electricity Intensity - IRP 2010 Input Parameter

Parameter	**Electricity intensity (combined long-term and short-term)**
Parameter Value	This parameter is not a specific input to the demand forecast model, but is used as a check to determine the correct trajectory for electricity demand (relative to economic growth).  The electricity intensity of the economy is a measure of the ratio of electricity energy consumption relative to the Gross Domestic Product (GDP). This can be expressed at basic prices and market prices. The recent historic trend is indicate in the graph above (comparing total South African consumption, including losses, to gross value added at basic prices in blue (constant 2005 prices)), with the intensity at 2009 sitting at 0,16kWh/R of gross value added. Whilst the gross value added at market prices in purple line (constant 2005 prices)), with the intensity at 2009 sitting at 0,129kWh/R of gross value added. The energy intensity will gradually decline from the 0,16kWh/R in 2009 to 0,1kWh/R in 2034 at basic prices. Whilst the energy intensity decline from 0,129kWh/R in 2009 to 0,09kWh/R in 2034.
Rationale	It is expected that, following the trend of developed countries, the tertiary sector of the economy (which is less energy intensive) would grow at a faster rate than the primary or secondary sectors. High price increases for electricity would also induce a certain amount of substitution to alternative energy sources, or increased energy efficiency, which would reduce the electricity intensity in the economy.

IRP INPUT PARAMETERS

Responses to Public Inputs

Summary of specific comments	Response
Industrial policy should be able to reduce the intensity at a faster rate (90x2030)	This is possible, but existing industrial policy would suggest the opposite, by increasing the manufacturing base (relative to services). The impact of the policy has not been fully assessed and this assumption may change in future iterations of the IRP.
Identify how the 3:2 ratio is determined (ACMP). Does it include load shedding? (MainstRenPower, SAWEA)	The discussion above indicates a different approach to Electricity Intensity, which is hopefully more descriptive of the underlying assumptions. Load shedding is not included in this assumption as supply constraints are excluded from the energy forecast (to indicate the requirement for energy regardless of constraints).
Energy efficiency must be actively encouraged by government, with the reduction in the electricity intensity ratio a policy target (Energy Caucus)	Noted. This is an option being explored in the Enhanced Efficiency scenario (Base Scenarios - O1).
Target of 6% growth is too high – structural constraints impede this (Private-WB)	Explanations for the GDP cone are available in D2.
Electricity intensity should be broken down into industrial, commercial and residential sectors. It should also be broken down into electricity, other fuels and transport (SAWEA)	Noted. While the SO and CSIR forecast reports indicate the expected demand per sector, the intensity remains to be calculated and will form part of developments for the next iteration of the IRP.
Continuing on an energy-intensive, coal-reliant growth path is not sustainable, either GDP or electricity demand growth (or both) must be reduced over time. (Energy Caucus, SusActMov) Sustainable development principles should be applied in a holistic approach (Windlab Development SA)	Noted.
Innovation in manufacturing technologies should be encouraged by the state. Climate friendly technologies and systems, inclusive of decentralised grid, would impact on grid energy demand. (SusActMov, MainstRenPower)	Noted.
DSM and EE should be coupled to electricity intensity input in the demand forecast model (Windlab Development SA)	While energy efficiency is inherently linked to electricity intensity, DSM refers more to interventions designed to reduce demand or alter demand patterns. The latter are included as supply side options (D6,7,8).
The Department of Economic Planning is urged to develop a structured plan for SA to regenerate and develop the manufacturing, retail and services sectors. (ACMP)	Noted.
It seems that the demand projection from D1 does not consider the shift from economic growth to electricity growth ratio from 3:2 to 2:1 in the proposed time range of 10 to 15 years, why? (90X2030, CJN!-WC)	The original D1 projection was an example. The revision of the two fact sheets (D1 and D3,4) should remove this inconsistency.
Target of 6% growth will not be achieved In any economy, primary, secondary and tertiary sectors are interrelated. (Coega Development Corporation) How is labour absorption going to be ensured? What if more beneficiation is achieved? (Coega Development Corporation)	Explanations for the GDP cone are available in D2. The labour absorption rate is not considered. Beneficiation as a result of industrial policy is considered in the growth projections and demand forecasts.
Historical intensity based on low electricity prices – new tariff trajectory will impact this (DoE)	Noted. The extent of this impact is not certain, but consideration has been taken. (D5 has more detail.)
A period of 15 years is too short for this assumptions (NIASA)	Noted. The full forecast and IRP horizon has been included above (25 years).
Short and long term impacts can be combined into a single fact sheet (SASOL, Eskom)	Noted.
Ratio of 3:2 equivalent to traditional income elasticity of 0.6 (in line with previous modelling results) (SASOL)	Noted.
Need to be consistent with industrial policy – if manufacturing to GDP ratio increases, then electricity intensity may not decline at all (SASOL)	Noted. The implementation of industrial policy may well slow the intensity decline, but the ratio of manufacturing to GDP may not necessarily increase as a result of the policy (as ancillary sectors should grow alongside manufacturing).
Potential increase in electricity intensity due to electric vehicles should be taken into account (SASOL)	Noted. This adjustment should be considered in the next iteration of the IRP with additional information relating to the impact of electric vehicles and the potential penetration in the SA economy.