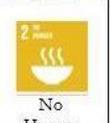
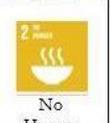
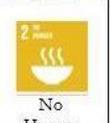


## India-Denmark Energy Partnership

<p><b>Introduction:</b></p> <p>India and Denmark have through Joint Working Groups at Permanent Secretary level and meetings at Permanent Secretary/Secretary and Ambassador level reached agreement on cooperation to support India's goals in climate change mitigation and green energy transition. A Strategic Sector Cooperation of lesser magnitude is already agreed and about to begin implementation. Funding for a bigger 5-year partnership programme has been allocated under the Climate Envelope for 2019.</p> <p><b>Key results:</b></p> <ul style="list-style-type: none"> <li>• Contribution to achieving India's targets in the Nationally Determined Contribution (NDCs) under the Paris Agreement on Climate Change, as well as SDG7 and SDG13 and other SDGs.</li> <li>• Integrated approach to onshore and offshore wind power development applying international experience on planning, regulation, integration into the power system, efficient tendering mechanisms and the mobilization of investment and finance.</li> <li>• Power sector analysis and medium and long-term energy planning using relevant modelling tools to identify least-cost potentials and future pathways to achieve India's clean energy targets cost efficiently, maintaining high security of supply and applying to national policy objectives.</li> <li>• Flexibility and integration of increasing levels of renewable energy in the power system through optimized flexibility, forecasting, energy efficiency, consolidated grid codes, efficient design of the power market, and other measures.</li> <li>• Increased mobilization of investment in clean energy facilitated through de-risking and an improved enabling framework.</li> </ul> <p><b>Justification for cooperation:</b></p> <ul style="list-style-type: none"> <li>• India and Denmark share common goals and have demonstrated high-level commitment to green energy transition and climate change mitigation efforts and have demonstrated action e.g.in increasing share of renewable energy.</li> <li>• India already has a population of over 1.3 billion and is the 3rd largest greenhouse gas (GHG) emitting country globally (although not on a per capita level), with the power sector accounting for half of GHG emissions. India's energy demand is expected to rise over the coming years to an extent comparable to the EU's combined energy demand. India' role for achieving the SDGs can be compared to the role China played vs. the MDGs.</li> <li>• The partnership will target climate change mitigation and SDGs prioritised in Denmark's strategy "The World 2030" for cooperation with emerging economies.</li> </ul>	<b>File No.</b>	F2: 2018-25829																								
	<b>Country</b>	India																								
	<b>Responsible Unit</b>	MKL with the Ministry of Energy Utilities and Climate (MEUC) and the Danish Energy Agency (DEA)																								
	<b>Sector</b>	Climate and energy																								
	<b>Partners</b>	Ministry of Power (MoP); Ministry of New and Renewable Energy (MNRE) – and key agencies under MoP and MNRE as well as the The National Institution for Transforming India (NITI Aayog).																								
	<i>DKK mill.</i>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>Tot</b>																		
	<b>Commitme</b>	55						55																		
	<b>Projected annual disburseme</b>	5	11	11	11	11	6	55																		
	<b>Duration</b>	Mid-2019 to mid-2024																								
	<b>Previous grants</b>	DKK 8.5 mill. for Strategic Sector Cooperation (SSC) in the energy sector 2019-2021 with MNRE and MoP.																								
	<b>Finance Act code</b>	06.34.01.70 Climate Envelope																								
	<b>Head of unit</b>	Henriette Ellermann-Kingombe																								
	<b>Desk officer</b>	Tobias von Platen-Hallermund																								
	<b>Financial officer</b>	Louise Kronborg Sorensen																								
	<b>Relevant SDGs</b>																									
	<table border="1" style="width: 100%; text-align: center;"> <tr> <td> No Poverty</td> <td> No Hunger</td> <td> Good Health, Wellbeing</td> <td> Quality Education</td> <td> Gender Equality</td> <td> Clean Water, Sanitation</td> </tr> <tr> <td> Affordable Clean Energy</td> <td> Decent Jobs, Econ. Growth</td> <td> Industry, Innovation, Infrastructure</td> <td> Reduced Inequalities</td> <td> Sustainable Cities, Communities</td> <td> Responsible Consumption &amp; Production</td> </tr> <tr> <td> Climate Action</td> <td> Life below Water</td> <td> Life on Land</td> <td> Peace &amp; Justice, strong Inst.</td> <td> Partnerships for Goals</td> <td></td> </tr> </table>								 No Poverty	 No Hunger	 Good Health, Wellbeing	 Quality Education	 Gender Equality	 Clean Water, Sanitation	 Affordable Clean Energy	 Decent Jobs, Econ. Growth	 Industry, Innovation, Infrastructure	 Reduced Inequalities	 Sustainable Cities, Communities	 Responsible Consumption & Production	 Climate Action	 Life below Water	 Life on Land	 Peace & Justice, strong Inst.	 Partnerships for Goals	
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<b>Risks and challenges:</b>																										
<ul style="list-style-type: none"> <li>• Vested interests in traditional energy solutions.</li> <li>• Limited institutional capacity in partner institutions.</li> <li>• Highly ambitious Indian targets.</li> <li>• Many other development partners active in climate change mitigation and clean energy development in India, and Denmark is a small partner in a crowded field.</li> </ul>																										
<i>January 2019</i>																										

# Danida Concept Note for the Programme Committee Meeting on 6 February 2019

## Strategic questions for the Programme Committee

MKL seeks guidance from the Programme Committee on the following issues for the formulation of support:

1. Ambition level – is the ambition level of the cooperation realistic, and is there enough flexibility built into the programme to allow cooperation to be demand responsive?
2. Partners – is the choice of partners and interventions in the three main outcome tracks balanced between strategic level cooperation and the achievement of concrete outcomes and outputs? How can Indian buy-in to the programme be best optimized?
3. Coordination – can the governance arrangements ensure a close enough integration with the SSC and DEPP as well as coordination with Danish support at the multilateral level and harmonisation with the activities of other development partners in India?

## List of key abbreviations

**AMG** – Danida Aid Management Guidelines  
**CEA** - Central Electricity Authority (under MoP)  
**CERC** - Central Electricity Regulatory Commission (under MoP)  
**DEA** – Danish Energy Agency  
**DEPP** - Danish Energy Agency Partnership Programme 2017-2020 (China, Mexico, South Africa, and Vietnam)  
**DED** – Development Engagement Document  
**DTU** – Danish Technical University  
**EDK** – Embassy of Denmark in New Delhi  
**EE** – Energy efficiency  
**ESMAP** – World Bank Energy Sector Management Assistance Program  
**EUDP** – Danish Energy Technology Development and Demonstration Programme  
**FFSR** – fossil fuel subsidy reform  
**GDP** – gross domestic product  
**GHG** – Greenhouse gases  
**GoI** – Government of India  
**GSI** – Global Subsidies Initiative  
**IISD** – International Institute for Sustainable Development  
**INR** – Indian Rupee (about 0,094 DKK)  
**JWG** – Joint working group  
**LCOE** – levelized cost of energy  
**LoI** - Letter of Intent  
**MEUC** – Danish Ministry of Energy, Utilities and Climate  
**MFA** – Ministry of Foreign Affairs of Denmark  
**MKL** – MFA Department for Multilateral Cooperation & Climate Change  
**MNRE** -Ministry of New and Renewable Energy of the Government of India  
**MoP** - Ministry of Power of the Government of India  
**NDC** – Nationally determined contribution (under the Paris Agreement on Climate Change)  
**NITI Aayog** - The National Institution for Transforming India  
**NIWE** – National Institute of Wind Energy, Chennai (under MNRE)  
**POSOCO** - Power System Operation Corporation Limited (under MoP)  
**RE** – Renewable energy  
**SDG** – Sustainable Development Goal  
**SMART** – Specific, measurable, achievable, relevant and time-bound  
**TQS** – Department for Technical Quality Support

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## 1. Context

### Background analyses and relevance:

With compounded annual growth rate of over seven percent in its real gross domestic product (GDP) over the past five years, India is one of the fastest growing large economies of the world. At 130 trillion INR India's GDP is among top five of the world. Rapid growth in its GDP has placed India in a position of 3rd largest energy consumer in the world (behind USA and China) although on a per capita basis it ranks much lower. India's economy is largely energised by fossil fuels, making India the third largest emitter of energy related CO<sub>2</sub> emissions in the world. India's power sector is a major contributor to the energy related CO<sub>2</sub> emissions. With a predominance of thermal generation, India's Weighted Average Emission Factor at 0.82 kg of CO<sub>2</sub> per kWh (net) generated is relatively high and has remained unchanged in recent years. With the rise in generation, CO<sub>2</sub> emissions from the Indian power sector have risen at a very high rate of over 7 percent per year during the period 2011/12 to 2015/16.

India's ambition is to raise its per capita electricity consumption by a factor of 3 from today's level by 2040. Against this background, India has demonstrated strong resolve to reduce carbon intensity as reflected in its Nationally Determined Contribution (NDC) pledges under the Paris Agreement on Climate Change as well as in its massive push for increasing the share of renewable energy (RE) in power generation, reflected in the following figures:

#### Key Indian climate and clean energy targets:

- Reduction in emission intensity of 30-35% by 2030, over 2005 level.
- RE power generating capacity of at least 40% of the total installed generation capacity by 2030:
  - Major thrust on solar & wind capacity.
  - Target of 175 GW of RE installed capacity by 2022 with solar capacity at 100 GW and wind capacity at 60 GW by the year 2022.
  - Ambitious offshore wind targets (5 GW by 2022, 30 GW by 2030).

The proposed partnership is highly relevant against this background, and its focus on India's NDC targets and SDGs (particularly SDG7 (affordable and clean energy) and SDG13 (climate action)), and also SDG8 (decent work and economic growth), SDG9 (industry, innovation and infrastructure), SDG 11 (sustainable cities and communities, and SDG17 (partnerships) is furthermore consistent with Danish priorities for climate change-related partnerships with emerging economies<sup>1</sup>.

**Priorities, policies, systems and structures:**

Electricity is in the “concurrent list” of the Indian Constitution, with both state and central government having identified roles. The responsibilities of the central/federal government include preparing the national legal and policy framework, regulatory and safety guidelines, implementing centrally sponsored programmes, country-wide planning, multi-state generation projects, and inter-state transmission systems. At federal level these tasks are carried out by the Ministry of Power (MoP), and the Ministry of New and Renewable Energy (MNRE) along with a number of subsidiary statutory bodies including the National Centre for Wind Energy (NIWE) in Chennai, which is the focal point for wind power R&D in India; and the Solar Energy Corporation of India Limited (SECI) under MNRE, which is responsible for tendering of RE including wind. Under MoP the following bodies are particularly relevant: The Central Electricity Authority (CEA); the Central Electricity Regulatory Commission (CERC), the load dispatch operator Power System Operation Corporation Limited (POSOCO), and the central transmission utility Power Grid Corporation of India Limited (POWERGRID. The Electricity Act 2003 and related central policies (National Electricity Policy, Tariff Policy, Rural Electrification Policy, Hydro Policy, etc.) prepared by the MoP have provided the legal and policy framework for the entire country. It is noted that in the energy sector there are also three other central level line ministries/departments with mandates in the coal, petroleum/gas and nuclear sub-sectors. The National Institution for Transforming India (NITI Aayog, the government's key policy think-tank and former national Planning Commission) has an over-arching mandate<sup>2</sup> cutting-across line ministries and ensuring a bottom-up approach to development.

The state governments are primarily involved in generation, transmission, distribution, policy making, budgetary support and regulatory functions limited to the state boundaries. This is carried out by the state energy departments, generation, distribution and transmission companies, the load dispatch centre and the electricity regulatory commission. In addition, some of the companies operating in the state can be owned privately or by the central government. Distribution companies may sub-contract distribution in some areas to franchisees. While the Indian national grid is one of the World's largest, the lack of legal basis for inter-state power markets is an obstacle for an open electricity market.

In 2017 Niti Aayog prepared a draft National Energy Policy, the broad objectives of which include enhanced energy independence, increased access at affordable prices, greater sustainability and higher economic growth, and aligning energy prices with benchmarks in the

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<sup>1</sup> See page 10 Table 1 in [“The World 2030”](#).

<sup>2</sup> Including to evolve a shared vision of national development priorities, sectors and strategies with the active involvement of States in the light of national objectives, and to be a platform for resolution of inter-sectoral and inter-departmental issues in order to accelerate the implementation of the development agenda. NITI Aayog is also responsible for the SDGs in India.

international market to enable market driven prices and limiting subsidies. It is expected that this draft policy is to be considered soon by the Indian Prime Minister.

**Relation to other relevant partners and actors:**

Climate change mitigation and clean energy development in India is a crowded field with many national and international development partners. Among the most important international development partners that are actively engaged on topics related to the expected focus areas of the Danish partnership programme, are the UK/DFID, USAID, GIZ Germany, the EU, the World Bank, and the Asian Development Bank. The identification mission has held meetings with each of these agencies to identify areas of synergy and emphasised the need to avoid any risk of duplication. It is noted that donor coordination is weak and mainly done at the initiative of development partners<sup>3</sup>.

**Considerations on Danish strengths and interests:**

The partnership programme will be built upon a clear recognition of the specific areas of Danish strength and partnership modalities that best match the prioritised needs and priorities of Indian partners and which no other development partner delivers in the same way. Denmark has demonstrated that it is possible to decouple economic growth, GHG emissions and energy consumption, resulting in green growth. Wind energy contributed 43% of the electricity consumption in Denmark in 2017. The Danish energy model has also demonstrated the importance of: a holistic view based upon an energy agreement as a roadmap for development of energy supply and demand; energy planning including models, scenarios and long-term planning; waste-to-energy; power generation system flexibility; integration of renewable energy; maintaining a very high security of electricity supply closely linked to significant cross border connections; close public and private cooperation, public engagement and acceptance, general public support for the energy sector transition, advancement of the Levelized Cost of Energy (LCOE) approach; offshore wind; biomass utilization; bioenergy; regulation of and targeted investments in energy efficiency; and a broad and integrated one-stop-shop mandate of DEA to regulate and deliver on the above. Denmark has a strong interest in sharing this experience in a partnership with India for mutual benefit, which will also contribute to Denmark's interest in achieving global climate goals and meeting SDG targets. The Danish private sector is already engaged in India, e.g. in wind energy, and the large Indian market for clean energy solutions will be of major interest to the Danish resource base in future. There is also cooperation with India in research, and the Danish Technical University DTU and NIWE have just signed a MoU on cooperation in wind energy.

**2. Presentation of the programme**

The partnership programme cooperation is seen as “centre of excellence activities” highlighting the strategic perspective and intended significance of the partnership for mutual benefit, but a physical centre of excellence is not envisaged. The cooperation will build on a well-tested government-to-government modality of cooperation featured by: Memorandum of Understanding outlining shared government goals for the cooperation; provision of technical advisory support including from the DEA and the Danish power system operator and offering counterparts wider access to acquaint with Danish experience, expertise and technology

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<sup>3</sup> An example is the MoU on RE integration between US, UK and Germany – they will co-host a conference on the topic in September 2019.

solutions; and daily programme presences in-country through Denmark's embassy and through the posting of an international Long-Term Advisor with a key-partner institution.

**Intended impact:** Reduced greenhouse gas emissions and leverage of the partnership in mobilising further resources for India's green transition.

**Overall goal to which the Programme contributes:** India achieves low-carbon development, implements the Paris Agreement on Climate Change and realises its NDC goals, and achieves SDG7 and SDG13 targets.

**Outcome 1: Integrated approach to onshore and offshore wind** power development applying international experience on planning, regulation, integration into the power system, attractive and flexible tendering mechanisms and the mobilization of investment and finance.

**Outcome 2: Power sector analysis and medium and long-term energy planning** using relevant modelling tools to identify least-cost potentials and future pathways to achieve India's clean energy targets cost efficiently, maintaining high security of supply and applying to other national policy objectives.

**Outcome 3: Flexibility and integration** of increasing levels of RE in the power system through optimized flexibility, forecasting, energy efficiency, consolidated grid codes, efficient design of the power market, and other measures.

#### **Lessons learned from previous engagements:**

While the Strategic Sector Cooperation (SSC<sup>4</sup>) has recently been approved, it is not yet in the implementation phase. But in the process of developing and agreeing on the SSC and through Danish presence in India as part of the cooperation, lessons have been learned that will benefit the formulation of the 5-year programme. The Energy Advisor at the EDK in New Delhi plays a crucial role in facilitating both the SSC and the new proposed partnership programme. He has the ongoing contacts with Indian partners and development partners, which are of critical importance for supporting high-level dialogue and organising the identification/formulation missions for the new programme. The lessons include the importance of seeing India as a partner not a recipient of development aid, the importance of being very focused on the specific niche and comparative advantages Denmark can bring to the partnership in an environment with many actors and competing interests, as well as experience with Indian procedures. It is also important to ensure that the India programme will benefit from lessons learned under DEA's global cooperation programme with other countries<sup>5</sup>, and it is noted that an MTR for the bilateral cooperation with China, Mexico, South Africa, and Vietnam (Danish Energy Agency Partnership Programme, DEPP) will start soon and expected to be completed in mid-April. Findings from

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<sup>4</sup> The SSC has a budget of DKK 8.5 million over three years (and is about to start very soon). The SSC objective is to mitigate climate change while fostering technological development and sustainable economic growth by supporting a green transition in the Indian power sector. It has 3 outcomes: i) India has been empowered to implement a better regulatory framework in the offshore wind sector including spatial planning, de-risking processes and efficient tendering procedures supporting its ambitious short- and long term targets; ii) the supply chain of the Indian offshore wind industry is developing enabled by an organised roadmap and efficient support mechanisms; iii) more efficient grid integration and operation of variable renewable generation including system flexibility and consolidated grid codes. There are close synergies between the SSC and the planned partnership programme, and the two interventions should eventually be seen as one combined cooperation between India and Denmark.

<sup>5</sup> China, Ethiopia, Germany, India, Indonesia, Mexico, South Africa, Turkey, Ukraine, United Kingdom, United States, and Vietnam – other country cooperation is underway.

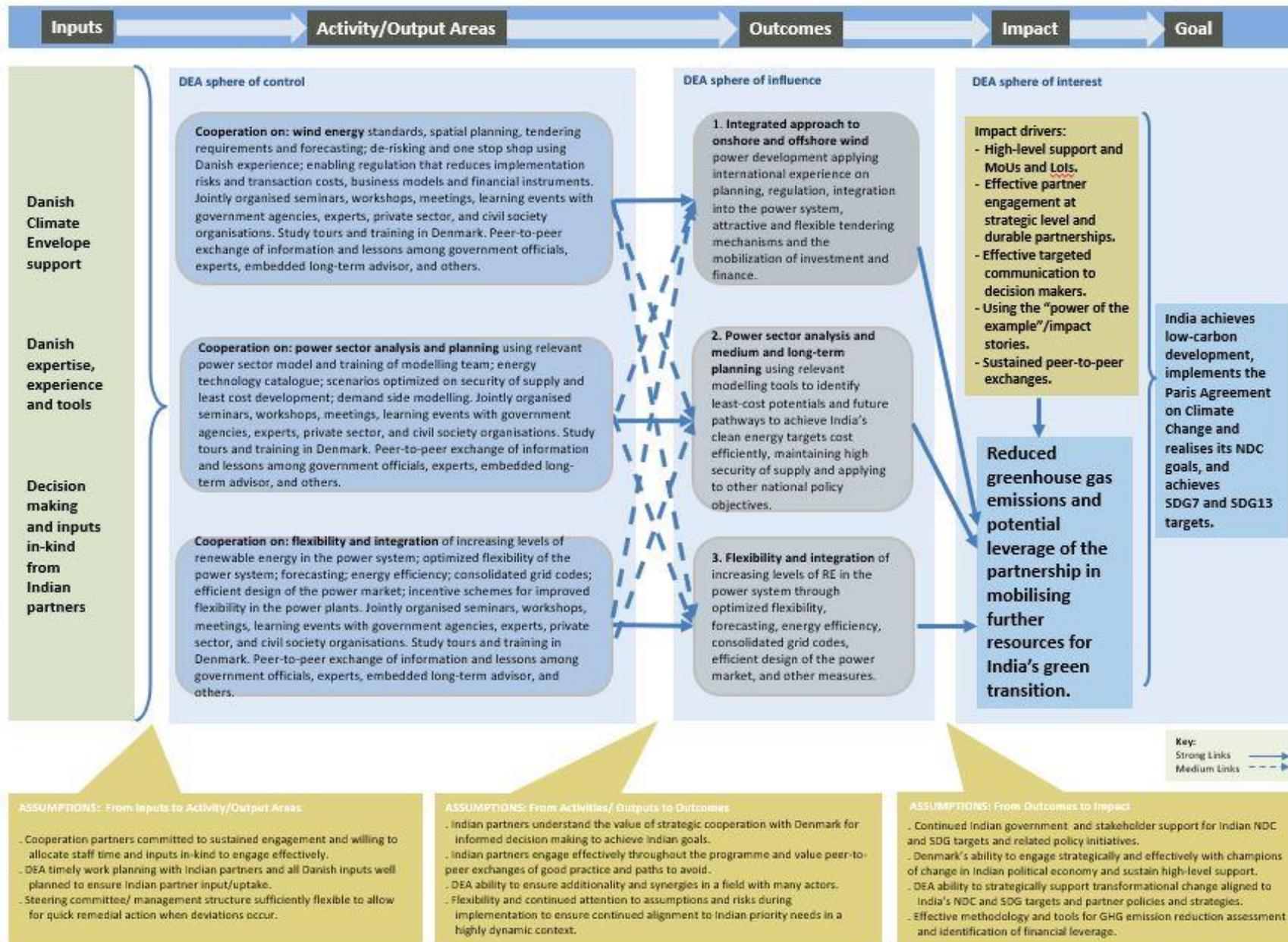
this review will as far as possible and relevant be considered in finalisation of the India Programme Document.

### **Theory of change, assumptions, impact drivers, and risks:**

Overall intervention logic: The partnership programme will utilize DEA's experience as a nodal agency in Denmark since 1976 in developing an advanced energy model including a leading position on long term planning and scenario modelling, integration of variable renewable energy into the grid, power plant flexibility, and offshore wind energy. Denmark can effectively respond to key Indian challenges and opportunities by utilizing DEA's expertise and experience and will engage in a demand-led partnership with India in these areas. Indian partner institutions will through this partnership with Denmark be better equipped to undertake medium- and long-term planning and scenario modelling of the power system, facilitate the creation of an investment-friendly offshore wind sector, use a relevant catalogue of RE technologies, improve the flexibility of grid-connected generation infrastructure, and strengthen enabling regulation that reduces implementation risks and transaction costs and facilitates business models and financial instruments that can help mobilise financial resources and investments in the green transition. In this manner, a strategic contribution will be made to achieving India's goals and targets under its NDC and SDG7, SDG13 and other SDGs. A graphic illustration of the Theory of Change is given in the figure below, which also identifies key assumptions and impact drivers.

Denmark is a small partner in the green transition of one of the World's largest emerging economies, and this theory of change is dependent upon interest and support at high political and decision-making levels that recognises the uniqueness of what Denmark has to offer through authority-to-authority cooperation, a modality that other development partners do not offer. It is assessed that there is such high-level understanding and support, which is both expressed through Memoranda of Understanding and the Letters of Intent (LoI) agreed at Secretary level in MNRE and MoP that are expected to be exchanged on January 18 during a meeting at Prime Minister level.

An MoU between MNRE and the then Danish Ministry of Climate and Energy was signed in February 2008 and is still valid; it covers cooperation under a Joint Committee and focuses on development of new and renewable energy technologies, systems, sub-systems, and components - a Joint Working Group (JWG) on Renewable Energy has been established under this cooperation and met for the first time on 28 February 2018 in Copenhagen and again on 4 October 2018 in New Delhi. An MoU between MoP and MEUC is expected to be signed soon (MoUs need Cabinet approval and can take a long time to formalise, but MoP has already designated two delegations that will visit Denmark to focus on flexibility of power plants and power market design, respectively) – this MoU will also include the establishment of a JWG on energy co-operation with a focus on power market design, integration of variable renewable energy, including e.g. forecasting, operational planning procedures and tools, optimising flexibility of power systems, consolidation of grid codes to integrate and operate efficiently variable generation, and other areas. An MoU was signed in December 2018 between NIWE and DTU - this cooperation will comprise a JWG to identify areas of mutual interest and collaboration on wind energy, wind-solar hybrid systems, sub-systems, devices, components, data analytics, etc.



### **Choice of Partners and Development Engagements:**

It is proposed that MNRE and MoP will be the implementing partners and that the above-cited Outcomes 1, 2, and 3 will be delivered by MNRE and MoP with their agencies under two Development Engagements each described in a Development Engagement Document (DED), as follows:

<p><b><u>DED 1: Implementing Partner: Ministry of New and Renewable Energy (MNRE):</u></b> <b>Outcome 1 - Cooperation on: wind energy.</b> Partners under this engagement/outcome will include NIWE (wind) and SECI (tendering) - these agencies are under MNRE. In addition, NITI Aayog could be a partner.</p>
<p><b><u>DED 2: Implementing Partner: Ministry of Power (MoP):</u></b> <b>Outcome 2 - Power sector analysis and medium and long-term planning.</b> <b>Outcome 3 - Flexibility and integration.</b> Partners will include CEA (long-term planning, modelling, forecasting under national electricity policy and strategy), CERC (regulation, market development and enabling environment), and POSOCO (forecasting, grid integration, flexibility) - these agencies are under MoP. In addition, NITI Aayog could be a partner under this engagement (at least in Outcome 3), with a focus on long-term planning and scenario modelling, links to NDC and SDG targets, and wider cross-sectoral and cross-ministerial issues).</p>
<p>The area of mobilising investments and finance is cross-cutting and will be an integral part of both engagements and the three outcomes. In this area there will be emphasis on synergies with initiatives supported by Denmark through other initiatives and modalities, including multilateral cooperation.</p>

### **Cross-cutting concerns:**

While access to affordable, reliable, sustainable and modern energy for all is a Sustainable Development Goal (#7), access to renewable energy is not a human right in itself. But given the role of clean and sustainable energy as a broader enabler of human and economic development, it is strongly interconnected with basic rights such as the right to life, food, health, shelter, education, etc. The contribution to be made by this programme in terms of capacity development and tools for more well-informed and transparent decision making in the energy transition, will support the human rights principles of participation, accountability, non-discrimination, and transparency will thus be supported. Similarly, the particular benefits of the cooperation for both women men and youth will be given careful attention in the formulation.

### **Programme focus:**

The identification mission identified the following key challenges and opportunities in India that the authority-to-authority cooperation programme is found to be well placed to respond to:

#### Offshore wind energy:

- Improving the tendering process and the regulatory framework to reduce risk
- Cooperation on spatial planning.
- Updating and validating wind maps, improving forecasting and long-term roadmap on offshore wind development.
- Cooperation on the domestic supply chain.

- Cooperation to improve the business case of offshore wind (costs currently estimated as high as INR 10-12/kWh).

#### Medium- and long-term energy planning and energy scenarios:

- Introducing a power sector optimization model that can model the whole power system on an hourly basis.
- Cooperation on an updated technology catalogue on energy – incl. LCOE calculation.
- Introducing energy scenarios optimized on RE investments, RE penetration, EE obligations – without jeopardizing the security of supply.
- Cooperation on long term holistic energy modelling – e.g. 2030, 2040 and 2050 energy outlooks.
- Introducing a stochastic energy model that can identify weak spots in the current power sector.
- Cooperation on demand side modelling and EE assumptions/roadmaps.
- Cooperation on implementation guidelines to be used on state level.

#### RE integration and market development:

- Cooperation on flexibility in the grid.
- Cooperation on flexibility in power plants (current supported plant load factors 55-70 % vs. expected to be able to run at 45%).
- Cooperation on energy market design:
  - Current market does not sufficiently incentivize power plants to be more flexible
  - Current market does not sufficiently allow for cross-state/border balancing
- Cooperation on the updating of current grid codes.
- Identification of storage possibilities (e.g. hydro/pumped storage).
- Cooperation with MNRE/NIWE/others on increased balancing (hybrid solutions – wind/solar).
- Handling of low wind speeds during 8-9 months a year.

#### Mobilizing investments and finance (integrated into and arising from the above areas of engagement):

- Need to reduce investment risk to reduce the cost of capital and hence RE prices.
- Power sector optimization modelling (e.g. with open source Balmorel) can help generate investment scenarios that guide state and federal investment planning and demonstrate cost-effective investment potentials in the energy sector.
- Mobilizing investment and finance will require coherent "packages" of investor-friendly policy/regulation, business models and financing instruments. An important challenge is to connect the dots between these elements to generate impact.
- Public-private partnership models that engage the private financing sector will be important.

#### **Monitoring and reporting:**

Programme progress and achievements will be monitored and reported against impact and outcome level indicators aligned with the guiding principles and monitoring guidelines for the Danish Climate Envelope, and as far as possible also aligned with the monitoring and reporting systems of Indian partner institutions (this will be addressed in more detail during the programme and DED formulation). Further, it is planned that the programme will begin with a three-month inception phase to further detail work plans and monitoring frameworks under each engagement and ensure alignment at a more specific level with the partner institutions' strategies and work plans, as well as complementarities with initiatives supported by other development partners. Where relevant, indicators will be gender disaggregated. In accordance with Danida guidelines, the Programme will be subject to a mandatory Mid-term Review managed by the MFA.

### **Communication on results:**

This partnership programme has a high political profile and effective communication of results and achievements will be given high priority, as further elaborated in Annex 7.

### **3. Management set-up**

The management set-up will be kept as simple and lean as possible, to ensure an efficient accountability mechanism for progress and results as well as an effective mechanism for giving strategic directions to the programme. It is expected that due to Indian partner procedures, there will need to be two separate steering committees, one for each of the two Engagements (with MNRE and MoP, respectively). As far as possible, the model agreed for the Strategic Sector Cooperation will be used, with overall guidance and decision-making by the steering committee having the overall strategic dialogue between Denmark and India in accordance with an existing MoU. NITI Aayog should be invited to participate in the Steering committee for the MoP engagement. The set-up will also include Project Management Teams with DEA and EDK and participation of partner institutions, to manage the day-to-day implementation of the programme including preparing material for the Steering Committees. In view of the significant independence of the state governments as well as the large variation in the level of capacity and amount of renewable energy resources of the states, it may be relevant to invite selected state level authority(ies), to strategic meetings and workshops. This partnership cooperation will be operationalized as Cooperation Agreements between the Indian implementing partners and DEA. The programme will be included in the current Advisory Group of the DEPP in Copenhagen with high-level representation from MFA and MEUC, DEA. The Advisory Group will discuss programme progress and will also ensure cross-exchanges of experience and good practice from/with other bilateral cooperation. In addition, the Advisory Group will ensure that efforts are made to maximise synergies with Danish multilateral cooperation on climate change and sustainable energy including related financing issues, by leveraging Danish relationships with multilateral partners and i.e. promoting the use of knowledge products developed by multilateral partners. DEA will continue to act as secretary to the Advisory Group and meetings will be held on a half yearly basis.

Beyond the management of the programme itself, the formulation phase will explore how the coherence of interventions by the different actors can be enhanced, including by leveraging the relationships with multilateral partners supported by Denmark as well as through partnerships with the private sector.

DEA will be responsible for financial management of the programme as the inputs are all provided in-kind. The partners and DEA will be responsible for drafting annual work plans to be approved by the steering committees. Implementation will be the joint responsibility of the partners and DEA as specified in the work plans. As far as possible the work plans will be aligned to/based on partner work plans and specify how DEA provides support to these plans. DEA will be responsible for the day to day implementation of their support activities with EDK providing a facilitating role especially for high-level liaison and participation in steering committees.

### **4. Budget**

The total budget for the 5-year programme is DKK 55 million sourced from the Danish Climate Envelope 2019. The preliminary budget at outcome level is given in Annex 4. One embedded

long-term advisor will be budgeted<sup>6</sup> for the entire 5-year programme duration. Other inputs will be DEA and Energinet inputs in-kind and inputs by external international and Indian consultants procured through DEA. Funds will not be channelled through Indian partner systems. In line with Danida AMG provisions, an unallocated reserve of 10% or DKK 5.5 million is set planned for unforeseen expenses and shortfalls on other budget lines. As also provided for in the AMG, in each DED budget a budget line for contingencies – also called budget margin – will be provided to provide flexibility over the 5-year implementation period working in a highly dynamic context. Contingencies will be budgeted at 5% of the DED budget in each DED. The inception phase will not be budgeted separately.

A draft budget by year by DED/Output will be included in the DEDs and Programme Document and updated during the Inception Period.

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<sup>6</sup> The standard MFA planning figures for long-term advisors will be used in the formulation. The long-term advisor will not be employed by partner ministries but possibly by the MFA as Danida advisor – this will be clarified during formulation.

## Annex 1: Context Analysis

### 1. Overall development challenges, opportunities and risks

#### **General development challenges:**

India has a population of over 1.3 billion and is the 3rd largest greenhouse gas (GHG) emitting country globally (although not on a per capita level), with the power sector accounting for half of GHG emissions. India's energy demand is expected to rise over the coming years to an extent comparable to the EU's combined energy demand.

With an aim to make Indian economy a well-developed and resilient economy with high level of human development, India's ambition is to raise its per capita electricity consumption by a factor of 3 from today's level (to a level of about 2900 kWh/capita/year) by 2040. Recognising that the carbon emissions implications of such massive intended increases in power generation would be environmentally unsustainable if no efforts are made to reduce already high CO<sub>2</sub> emissions and emission factors, the Indian government in 2014-15 resolved to aggressively reduce the carbon intensity of its power generation activity.

#### **Development in key economic indicators: GDP, economic growth:**

India is one of the fastest growing economies in the World. According to an IMF report in August 2018, India's GDP growth rate is expected to rise to 7.3% during 2018-19 from 6.7% for the year 2017-18 (Financial Year: 1 April -31 March). The GDP per capita is USD 1,590, placing India in the lower middle-income group of countries. India has initiated new policies such as introduction of goods and services tax and opening up more to foreign investors. However, the inflation rate has increased and rising crude oil prices in the international market can hamper economic activity. Other risks to economic development may result from tighter global financial conditions. The fast-growing economy with rising income levels (increasing disposable income among the urban middle class), rapid urbanisation (present urbanisation level around 33%; expected to increase more than 50% by 2050), industrialisation in line with 'make in India' programme, are all factors resulting in a rapidly increasing energy demand, which is a critical determinant for realising India's growth potential and aspirations.

#### **Status and progress in relation to SDGs:**

General: India's role for achieving the SDGs can be compared to the role China played vs. the MDGs. NITI Aayog is in charge of India's targets for the SDGs and held [national/regional consultations on SDGs](#) in 2018. NITI Aayog in 2018 undertook an extensive exercise of measuring India and its States' progress towards SDGs, resulting in the development of the first SDG India Index, which is intended to provide a holistic view on the social, economic and environmental status of the country – the report is found [here](#) (but it does not cover all SDGs e.g. SDG17 (partnerships) is not included). It is also noted that there is not full consistency between the national index report and international tracking e.g. on SDG7, so information from the Global tracking Framework has also been included below.

#### SDG7 (affordable and clean energy):

Niti Aayog notes that as per the energy modelling exercise undertaken by the NITI Aayog — India Energy Security Scenarios (IESS) 2047, the energy demand is likely to increase by a factor of 1.5-1.7 from 2017 to 2030, with the electricity component itself rising 2.3 times. To promote

the use of clean energy, the Ministry of Petroleum and Natural Gas aims to reduce oil imports by 10% from 2014/15 to 2021/22 mix to above 40 percent by 2030. India has also taken vast strides in provision of clean energy and is currently running one of the largest renewable capacity expansion programmes in the world, setting total renewable capacity targets at 175 GW by the end of 2022, which includes 100 GW from solar power, 60 GW from wind power, 10 GW from biomass power, and 5 GW from small hydro power, towards energy security and meeting the NDC targets. With 69 GW installed at the end of March 2018, renewable energy accounts for a little over 20 percent of total installed capacity. Thus, the renewable energy installed capacity has grown by 77 percent from 38.9 GW capacity in March 2015 in a period of 3 years. The renewable energy Sector has been growing at a combined annual growth rate of 19 % in the last 6 years and 36% in 2017 alone. Currently, in terms of renewable energy installed capacity, India ranks 4th globally after China, USA and Germany.

According to the May 2018 global Energy Progress Report tracking SDG7 India 85% of the population had access to electricity (and further progress has been made recently on access to electricity in India, which has been a high GoI priority – thus power from the grid has now reached a transformer in each Indian village); 36% of total final energy consumption was renewable energy; and India’s energy intensity was 4.73 MJ per USD purchasing power parity (PPP) 2011, compared to a global average of 5.27. On the Regulatory Indicators for Sustainable Energy (RISE), India scores 75 overall, compared to a global average of 58 and regional average for South Asia of 50. India’s scores are 71 for electricity access, 66 for energy efficiency, and 87 for renewable energy. At the more [detailed level](#) low scores are given on utility creditworthiness (extremely low score of 2), scope of officially approved electrification plan (score 50), and incentives & mandates: public sector for energy efficiency (score 20).

SDG13 (climate action) and the NDC under the Paris Agreement on Climate Change: India is committed to reducing its emissions intensity as part of GDP by 20-25% by 2020 and by 33-35% by 2030 compared to 2005 levels. NDC mitigation actions include: • Achieving 40% of cumulative electric power installed capacity from non-fossil fuels by 2030; • Increasing carbon sequestration by 2.5 to 3 billion MtCO<sub>2e</sub> through increased forest and tree cover by 2030; and • Low-carbon infrastructure and public transportation.

The Climate Action Tracker rates India’s NDC as 2 degree Celcius compatible.

#### **Political economy - key Entities in the Indian Power Sector:**

<b>Function</b>	<b>Organisations Responsible</b>
<b>Policy</b>	<ul style="list-style-type: none"> <li>• <b>Central</b> – Ministry of Power (MoP); Ministry of New and Renewable Energy (MNRE)</li> <li>• <b>State</b> – State Energy Departments</li> </ul>
<b>Planning</b>	<ul style="list-style-type: none"> <li>• Central Electricity Authority (CEA)</li> </ul>
<b>Regulation</b>	<ul style="list-style-type: none"> <li>• <b>Central</b> - Central Electricity Regulatory Commission (CERC), Central Advisory Committee (CAC)</li> <li>• <b>State</b> - State Electricity Regulatory Commissions (SERCs), State Advisory Committee (SAC)</li> <li>• Forum of Regulators (FoR)</li> </ul>
<b>Generation</b>	<ul style="list-style-type: none"> <li>• <b>Central</b> - Central Generating Stations (CGS),</li> </ul>
<b>Transmission Related Bodies</b>	<ul style="list-style-type: none"> <li>• Central Transmission Utility (CTU) – Power Grid Corporation of India Ltd. (PGCIL)</li> <li>• State Transmission Utilities (STUs)</li> <li>• Private Transmission Utilities</li> </ul>

<b>Systems Operators</b>	<ul style="list-style-type: none"> <li>• Central POSOCO – NLDC, 5 RLDCs at regional level</li> <li>• State Load Despatch Centres (SLDCs)</li> </ul>
<b>Distribution companies</b>	<ul style="list-style-type: none"> <li>• State Electricity Distribution Companies (SEDGs)</li> <li>• Distribution licensee</li> <li>• Private sector electricity distribution companies</li> </ul>
<b>Generation entities</b>	<ul style="list-style-type: none"> <li>• Interstate generating units</li> <li>• State generating stations</li> <li>• Private, PPPs, CPPs, MPPs, etc.</li> </ul>
<b>Trading</b>	<ul style="list-style-type: none"> <li>• Trading licensee</li> <li>• Power Exchange</li> </ul>
<b>Appeal</b>	<ul style="list-style-type: none"> <li>• Appellate Tribunal for Electricity (APTEL)</li> </ul>

It is also important to note that there are numerous civil society organisations and think tanks in India who are deeply engaged in clean energy development. The identification mission met with [The Energy and Resources Institute \(TERI\)](#) and the formulation mission should have more detailed discussions with TERI. The identification mission also met with the [Brookings Institution](#) that has researched and published extensively in the sector.

***Key documentation and sources used for the analysis:***

The consultant’s draft sector overview and targeted assessments of Legal, policy, strategic and planning framework, Institutional and coordination framework, and sector expenditure and financial overview.

Baseline description and stakeholder analysis, May 2018 for DEA.

Energy Progress Report - tracking SDG7 progress (May 2018): <http://www.irena.org/publications/2018/May/Tracking-SDG7-The-Energy-Progress-Report>

ESMAP Regulatory Indicators for Sustainable Energy ([RISE](#)) for India

SDG7: <https://sustainabledevelopment.un.org/sdg7> and [NITI Aayog national consultation](#)

SDG13: <https://sustainabledevelopment.un.org/sdg13>

The [Climate Action Tracker](#) has a detailed assessment of India’s NDC and the World Bank’s assessment of the India’s NDC can be found [here](#).

***Are additional studies / analytic work needed? How and when will it be done?***

The consultant’s draft targeted assessments will be updated as relevant during the formulation phase and reflected in the Programme Document and DEDs.

**2. Fragility, conflict, migration and resilience**

The programme’s focus on climate change mitigation and the green energy transition will mean a positive but indirect effect on conflict, migration and resilience issues.

***Are additional studies / analytic work needed? How and when will it be done?***

No additional studies or analytical work required.

**3. Human rights situation (HRBA) and gender**

India is the World’s largest sovereign, secular, democratic republic – but the human rights issue is complicated by its large size and population, diverse culture and widespread poverty. The six fundamental rights recognised by the Indian constitution are the right to equality, right to live,

right to freedom, right against exploitation, right to freedom of religion, cultural and educational rights, and right to constitutional remedies. While access to affordable, reliable, sustainable and modern energy for all is a Sustainable Development Goal (#7), access to renewable energy is not a human right in itself. But given the role of clean and sustainable energy as a broader enabler of human and economic development, it is strongly interconnected with basic rights such as the right to life, food, health, shelter, education, etc. The contribution to be made by the programme in terms of capacity development and tools for more well-informed and transparent decision making in the energy transition, will enable the *duty bearers* (i.e. the political decision makers and public authorities) to be mindful of the needs and priorities of end-users and ultimate beneficiaries at the household and enterprise level (*the rights holders*). The human rights principles of participation, accountability, non-discrimination, and transparency will thus be supported. Similarly, the particular benefits of the cooperation for both women men and youth will be given careful attention in the formulation.

***Are additional studies / analytic work needed? How and when will it be done?***

More work will be done during formulation to ensure a focus on gender and youth issues where relevant, including gender disaggregated indicators.

**4. Inclusive sustainable growth, climate change and environment**

The Programme has a direct focus on climate change mitigation and sustainable growth. Environmental issues are considered part of addressing the enabling framework for e.g. offshore wind energy, but since the programme will not include any physical infrastructure investments, no environmental impact assessments are required. Similarly, no strategic environmental assessments will be made.

***Are additional studies / analytic work needed? How and when will it be done?***

The consultant's draft targeted assessments will be updated as relevant during the formulation phase and reflected in the Programme Document and DEDs.

**5. Capacity of public sector, public financial management and corruption**

**Capacity of the public sector for policy making, enforcement and service delivery:**

The consultant's draft targeted assessment of the institutional framework and the baseline and stakeholder study already done for DEA provide information on public sector organisation relevant for the programme and will be supplemented with more detailed capacity assessment during the formulation phase. The aforementioned RISE assessments have also identified issues related to the enabling framework for sustainable energy in India.

**Corruption situation:**

India ranks #81 of 180 countries on Transparency International's Corruption Perceptions Index 2017.

***Are additional studies / analytic work needed? How and when will it be done?***

The consultant's draft targeted assessments will be updated as relevant during the formulation phase and reflected in the Programme Document and DEDs.

**6. Matching with Danish strengths and interests, engaging Danish actors, seeking synergy**

The Danish Energy Agency (and other Danish energy institutions such as the transmission system operator Energinet) have strong competences in long-term model-based energy

scenarios and energy planning for RE deployment, including grid integration of high proportions of variable RE.

Denmark has demonstrated that it is possible to decouple economic growth, GHG emissions and energy consumption, resulting in green growth. Wind energy contributed 43% of the electricity consumption in Denmark in 2017. The Danish energy model<sup>7</sup> has also demonstrated the importance of: a holistic approach based upon an energy agreement as a roadmap for development of energy supply and demand; energy planning including models, scenarios and long-term planning; power generation system flexibility; integration of renewable energy; maintaining a very high security of electricity supply closely linked to significant cross border connections; close public and private cooperation, public engagement and acceptance, general public support for the energy sector transition, advancement of the Levelized Cost of Energy (LCOE) approach; offshore wind; biomass utilization; regulation of and targeted investments in energy efficiency; and a broad and integrated one-stop-shop mandate of DEA to regulate and deliver on the above. Denmark has a strong interest in sharing this experience in a partnership with India for mutual benefit, which will also contribute to Denmark's interest in achieving global climate goals and meeting SDG targets. The Danish private sector is already engaged in India, e.g. in wind energy, and the large Indian market for clean energy solutions will be of major interest to the Danish resource base in future. There is also cooperation with India in research, and the Danish Technical University DTU and NIWE have just signed an MoU on cooperation in wind energy.

The Danish development and demonstration programme for energy technology (EUDP) supports new energy technology that can contribute to Denmark's goals in energy and climate change. The EUDP strategy 2017-2019<sup>8</sup> identifies Danish strongholds and business potentials in energy technology and energy-related research and development. The following are Highlights include the following: Denmark as a world leader in wind technology; Denmark as relatively well positioned within energy efficiency; and a strength in smart grids and system integration. Similarly, the State of Green highlights areas of Danish comparative strength in clean energy sources and related areas such as energy efficiency, etc. and the Danish public and private actors who have particular expertise and experience in these areas. It is assessed that (as also evidenced by the interest shown at the seminar held in Copenhagen on 19 November 2018 by the Indian-Danish Chamber of Commerce) that the outcomes of this proposed partnership programme will be of interest to Danish actors, subject of course to relevant procurement procedures in Indian partner institutions.

- where we have the most at stake – - Denmark is a global leader in many aspects of the interests and values, green energy transition, including RE and EE.
- where we can (have) influence through strategic use of positions of strength, expertise and experience, and Denmark's interests and values are strong in this space, as mentioned above.

<sup>7</sup> The World Bank Regulatory Indicators for Sustainable Energy (RISE) in 2017 found that Denmark has the best framework conditions in the world when it comes to access to energy, energy efficiency and renewable energy. On a scale from 1-100, Denmark scored 100 in "energy access", 86 in "energy efficiency" and 94 in "renewable energy" – with a total of 94 points, Denmark received a world first place.

<sup>8</sup> [https://ens.dk/sites/ens.dk/files/Forskning\\_og\\_udvikling/uk\\_total\\_final\\_eudp\\_strategi.pdf](https://ens.dk/sites/ens.dk/files/Forskning_og_udvikling/uk_total_final_eudp_strategi.pdf)

<ul style="list-style-type: none"> <li>- where we see that Denmark can play a role through active partnerships for a common aim/agenda or see the need for Denmark to take lead in pushing an agenda forward.</li> </ul>	<ul style="list-style-type: none"> <li>- The partnership programme in India will through authority-to-authority cooperation and peer-to-peer exchanges have potentially strong strategic influence on India's green transition.</li> </ul>
<ul style="list-style-type: none"> <li>- Brief mapping of areas where there is potential for increased commercial engagement, trade relations and investment as well as involvement of Danish local and central authorities, civil society organisations and academia.</li> </ul>	<ul style="list-style-type: none"> <li>- As highlighted at the seminar held by Indian-Danish Chamber of Commerce on 19 November 2018, RE deployment including wind energy as well as waste-to-energy are areas of particular priority. An MoU that has just been signed between NIWE and DTU and provides for increased research collaboration on offshore and other wind energy issues (but this is not funded on the proposed partnership programme).</li> </ul>
<ul style="list-style-type: none"> <li>- Donor landscape and coordination, and opportunities for Denmark to deliver results through partners including through multilaterals.</li> </ul>	<ul style="list-style-type: none"> <li>- There are many donors supporting the green energy transition in India and donor coordination is weak. It will be particularly important to ensure synergy with India's bilateral cooperation with the UK, USA and Germany. Denmark works through several multilateral channels (WB ESMAP, UNEP DTU Partnership, IEA, IISD, CEM, the Clean Energy Investment coalition, CIF, etc). in areas that can supplement the bilateral partnership programme and these synergies will be described in the programme document.</li> </ul>
<p><b>Key documentation and sources used for the analysis:</b>  <a href="#">State of Green EUDP report</a> - DEA on the <a href="#">Danish Energy Model</a></p>	
<p><b>Are additional studies / analytic work needed? How and when will it be done?</b>  Synergies with Danish multilateral cooperation will be described in the programme document.</p>	
<p><b>7. Stakeholder analysis</b></p>	
<p>The key partners and stakeholders in the programme are identified and briefly described in Annex 2 Partners.</p>	
<p><b>Are additional studies / analytic work needed? How and when will it be done?</b>  A targeted assessment has been done by the consultant of the institutional framework, and this will be updated as required during the formulation phase and reflected in the Programme Document.</p>	

## Annex 2: Partner Considerations

### Summary of stakeholder analysis

The **Ministry of New and Renewable Energy (MNRE)** is the nodal Ministry of the Government of India for all matters relating to new and renewable energy. For this programme, the most relevant key nodal agencies under MNRE include the [National Institute of Wind Energy](#) (NIWE), [The Indian Renewable Energy Development Agency](#) (IREDA); and the [Solar Energy Corporation of India](#) (SECI) (which is also involved in wind energy).

The **Ministry of Power (MoP)** is the nodal Ministry of the Government of India for all matters relating to electricity production and related infrastructure development, including generation, transmission, and delivery, as well as maintenance. For this programme, the most relevant key nodal agencies under MOP include the [Central Electricity Authority](#) (CEA), the [Power System Operation Corporation Ltd](#) (POSOCO), and the [Central Electricity Regulatory Commission](#) (CERC).

The **National Institution for Transforming India (NITI Aayog)** is the GoI's policy think tank, with a broad cross-sectoral mandate that also includes energy planning and scenario modelling, working across sector line ministries.

### Criteria for selecting programme partners

The most critically important stakeholders are the proposed implementing partners, i.e. MNRE and MoP. As mentioned previously, there is already a signed MoU with MNRE (albeit dated, from 2008), and an MoU with MoP is expected to be signed shortly. NITI Aayog has in its meeting with the identification mission in December 2018 expressed its interest in cooperation with DEA/Denmark. These partners and the above-mentioned nodal agencies under the line ministries are of critical importance to the partnership programme due to their mandates in the sector and their expressed interest in the partnership.

### Brief summary of selected key partner features:

Partner name	Partner core business and goals	Importance of the programme for the partner (low, medium, high)	Influence of the partner over the programme (low, medium, high)	Main contribution of the partner to the programme	Capacity issues	Exit strategy for the partnership
MNRE	MNRE is the nodal Ministry of the Government of India for all matters relating to new and renewable energy. Until now, MNRE been the main Indian ministry for bilateral dialogue since the Indo-Danish MOU on Renewable Energy from 2008. MNRE is also the	Medium. This is a very large ministry and Denmark is a small albeit strategically important partner.	High	Overall institutional anchoring of programme activities on renewable energy development. Decision making and regulatory powers within its mandate, staff time expertise and experience (in-kind), data, information,	To be further assessed during formulation.	Will be addressed during formulation.

	main national partner for the SSC project focused on offshore wind development. MNRE works to develop new and renewable energy technologies, processes, materials, components, sub-systems, products and services at par with international specifications, standards and performance parameters in order to make the country a net foreign exchange earner in the sector and deploy such indigenously developed and/or manufactured products and services in furtherance of the national goal of energy security.			reports, communication channels for information and results.		
NIWE	NIWE is an R&D institution under MNRE. It is the national organisation for wind research, certification and training and the national nodal agency for offshore wind development.	High	High	Institutional anchoring of SSC and programme activities on wind power. Staff time and technical expertise and experience (in-kind), data, information, reports, communication channels for information and results.	To be further assessed during formulation.	Will be addressed during formulation.
SECI	SECI is responsible for renewable energy auctions/tenders (incl. offshore wind). Despite its name, the mandate of SECI has recently been broadened to cover the entire renewable energy domain.	Medium	High	Institutional anchoring of programme activities on tendering of RE and market development.	To be further assessed during formulation.	Will be addressed during formulation.
MoP	MoP is primarily responsible for the development of electrical energy in India, including perspective planning, policy formulation, processing of projects for investment decision, monitoring of the implementation of power projects, training and manpower development and the administration and enactment of legislation in regard to thermal and hydro power generation, transmission and distribution. MoP is responsible for the Administration of the Electricity Act, 2003, the Energy Conservation Act, 2001	Medium. This is a very large ministry and Denmark is a small albeit strategically important partner.	High	Institutional anchoring of programme activities on flexibility and integration. Decision making and regulatory powers within its mandate, staff time expertise and experience (in-kind), data, information, reports, communication channels for information and results.	To be further assessed during formulation.	Will be addressed during formulation.

	and to undertake amendments to these Acts.					
CEA	<p>CEA is responsible for the technical coordination and supervision of programmes and is also entrusted with a number of statutory functions. The CEA advises the government on policy matters and formulates plans for the development of electricity systems. It prescribes the standards on matters such as construction of electrical plants, electric lines and connectivity to the grid, installation and operation of meters and safety and grid standards. It is also responsible for concurrence of hydropower development schemes of central, state and private sectors taking into consideration the factors which will result in efficient development of the river and its tributaries for power generation, consistent with the requirement of drinking water, irrigation, navigation and flood control.</p> <p>The Central Electricity Authority is tasked with preparing a National Electricity Plan in accordance with the National Electricity Policy and notify such plan once every five years. The latest National Electricity Plan was published in January 2018.</p>	Medium.	High	Regulatory powers within its mandate, staff time expertise and experience (in-kind), data, information, reports, communication channels for information and results.	To be further assessed during formulation.	Will be addressed during formulation.
POSOCO	<p>As the National Load Despatch Centre, it is the apex body to ensure integrated operation of the national power system. Its mandated functions include: Supervision over the Regional Load Despatch Centres; scheduling and despatch of electricity over inter-regional links; achieving maximum economy and efficiency in the operation of National</p>	Medium	High	Staff time expertise and experience (in-kind), data, information, reports, communication channels for information and results.	To be further assessed during formulation.	Will be addressed during formulation.

	Grid; providing operational feedback for national grid planning.					
CERC	<p>CERC is a statutory body under MOP for rationalization of electricity tariffs, transparent policies regarding subsidies, promotion of efficient and environmentally benign policies and for electricity tariff regulation.</p> <p>CERC's mandated functions include: to regulate the tariff of generating companies; to regulate the inter-State transmission of electricity; and to specify Grid Code.</p>	Medium	High	Regulatory powers within its mandate, staff time expertise and experience (in-kind), data, information, reports, communication channels for information and results.	To be further assessed during formulation.	Will be addressed during formulation.
NITI Aayog	Aayog is Hindi for "policy commission". It GoP's policy think tank established in 2015 (replacing the national Planning commission) with the aim to achieve the SDGs and enhance cooperative federalism by fostering the involvement of State Governments in the economic policy-making process using a bottom-up approach. NITI Aayog	Medium, if selected as implementing partner for a Development Engagement.	High, if selected as implementing partner for a Development Engagement – and particularly if given high-level political support.	Institutional anchoring of medium-long term planning and scenario modelling. Staff time expertise and experience (in-kind), data, information, reports, communication channels for information and results.	To be further assessed during formulation.	Will be addressed during formulation.

### Annex 3: Preliminary Results Framework at Outcome Level

Programme		<b>India-Denmark Energy Partnership</b>	
Objective		Reduced greenhouse gas emissions and leverage of the partnership in mobilising further resources for India's green transition.	
Impact Indicators		The programme will contribute to emission reductions measured in tons of carbon dioxide equivalent, but this cannot be accurately estimated at the overall programme level as impacts of the contribution are impossible to separate from those of many other initiatives in India in the space of renewable energy, climate change mitigation, and sustainable development. Moreover, impacts are likely to manifest themselves concretely in the longer term, beyond completion of the five-year programme. However, all efforts will be made to assess emission reductions resulting from the interventions. Thus, the long-term planning and scenario modelling may be able to dimension CO <sub>2</sub> equivalent reduced, and the programme's three outcomes will all contribute to strengthened awareness and capacity of decision-makers and experts that will lead to more well-informed decision making contributing to the achievement of the targets set in SDG 7 and SDG 13 and India's NDCs. The financial leverage of the cooperation in terms of its contribution to increased finance and investment in the areas covered by the partnership will be reported where possible and relevant.	
Baseline	Year	2019	High political ambitions expressed in NDG, SDG and RE targets, but insufficient flexibility in power generation, limited integration of RE, inadequate supply chain and markets for offshore wind, investment risk and high cost of capital resulting in high RE prices and lack of incentives for investors and states for higher levels of RE; inadequate modelling to guide state and federal investment planning and demonstrate cost-effective investment potentials, and lack of inter-state trade of electricity.
Target	Year	2024	Indian decision makers and experts in partner institutions are more aware of bottlenecks and opportunities and the regulatory and enabling framework improved on at least 3 of the above parameters.
Development Engagement 1		Implementing partner: Ministry of New and Renewable Energy (MNRE)	
Outcome 1		Integrated approach to onshore and offshore wind power development applying international experience on planning, regulation, integration into the power system, efficient tendering mechanisms and the mobilization of investment and finance.	
Outcome indicator		Significant improvements related to integrated approaches such as: spatial planning related to wind energy, updated windmaps, improved forecasting, improved supply chains, reduction in offshore wind costs, improved tendering procedures. Where possible, contributions made to increased proportion of wind energy supply/ # MW of wind energy capacity installed	

			will be identified, but it may be difficult to separate this contribution from those of many other initiatives in India.
Baseline	Year	2019	Weak spatial planning, need for updating wind maps, improving forecasting and long-term roadmap on offshore wind; inadequate domestic supply chain for offshore wind; offshore wind costs evaluated as high as INR 10-12/kWh; need for improving tendering processes to reduce risk, including ceiling rates, local content requirements, Environmental Impact Assessment (EIA), smooth tender procedures; curtailment of RE when connected. Investment risk and high cost of capital as well as need for coherent investor-friendly policy/regulation, business models, public-private partnership models and financing instruments.
Target	Year	2024	Regulatory framework improved on at least 3 of the above parameters to incentivise wind power development.
Development Engagement 2		Implementing partner: Ministry of Power (MoP)	
Outcome 2		Power sector analysis and medium and long-term energy planning using relevant modelling tools to identify least-cost potentials and future pathways to achieve India's clean energy targets cost efficiently, maintaining high security of supply and applying to other national policy objectives.	
Outcome indicator		Significant advancement in policies, institutions, coordination mechanisms, and regulatory frameworks that improve incentives for medium and long-term low-emission planning and development and their effective implementation including factors such as: advanced power sector models; long term energy scenarios; investment optimisation models; updated and new technology catalogues; stochastic energy model; national energy outlooks; guidelines for state level.	
Baseline	Year	2019	Need for a power sector model and capacity to model the whole power system on an hourly basis; need for an optimization model that can optimize RE investments, RE penetration, EE obligations – without jeopardizing the security of supply; updated technology catalogue on energy (incl. LCOE); need for a stochastic energy model that can identify weak spots in the current power sector; need for more accurate guidelines from federal level to the states.
Target	Year	2024	Modelling capacity significantly improved and regulatory framework improved on at least 3 of the above parameters.
Outcome 3		Flexibility and integration of increasing levels of RE in the power system through optimized flexibility, forecasting, energy efficiency, consolidated grid codes, efficient design of the power market, and other measures.	
Outcome indicator		Significant advancement in policies, institutions, coordination mechanisms, and regulatory frameworks that improve incentives for low-emission planning and development and their effective implementation	

			including factors such as: increased flexibility in the grid; increased flexibility in power plans; improved incentives for cross-state-border balancing; increased storage (e.g. pumped hydro); updated grid codes.
Baseline	Year	2019	Insufficient flexibility in the grid; insufficient flexibility in power plants (plant load factors 55-70%); current market does not sufficiently incentivize power plants to be more flexible and does not sufficiently allow for cross-state/border balancing; need for storage (e.g. hydro/pumped storage); generators required to do the balancing (hybrid solutions); grid codes need updating.
Target	Year	2024	Regulatory framework improved on at least 3 of the above parameters.

## Annex 4: Preliminary budget

Main budget items	DKK million
<b>Outcome 1:</b> Integrated approach to onshore and offshore wind power	14.4
<b>Outcome 2:</b> Power sector analysis and planning using relevant modelling tools	14.4
<b>Outcome 3:</b> Flexibility and integration of increasing levels of RE in the power system	14.3
One embedded long-term advisor (each 5 years @ DKK 1.2 million)	6
An unallocated reserve of 10% is envisaged for unforeseen expenses including currency fluctuations or shortfalls on other budget lines.	5.5
Mid-term Review (managed by the MFA)	0.4
<b>Grand total</b>	<b>55.0</b>

### Notes:

Including contingencies of 5% under each Engagement covering unforeseen expenditures.

The embedded long-term advisor position will be further discussed with Indian partners during formulation and the draft job description and anchoring/duration of the position will be clarified during formulation.

DEA Administration has not been estimated separately as it will depend upon the recruitment modality for the long-term advisor. This will be clarified during the formulation.

## Annex 5: Preliminary Risk Management Matrix

(outlining contextual, programmatic and institutional risk, with risk mitigation on programmatic and institutional risks only at Concept Note stage – the full risk analysis will be included in the Programme Document).

Contextual risks <sup>9</sup> :					
Risk Factor	Likelihood	Impact	Risk response	Residual risk	Background to assessment
Vested interests and fossil fuel subsidy regimes could hamper efforts to increase the level of ambition in the energy transition including uptake of RE and EE.	Likely	High	will be included in the Programme Document		
Programme affected by political instability or unrest, leading to lack of engagement and Commitment.	Unlikely	Medium	will be included in the Programme Document		
Social unacceptance of RE deployment.	Unlikely	Low to medium	will be included in the Programme Document		In Denmark the “not-in-my-backyard” syndrome vs. wind turbines and the scepticism about variability and security of supply are examples of challenges to social acceptability. Land rights and land availability for development of RE are also challenges and risk factors.
Political commitment to the green energy transition downscaled due to changes of government and/or political priorities.	Possible but unlikely	Medium	will be included in the Programme Document  it is also noted that the business case for RE increasingly reduces this risk		
India’s NDC and national sectoral policies and strategies with which	Not unlikely	Medium	will be included in the Programme Document		

<sup>9</sup> This category covers the range of potential adverse outcomes that may arise in a particular context, including the risk of harm beyond the immediate context or the country’s borders and may include governance failure (e.g. the failure of effective public financial management or law enforcement); competition for resources; natural hazards; and pre-existing socio-political tensions. (Danida Guideline to Risk Matrix 2018).

the programme will align, prove to be overly ambitious or are not enacted.					
<b>Programmatic risks<sup>10</sup>:</b>					
<b>Risk Factor</b>	<b>Likelihood</b>	<b>Impact</b>	<b>Risk response</b>	<b>Residual risk</b>	<b>Background to assessment</b>
Indian Government entities might not engage as expected.	Unlikely	High	The Indian partner institutions are being identified based upon their expressed and prioritised interest in the unique value added of what Denmark has to offer through government-to-government, authority-to-authority cooperation. Memoranda of Understanding and Letters of Intent combined with high-level visits both in India and Denmark, have facilitated a common understanding and high-level support of the cooperation. The authority-to-authority cooperation provides opportunities for peer-to-peer exchanges that can strengthen partner relations at senior levels of decision-making and thus mitigate against the risk of non-engagement.	Low	Denmark is a small development partner in the Indian context and climate change mitigation and clean energy development in India is a crowded arena. Indian-Danish relations have recently been significantly strengthened through diplomatic efforts and high-level visits It is also important to underline that DEA/MEUC/ MFA are not risk-averse and that opportunities for impact also come with taking informed risk.
Lack of political will on Indian partners to follow-through on commitments to action.	Unlikely	High	As above, the careful selection of partners, is key, building on expressed commitment and demand by Indian partners – coupled with high-level agreement through MoUs/LoIs. Political buy-in will be ensured through continued high-level dialogue.	Low	As above. There will be elections in both India and Denmark in 2019 and political priorities could change – but in terms of the India-Denmark clean energy partnership this is unlikely.
Limited capacity of Indian partners could impede the ability to engage with DEA and other Danish inputs thus hampering uptake of technical know-how and experience and overall implementation progress and results.	Likely	High	As above, selection of committed and engaged partners who see value of engagement. Capacity development/technical cooperation support throughout the programme. Clear TOR for each DEA/Danish technical input reflecting the need for counterpart capacity to engage for effective peer-to-peer exchanges and development of outputs.	Medium	Developing the capacity of political decisionmaker and practitioners in long-term energy planning as an important part of this project. The effectiveness of the partnership is highly dependent on partner staff capacity to engage with Danish experts.

<sup>10</sup> This category covers include two kinds of risk: (1) the potential for a programme to fail to achieve its objectives; and (2) the potential for the programme to cause harm in the external environment. With regard to (1), the risk factors for programme failure include many of the contextual risks outlined above, as well as institutional and political factors. But there are many other reasons for potential programme failure, including inadequate understanding of the context or flawed assessment of what needs to be done; management and operational failures; and failures of planning and co-ordination. Risk is also associated with new or innovative programme approaches (although there may also be risk in failing to innovate). (Danida Guideline to Risk Matrix 2018). The categorisation of likelihood, impacts, and residual risk is also consistent with Danida guidelines.

Ineffective work planning and monitoring resulting in delays and/or non-achievement of outputs and outcomes.	Likely	High	A Theory of Change and results framework will guide the dynamic work planning and the indicators for monitoring will be identified therein. Indicators for reporting will be identified. A lean and effective management set-up building upon the SSC model will be important.	Medium	In a demand-driven programme operating in a highly dynamic context, there will inevitably be risks associated with work planning and monitoring.
<b>Institutional risks<sup>11</sup>:</b>					
<b>Risk Factor</b>	<b>Likelihood</b>	<b>Impact</b>	<b>Risk response</b>	<b>Residual risk</b>	<b>Background to assessment</b>
The programme could duplicate existing activities and sources of finance and/or fails to recognise interfaces and synergies with other initiatives in a crowded arena.	Likely	High	Careful identification done of other relevant bilateral donor and multilateral development partner support. Denmark also provides multilateral support to development partners active in India (WB ESMAP, IEA, IRENA, IISD-GSI, CEM) and other initiatives that could be relevant in future (e.g. the new TA support facility in the Climate Investment Funds etc.). Denmark – though the Embassy in Delhi – should engage in donor coordination for a in India and should also - through its role as supporter of multilateral agencies – work to ensure synergies and additionality of the programme.	Medium	Climate change mitigation and clean energy development is a crowded field in India dominated by a number of major bilateral and multilateral development partners. Denmark is a small development partner, but the unique value added of authority-to-authority cooperation is a key feature of the programme and something no other development partner provides. Furthermore, Denmark boasts unique knowledge on offshore wind, power plant flexibility, forecasting and modelling. However, donor coordination in India seems to be weak.
The programme could fail to deliver its outcomes, which will reflect negatively on DEA, MEUC, and the MFA.	Unlikely	Major	The theory of change and results framework with SMART indicators will be designed with realistic and measurable targets. A communication strategy (Annex 7) will ensure that results and achievements are communicated effectively to key audiences, and impact drivers will be used proactively.	Low	This programme is strategic and high-profiled, but India is complex and there are many other actors and the Danish reputation is important in setting realistic targets in the identified niche areas of cooperation.
Unrealistic expectations to programme impact in terms of CO <sub>2</sub> emission reductions and financial leverage.	Likely	High	The Danish Climate Envelope has emission reductions as a core indicator for mitigation projects, but it will be important to realistically set targets and manage expectations in this regard. The programme does not comprise any investments on the ground and is based only on technical cooperation with objectives of e.g. medium and long-term energy planning and integration of increasing levels of renewable energy in the power system. As a result, it is difficult to set specific targets for	Medium	As the programme is funded from the Climate Envelope, there are expectations regarding emission reductions and financial leverage.

<sup>11</sup> This category includes “internal” risk from the perspective of the donor or its implementing partners. It includes the range of ways in which an organisation and its staff or stakeholders may be adversely affected by interventions, e.g. damage to a donor’s reputation if it fails to achieve its objectives, or from financial/fiduciary failure (Danida Guideline to Risk Matrix, 2018).

			programme impact on CO <sub>2</sub> emission reductions, which must be set and assessed with the relevant caveats concerning contribution vs attribution.		
Partners external to DEA could engage in fraud, corruption or misconduct under activities funded by the programme.	Unlikely	Medium	The programme will follow DEA financial procedures including procurement procedures and this risk is considered unlikely. Funds are not channelled through the Indian partner systems.	Low	Any corruption related to programme activities could negatively affect the implementing and donor agencies.
There could be unrealistic expectations to opportunities for Danish private sector commercial interests related to the cooperation.	Likely	Medium	The programme as such will give very limited opportunities for procurement of consultancy inputs – if so these will be announced through DEA. It is also extremely important that the cooperation is not perceived by Indian partners to be promoting Denmark's commercial interests. It is a technical cooperation programme government-to-government. But by assisting to unblock bottlenecks in the regulatory framework and generally help accelerate RE deployment and increase focus on EE, the cooperation will indirectly help generate new market opportunities in these areas.	Medium	As Denmark has a strong resource base in RE, EE and climate change mitigation, and India will be one of the largest markets for RE in the coming decades, there are expectations that cooperation with India will give rise to commercial opportunities. This general issue is also mentioned in the Danish government strategy “The World 2030” and is part of the mandatory context analysis in Annex 1.

## Annex 6: Preliminary list of supplementary materials

#	Documents / Material	Source
1.	Presentations made at the Indian-Danish Chamber of Commerce seminar held in Copenhagen on 19 November 2018.	Presenters at the seminar, including the Embassy of India in Denmark and the Embassy of Denmark in India
2.	The joint Danish-Indian Cooperation on Climate and Energy	Danish Energy Agency, 2018
3.	Strategic Sector Cooperation (SSC) - full project document and work plan	Ministry of Foreign Affairs of Denmark, 6 November 2018
4.	Draft National Energy Policy, 27 June 2017	NITI Aayog
5.	Signed MoU between MNRE and the then Danish Ministry of Climate and Energy. Draft MoU between MoP and MEUC (expected to be signed soonest - MoUs need Cabinet approval and can take a long time to formalise, but MoP has already constituted two groups that will focus on flexibility of power plants and power market design, respectively) – this MoU will also include the establishment of a JWG on energy co-operation with a focus on power market design, integration of variable renewable energy, including e.g. forecasting, operational planning procedures and tools, optimising flexibility of power systems, consolidation of grid codes to integrate and operate efficiently variable generation, and other areas. And this cooperation will comprise a JWG to identify areas of mutual interest and collaboration on wind energy, wind-solar hybrid systems, sub-systems, devices, components, data analytics, etc.	February 2008
6.	Draft MoU between MoP and MEUC	23 March 2018
7.	MoU between NIWE and DTU	Signed in December 2018
8.	Background and stakeholder analysis.	for DEA 18 May 2018
9.	SSC inception mission Dec 2017	(in Danish, internal document).
10.	The Indian Power Sector, Low Carbon Transition Strategy for renewable Energy Integration	NITI-IEA-ADB workshop report 2018.
11.	Tracking SDG 7 the Energy Progress Report, May 2018	WB/IEA/IRENA/WHO/UN Statistics Division
12.	Variable Renewable Energy Sources Integration, Energy Transition towards 2030	Deloitte, 2018.
13.	Greening the Grid (series of publications)	Ministry of Power with USAID
14.	India's INDC to UNFCCC	Government of India
15.	National Electricity Plan, January 2018	Central Electricity Authority, Ministry of Power
16.	India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, November 2017	IISD GSI
17.	Solving India's Renewable Energy Financing Challenge: Which Federal Policies can be Most Effective?	Climate Policy Initiative and Indian School of Business
18.	REmap India, 2017	IRENA
19.	India Energy Outlook, 2015	IEA
20.	Reaching 175 GW RE by 2022	NITI Aayog, 2015
21.	State Renewable Energy Overview	NITI Aayog

## Annex 7: Preliminary reflections on opportunities for communicating results

<b>What?</b> (the message)	<b>When?</b> (the timing)	<b>How?</b> (the mechanism)	<b>Audience(s)</b>	<b>Responsible</b>
News that India-Denmark Clean Energy partnership programme approved. Results and impact stories, replicable examples of good practice. Contributions made to CEM, COPs, and the UNSG Climate Summit New York, 2019.	When programme approved by all parties.  During implementation as soon as available.	Press release on the Ministry of Foreign Affairs website and the Embassy of Denmark in New Delhi (EDK) website. MFA public diplomacy Denmark Daily newsletters, World's Best News campaign. State of Green.	Political decision makers and practitioners. Danish private enterprises interested in India. The general public. International partners.	MFA/MKL and EDK
News that India-Denmark Clean Energy partnership programme approved. Results and impact stories, replicable examples of good practice. Contributions made to CEM, COPs, and the UNSG Climate Summit New York, 2019.	When programme approved by all parties.  During implementation as soon as available.	MEUC website and State of Green.	Danish resource base. International development partners.	MEUC
News that India-Denmark Clean Energy partnership programme approved. Results and impact stories, replicable examples of good practice.	When programme approved by all parties.  During implementation as soon as available.	DEA website and State of Green.	The Danish professional community/resource base /Danish enterprises. International development partners.	DEA
News that India-Denmark Clean Energy partnership programme approved. Results and impact stories, replicable examples of good practice.	When programme approved by all parties.  During implementation as soon as available.	Websites, newsletters, seminars.	Indian decision makers and the professional community in public and private sectors and academia.	Indian partner institutions (MNRE, MoP, NITI Aayog, NIWE, POSOCO, CEA, CERC, etc.)

## Annex 8: Process Action Plan

Action/product	Dates/Deadlines	Responsible/ involved unit	Comment/status
<b>Formulation:</b>			
DEA will participate and meet partners in the Vibrant Gujarat Global Summit	18-20 January	DEA	Could possibly include a workshop. High-level discussions will also take place at Prime Minister level.
Formulation mission to India	25 February – 5 March	DEA and MEUC with Embassy	With consultant team
Workshops at DEA	11 and 20 March	DEA with Consultant	½ day workshops to discuss formulation mission outcomes and draft programme document end DEDs
Draft Programme Document incl. DEDs and associated partner documentation forwarded to TQS for appraisal	29 March	DEA with MEUC and MKL	
<b>Appraisal:</b>			
Draft TOR for appraisal.	1 March	DEA with input from MEUC and Consultant	
Procurement of external consulting services for appraisal.	March	TQS	
Appraisal.	April	TQS	
Final Appraisal Report with recommendations	3 May	TQS	
<b>Approval:</b>			
Revision of Programme Document and DEDs based on draft Appraisal Report	Late April-10 May	Consultant with DEA	
Possible short mission to India to secure the key partners' agreement to final programme documentation and implementing partner agreements.	Mid-May	DEA with Embassy	
Final Programme Document, annexes and Development engagement Documents forwarded to TQS.	28 May	DEA with MEUC and MKL	
Presentation to the Council for Development Policy (UPR)	18 June	DEA/MEUC in liaison with MKL	
The Danish Minister for Development Cooperation approves the programme	Immediately after UPR meeting		
Document for Finance Committee (Aktstykke)	Tbc - depending on meeting dates for Finance Committee	Draft by MKL with inputs by DEA/MEUC and Consultant	
Signing of legally binding agreements (commitments) with partners	Tbc – depends on Finance Committee meeting date	MFA/Embassy	
Register commitment in MFA's financial systems within budgeted quarter.	Tbc – depends on Finance Committee meeting date	MKL	
Start of programme.	August/September but tbc – depends on Finance Committee meeting date.	DEA	