

**Energy Partnership Programme
between South Africa and Denmark
Programme Document**

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Acronyms and Abbreviations

AMG	Aid Management Guidelines (DANIDA)
DANIDA	Danish International Development Assistance
DE	Development Engagement
DEA	Danish Energy Agency
DEPP	Danish Energy Partnership Programme
DoE	Department of Energy
EDK	Embassy of Denmark
ESKOM	Electricity Supply Commission of South Africa
GHG	Greenhouse Gases
GIZ	German Federal Enterprise for International Cooperation
IEP	Integrated Energy Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
LTA	Long-Term Adviser
MFA	(Danish) Ministry of Foreign Affairs
NERSA	National Electricity Regulator of South Africa
NESMO	National Energy Systems and Market Operator
RE	Renewable Energy
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
TA	Technical Assistance

1. INTRODUCTION AND NATIONAL CONTEXT

South Africa is one of the prioritised transition and growth economies according to the new Danish Development Policy and Humanitarian Strategy, "The World in 2030" (January 2017). In 2014 South Africa was denoted as the 15th largest emitter of CO₂ in the world and therefore also a significant global player in the follow-up of the Paris Agreement. South Africa is currently heavily dependent on coal with a fleet of old and inefficient coal-fired power plants that are coming close to their designed end-of-life cycles. South Africa is investing heavily in transforming its energy sector to low carbon, including substantial investments in renewable energy. In its Nationally Determined Contribution to the United Nations Framework Convention on Climate Change, South Africa has committed to a peak in greenhouse gas emissions between 2020 and 2025 at a level between 398 and 614 Mt CO₂-equivalents. The effective implementation depends on the availability of financial resources, development and transfer of technology, and capacity building. The Danish Development Policy and Humanitarian Strategy emphasizes that Denmark will support partner countries in fulfilling their commitment to the Paris Agreement obligations. With the Partnership Programme focusing on government-to-government cooperation, a particular emphasis will be on knowledge sharing and capacity building in order to support the follow-up of the Paris Agreement and long term energy transition in South Africa.

South Africa has relatively high emissions both measured per capita and by emissions per unit of GDP. The power sector is the single largest emitter of CO₂ in South Africa, accounting for 50% of total carbon emissions. This is due to an almost total reliance on coal for electricity generation. The Government recognises that the high use of fossil fuels is contributing to climate change and regards climate change as one of the greatest threats to sustainable development. This is clearly stated in the National Climate Change Response White Paper published in October 2011. Policy instruments under development include a carbon tax, emission reduction targets for sectors, company level carbon budgets, as well as regulatory standards and controls for certain greenhouse gas (GHG) emitters.

As a growing economy, South Africa focuses on balancing the competing need for continued economic growth with its social needs and the protection of the natural environment. To this end, South Africa aims to grow its energy supply in support of economic expansion while alleviating supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean, modern and affordable energy. The National Development Plan 2030 defines South Africa's main goals as eliminating poverty and reducing inequality by 2030. Among 'enabling milestones' are the need "to produce sufficient energy to support industry at competitive prices, ensuring access for poor households, while reducing carbon emissions per unit of power by approximately one-third". To achieve this, the plan outlines a range of significant energy infrastructure investments: procuring at least 20,000 MW of renewable electricity by 2030; importing electricity from other countries; decommissioning 11,000 MW of ageing coal-fired power stations and; stepping up investments in energy efficiency.

This Energy Partnership Programme between South African and Denmark will indirectly support two key documents for long range policy and planning by the Government of South Africa: the Integrated Energy Plan (IEP) and the Integrated Resources Plan (IRP 2010-50), that forms the basis of South Africa's generation capacity expansion. Both documents were recently updated (in November 2016).

This Partnership Programme relates to four of the eight key objectives of the IEP, namely ensuring the security of supply; minimising the cost of energy; diversifying supply sources and primary sources of energy; and minimising emissions from the energy sector.

The IRP forms the basis of South Africa's power generation capacity expansion programme, and ESKOM, in its function as the national system operator, assist DoE through provision of modelling results for the IRP.

Since its launch in 2011, South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) has procured around 6.2 GW of new generation capacity, representing ZAR 193 billion (USD 13 billion) of private-sector investment as of June 2016. Overall, this makes the South African REIPPPP one of the most successful renewable energy procurement programme on a global scale. The REIPPPP targets 8.4 GW of wind and 8.4 GW of solar capacity by 2030. However, with around 3 GW installed in 2016, ESKOM called for a moratorium on the integration of more RE into the grid until certain technological and financial problems were solved. RE integration and system flexibility continue to be big challenges in South Africa, both issues that are addressed by this Partnership Programme between South Africa and Denmark.

DEA and South Africa has already since 2013 been engaged in a very fruitful bilateral cooperation. DoE and ESKOM are already partners in the existing phase of the Danish-South African cooperation that comes to an end by June 2017 with several positive results achieved that have informed the design of the new and more focused programme. The Renewable Energy Data and Information Service (REDIS) is one of these important achievements. Data collected and processed from renewable generators is now online (<http://redis.energy.gov.za/>) and utilised in the Energy Planning Chief Directorate of the DoE for inputs and assumptions related to renewable energy deployment and to inform decision making on long-term energy planning. DEA assists South Africa in drafting their post-2015 national energy efficiency targets and strategy towards 2030 through a bottom-up approach identifying energy efficient potentials and measures across sectors and conducting cost-benefit analysis combined with stakeholder consultations to suggest the most effective and appropriate measures to be implemented. The strategy will inform the IEP process going forward. The programme also provides expert knowledge and support of relevant for energy planning and scenario development. This is intended to improve the basis and capacity for energy end-use, demand-side modelling using LEAP (the Long-Range Energy Alternatives Planning System) which will serve as input to DoE for the IEP process. The present Danish support to ESKOM is also yielding positive results. Through its SISYFOS model, DEA supported the development of a strategy on system adequacy and reserve margin assessing the effect of increasing levels of renewables. In workshops with DoE and ESKOM participation it showcased that the likelihood for reduced system adequacy and need for reserve margin with high RE penetration is not as significant as previously anticipated. Denmark further supports ESKOM in assessing large-scale renewable energy penetration on the dynamic stability of the ESKOM power system and with capacity building and training on network operation and control of distribution systems in ESKOM and selected municipalities. RE is relatively new in ESKOM and the Research, Training and Development (RT&D) unit is at the forefront of this development. The unit works across ESKOM's internal structure and can provide links to other divisions needed for this work, and convey people from other divisions for capacity development activities.

Programme partners and other stakeholders

This particular programme between South Africa and Denmark is a partnership between the Danish Energy Agency (DEA), Department of Energy (DoE) and ESKOM respectively. DoE is responsible for ensuring exploration, development, processing, utilisation and management of South Africa's energy sources. ESKOM is the vertically integrated state-owned electricity company of South Africa. ESKOM's mandate is to provide electricity in an efficient and sustainable manner, including generation, transmission, and distribution and sales. ESKOM is a critical and strategic contributor to the South African government's goal of security of electricity supply in the country as well as securing economic growth and prosperity. For a description of these institutions please refer to Annex A.

Municipalities have substantial influence and responsibility, including the mandate to distribute and sell electricity. Decentralisation is a very important policy issue in South Africa. Municipalities have their own distribution control centres and since some of the new RE generation will be supplied directly to municipality grids, the programme will as a continuation of the current phase of the programme support these in order to further facilitate integration of RE while maintaining grid stability. The main criteria to select partner municipalities for the next phase of the programme will be the potential for RE to be integrated into the grid.

Also, civil society and academia follow closely the developments around the choices for the future energy supply path of South Africa, and have for example been involved in the public hearings around the IRP, especially related to the assumptions and scenario development on the energy mix. Also at the municipal level, civil society is focusing on the need to have clear guidelines and incentives for embedded generation, in particular roof-top PV solar systems. Some municipalities, notably the large ones like Johannesburg and Cape Town, are also looking for opportunities to expand electricity capacity through embedded generation system, for example small scale solar. Likewise, private sector energy companies are also calling for the removal of barriers that limit their commercial opportunities and potential investment in RE.

The programme is also expected to provide a role for Danish private sector companies. Danish companies are already involved in South Africa, for example by providing technical support and expertise on various RE technologies e.g. wind and biomass and by local manufacturing of RE components. As the capacity of South Africa to generate and utilize renewable energy increases, demand for cost-effective green energy solutions will be raised significantly. This will provide greater opportunities for private sector companies to be involved and make way for new technical and commercial partnerships between Danish and South African companies to deliver green energy solutions. Likewise, the programme will provide a good platform and entry point for Danish companies to demonstrate how their products and know-how may benefit South Africa in its low carbon transition.

In terms of other development partners working with South Africa it should be noted that the German Federal Enterprise for International Cooperation (GIZ) supports South Africa on RE and energy efficiency with € 17.5 million over 4 years with 60% committed to RE. GIZ's support to DoE is mainly through the Electricity and Clean Energy Directorates, but GIZ also supports ESKOM in some issues relating but not overlapping with the respective

DE. Other support is for implementation at municipal level of roof-top solar photovoltaic, biogas and for facilitating discussions on regulatory frameworks, etc.

There is also a USD 39 million UNDP-GEF programme the “South Africa Wind Energy Project (SAWEP) - Phase II” with objectives that do not overlap with the Partnership Programme between South Africa and Denmark, and the following components: (i) optimisation and improvement of local content targets in wind energy procurement mechanisms, (ii) resource-mapping and wind corridor development support for policy-makers, (iii) support for the development of small-scale wind sector, and (iv) training and human capital development for the wind energy sector.

All other donors have relatively small budgets and little focus on RE. Norway is providing risk capital through the NORD fund for investments in RE, setting-up a trust fund on Carbon Capture and Storage. Sweden is focusing on opportunities for private sector transport fuel flexibility with Volvo and Scania. The Swiss Development Cooperation works with private sector on a global programme and climate change and works on energy efficiency in clay brick factories with the Department of Trade and Industry.

2. PRESENTATION OF THE PARTNERSHIP PROGRAMME

2.1 Programme Rationale and Justification

The key rationale for this partnership programme between South Africa and Denmark originates from the ambition of the South African government to increase the share of renewables in its energy mix. At the same time, the Danish government wishes to offer support to emerging economies that are pursuing a less carbon-intensive economy.

Denmark and South Africa share a joint agenda in countering climate change. One of the key factors in this regard will be to integrate more renewable energy in electricity systems across the world while ensuring power stability, electricity access and economic growth.

There is already an ongoing positive and constructive policy dialogue between South Africa and Denmark with regards to energy and climate issues, both in multilateral fora as well as a bilaterally. The bilateral high-level consultations between South Africa and Denmark will continue throughout this programme to take stock of the programme and discuss policy issues related to climate change and renewable energy. Regular meetings will be held at high-level to discuss various policy-issues as appropriate as well as senior officials from South Africa and Denmark will coordinate closely to discuss policy-issues relating to the programme. Steering Committee meetings will be organized regularly to provide an opportunity to exchange views and coordinate positions.

The partnership programme will aim to provide relevant technical support in order to contribute to South Africa's ambition to increase its renewable energy capacity. The partnership with DoE and ESKOM covers an area of work that is not covered by other development partners in South Africa and thus fills an important gap. The programme focuses on areas where Denmark has particular expertise to offer such as the integration of high shares of renewable energy into the grid, advanced forecasting, and the transition from a fossil fuel-based electricity system to one that to a larger extent is diversified, for example through the use of policy implementation scenarios to help support policy making and long

range planning.

The transformation of the electricity supply sector will require the development of additional expertise in the regulation, management and operation of the South African power system. If renewables are to be recognised as a viable alternative and play an even greater role in reducing GHG emissions, it is important that RE is integrated efficiently and in a manner that realises the full potential of RE in the power system. Regulatory and technical experience from Denmark in integration of high shares of renewable in the power mix can be used as a good basis for improving the utilization of RE in South Africa's power sector. Likewise, a better utilization of RE is expected to be of mutual benefit to Danish and South African private sector companies, increasing the demand and opportunities for delivering green energy solutions and expertise. The transformational effect is expected create opportunities for technology transfer to, and new jobs in the South African power sector.

2.2 Country Programme Objective

The development objective of the programme is that South Africa is in transition to a less carbon-intensive electricity production including through expansion of RE generation" in alignment with the targets in the National Development Plan 2030 aiming at procuring at least 20,000 MW of renewable electricity by 2030. (The current IRP 2010 – 2030 has a target of app. 17,000 MW subject to future IRP update).

Priority of the partnership programme is given to interventions where transformational change to renewable energy can be achieved through cost-neutral or financially advantageous changes to policies and market structures. This includes particularly changes to existing systems and structures where the partners have already expressed the desire to implement reform, including in policy, planning and technological renewal. Interventions are identified where Denmark adds value in terms of capacity and expertise, in particular in relation to renewable energy, energy planning and the design of enabling policy frameworks.

The achievement of these objectives will be supported through two Development Engagements as follows:

- 1) Capacity Development for Energy Sector Planning with the DoE.
- 2) Renewable Energy Integration into the Power System with ESKOM.

2.3 Theory of Change

The support from Denmark is based on South African counterparts' own requests and demand for support with its energy sector transition. The rationale is that Denmark offers unique experience in this respect, which is in demand and valuable to share and utilize in the national context of South Africa.

The Theory of Change related to the development engagement with DoE, is that by informing policy dialogues, and decisions on energy sector development through the use of factual based input, accurate policy implementation scenarios and long range forecasts of the energy and power system, policy makers and stakeholders can make decisions with greater certainty about key issues of concern around RE-integration in the power mix, for example concerns over relative costs, displacement of coal-related jobs and security of supply. If the Danish support is successful, then DoE will get better data input for modelling and more comprehensive capacity to utilize modelling tools. This will lead to robust modelling results,

either consolidating present or suggesting revised implementation pathways for achieving the policy objectives of the Government. For this eventually to lead to changes needed, if any, of the enabling environment for investments in RE generation, again depends on actual policy making as well as other factors beyond this DE, not least the wider political and economic context.

The engagement builds on the assumption that long term planning and policy implementation scenarios building on factual based input data are effective tools to better informed policy dialogues and policy making.

The theory of change related to the development engagement with ESKOM is that by supporting ESKOM in integrating RE into the grid (also with municipalities), assisting with knowledge and expertise to operate the power system with a higher degree of flexibility and cost-efficiency, and providing tools and methodologies to do accurate RE generation forecasting, then South Africa will be able to integrate larger shares of RE into the power supply in a cost-effective way as new RE-capacity comes on line. For this to materialise, however, changes are required, including:

- Increased flexibility of coal power plants and the development of clear protocols to facilitate cost-efficient integration of thermal power production in the dispatch operation under conditions of high penetration of RE generation.
- Stability issues caused by a larger share of variable RE generation can be resolved.
- Economic/market incentives are proposed to support the additional costs of the operational flexibility of thermal power plants.
- RE is integrated more efficiently into the grid at a national and municipal level and in a cost-effective manner.

The engagement builds on the assumption that the Danish system operation paradigm with a high share of fluctuating RE in the grid offers the technical insights and experience that can facilitate the changes needed in order for ESKOM to efficiently integrate increasing shares of RE as more RE-generation capacity comes on line in the future.

2.4 Development Engagements

The formulation of the Partnership Programme has focused on requests presented by South Africa that matches unique Danish energy regulatory experiences to promote sustainable growth and development. This has led to two development engagements:

DE 1: Energy Sector Planning with the DoE

The objective of this Development Engagement is to facilitate the development of a less carbon intensive electricity sector in line with the IEP and IRP by working with the DoE to develop more comprehensive energy planning capabilities that include the efficient deployment and integration of renewable energy and energy efficiency technologies within the context of the energy mix.

The DoE is responsible for modelling and developing scenarios which reflect the policy options of the government. This development engagement for the DoE focuses on strengthening the planning outputs of the DoE for the energy sector in South Africa, particularly with a view to achieving an optimal energy system.

The targeted outcome of the Development Engagement is that “Recurrent planning processes and attached input are informed by even more consolidated data, forecasts, peer reviewed assumptions and additional long range policy implementation scenarios for a less-carbon intensive electricity sector including through expansion of RE-generation capacity”.

This outcome will be achieved by realising three outputs:

- 1) DoE has strengthened capacity for energy sector modelling: Recurrent modelling by DoE relies on quality data maintained by the DoE and validated through extensive stakeholder consultations. Long range policy implementation scenarios are developed and peer reviewed through a public consultation process encompassing relevant stakeholders and interested parties, as well as through high-level policy dialogues.
- 2) DoE has strengthened capacity to peer review external modelling input: DoE maintains expertise to define the assumptions and analyse the results of external modelling done with the PLEXOS® model for DoE planning purposes and translates verified results into planning outputs.
- 3) DoE has strengthened capacity for collecting, processing, and reporting on renewable energy data: REDIS is deployed and based upon lessons learned and the concept is replicated to support the wider DoE planning functions.

The overall implementation of this development engagement lies with the DoE’s Deputy Director General for Policy, Planning and Clean Energy. Daily implementation is the responsibility of the Development Engagement Implementation Group (DE1 Implementation Group). Through its head the Implementation Group reports to an established Management Group for the Partnership programme, and is held accountable by the Programme Steering Committee.

This development engagement will have no cash transferred or disbursed directly to the development engagement partner. Hence, there are no requirements for accounting of funds and financial reporting at development engagement level.

The technical assistance will be delivered by an international long-term adviser (LTA) to be stationed at DoE, by experts from the DEA and by other international and/or national experts as required during implementation. Study tours can be part of this Development Engagement as deemed necessary during implementation. A complete description of this development engagement is found in Annex E.

DE2: Renewable Energy Integration into the National Power System of South Africa with ESKOM

The objective of this Development Engagement is to facilitate the development of a less carbon intensive power sector by assisting ESKOM to integrate a larger share of RE into the electricity grid. ESKOM is the state owned, vertically integrated power company and the key partner for any development related to RE grid-integration.

The targeted outcome of this Development Engagement is “enhanced power system ability to integrate the renewable energy generated in a cost effective way”. This outcome will be

achieved by realising three outputs:

- 1) Operational flexibility of the national electricity system is enhanced: The national electricity system is well prepared for integrating increased shares of fluctuating RE in the power supply, and in a cost-effective way including through additional use of thermal power plants balancing services, and steps are taken by ESKOM to deal with the grid stability issues reviewed under this DE.
- 2) RE generation forecasting is improved: ESKOM uses advanced tools and procedures for RE generation and dispatch of non-renewable generation
- 3) Integration of RE generation at distribution level is strengthened: ESKOM local distribution control centres, including centres at municipal level has developed operational frameworks that can efficiently integrate and operate variable generation at the distribution level without compromising grid stability

The overall implementation of this development engagement is the responsibility of the General Manager of the Research, Testing and Development (RT&D) at ESKOM. Daily implementation of the development engagement is the responsibility of the Development Engagement Implementation Group (DE2). Through its head, the Implementation Group reports to an established Management Group for the Partnership programme, and is held accountable by the Programme Steering Committee.

This development engagement will have no cash transferred or disbursed directly to the development engagement partner. Hence, there are no requirements for accounting of funds and financial reporting at development engagement level.

The technical assistance will notably be delivered by the Danish Transmission System Operator, short term advisory support from DEA and other international and/or national advisers who will work in a peer-to-peer relationship with ESKOM including ESKOM local distribution control centres. A complete description of this development engagement is found in Annex E.

Unallocated funds

It has been decided to dedicate 2.74 million DKK as unallocated funds. These unallocated funds can be activated as appropriate by the Steering Committee upon receipt and approval of a relevant proposal from the Management Committee.

The proposed intervention will be contingent upon alignment with the overall objectives of the programme as agreed with the development partners. This includes for instance supporting capacity building for institutions working on grid codes such as NERSA (decision before end of 2017). It could also focus on scaling up already planned activities including i) promoting a policy agenda of interest for to both Denmark and South Africa such as integration of distributed (decentralized) RE or ii) supporting a strategic intervention to stimulate implementation of a strategy, policy or plan related to the outcomes in development engagement 1 or 2.

A proposal to activate the unallocated funds should be submitted to the Steering Committee prior to the mid-term review. This would leave at least 1.5 year for implementation. The proposal should be drafted and quality assured by Management Group to the Steering Committee upon request of the Steering Committee. Appraisal of the proposal should follow procedures described in the Danish Aid Management Guidelines.

2.5 Assumptions and Risk Analysis

Key assumptions

A successful achievement of the outcomes rests on a set of assumptions that explains the change logic: (i) the Government of South Africa retains its commitment to climate change mitigation and related targets on energy, most particularly on renewable energy and that this commitment is reflected in key planning documents as well as in resource allocation to responsible ministries and institutions, (ii) the partner institutions have ownership of the cooperation, (iii) partner's staff remains in posts long enough to take up results from the cooperation and to carry through change, (iv) ESKOM is genuinely interested in integrating RE into the grid, (v) Danish experience is relevant for the proposed interventions, and (vi) DEA makes available adequate and qualified staff resources.

An assumption is also that low prices on coal will not affect the long-term appetite to implement renewable energy; the programme will work on reducing barriers for RE penetration, and; that the private sector will be willing to seize the opportunity supported by the significant recent private investments in RE supply in South Africa. It is also assumed that civil society will use information generated by this programme and apply it to their work in national and municipal energy platforms related to energy access and will participate in workshops on knowledge dissemination and good practices for the local level

Contextual Risks

South Africa is a stable partner country and contextual risk level is assessed as being low. The contextual risk factor considered for the programmatic and institutional risk assessment is corruption.

Corruption: South Africa is ranked 64 of 176 countries on the Transparency International 2016 Corruption Perception Index. Corrupt practice in general of South Africa would constitute a risk of reputational loss and a risk of programme failure if activities were to be postponed or abandoned to reduce reputational losses. If discovered in relation to direct partners (DoE and ESKOM) it will have consequences for the collaboration for the partner in question and potentially lead to discontinuation of the cooperation and directing support to other parts of the cooperation not affected.

External economic dislocations or crises: Such crises or internal financial disruption (inflation, foreign debt, currency crisis etc.) are possible because, although the economic situation is generally stable, foreign debts are high and increasing. If a shock were to occur, planning and budgeting would be made difficult, but with the power sector being important to continued development of the country the likelihood of significant disruption to the programme is seen as being relatively small.

Programme and institutional risks

Programme risks identified are:

As part of energy mix, alternate clean energy sources such as nuclear, hydro and clean use of coal gets in the way of development of renewable energy. Denmark respects any decision of future energy mix in South Africa. The program will thus target increased use of RE in support of the Paris Agreement. The programme may be impacted by this and DoE and ESKOM could divert resources toward these alternate technologies leading to a slowdown in the expansion of renewable energy integration into the grid. Continued dialogue with Government and support to engagements on renewable energy, modelling scenarios showing benefits on integrating renewable energy and a long-term sustainability and that a low carbon path is economically feasible, may mitigate the long-term impacts. The short-term risk remains high during the programme implementation period as the IRP is being updated.

Capacity and skills lost. The salary level in government often does not match the level obtainable in the private sector. Maintaining core staff in the DoE hence is a challenge. Delivering high-quality TA from Denmark in modelling that includes renewable energy is anticipated to retain interest among competent staff. Skills acquired participating in the engagement can be used beyond the institutions and the residual risk is medium.

Overlap of activities with other Development Partners (DP) in the sector. Energy sector is of great interest to several of DPs with well-funded programmes on-going and planned particularly GIZ. There are many more needs in the sector than what is currently provided by the DPs combined, underlining the need for coordination across DPs. This is mitigated through a programme design with focus on the special needs of DoE and ESKOM in areas where Denmark has unique expertise and a good track-record in South Africa. Continuing the dialogue with other DPs and appropriate adjustments as the program evolves will assist in keeping the residual risk to minor.

Institutional risks identified are:

If electricity generation from coal and nuclear emerges as significant part of the energy mix for South Africa's energy policies, it may reduce the impact of this DE. At the same time, however, it may also attract attention towards the fact that Denmark is providing significant assistance to renewable energy in a context where coal and nuclear remain significant part of the energy mix. The Embassy of Denmark will follow closely the trends and developments around the energy sector in South Africa, including particularly key political discussions. This will allow for a timely and clear communication of risks and potential mitigation measures to be taken by the DEA and will serve to reduce this residual risk to minor.

Unexpected delays due to slow decision making and programme management in implementing of the programme objectives. The previous programme experienced unexpected delays in relation to program management and implementation which was also critically noted by the mid-term independent review and not fully resolved according to the follow-up review. The new Partnership programme's stronger focus and linkage between activities and the reduced number of activities, as well as a new programme management setup, will mitigate the risk of serious delays. DoE engagement with participation at Deputy Director General level will reduce the residual risk to minor.

There are no other major risks identified that have not been mitigated as part of the design. Any residual risks and new potential risks will be monitored closely throughout

implementation and measures to address any arising issues will be developed as necessary and findings included in the regular reports will be carried out accordingly.

3. OVERVIEW OF PARTNERSHIP PROGRAMME MANAGEMENT

In South Africa a Steering Committee for the partnership programme is established and expected to meet once or twice per year. The Steering Committee will be composed of the Deputy Director General of DoE (Chair), the Ambassador of Denmark in South Africa (Chair), the Danish Energy Agency at high-level, representative from ESKOM, Treasury and Department of Public Enterprises. Its main task will be to approve annual work plans, budgets and reports, and review annual progress. The Steering Committee should provide strategic guidance to the Partnership Programme, discuss and resolve issues related to programme progress and decide on any reallocation between the Development Engagements. Decisions are made by consensus. Also, the Steering Committee is a forum for high level policy dialogue on matters of relevance to the programme.

A Management Group for the Partnership Programme between South Africa and Denmark is established with representatives from the partner's institutions at senior operational level, the Long-term Advisor, DEA-representative(s) and EDK representative. Decisions are made by consensus. The Management Group will be co-chaired by DoE and DEA-country coordinator. The Management Group follows progress, approve work plans with associated TA procurement plans to be reported to the Steering Committee (annual), advises the Steering Committee and is a forum for technical level policy dialogue. This group will meet at least twice per year and have the responsibility to: i) consolidate and check annual detailed bi-annual work-plans with associated TA procurement plans against development engagement partners work-plans and budgets; ii) monitor and report performance progress at output level, using the "traffic light" system; iii) ensure cross fertilization between engagements.

Each development engagement will establish an Implementation Group to undertake daily management of the engagement implementation. It will be composed by representative(s) from the development engagement partner, the LTA, the DEA-country coordinator/DEA TA specialist and specialist(s) as relevant. The Implementation Group will meet at regular intervals and will: i) develop annual and detailed bi-annual work plans matching priorities in the partners work plans, ii) determine need for national and international technical assistance input and develop technical assistance procurement plans; iii) approve TORs developed and; iv) monitor and coordinate day-to-day progress of implementation. Provision of TA should be based on the principles of a) national TA where relevant; b) DEA/Energinet.dk experts where peer advice is required and; c) international specialists where dedicated specialist tasks will be needed.

Procurement of agreed international TA (in any form) will be carried out by DEA and follow Danish procurement rules or drawn from a pool of experts. Final selection of procured TA will be done in close cooperation with partners based on no objection from the Implementation Groups.

Procurement of agreed national specialist TA, not covered by the above, will be carried out by the EDK in consultation with DEA, and follow Danish procurement rules for local

procurement of TA. Final selection will be done by in close cooperation with the Implementation Group.

The Partnership Programme between South Africa and Denmark is part of the DEA Energy Partnership Programme (DEPP) supported by the Danish Climate Envelope with four countries including South Africa, China, Vietnam and Mexico. Daily operation and coordination of DEPP is the responsibility of the DEA.

To oversee the overall DEPP implementation an Advisory Group will be established in Copenhagen with representation from MFA and the Danish Ministry of Energy, Utilities and Climate. DEA will act as Secretary to the Advisory Group. The Advisory Group will meet at regular intervals to discuss programme progress and solicit cross-programme countries experience and to discuss opportunities from learning across partnerships. DEA will, in its capacity as Secretary to the Advisory Group be responsible for i) submission to the Advisory Group of progress reports consolidated from the four countries and ii) management of funds allocated for activities above individual country-level including mid-term reviews.

It has been decided to dedicate 8.0 DKK million as unallocated funds at the overall DEPP level. The unallocated funds could be activated by having any of the Country Steering Committees in the four countries submit a proposal to the Advisory Group for approval if one of the following criteria is fulfilled:

- Dissemination of lessons learned across the four partnership countries that would stimulate cross fertilisation (south-south dialog).
- Activating partnerships between Civil Society Organisation and academia on e.g. awareness, consultation, analysis, monitoring etc.
- Activities that will address barriers and opportunities to mobilise and leverage of funds from other sources or engage the private sector to be the benefit of both Denmark and the partner country.
- Promote a policy agenda of interest for both Denmark and the partner country e.g. accelerating implementation of a strategy, policy or plan developed as part of a Development Engagement.

A proposal to activate the unallocated funds should be submitted at least prior to the mid-term review. This would leave at a minimum of 1.5 year for implementation. Only proposals encouraged by both the DEA and the Development Engagement partners will be considered. The proposals should be drafted and quality assured by country Management Group upon request of the country Steering Committee.

An approved proposal to activate unallocated funds at overall DEPP level should be submitted for processing and recommendation for approval by the Advisory Group. Unallocated funds could thus be activated at any time during the implementation period. Appraisal of proposals will follow procedures described in Danida Aid Management Guidelines.

3.1 Results Monitoring Mechanisms

Overall programme monitoring will be undertaken by the Management Group reporting to the Steering Committee of the Partnership Programme. The Steering Committee will follow progress towards the programme targets and progress towards the Development Engagement outcome and output targets through the annual progress report.

Bi-annual reports on performance management will be submitted to the Steering Committee for approval and a full annual end-of-year report, which includes progress against indicators and a discussion of challenges that have been encountered or which may lie ahead for approval by the Steering Committee.

Performance monitoring reported to the Steering Committee through the biannual progress report at output and development engagement level will be using a “traffic-light” system, where:

- “green” is on-track – implementation continues as scheduled;
- “yellow” is partly on-track which needs an explanation by the Implementation Group to the Management Group, including actions taken to get back on-track and closer monitoring of progress by the Management Group;
- “red” is off-track, which needs a detailed explanation by Management Group to the Steering Committee with recommendations of changes to the implementation to get the engagement back on-track. If “red” in two consecutive reporting periods, the Steering Committee may consider reallocation between outputs within or between the development engagements as deemed relevant.

The initial results frame is established for each of the development engagements and appears in Annex B. During the inception phase, indicators and specific targets will be revisited, validated and potentially refined. These will be approved by the Steering Committee and informed to the Advisory Group in Copenhagen overseeing the entire DEPP in the four countries (Vietnam, Mexico, China and South Africa). Any material changes to the Partnership Programme between South Africa and Denmark and included development engagements, including the final, budgets, indicators and targets have to be approved by the Steering Committee. A detailed inception report will be produced three month after implementation start, including documentation of any changes in indicators and targets and include the first annual work plan.

The Danish MFA shall have the right to carry out any technical or financial mission that is considered necessary to monitor the implementation of the programme, which may include a mid-term review. After the termination of the programme support the Danish Government reserves the right to carry out evaluation in accordance with this article.

3.2 Outcome Level Budget

The overall budget for the DEPP is DKK 115 million, out of which DKK 18.19 million have been allocated to South Africa including (technical) assistance from DEA.

The budget for each outcome of the two Development Engagements is set out in the

following table. Note that each engagement has one outcome and that the table only includes the funds contributed by Denmark.

Budget in Millions DKK

Development Engagement Outcomes	DE Partner	17/18	18/19	19/20	Total
DE 1: Recurrent planning processes and attached inputs are informed by even more consolidated data, forecasts, peer reviewed assumptions and additional long range policy and policy implementation scenarios for a less carbon-intensive electricity sector including through the expansion of RE generation capacity	DoE	3.43	3.43	3.43	10.29
DE 2: The power system, in a cost-effective way, fully integrates the renewable energy generated	ESKOM	1.72	1.72	1.72	5.16
Unallocated budget (contingencies, reviews, strategic interventions)					2.73
Grand total		5.15	5.15	5.15	18.19

The outcome budget for DE1 covers costs for the international Long-term Adviser.

4. THE PARTNERSHIP PROGRAMME BUDGET

Because each Development Engagement will yield one major outcome, the programme budget is identical to the outcome budget tabulated above. Detailed output based budgets is annexed to this programme document. Detailed output budgets showing technical assistance inputs and costs are included in each development engagement document. The total amount of hours from DEA allocated for the programme is 7140.

ANNEXES

Annex A: Partners - brief description

A.1 - Department of Energy (DoE)

The Department of Energy is responsible for ensuring exploration, development, processing, utilisation and management of South Africa's energy sources. As the country's economy continues to grow, energy is increasingly becoming a key focus. DoE's organisation consists of the following programmes:

Programme 1: Administration. To provide strategic support and management services to the Ministry and the DoE.

Programme 2: Energy Policy and Planning. To ensure evidence-based planning, policy setting and investment decisions in the energy sector to improve energy security through supply- and demand-side management options and increase competition through regulation.

Programme 3: Petroleum and Petroleum Products Regulation. To manage the regulation of petroleum and petroleum products to ensure optimum and orderly functioning of the petroleum industry to achieve Government's developmental goals.

Programme 4: Electrification and Energy Programme and Project Management. To manage, coordinate and monitor programmes and projects focused on access to energy.

Programme 5: Nuclear Energy. To manage the South African nuclear energy industry and control nuclear material in terms of international obligations, nuclear legislation and policies to ensure the safe and peaceful use of nuclear energy.

Programme 6: Clean Energy. To manage and facilitate the development and implementation of clean and renewable energy initiatives as well as EEDSM.

The department's organisational structure supports the ambition to realise RE targets, and even to accelerate these. A senior person is in charge of policy, planning and clean energy, implying that the overall responsibility for all energy policy and planning, as well as clean energy resides with one key position in DoE, allowing for a fully integrated and rational energy planning.

A.1.1 – Energy Policy and Planning Department

The Purpose

To ensure evidence-based planning, policy setting and investment decisions in the energy sector to improve energy security through supply- and demand-side management options and increase competition through regulation.

Sub-Programmes

- Policy Analysis and Research
- Energy Planning
- Hydrocarbon Policy
- Electricity, Energy Efficiency and Environment Policy

Table 1: Strategic Objective 2.1-2.6 of Programme 2

Strategic Objective	SO 2.1 To Improve Energy Security
Objective Statement	<p>To improve energy security by:</p> <ul style="list-style-type: none"> - Regulating demand & introducing a diversified mix of energy generation & EE technologies on an on-going basis. - Increasing competition in the energy sector by introducing IPPs, using renewable technologies through a bidding process on an annual basis. - Planning interventions to expand energy infrastructure through the development of a policy framework for the IEP, IRP, the Transmission Distribution Plan & the Major Distribution Infrastructure Plan over the medium term. - Publishing an Annual Energy Balances and Energy Statistical reports to facilitate information based decision-making.
Baseline	Annual Energy Balance (2012) published by March 2015.
Five-Year Target	Annual Report on Energy Balances provided to support compilation of the GHG inventory.
Justification	South Africa has committed to implement mitigation actions that will collectively result in a 34% & 42% deviation below its “business as usual” emissions growth trajectory by 2020 & 2025. Actions will include interventions that will mitigate against the effects of climate change. The National Development Plan also recognises that the actions related to adaptation will depend on strong policies supported by a sound technical understanding & operational capacity to deal with developmental challenges. The desired outcomes include a reduction in impacts of climate change, risk mitigation through appropriate disaster responses & the deployment of innovative technologies that combat the effects of climate change.

Note: Strategic objective 2.2 is about liquid fuels, not relevant for this cooperation.

Strategic Objective	<p>SO 2.3 To Review Policy & Regulations to Ensure Security of Supply</p> <p>SO 2.4 To Review the Bulk electrical Infrastructure required for the Universal Access to electricity</p> <p>SO 2.5 To Establish mechanisms to Refund Capital & to Create a Smooth Price Path over the Long Term</p> <p>SO 2.6 To Ensure Security of Supply through Additional Power Generation Capacity</p>
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Objective Statement	To address current & envisaged energy supply & distribution constraints by developing the planned Approach for Distributed Asset Management for the rehabilitation of critical municipal electricity distribution infrastructure.
Baseline	<ul style="list-style-type: none"> - Draft price path in line with updated IRP. - Updated IRP presented to Cabinet for approval. - Introduce the National Energy Regulator Bill for consideration & support by Cabinet & by Parliament. - Review & integrate the Strategic Transmission Development Plan, including international connections to neighbouring countries into the IRP.
Five-Year Target	<p>Check against 2017/18 APP</p> <ul style="list-style-type: none"> - The Electricity Regulation Amendment Bill & National Energy Regulator Amendment Bill introduced for consideration & support their promulgation if approved by Cabinet & Parliament. - Develop an electricity price path in line with the updated IRP & promulgate by March 2015. - Develop a PSP Framework in the energy sector in base-load & renewable electricity generation, liquid fuels & gas within the context of Cabinet-approved policy & with an analysis of the implications for tariffs. - Develop SFF Bill & improve LPG usage, shale gas, fuel gas, bio-mass & Operation Phakisa. - Renewable energy IPP Bid Windows 1, 2, 3 & 4 of 6,725 MW of renewable energy by 31 March 2019. - Hydropower IPP based on Inga &/or Mozambique's hydro resources launched. - Hydropower Procurement Framework completed by March 2015. - Ratification of the Inga Treaty by Cabinet by March 2016. - Procurement of power from Inga supported by March 2017, March 2018 & March 2019. - Review the bulk electrical infrastructure required for universal access to electricity, prepare an implementation plan & implement it (submission of implementation plan to Cabinet). - The National Energy Systems and Market Operator (NESMO) Bill introduced for consideration & support its promulgation by March 2015. - Position paper based on stakeholder re-engagement on establishment of the NESMO & the bill drafted by March 2015. - The NESMO Bill introduced to Cabinet by March 2016. - Regulations emanating from the NESMO bill drafted by March 2017. - Regulations emanating from the NESMO Bill drafted & reviewed by March 2018 & March 2019.
Justification	Review economic regulators existing & potential), consider further consolidation &/or additions & update related legislation & subsidiary regulations.

The following acts regulate the South African energy sector and reflect the legislative measures, instituted by the DoE:

- The National Energy Act, 2008 (Act No. 34 of 2008).
- The Petroleum Products Act, 1977 (Act No. 120 of 1977), as amended.
- The Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended.

A.2 - ESKOM

ESKOM's mandate is to provide electricity in an efficient and sustainable manner, including its generation, transmission, and distribution and sales. ESKOM is a critical and strategic contributor to the South African government's goal of security of electricity supply in the country as well as economic growth and prosperity.

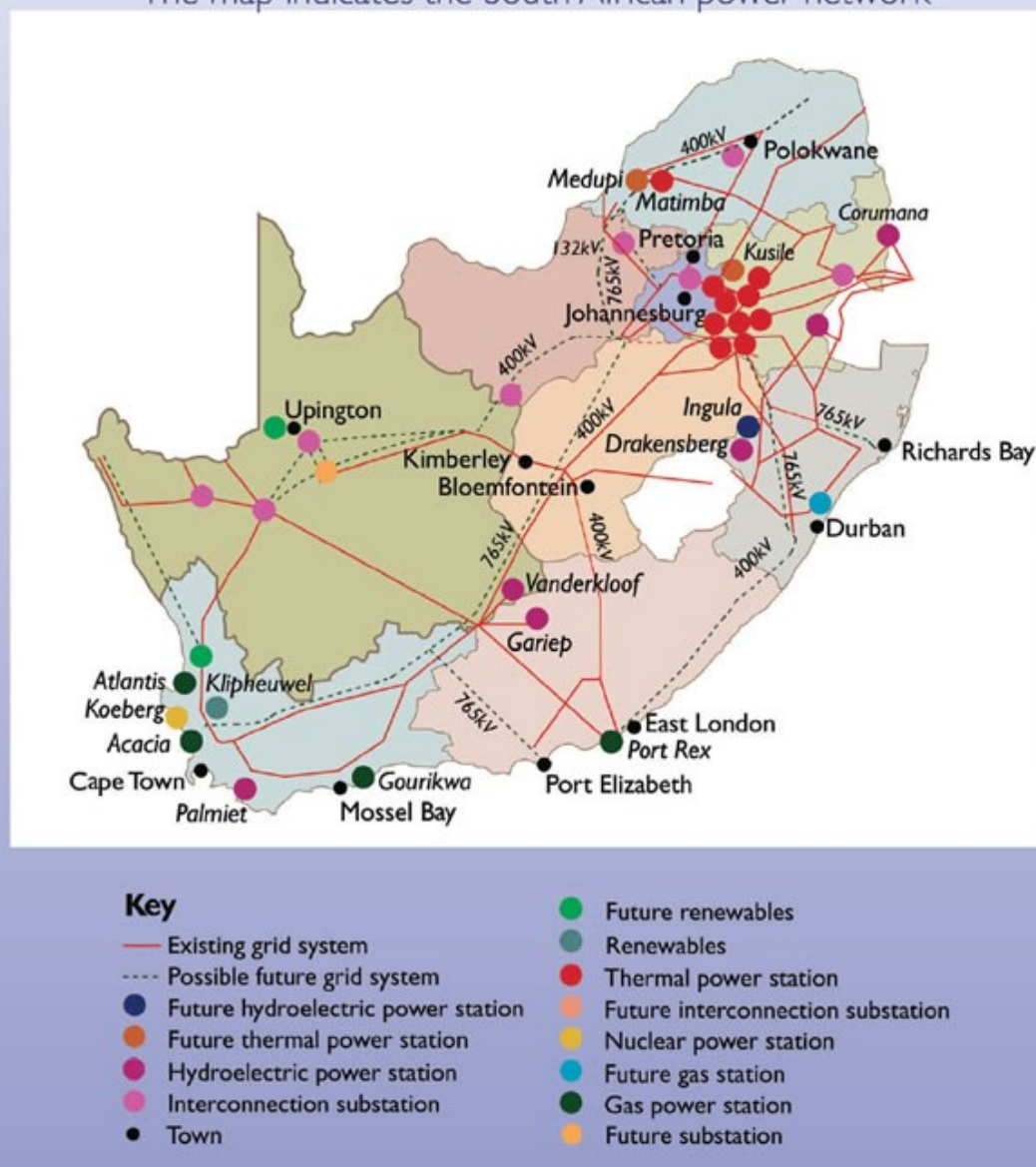
ESKOM is a vertically integrated company across a value chain that supplies electricity to both South Africa and the Southern African Development Community region (via the Southern African Power Pool consisting of South Africa, Botswana, Lesotho, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe).

ESKOM is the main supplier of generation, transmission and distribution capacity, and supplies to industrial, mining, commercial, agricultural and residential customers in South Africa. It also supplies to redistributors (municipalities and metros), who in turn redistribute electricity to businesses and households within their areas. ESKOM operates 23 power stations with a total nominal capacity of 42,090 MW, comprising 35,721 MW of coal-fired stations, 1,860 MW of nuclear power (Koeberg), 2,409 MW of gas-fired, 600 MW hydro and 1,400 MW pumped storage stations, as well as the recently commissioned 100 MW Sere Wind Farm. ESKOM maintains 368,331 km of power lines and substations with a cumulative capacity of 239,490 MVA.

During 2014/15, ESKOM sold 216,274 GWh of electricity to 804 municipalities in bulk, as well as to 2,773 industrial, 1,034 mining, 50,613 commercial, 83,136 agricultural, 508 rail, 11 international customers, and to 5,338,723 residential customers, which includes prepaid customers.

South African grid map

The map indicates the South African power network



The Integrated Resource Plan 2010-2030 sets out South Africa's long-term energy needs and discusses the generating capacity, technologies, timing and costs associated with meeting that need. The electricity market is regulated by NERSA in terms of the National Energy Regulatory Act, 2004. NERSA issues licences, regulates all tariff increases, provides national grid codes, etc.

Independent Power Producers have been invited to participate through a renewable energy programme run by the Department of Energy. Potential players were shortlisted and successful bidders have been contracted to supply energy into the national grid owned by ESKOM. All grid planning is done by ESKOM, lines are constructed under specific

licensing criteria and conform to a National Grid Code which is overseen and regulated by NERSA, South Africa's energy regulator.

The National Energy System Market Operator (NESMO) Bill was a proposal to restructure the existing market, with one dominant player within a regulated market managing the overall value chain of electricity generation, transmission and the bulk sale of electric power. A proposed independent system operator, with or without transmission assets being incorporated into the structure, was considered in terms of legislation, but the NESMO Bill has since been retracted.

ESKOM is under restructuring and an overview of the organisation of the company is not available. However, ESKOM was divided into business units which include Generation, Transmission, Distribution, Group Customer Services, Technology and Commercial, Finance and Group Capital, Enterprise Development and Sustainability. The Research, Testing and Development (RT&D) Group is the proposed counterpart for the DE with ESKOM, is part of the Sustainability Division.

RT&D mission is divided into five areas:

- Identifies and prioritises opportunities for improvement, or risks, in areas of high strategic or operational importance for the organisation.
- Acquires and generates knowledge on strategic and operational technical focus areas to enable good decision making.
- Influences, coaches and improves ESKOM by sharing new knowledge and insight in such a way that it becomes deeply embedded; an ingrained understanding upon which decisions are made.
- Provides specialist testing and consulting skills for operational challenges to keep the lights on, ensure safety and protect the environment.
- Builds flagship pilot projects that demonstrate to ESKOM and stakeholders which alternate innovative options make good business sense.

Annex B: Results Framework

Country Programme	Energy Partnership Programme between South Africa and Denmark
Thematic Programme Objective	South Africa is in transition to a less carbon-intensive electricity production including through expansion of renewable energy generation.
Impact Indicator	Tons of carbon dioxide equivalent (tCO ₂ eq.) reduced contributed to by the programme in South Africa

Development Engagement 1:

Outcome	Recurrent planning processes and attached inputs are informed by even more consolidated data, forecasts, peer reviewed assumptions and additional long term policy and policy implementation scenarios for a less-carbon intensive electricity sector including through the expansion of RE-generation capacity.		
Outcome indicator	Number of policy or planning inputs for the recurrent IEP and IRP process incorporating merits obtained as a result of the Danish support and subject to dialogues with right holders and duty bearers (including government stakeholders, academia, civil society, private sector investors and other relevant stakeholders).		
Baseline	Year	2017	None
Target	Year	2020	At least two policy or planning inputs by DoE with traceable merits to the Danish support, and subjected to dialogues with right holders and duty bearers.

Output 1	DoE has strengthened capacity for energy sector modelling Recurrent modelling by DoE relies on quality data maintained by the DoE and validated through extensive stakeholder consultations. Long range policy implementation scenarios are developed and peer reviewed through a public consultation process encompassing relevant stakeholders and interested parties, as well as through high-level policy dialogues.		
Output indicator 1.1	Disaggregation of electricity demand by sectors and end-uses, subjected to stakeholder consultation and used as input data for DoE forecasting		
Baseline	Year	2017	Disaggregated data as per project start
Target	Year 1.5	2019	Disaggregated data for at least one additional sector completed
Target	Year 3	2020	Disaggregated data for at least two additional sectors completed
Output indicator 1.2	Number of energy technologies updated data, verified through consultative process ("technology catalogue approach"), and used as input data for DoE planning		
Baseline	Year	2017	Technology data as per programme start
Target	Year 1.5	2019	Stakeholder consultation completed on energy data for at least one technology
Target	Year 3	2020	Stakeholder consultation completed on energy data for at least one more additional technology
Output indicator 1.3	Number of long range policy implementation scenarios additional to- or modifications of the scenarios in IEP 2016		
Baseline	Year	2017	No additional scenario
Target	Year 1.5	2019	At least one additional scenario with updated data completed
Target	Year 3	2020	At least one more additional scenario with update data

			completed
Output indicator 1.4		Number of roundtables/seminars where results from the programme translated into policy advice, are disseminated, and forms basis for policy dialogue with stakeholders	
Baseline	Year	2017	None
Target	Year 1.5	2019	At least 2 roundtables/seminars successfully completed.
Target	Year 3	2020	At least 2 additional roundtables/seminars successfully completed.

Output 2	DoE has strengthened capacity to peer review external modelling input DoE maintains expertise to define the assumptions and analyse the results of the external modelling done with the PLEXOS® model for DoE planning purposes and translates verified results into planning outputs.		
Output indicator 2.1	Relevant and accurate data used for modelling		
Baseline	Year	2017	EPRI technology data (Electric Power Research Institute) is used for PLEXOS® modelling informing the IRP
Target	Year 1.5	2018	RSA technology data – qualified through consultative process with right-holders and duty bearers is in place for input for PLEXOS® modelling informing the IRP.
Target	Year 3	2020	No additional update expected
Output indicator 2.2	IRP scenario with updated data		
Baseline	Year	2017	Not applicable (as updated data is not available from project start)
Target	Year 1.5	2018	Not applicable (as updated data is not available to have scenario ready in 2018)
Target	Year 3	2020	One IRP scenario with updated data

Output 3	DoE has strengthened capacity for collecting, processing and reporting on RE data REDIS is deployed and based upon lesson learnt, the concept is replicated to support the wider DoE’ planning function.		
Output indicator 3.1	Number of data sources, RE-technologies and RE-resources for which RE-data is compiled, processed and made public available online through REDIS		
Baseline	Year	2017	Data sources, RE-resources and attached technologies covered by REDIS as per programme start
Target	Year 1.5	2019	REDIS covers one additional RE-resource and attached technologies compared to baseline situation.
Target	Year 3	2020	REDIS covers two additional RE-sources and attached technologies compared to baseline situation and data comes from additional sources compared to the baseline.
Output indicator 3.2	Proof of concept of REDIS in terms of in-house capacity in place for continued updating of data and in terms of feed-back from public and private sectors stakeholders in RE-data including academia, civil society and private sector investors		
Baseline	Year	2017	REDIS is in initial test phase.
Target	Year 1.5	2019	REDIS in pilot phase and gets good feedback from stakeholders.
Target	Year 3	2020	Staff competencies and allocations are in place to maintain

			REDIS and regular update underlying data without further support from DEA.
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Development engagement 2:

Outcome		Enhanced power system ability to integrate the renewable energy generated in a cost effective way.	
Outcome indicator		1) Capacity to effectively integrate RE into the grid. 2) RE generation uptake in the supply mix of South Africa.	
Baseline	Year	2017	1) Limited capacity available to integrate all generated RE. 2) No significant curtailment with current level of RE integration
Target	Year	2020	1) ESKOM has the capacity to fully integrate all generated RE while at the same time minimizing the costs of the base load needed to balance the variable nature of the resource 2) No significant curtailment with the increased level of RE integration

Output 1		Operational flexibility of the national electricity system is enhanced The national electricity system is well prepared to integrate increased shares of fluctuating RE in the power supply in a cost-effective way, including through additional use of thermal power plants balancing services, dispatch operation under conditions of high penetration of RE generation and grid stability issues.	
Output indicator		Ability to operate the power system to serve varying demand as well as supply load	
Baseline	Year	2017	ESKOM is operating the power system primarily to serve a varying demand load and are able to integrate most of the produced RE generation at current penetration.
Target	Year 1 1.5	2018	ESKOM has identified tools to operate the power system in a way that may serve increasing amounts of varying demand and supply load when more RE is coming online. Financial incentive needed to integrate even more RE through thermal power plant balancing services is identified in close dialogue with ESKOM.
Target	Year 3	2020	ESKOM is able to operate the power system to serve varying demand as well as supply load as more RE is coming on line. Also, it is known what kind of financial incentive is needed to do this in a cost-neutral way.

Output 2		RE generation forecasting is improved ESKOM uses advanced tools and procedures for RE generation forecasting and dispatch of non-renewable generation.	
Output indicator		Ability to do advanced forecasting more accurately	
Baseline	Year	2017	ESKOM uses a 24h forecasting (or day-ahead) of the RE generation to plan the dispatch of non-renewable power plants.
Target	Year 1.5	2018	ESKOM is able to use hourly forecasting of RE generation based on real-time meteorological data.
Target	Year	2020	ESKOM is able to use hourly forecasting more accurately of RE generation by linking real-time weather data to forecasting models and can dispatch non-renewable generation in a cost-

			efficient manner.
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Output 3		Integration of RE generation at distribution level is strengthened ESKOM's local distribution control centres including centres at municipal levels has developed operational frameworks that can efficiently integrate and operate variable generation at the distribution level without compromising grid stability	
Output indicator		Change in operational strategies as a result of training	
Baseline	Year	2017	Not applicable as training has not started. Small scale embedded generation not captured fully in the existing network
Target	Year 1.5	2018	Centres have developed new or revised their existing operating strategies due to training received. Percentage small scale embedded generation captured in the existing network measured in data acquisition systems
Target	Year	2020	No additional target for 2020, this output is in principle designed to be implemented in the first year of the DE.

Annex C: Budget at output level

Development Engagement 1: Capacity Development of Energy Sector Planning

Outputs	DKK'000
1. DoE has strengthened capacity for energy sector modelling	3,364
Technical assistance	2,881
Travel costs etc. attached to technical assistance	214
Delegations to Denmark	200
Other costs	70
2. DoE has strengthened capacity to peer review external modelling input	2,049
Technical assistance	1,645
Travel costs etc. attached to technical assistance	134
Delegations to Denmark	200
Other costs	70
3. DoE has strengthened capacity for collecting, processing and reporting on RE data	980
Technical assistance	520
Travel costs etc. attached to technical assistance	89
Delegations to Denmark,	300
Other costs,	70
International Long-Term Adviser	3,900
GRAND TOTAL	10,293

Development Engagement 2: Renewable Energy Integration into the Power System

Outputs	DKK '000
1. Operational flexibility of the national electric system is enhanced	2,764
Technical assistance	2,306
Travel costs etc. attached to technical assistance	258
Delegations to Denmark	130
Other costs	70
2. RE generation forecasting is improved	845
Technical assistance	560
Travel costs attached to technical assistance	85
Delegations to Denmark	130
Other costs	70
3. Integration of RE generation at distribution level is strengthened	1,552
Technical assistance	1,254
Travel costs etc. attached to technical assistance	98
Delegations to Denmark	130
Other costs	70
	-
GRAND TOTAL	5,161

Annex E: Development Engagement Documents