



Danish Energy  
Agency

The background of the entire page is a photograph of a large electrical transmission tower on the left, with power lines stretching across the sky. In the lower right, a power plant with several tall chimneys is visible, illuminated by lights against a sunset sky. Three semi-transparent circles are overlaid on the image: a large white one in the center-right containing the title, a teal one in the lower-left, and a pink one in the lower-right.

The joint  
Danish-South African  
cooperation on  
climate and energy

# Key Data

## South Africa

Population (millions):	55.9 (2016)
CO <sub>2</sub> -emissions (Mega tonnes):	427.6 (2015)
CO <sub>2</sub> (t/capita):	7.7 (2015)
kg CO <sub>2</sub> /GDP:	1.02 (2015)
Investment in RE (billion \$US):	0.89 (2016)

Source: IEA 2017, WorldBank 2016 and Frankfurt School-UNEP Centre/BNEF 2017

## South Africa NDC Goals

South Africa's emissions by 2025 and 2030 will be in a range between 398 and 614 Mt CO<sub>2</sub>-eq, as defined in national policy.



## Denmark

Population (millions)	5.7 (2016)
CO <sub>2</sub> -emissions (Mega tonnes)	32 (2015)
CO <sub>2</sub> (t/capita):	5.63 (2015)
kg CO <sub>2</sub> /GDP:	0.09 (2015)
Investment in RE (billion \$US):	2.5 (2016)

Source: IEA 2017, WorldBank 2016 and Frankfurt School-UNEP Centre/BNEF 2017



## Green government-to-government cooperation

Inclusive, sustainable growth - and development is a strategic objective of Denmark's development cooperation. Economies in transition and emerging economies are considered key players for achieving the global Sustainable Development Goals and it is important to provide support for their sustainable development, as they demand expertise, knowledge, technologies and investments to make appropriate strategic choices for their sustainable development. This is not least true with regard to development of their energy sector.

The Danish Energy Agency's global cooperation intends to assist partner countries with their transition to a low carbon pathway reaching the National Determined Contribution (NDC) targets they committed to at COP21.

The primary modality of the Danish Energy Agency is to engage in government-to-government cooperation to promote the common climate change agenda. It strives for true peer-to-peer exchange to advance the understanding of policy options, strengthen planning - and framework conditions, and strengthen enforcement of regulation.

The overall development objective agreed to by the counterparts of the Partnership Program between Denmark and South Africa is "to assist South Africa in moving 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.

## Facing the challenges

As a growing economy, South Africa is focused on balancing the competing need for continued economic growth with its social needs and the protection of the natural environment. South Africa aims to grow its energy supply to support the 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 main goals of the South African National Development Plan 2030 are to eliminate poverty and reducing inequality by 2030. Among the 'enabling milestones' there are the needs "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.

The power sector of South Africa is the largest emitter of CO<sub>2</sub> in the African continent, accounting for more than 50% of CO<sub>2</sub> emissions. This is due to an almost total reliance on coal for electricity generation. South Africa has in recent years taken significant and positive steps to support its low carbon transition and has invested significantly in renewable energy technologies to replace an old and ineffective fleet of coal power plants.

Since its launch in 2011, South Africa's Renewable Energy Independent Power Producer Procurement Programme (REI4P) has procured around 6.2 GW of new





generation capacity. Overall, this makes the South African REI4P one of the most successful renewable energy procurement programmes on a global scale. The REI4P targets 8.4 GW of wind and 8.4 GW of solar capacity by 2030. RE integration and system flexibility are key issues that are being addressed by the new joint partnership between South Africa and Denmark.

The Partnership programme focuses on areas where Denmark has a particular expertise to offer, such as 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 green policy making and long range planning.

## Cooperating on long-range Energy Planning and Integration of Renewable Energy in the Power System

Since 2013, South African and Denmark have been engaged in a fruitful cooperation on renewable energy. The present partnership that started mid2017 and will run until mid2020 consists of two development engagements, respectively focusing on capacity development for energy sector planning with the Department of Energy (DoE) and renewable energy integration into the power system with the ESKOM.

The present partnership is funded with DKK 18,2 million from the Danish Climate Envelope.



## Long-range Energy Sector Planning

The aim of the engagement with the DoE is to facilitate the development of a less carbon intensive electricity sector in line with the key development focus of the DoE: the Integration Energy Plan (IEP) and the Integrated Resource Plan (IRP). Accordingly, Denmark will assist the DoE in developing a more comprehensive energy planning capability focusing on strengthening DoE's capacity for investigating future energy options and providing robust technical, economic, environmental, and regulatory assessments.

The DoE is responsible for modelling and developing scenarios, which reflects the policy options of the government. The focus of the partnership with the DoE is to strengthen the capability of the planning process, including construction

of scenarios and updating of technology data for scenario analyses. As part of the assistance, the DEA also provides continuous technical support for the development of the Renewable Energy Database and Information System (REDIS).

## Renewable Energy Integration in the Power System

The targeted outcome of the engagement with ESKOM is to enhance the power systems ability to integrate increasing levels of renewable energy, in a reliable and cost effective way. This is realized by providing ESKOM with assistance on how to enhance dispatch operation strategies and operational flexibility while ensuring grid stability and security of supply.

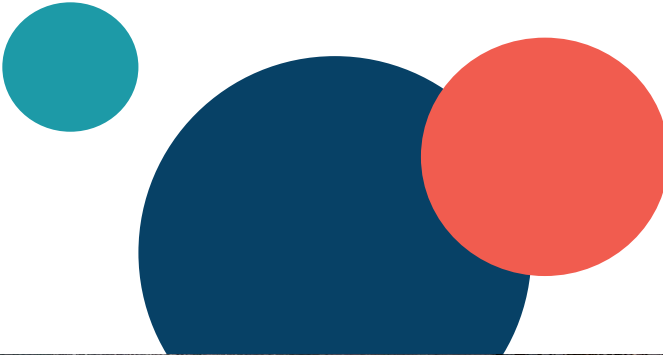





The partnership is also supporting ESKOM with the development of relevant tools and procedures for more accurate forecasting of RE generation, in order for ESKOM to eventually practice hourly forecasting and better link real-time weather data to forecasting models for power generation. This will also allow for dispatching non-renewable energy in a more cost-effective manner.

Finally, ESKOM and municipalities' local distribution control centres will be engaged

in the cooperation to strengthen their ability to foresee and handle the impact of variable RE generation on the operation and stability of distribution networks. This will be done through training and knowledge sharing of best practice from Denmark. Thus, under this engagement, distribution control centres are expected to develop operational and regulatory frameworks that will enable a more efficiently integration of variable renewable generation at the distribution level.





The Danish Energy Agency's Centre for Global Cooperation supports emerging economies to combine sustainable future energy supplies with economic growth. The initiative is based on four decades of Danish experience with renewable energy and energy efficiency, transforming the energy sectors to deploy increasingly more low-carbon technologies.

Learn more on our website:  
[www.ens.dk/en/our-responsibilities/global-cooperation](http://www.ens.dk/en/our-responsibilities/global-cooperation)

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