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PRESENTATION TITLE



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ENERGY POLICY LANDSCAPE

**PRESENTATION MADE TO THE STAKEHOLDER
CONSULTATION WORKSHOP IN PREPARATION OF
THE SECOND EDITION OF THE STATE OF
RENEWABLE ENERGY IN SOUTH AFRICA REPORT**

28 NOVEMBER 2016

PROBLEM STATEMENT



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- Energy is the life blood of the economy which impacts on all sectors as well as individual livelihoods. Integrated energy planning is required to ensure that current and future energy service needs can be met in the most cost effective, efficient and socially beneficial manner while also taking into account environmental impacts.
- A lack of coordinated and integrated national planning for the energy sector has led to underinvestment in much needed energy infrastructure.
 - There is currently inadequate supply in both the electricity and liquid fuel industries due to a lack of timely investments in new capacity.
 - Electricity generation is constrained due to insufficient capacity and inadequate availability of existing infrastructure.
 - There is a high dependence on import of liquid fuels as the current production capacity does not meet national and export demand. No investments have been made in new capacity since the start of the new democracy.
- Planning at individual organisation level is commercially driven and therefore investments which are required in order to ensure that the policy objectives of the country have been left under invested.
- The IEP aims to guide future energy infrastructure investments, identify and recommend policy development to shape the future energy landscape of the country.



ENERGY WHITE PAPER (1998)

- The 1998 White Paper on the Energy Policy of the Republic of South Africa (Energy White Paper) is the primary policy document which guides all subsequent policies, strategies and legislation within the energy sector. It provides specific policy statements on what government intends for the energy system as a whole and sets out five key objectives. These objectives have subsequently formed the foundation and informed the development of energy policy in South Africa and still remain relevant. Various other energy policies have been developed and are in different stages of implementation.
 - Increasing access to affordable energy services
 - Improving energy governance
 - Stimulating economic development
 - Managing energy-related environmental impacts
 - Securing supply through diversity



LEGISLATIVE FRAMEWORK

LEGISLATION	SCOPE
National Energy Act, 2008	In terms of the National Energy Act, the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The National Energy Act requires the IEP to have a planning horizon of no less than 20 years. The development of the IEP is therefore a continuous process as it needs to be reviewed periodically to take into account changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst other factors. Since change is on-going, the plan must remain relevant.
Section 34 (1) of the Electricity Regulation Act (ERA)	Section 34 (1) of the ERA empowers the Minister of Energy, in consultation with NERSA, to make Ministerial Determinations for new generation capacity is so required to secure the continued uninterrupted supply of electricity. The Ministerial determination may outline the type of energy sources from which the electricity must be generated.
Regulations on New Electricity Generation	Stipulate that the IRP must be developed by the Minister of Energy after consultation with NERSA Empowers the Minister to make determinations in terms of section 34 of the ERA

ENERGY PLANNING WITHIN THE NATIONAL POLICY FRAMEWORK



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NATIONAL DEVELOPMENT PLAN, NEW GROWTH PATH, 9-POINT PLAN



ENERGY PLANNING PROCESS

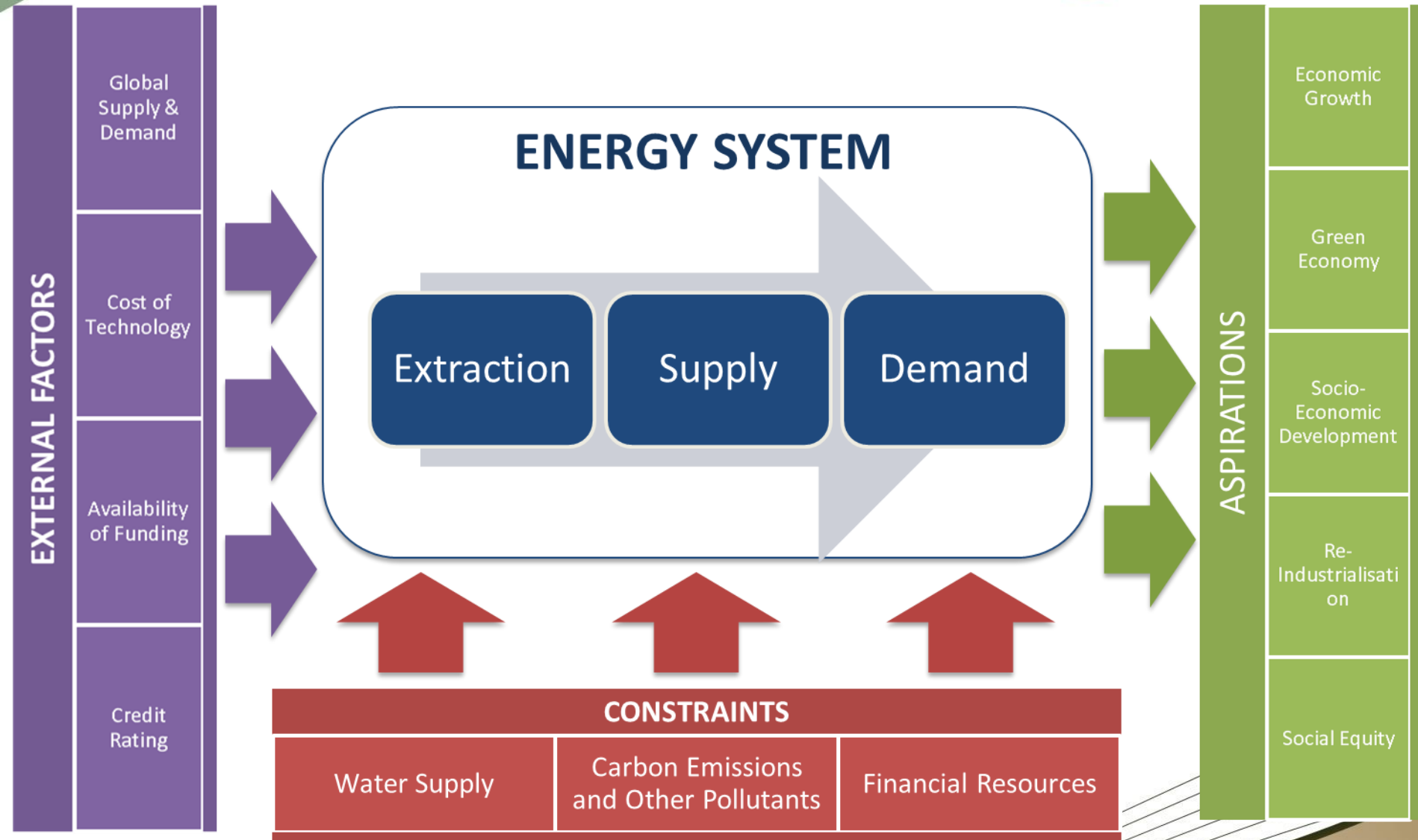


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ENERGY PLANNING SCOPE

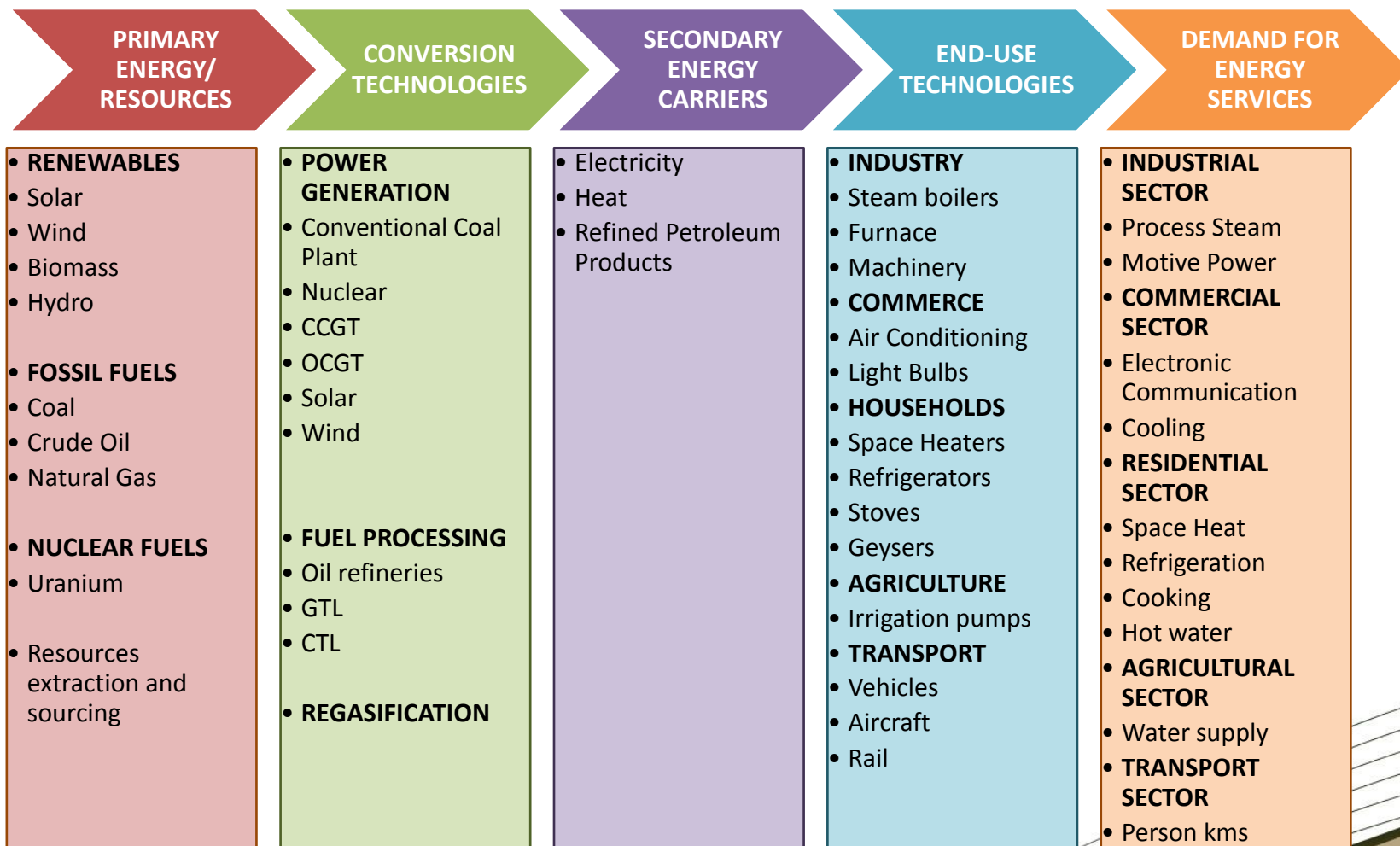


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The Energy Planning Framework considers all energy carriers, all technology options and all key national policy imperatives and proposes an energy mix and policy recommendations which ensures that the energy sector can help achieve these in the most optimal manner.



IEP AND OTHER PLANS

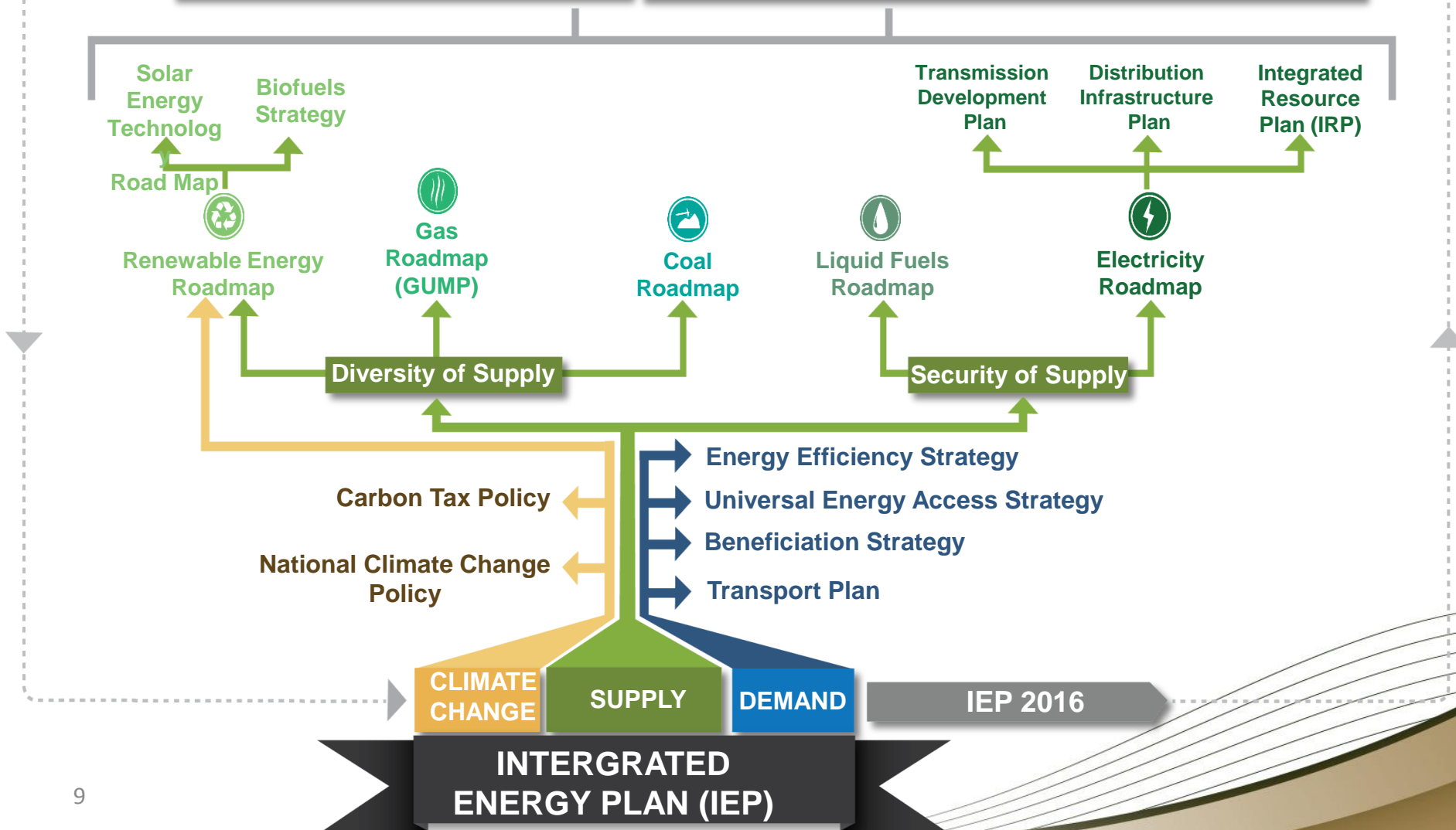


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The IEP takes into consideration existing policies

- Informs development of future energy sector roadmaps
- Provides feedback to development & review of external policies



ENERGY PLANNING FRAMEWORK



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	IEP	IRP	LFRM	GUMP
SCOPE	<p>Entire energy sector</p> <ul style="list-style-type: none"> • All energy carriers • Cross-cutting issues that span entire energy sector 	<ul style="list-style-type: none"> • Electricity generation build plan • Transmission build plan • System Adequacy • Electricity Price Path 	<p>Liquid Fuel Supply Infrastructure</p> <p>- Location and logistics</p>	<p>Gas supply and infrastructure</p>
ENERGY CARRIERS CONSIDERED	<ul style="list-style-type: none"> • All primary fuels <ul style="list-style-type: none"> - Coal - Natural Gas (Imported LNG and indigenous sources) - Crude oil - Renewables (Solar, Wind, Hydro, Biomass, etc.) • All secondary fuels <ul style="list-style-type: none"> - Electricity - Petroleum Products 	<ul style="list-style-type: none"> • Primary fuels <ul style="list-style-type: none"> - Coal - Natural Gas (Imported LNG and indigenous sources) - Renewables (Solar, Wind, Hydro, Biomass, etc.) • Secondary fuels <ul style="list-style-type: none"> - Electricity - Petroleum Products 	<ul style="list-style-type: none"> • Primary fuels <ul style="list-style-type: none"> - Coal - Natural Gas (Imported LNG and indigenous sources) - Renewables (Biomass, Crops) - Crude Oil • Secondary fuels <ul style="list-style-type: none"> - Petroleum Products 	<ul style="list-style-type: none"> • Primary fuels <ul style="list-style-type: none"> - Imported Natural Gas - Indigenous gas (Shale gas, CBM, other natural gas)



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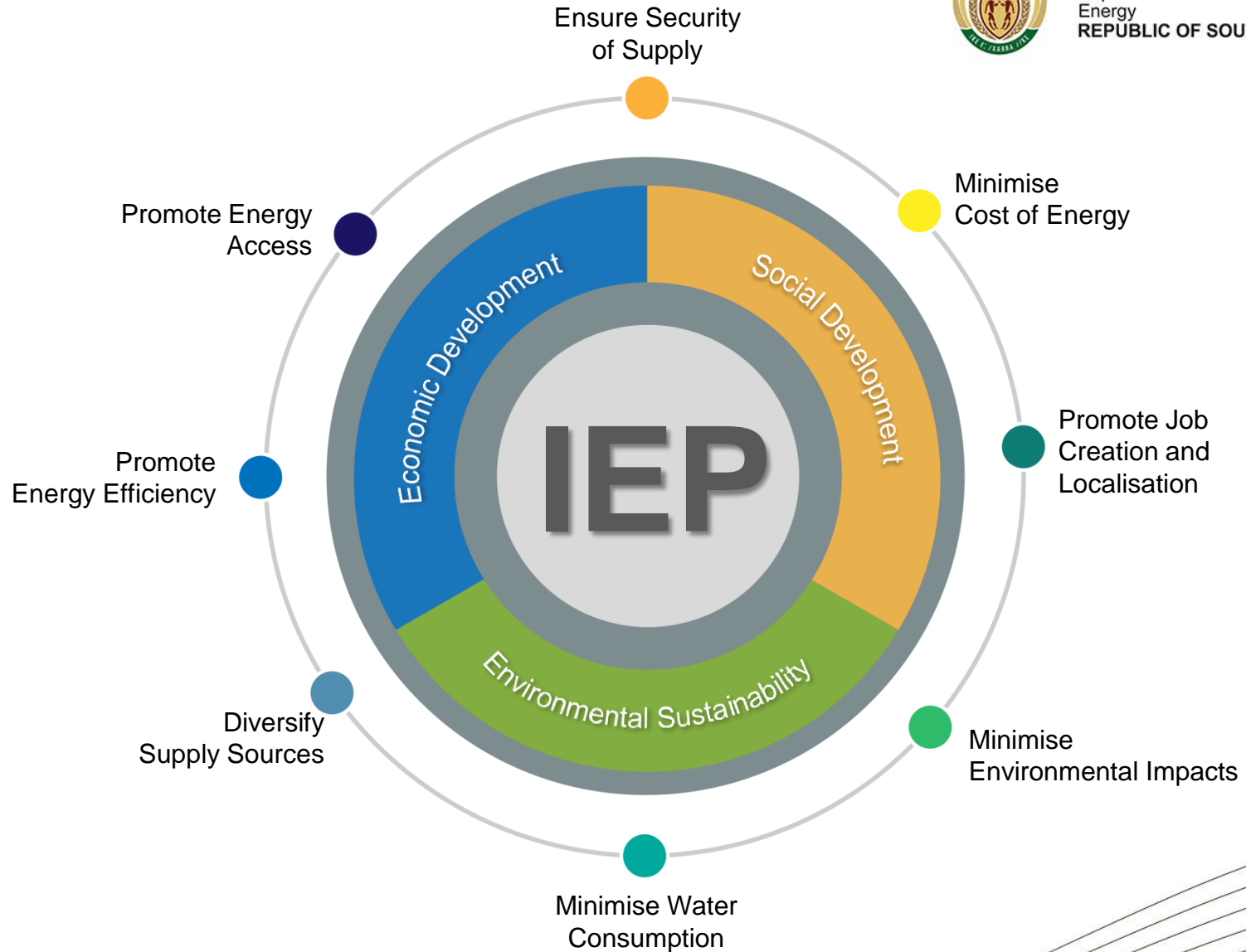
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INTEGRATED ENERGY PLAN

8 KEY ENERGY PLANNING OBJECTIVES



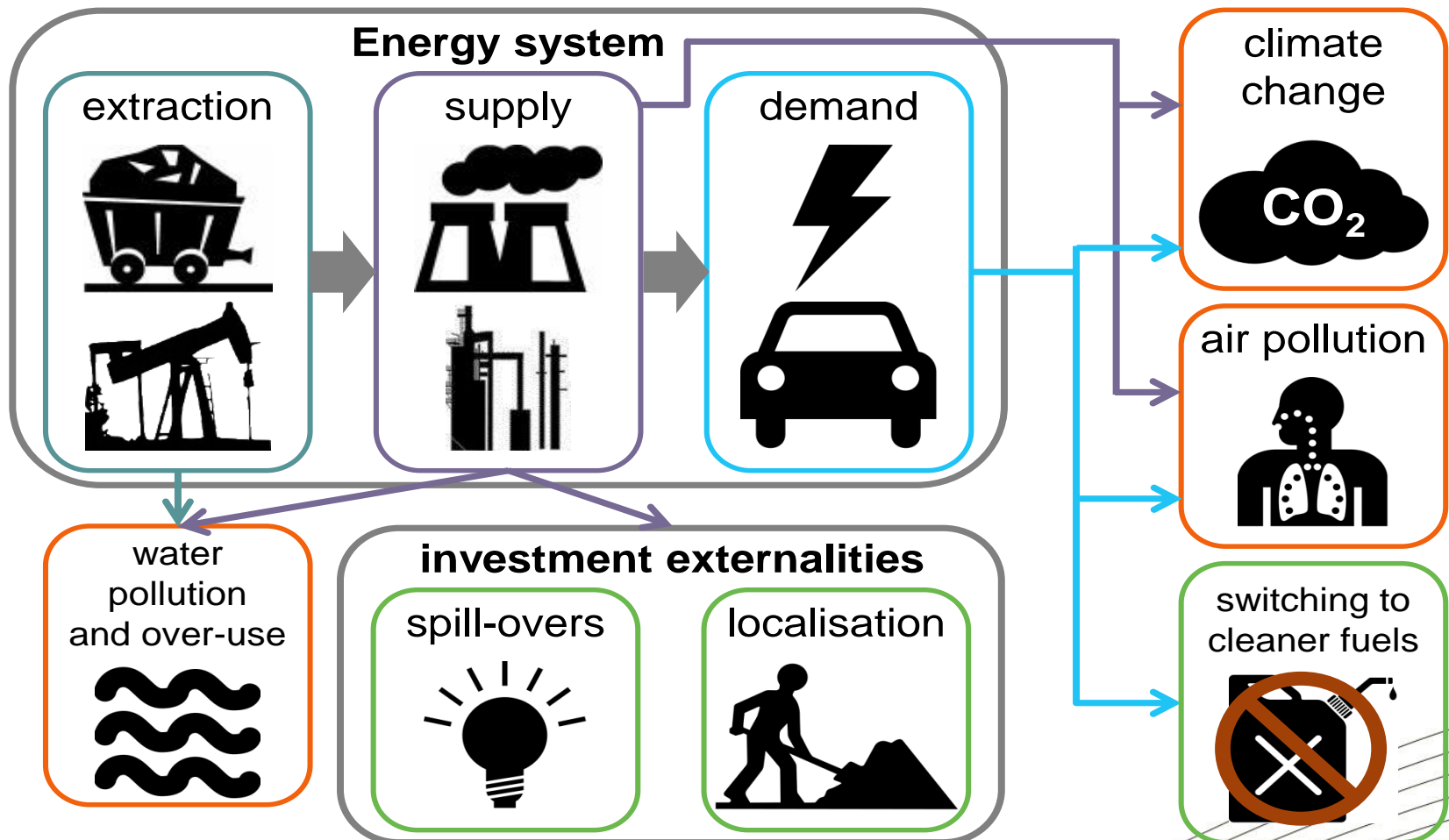
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ENERGY SYSTEM EXTERNALITIES

*IEP Internalises Energy System Externalities (both **negative** and **positive**)*



Source: Vivid Economics 2014

JOB CATEGORIES CONSIDERED



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CATEGORY	DEFINITION	EXAMPLE
Direct Jobs	Jobs resulting from construction or operation of the technology	<ul style="list-style-type: none"> • Construction workers • Brick layers • Plant operators
Supplier Jobs	Jobs resulting from first level suppliers during construction and/or operation	<ul style="list-style-type: none"> • Turbine manufactures • Cement producers • Steel manufacturers
Indirect Jobs	Jobs resulting further down the value chain during construction and/or operation. i.e. suppliers to suppliers	<ul style="list-style-type: none"> • Iron ore miners and smelters
Induced Jobs	Jobs resulting from more money in the economy because of the project.	<ul style="list-style-type: none"> • Restaurants • Transport services • Medical facilities
Permanent Jobs	These are jobs which have a longer duration and are more permanent in nature. Services are usually established in-house within the organisation.	<ul style="list-style-type: none"> • All operations jobs are considered to be permanent jobs • Estimated per unit of capacity installed
Temporary Jobs	These are jobs which have a relatively short duration. Services are usually contracted.	<ul style="list-style-type: none"> • All construction jobs are considered to be temporary jobs • Estimated per unit of energy output



LOCALISATION POTENTIAL

(BASED ON CURRENT POLICIES AND LOCAL CAPABILITY)

Level of difficulty to localise

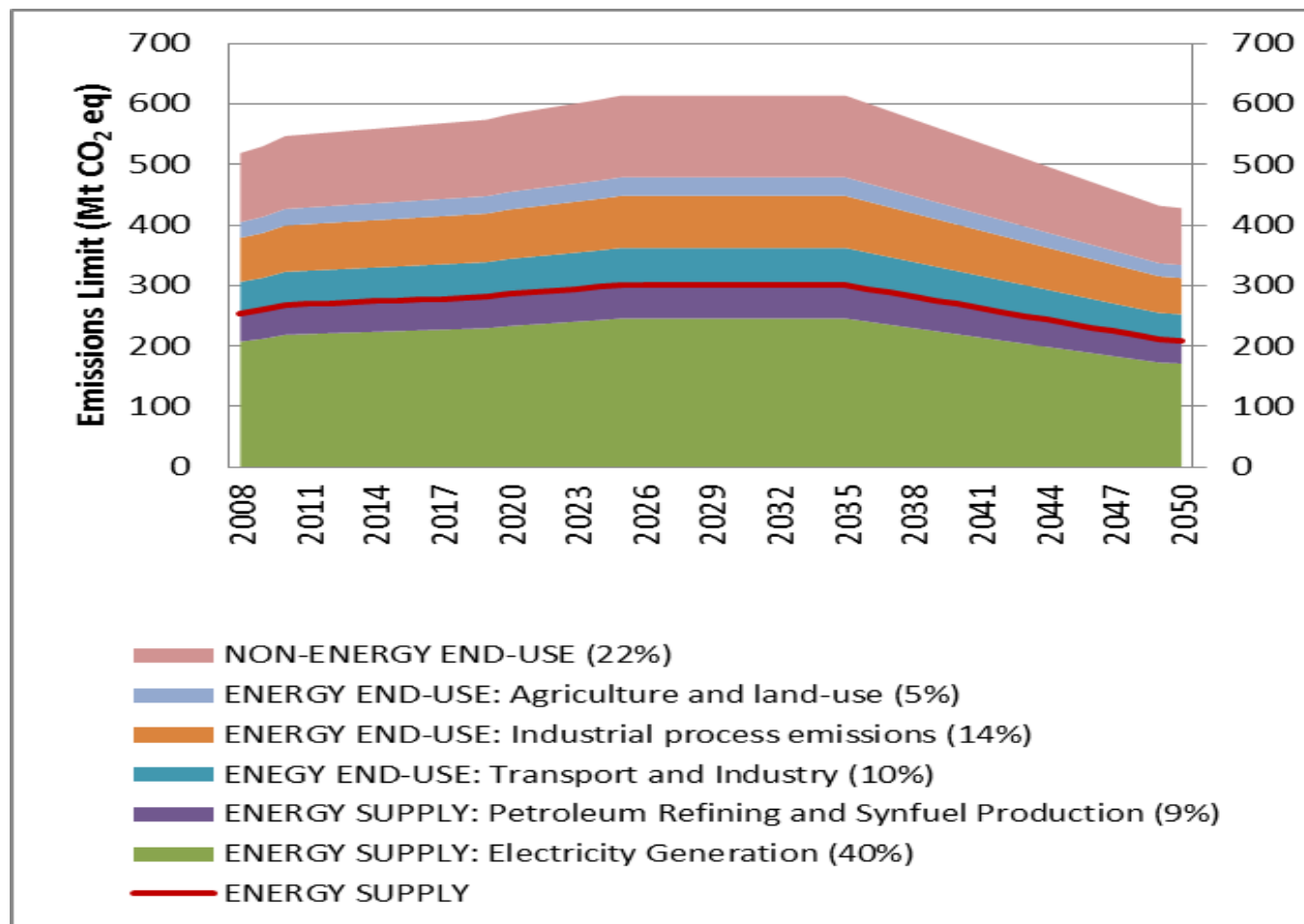
Localisation Potential	Description
Localisable	The current policy framework is conducive for localisation; local supply of the required skills set is available; and there is sufficient demand for raw material to justify local production
Potentially localisable	The current policy framework exists or could be developed and implemented within a fairly short timeframe (3-5 years)
Collaboration	The current policy and regulatory framework could be developed and implemented within five years and some targeted investments would need to be made
Significant investment required	Regional cooperation and partnerships would need to be developed in order to create demand beyond South Africa's borders
Global demand required	Some of the required technology components can be localised but South Africa would need to be competitive in exporting the technologies and services to the global market

EMISSIONS CONSTRAINTS



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The National Climate Change Response White Paper (NCCRWP) sets emission limit targets for all sectors. The energy planning framework considers the impact of the emission limit targets for the energy supply sectors only (electricity generation and the production of petroleum products).



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IEP SCENARIOS

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INDICATORS	BASE CASE	RESOURCE CONSTRAINED	ENVIRONMENTAL AWARENESS	GREEN SHOOTS
Technology Constraints	9.6 GW New Nuclear Build enforced			
GDP	Treasury moderate GDP growth			National Development High GDP Growth
DEMAND-SIDE INTERVENTIONS				
DSM	1 million SWH		5 million SWH	10 million SWH
Energy efficiency	Business As Usual	High Energy Efficiency		
VEHICLE EFFICIENCY (new vehicle improvement per annum)				
Cars and SUVs	1.1%	2.50%		
Trucks and buses	0.8%	1.00%		
Electric vehicle penetration	20% annual rate			40% annual rate
Prices of Energy Commodities	Moderate	High	Moderate	Moderate
CLIMATE CHANGE				
CO ₂ emissions limits	Upper bound “Peak-Plateau-Decline” (PPD) emission limit trajectory from the National Climate Change Response White Paper		PPD lower limit	PPD upper limit
CO ₂ externality costs	• R48-R120/t (2015 - 2019) • R120/t onwards		• R270/t 2015 - 2050	• R48-R120/t (2015- 2019) • R120/t onwards
Carbon Tax	Embedded in the externality cost of Carbon			

IEP SCENARIOS



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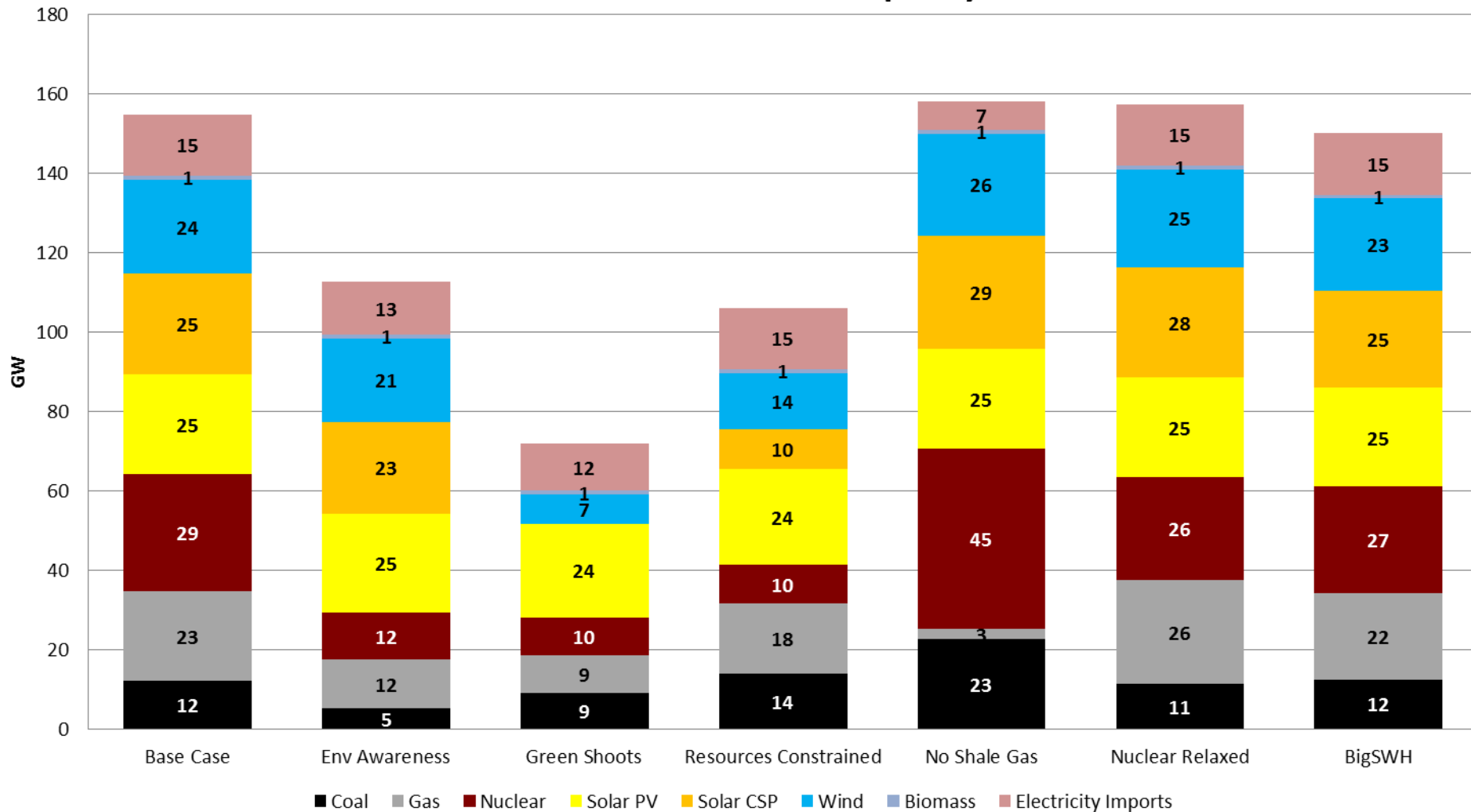
INDICATORS	BASE CASE	BIG SWH	NUCLEAR RELAXED	NO SHALE GAS
Technology Constraints	9.6 GW New Nuclear Build enforced		None	9.6 GW New Nuclear Build enforced
GDP	Treasury moderate GDP growth			
DEMAND SIDE INTERVENTIONS				
DSM	1 million SWH	10 million SWH	1 million SWH	
Energy efficiency	Business As Usual			
VEHICLE EFFICIENCY (new vehicle improvement per annum)				
Cars and SUVs	1.1%			
Trucks and buses	0.8%			
Electric vehicle penetration	20%			
Prices of Energy Commodities	Moderate			Unavailable shale gas
CLIMATE CHANGE				
CO ₂ emissions limits	PPD upper limit			
CO ₂ externality costs	• R48-R120/t between 2015 and 2019 • R120/t onwards			
Carbon Tax	Embedded in the externality cost of carbon			

IEP SCENARIOS



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Accumulated New Generation Capacity - 2050





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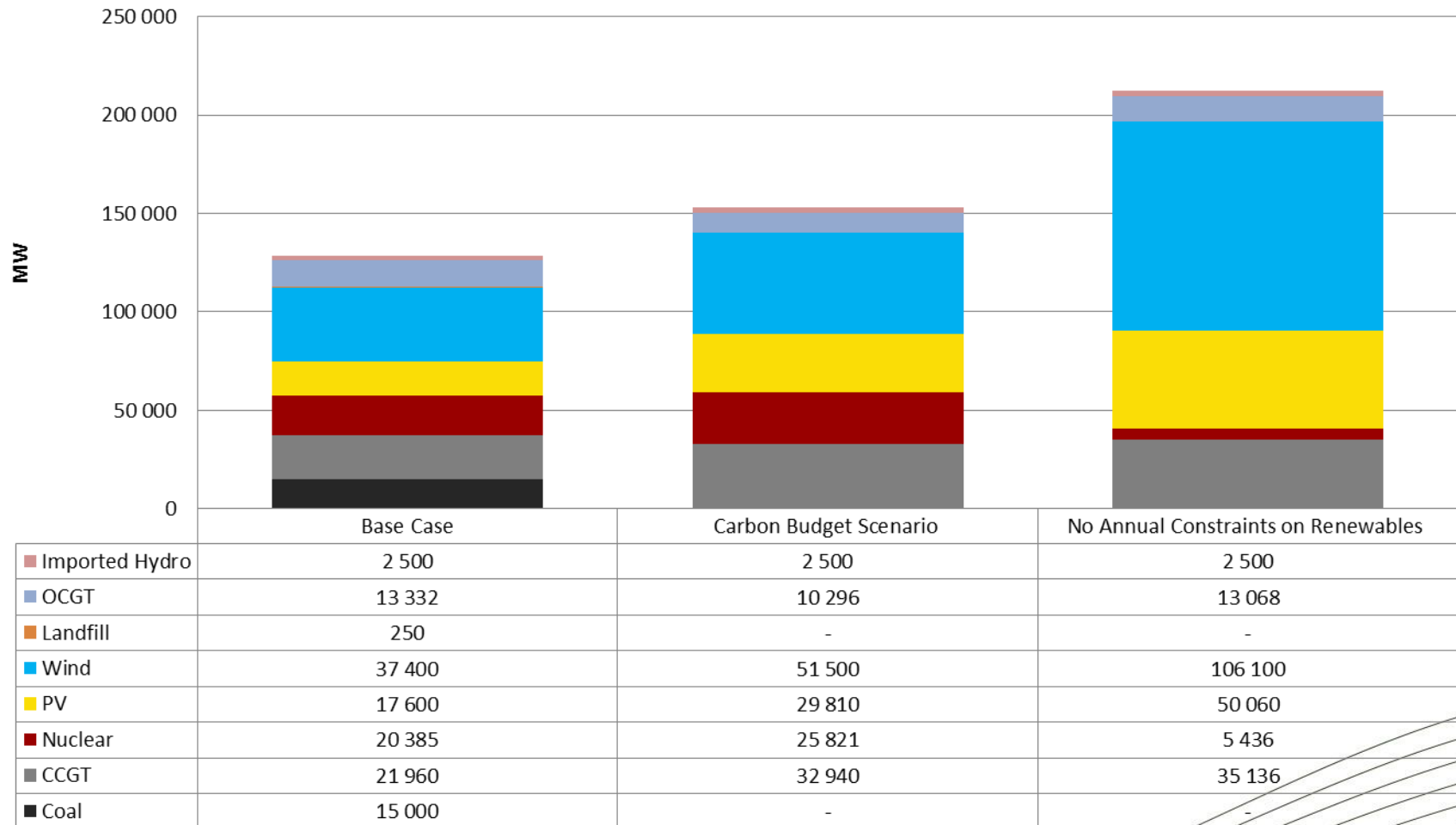
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Indicators	Base Case	Carbon Budget Scenario	No Annual Constraints on Renewables
Learning Rates	Moderate		
PV and Wind Constraints	Annual Build Constraints		
Fuel Prices	Fixed Fuel Prices		
Emissions	Moderate Decline	DEA Lower Carbon Budget	



IRP SCENARIOS

Accummulated New Generation Capacity - 2050





ADDITIONAL SCENARIOS

Some of the additional scenarios and sensitivity analyses that will be run are as follows:

- Carbon Tax
- Commodity Price sensitivities
- Low demand trajectory
- Embedded Generation (Rooftop PV)
- Enhanced Energy Efficiency
- Low Eskom Plant Performance
- Regional Options
- Indigenous gas



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