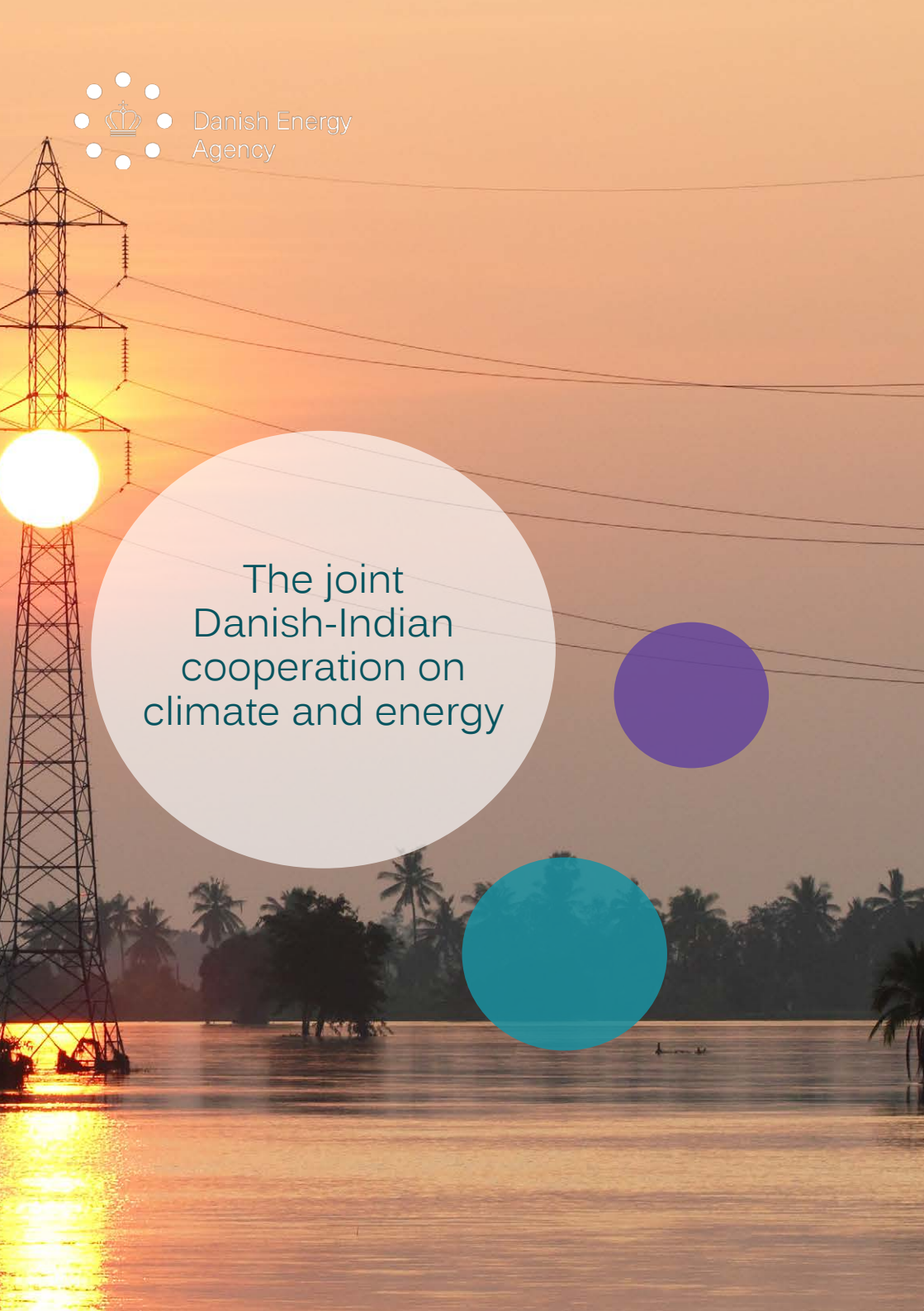

Danish Energy
Agency
The joint
Danish-Indian
cooperation on
climate and energy

# Key Data

## India

| | |
|---|---|
| Population (millions): | 1.324 (2016) |
| $C0_2$-emissions (Mega tonnes): | 2.066 (2015) |
| $C0_2$ (t/capita): | 1.58 (2015) |
| kg $C0_2$/GDP: | 0.90 (2015) |
| Investment in RE (billion $US): | 8.4 (2016) |

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

## NDC goals - India

To reduce the emissions intensity of GDP by 33%–35% by 2030 below 2005 levels.

To increase the share of non-fossil based energy resources to 40% of installed electric power capacity by 2030, with help of transfer of technology and low cost international finance including from Green Climate Fund (GCF).

## Denmark

| | |
|---|---|
| Population (millions): | 5.7 (2016) |
| $C0_2$-emissions (Mega tonnes): | 32 (2015) |
| $C0_2$ (t/capita): | 5.63 (2015) |
| kg $C0_2$/GDP: | 0.09 (2015) |
| Investment in RE (billion $US): | 2.5 (2016) |

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

May 2018

## Green government-to-government cooperation

Inclusive, sustainable growth and development is a strategic objective of Denmark's development cooperation. Transition and growth economies are considered key players for achieving the global Sustainable Development Goals and it is vital to provide support for their sustainable development and meet the demand for expertise, knowledge-sharing, technologies and investments. This is especially true for the 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 for achieving 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 in a forthcoming program between India and Denmark is that India is in transition to decouple carbon emissions from economic growth through an increased share of renewable energy in its system.

## Powering the Indian transition

India is experiencing one of the most rapid social and economic transformations in the world. Its economy is projected to expand to more than five times its current size by 2040.

Energy access and a higher share of renewable energy are some of the leading development challenges for India in order to meet the energy demand for an increasing population, increase domestic production of energy, reduce dependence on energy imports, provide renewable energy for industrial growth and ensure poverty alleviation. According to projections from the International Energy Agency, India alone will account for 30% of the global increase in energy demand from 2017 towards 2040. Today, between 200 and 300 million people live without access to electricity and India is planning a significant expansion of power capacity concerning first and foremost renewable energy sources but also thermal and an extensive agenda focused on energy efficiency and energy savings.

India has recently seen very low prices for solar, and wind (on par or lower than coal) and the Indian government is thus committed to increasing the share of renewable energy rapidly. India has a very ambitious target of 175 GW of renewable energy by 2022 of which the majority will come from solar (100 GW) and wind (60 GW) energy. Investments and projects in the wind sector have been the primary driver of the renewable energy deployment of the country (65% of the total renewable energy capacity installed), making India the fourth largest wind power market in the world after China, the US, and Germany. The installed onshore wind power capacity amounts to approximately 33 GW and the remaining 27 GW will be auctioned before March 2020.

In an effort to exceed the renewable energy targets for 2022, the Indian government has recently announced a new 5 GW target for offshore wind. Offshore wind power has the potential to play a substantial part of delivering carbon-free electricity to the fast-growing Indian economy due to the additional benefits of higher capacity factors, more reliable wind speeds, less use of land/less land availability issues, proximity to energy demand centres in coastal areas and reduced grid evacuation issues. Also, wind-solar hybrid technologies are being pursued with tenders being prepared.

## Indo-Danish cooperation on development of offshore wind energy in India

European offshore wind farms have recently settled at contracts where the offshore wind farm itself is even subsidy-free. This is a result of decades of experience in developing the offshore

wind sector and the presence of a transparent regulatory framework and a well-developed supply chain. Kick-starting the development of offshore wind in India is expected to come at a premium in the initial phases, while the regulatory framework is developed, major infrastructure is established, and the offshore value-chain becomes engaged in India.

Denmark is in a unique position to offer assistance to India having experienced a pronounced decoupling of economic growth from greenhouse gas emissions and gathering more than 40 years of experience in retrofitting and greening its energy system. Denmark is the country in the world with the largest share of wind power in domestic demand (43% in 2017), which is projected to reach 50% by 2020. With more than 25 years of experience in developing its offshore wind industry, Denmark can bring instrumental knowledge to the Indian authorities on de-risking the associated policy and regulatory frameworks. Furthermore, with its high wind penetration and extremely reliable security of supply, Denmark represents an excellent case study on the integration of renewable energy in power systems. The Danish success can be summarised in some key features: an efficient power market, specialised and precise forecasting, well-designed grid codes, a flexible generation system, and an efficient one-stop-shop regulatory framework.

As such, the knowledge acquired and the lessons learned during the development of wind power in Denmark, in particular offshore wind power, can be valuable for the Indian government in establishing and expanding their offshore wind sector, and enabling them to achieve their renewable energy goals.

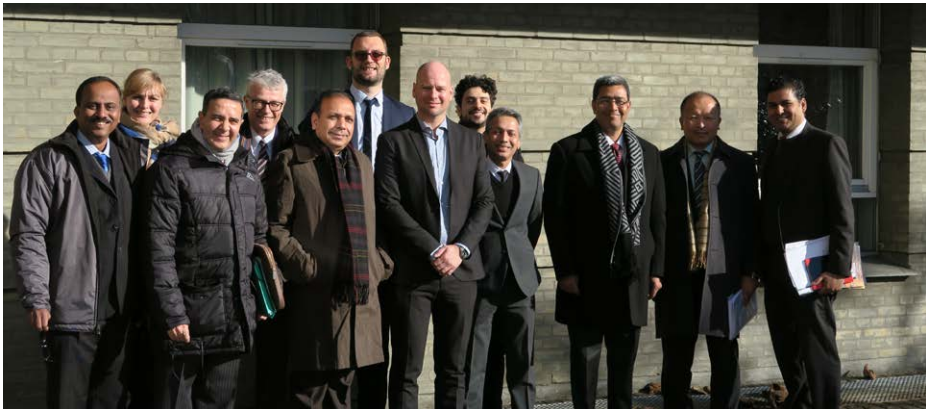
## The Sector Cooperation

The proposed energy partnership comprises a Strategic Sector Cooperation (SSC) program, which will facilitate government-to-government collaboration around areas where Denmark has decades of experience and which can support green growth in rapidly growing economies such as India. The foundation for providing technical assistance takes its outset in Denmark's four-decades of experience with low carbon transition, scenarios and long-term planning, and a gradual reduction of energy intensity.

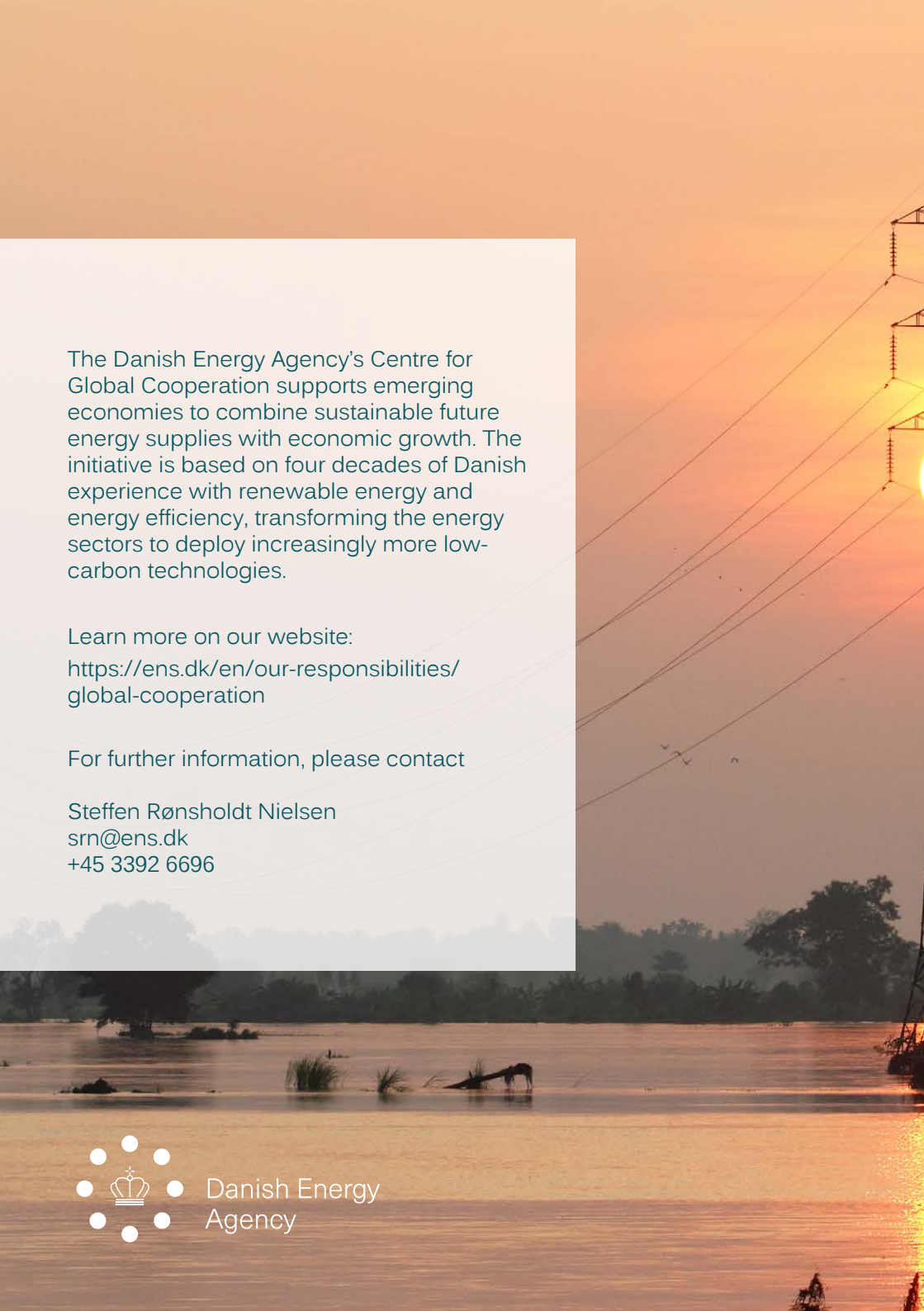
The nature of the proposed SSC is based on peer-to-peer cooperation making the Danish experience available and relevant in the Indian context. In addition, the collaboration aims at bringing together both the public and private sectors and other relevant stakeholders.

The SSC is a three-year program running from 2018 to 2021, with the objective to assist the Indian government agencies and other relevant stakeholders in developing applicable policies, planning strategies and solutions to deploy offshore wind power, and therefore to achieve the Indian government's ambitious long-term renewable energy objectives.

The cooperation is proposed on both technical and institutional levels, which aim at enhancing the Indian experience in relevant areas necessary for the expansion of offshore wind in the country. As such, it will provide support in all related areas that Danish expertise has shown essential to have a successful deployment of offshore wind, including government goals.



Offshore wind is capital intensive and requires long-term planning and investment by all stakeholders. This will be possible only when there are long-term policy certainty and a plan in place. Experience shows that a clear, time-bound, quantitative target for offshore wind development, and a roadmap of how to achieve it, is an effective tool to leverage offshore wind potential. As such, it is planned for the cooperation to address the concerns and necessities of stakeholders relevant to achieving the goals for offshore wind in a sustainable and transparent manner.



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:
https://ens.dk/en/our-responsibilities/global-cooperation

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