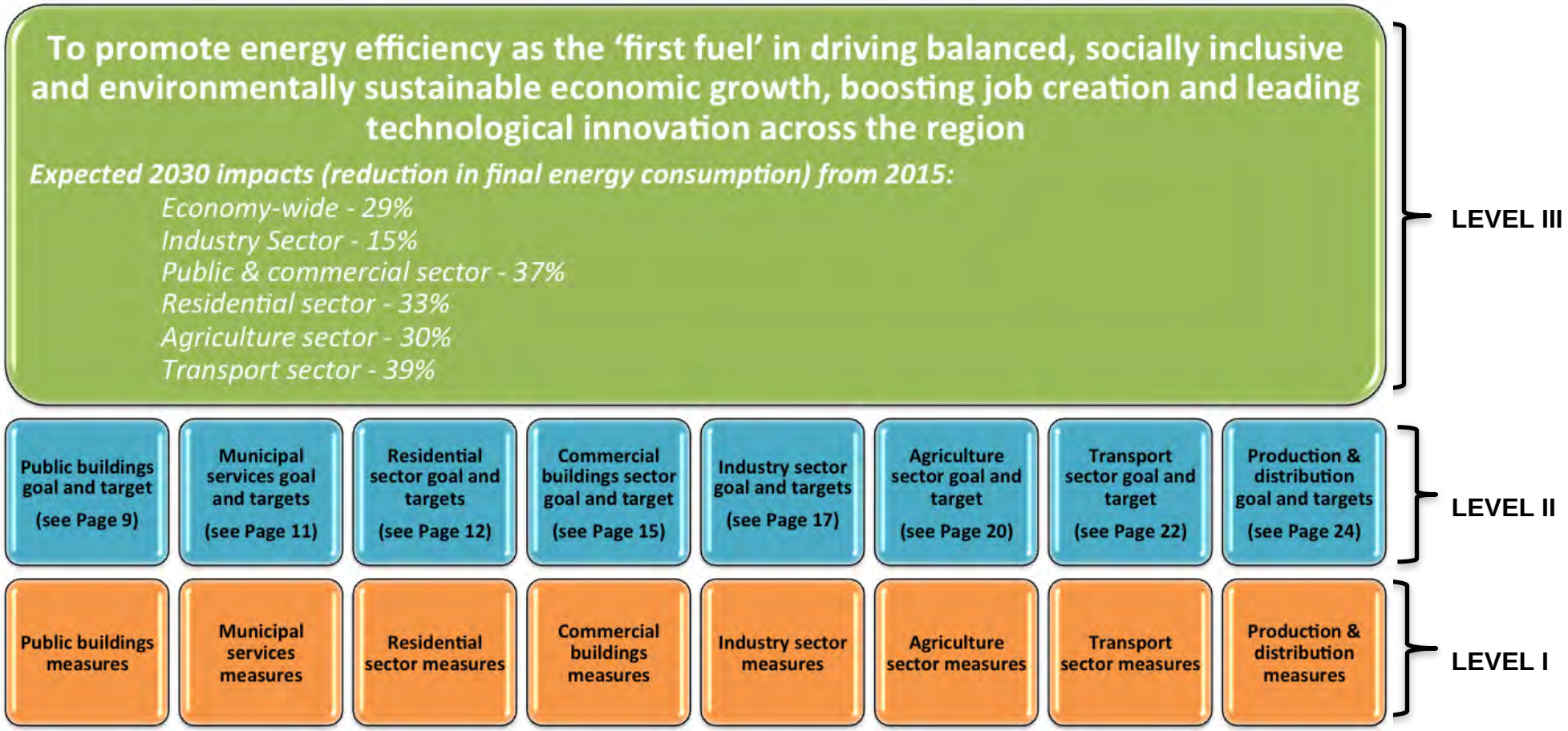
ANNEX A: Detailed results-based framework



LEVEL I: The results framework illustrated above is broken down in detail in the following tables. The expected savings from the implemented measures are described for the lowest level of the results framework in the corresponding orange tables.

MEASURES		
Description	**Estimated savings**	**Risks and assumptions**
Public buildings sector		
Leading by example – developing the brand Green procurement Energy management Innovative financial solutions Professionalisation of ESCOs Expansion of mandatory EPCs Expansion of standards and labelling	10 PJ (building retrofits)	• The institutionalisation of the energy efficiency culture requires strong political commitment. If full political buy-in is not evident, the measure will not be as effective. • Green procurement can lead to higher up-front costs, causing annual procurement budgets to inflate. This may be challenging to justify in the current resource constrained context. • Facilities managers may not have a technical background and therefore will require capacity building before they are able to take on the role of energy manager. • Based on the current economic climate, the introduction of innovative investment solutions may prove challenging, specifically due to recent devaluations. • The accreditation process for ESCOs needs to be relatively simple and not too costly to encourage smaller SMEs to invest.
Tightening of building standards	25 PJ (new buildings)	• The tightening of standards, specifically the energy performance of building materials, may result in an increase in the cost of new buildings. • Indoor climate may suffer as a result of improved energy efficiency.

Municipal sector		
Municipal energy efficiency strategies Support to identification of energy efficiency opportunities Innovative financial solutions Professionalisation of ESCOs Energy rating system for municipal services	5 PJ (municipal services) 9 PJ (vehicle fleets)	• Municipalities that do not have a qualified Energy Manager may find it challenging to ensure the quality of the comprehensive audits and resulting strategy. • For smaller municipalities where the potential for energy savings is limited, attracting financing may be challenging. Pooling buildings and services under one contract may make the investment more attractive. • The incentive of the energy rating system is limited for small municipalities, due to a lack of financial independence to implement large energy saving initiatives. • Lack of financial incentive in general for municipalities to undertake measures due to funding structure. • The accreditation process for ESCOs needs to be relatively simple and not too costly to encourage smaller SMEs to invest.
Residential sector		
Tightening of MEPS for appliances Energy efficiency endorsement label Appliance scrappage scheme	31 PJ (appliances)	• Prices of new appliances may increase as the cheaper, poorer quality products will be filtered out of the market, thereby making them unaffordable. • The second-hand market for cheap equipment may become more active to cater for those that cannot afford new and efficient appliances. • The appliance scrappage scheme may encourage fraudulent claims and therefore needs to be administered carefully.
Tightening of building standards	34 PJ (new buildings)	• Assumes that full compliance is achieved • Increased cost of construction may limit the rate at

		which new subsidised homes can be delivered • Indoor climate may suffer as a result of improved energy efficiency.
Financial incentives for thermal retrofits of dwellings Energy performance certificates for residential buildings Engaging municipalities in the delivery of residential energy efficiency	43 PJ (building retrofits)	• The full potential for building retrofits will only be realised if EPCs allow the value of improved energy efficiency to be reflected in property prices
Targeted awareness-raising	8 PJ	• As average living standards improve, the financial imperative for householders to adopt energy saving behaviour may weaken • Easing of recent electricity supply constraints may weaken the energy saving message
Dissemination of improve cookstove technologies		• The EE technology hubs would identify suitable and socially acceptable technologies that are high performing • Changes may be required in fuel source which means the supply chain needs to be considered • As average living standards improve and electricity is accessible to all, the need for this intervention will reduce • Users may consider this as an inadequate action as they will expect to receive electricity
Commercial buildings sector		
Tightening of building standards	66 PJ	• Assumes that full compliance is achieved
Energy performance certificates Professionalisation of ESCOs Tax incentives for building retrofits	17 PJ 3 PJ	• Risk of that ESCOs may exploit only the 'low hanging fruit', leaving deeper retrofits impossible to finance • Tax incentives may result in 'free-riders'

		• The accreditation process for ESCOs needs to be relatively simple and not too costly to encourage smaller SMEs to invest.
Tightening and expanding of MEPS for appliances / equipment Energy efficiency endorsement label	7 PJ	• Tighter MEPS may result in increased price of equipment and an inability to afford replacement, leading to prolonged use of older, inefficient equipment
Industry sector		
Continuous improvement to 12L tax incentive	42 PJ	• The 12L may be used by 'free riders' that would have undertaken the energy efficiency improvement anyway.
Mandatory energy management plans Promote ISO50001 certification	45 PJ	• The purpose and function of energy management plans is not clearly understood. The purpose of completing them and the implications of not taking action needs to be made clear. • ISO50001 is considered to be an expensive process that requires investment year on year.
Minimum energy performance / design standards Energy efficiency endorsement label	2 PJ	• Too aggressive use of MEPS may damage local suppliers / manufacturers of equipment or act as a barrier to new entrants • Introduction of MEPS for motors before systems are fully optimised may yield little if any savings
Targeted advice / audits	25 PJ	• Due to the economic situation, even with all the incentives offered, businesses are focused on survival.
Agriculture sector		
Establish effective financing mechanisms (incl. carbon offsets) Provision of direct grants to smallholders / small farmers	1 PJ	• The potential for individual farmers to save may be too small to be of interest. • Continuation of current drought conditions may lead to unavailability of water, and abandonment of land

Awareness raising for savings in electric motor-driven systems		requiring irrigation.
Awareness raising for savings in agricultural vehicles	26 PJ	• Assumed that savings may be realised with little or no requirement for significant capital expenditure once awareness is raised
Transport sector		
Minimum fuel performance standards for vehicles Strengthening vehicle roadworthiness testing to include emissions	100 PJ	• Corruption is considered to be a high risk in relying on vehicle testing.
Voluntary agreements with vehicle manufacturers Voluntary agreements with operators of private passenger fleets National eco-drive strategy Accreditation for specialist transport sector energy auditors	-	• Risk that private sector stakeholders do not perceive any benefit to entering into voluntary agreements • Eco-driving is effective in the medium term but drivers often require reminders/ refresher courses.
Energy sector		
Enabling framework for cogeneration and waste heat recovery	10 PJ	• There is currently little uptake of the opportunities. The risk is that the barriers cannot be addressed to make cogeneration attractive.
Energy efficiency obligations on distributors / suppliers	-	• There is a risk of double-counting savings if distributors/ suppliers implement measures in end use sectors.
Expansion of internal energy efficiency programme for producers	-	

LEVEL II: The targets that are set for each sector or sub-sector are outlined in the corresponding blue tables below.

GOALS AND TARGETS		
Description	**2030 Target(s)**	**Risks and assumptions**
Public buildings sector		
Reduction in specific energy consumption (measured as GJ annual energy consumption per m^2 of occupied floor area).	50% reduction	• Assumes 54% of the total stock of buildings in 2030 will consist of post-2015 construction • There is a risk that increases in the use of technology will increase consumption.
Municipal sector		
Reduction in the energy intensity (measured as energy consumption per head of population served) of municipal service provision. The specific services included are street lighting, traffic lights, water supply and wastewater treatment.	20% reduction	• Over a period of 15 years, service levels are likely to change, as well as the use of energy-consuming technologies.
Reduction in the fossil fuel intensity of municipality vehicle fleets (measured as total fossil fuel consumption by municipal vehicles per head of population served)	30% reduction	• Assumes 20% improvement in technical efficiency of vehicles, with remainder of improvement deriving from driver behaviour, fleet management and alternative fuels • The replacement of petroleum vehicles with electric may still have negative environmental consequences if the electricity is produced by coal-fired power stations.
Residential sector		
Reduction in the average specific energy consumption of new household appliances purchased in South Africa	33% reduction	• Assumes two tightening phases for appliance MEPS, each of one 'band' on the energy label
Reduction in the average specific energy	20% reduction	• Assumes 4 million new dwellings constructed

consumption of the residential building stock		between now and 2030
Commercial buildings sector		
Reduction in the specific energy consumption (measured as GJ annual energy consumption per m^2 of lettable / habitable floor area)	37% reduction	• The potential failure of the market to respond to the EPCs may result in property owners being discouraged to invest in energy efficiency improvements. • Assumes 50% of 2030 building stock will consist of post 2015 construction
Industry sector		
Reduction in the weighted mean specific energy consumption for the manufacturing industry	16% reduction	• The current economic crisis combined with increases in electricity prices reduces the ability for companies to invest.
Cumulative total annual energy saving from specific energy saving interventions undertaken by in the mining sub-sector.	40 PJ saving	• The current economic crisis combined with increases in electricity prices reduces the ability for companies to invest.
Agriculture sector		
Total verified electricity saving from officially supported projects	1 PJ saving	• Assumed that a significant fraction of the total potential savings are realised through officially supported projects
Transport sector		
Reduction in the average vehicle energy intensity (measured in MJ/km) of the South African road vehicle fleet	20% reduction	• Stricter vehicle standards may push up the price of new vehicles and result in older vehicles remaining in use for longer. • Low global oil prices may reduce the international pressure to improve vehicle efficiency standards

Energy sector		
Reduce overall average distribution losses	Below 8% nationally	• Potential political risk associated with attempts to control theft of electricity • Smaller municipalities may be unable to finance
Total electricity generation from grid-connected cogeneration	10 PJ annually	

LEVEL III: The anticipated impacts on sectors overall are described in the corresponding green tables below.

ENERGY SAVING IMPACTS	
Expected 2030 Impact	**Risks and assumptions**
Public and commercial sector	
37% saving against a baseline projected from 2015	• This is the saving across the combined commercial and public sector that would be revealed through a decomposition analysis conducted in 2030
Residential sector	
33% saving against a baseline projected from 2015	• This is the saving that would be revealed by a decomposition analysis conducted in 2030 that separates out the effects of changes in the number of households and changes in living standards. A detailed methodology for performing this analysis is provided in the documentation that supports the Energy Efficiency Target Monitoring System (EETMS). • The data necessary for performing a decomposition analysis would be obtained from household energy surveys. • This saving is the combined result of achievement of the two residential sector targets along with additional efficiency improvements resulting from behavioural and lifestyle factors.
Industry sector	
15% saving against a baseline projected from 2015	• This is the saving that would be revealed through a decomposition analysis conducted in 2030. • The saving is the combined result of achieving the separate manufacturing and mining sub-sector targets
Agriculture sector	
30% reduction in energy intensity relative to 2015	• It is assumed that detailed sub-sectoral data will not be available to enable a decomposition analysis of the agricultural sector to be

	performed. • Assumed that there is not significant suppressed demand currently in the sector
Transport sector	
39% reduction in energy intensity relative to 2015	• Assumed that modal shifts occur alongside improvements in vehicle efficiency
Economy-wide	
29% saving against a baseline projected from 2015	• Saving that would be revealed by a decomposition analysis conducted in 2030. • The figure is based on a weighted mean of the individual sector-level impacts and an assumed 2030 share of total final consumption