Ministry of Foreign Affairs – (Department for Multilateral Cooperation and Climate Change, MKL)

Meeting in the Council for Development Policy 11 September 2019

Agenda item 6

1. Overall purpose	For discussion and recommendation to the Minister
2. Title:	Support to the Denmark-India Energy Partnership, INDEP
3. Presentation for Programme Committee:	6 February 2019

India-Denmark Energy Partnership (INDEP) Final 26.08.2019

Key results:

- Contribution to achieving India's targets in the Nationally Determined Contribution (NDCs) under the Paris Agreement on Climate Change, as well as SDG7, SDG13 and other SDGs.
- A more integrated approach to 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.
- 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.
- Improved 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.
- Increased mobilization of investment in clean energy facilitated through de-risking and an improved enabling framework.

Justification for support:

- 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.
- 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. India' role for achieving the SDGs can be compared to the role China played vs. the MDGs.
- The partnership will target climate change mitigation and SDGs prioritised in Denmark's strategy "The World 2030" for cooperation with emerging economies.

Major risks and challenges:

- Vested interests in traditional energy solutions.
- Limited institutional capacity in partner institutions and needs for increased cross-ministerial, central-state level and inter-state coordination and collaboration.
- Ambitious Indian renewable energy and climate change mitigation targets some of which may be hard to achieve.
- 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 – albeit with clearly identified and recognised areas of comparative strengths.

File No.	F2: 2019-31594						
Country	India						
Responsible Unit	MKL with Ministry of Climate, Energy and Utilities (MCEU)/Danish Energy Agency (DEA)						
Sector	Climate and energy						
DKK mill.	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**Tot**
Commitment	60						60
Projected annual Disbursements	.5	9.7	13.3	13.6	12.5	10.4	60
Duration	Q4-2019 to Q3-2024 (5 years)						
Finance Act code.	06.34.01.70 Klimapulje						
Head of unit	Henriette Ellermann-Kingombe						
Desk officer	Tobias von Platen-Hallermund						
Financial officer	-						

Relevant SDGs

Strategic objective:

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

Engagements/Outcomes:	**Partner:**	**Total budget DKK mill.**
Engagement 1: **Outcome 1: India has taken ownership of the centre of excellence for offshore wind and the integration of renewable energy that promotes and creates an enabling environment for lowering the cost of offshore wind power using best available practice in planning and cost reducing measures to continue the implementation of ambitious targets.**	Ministry of New and Renewable Energy (MNRE)	**15.7**
Engagement 2: **Outcome 2:** Energy planning decision making is guided by state-of-the-art long-term-energy modelling tools based on a regularly adjusted technology catalogue	Ministry of Power (MOP)	**16.3**
Outcome 3: Flexibility and integration of increasing levels of renewable energy in the power system.	Ministry of Power (MOP)	**18.1**
	Unallocated Reserve	6.0
	Inception phase	.31
	Mandatory Mid-term Review	.40
	Framework contract tender	.50
	Programme Management	2.70
	Total	60.00

Danish Ministry of Foreign Affairs of Denmark (MFA)
Danish Ministry of Climate, Energy and Utilities (MCEU)
Danish Energy Agency (DEA)
Indian Ministry of New and Renewable Energy (MNRE)
Indian Ministry of Power (MOP)

India-Denmark Energy Partnership (INDEP)

2019-2024

Programme Document

Final

26 August 2019

Ref: F2 2019-31594

1. List of key abbreviations and selected terminology

ADB	Asian Development Bank
AMG	MFA/Danida Aid Management Guidelines
ATE	Appellate Tribunal for Electricity
BEE	Bureau of Energy Efficiency (under MOP)
CCEE	Copenhagen Centre on Energy Efficiency
CEA	Central Electricity Authority (under MOP)
CECP	EU-India Clean Energy and Climate Partnership
CEEW	Council on Energy, Environment and Water
CERC	Central Electricity Regulatory Commission (under MOP)
CEM	Clean Energy Ministerial
COE	Centre of Excellence
COP	Conference of the parties (under the UNFCCC)
CO_2	Carbon dioxide
CPI	Climate Policy Initiative
Crore	Ten million (10,000,000) equal to 100 lakh in the Indian numbering system and written in India as 1,00,00,000
CTCN	Climate Technology Centre and Network
Curtailment	Reduction of renewable energy production (e.g. of a wind farm by shutting-down wind turbines) to mitigate issues associated with export to the grid, or inflexibility of thermal power plants, etc.
DAC	Development Assistance Committee (OECD)
Danida	Brand name for Danish international development cooperation, under the Ministry of Foreign Affairs of Denmark
DEA	Danish Energy Agency
DED	Development Engagement Document
DEPP	Danish Energy Agency Partnership Programme 2017-2020 (China, Mexico, South Africa, and Vietnam)
DFC	Danida Fellowship Centre
DFID	UK Department for International Development
DISCOMS	Distribution companies
DKK	Danish Kroner
DTU	Danish Technical University
EDK	Embassy of Denmark in New Delhi
EE	Energy Efficiency
EIA	Environmental impact assessment
EIB	European Investment Bank
ESCO	Energy service company
ESMAP	World Bank Energy Sector Management Assistance Program
EUDP	Danish development and demonstration programme for energy technology
F2	MFA, EDK, MEUC, DEA electronic archive system
FFSR	Fossil Fuel Subsidy Reform
Flexibility	For the purpose of this programme, flexibility is the ability to handle variability and uncertainty in generation and demand while maintaining satisfactory reliability.
Forecasting	Forecasting is the prediction of power generation from variable energy sources such as wind and solar power and demand so that system operators can plan the schedule for power generation.
FOWIND	Facilitating Offshore Wind Energy in India
FOWPI	First Offshore Wind Project in India
G20	The Group of Twenty (leading World economies)
G2G	Government-to-government
GCF	Green Climate Fund
GDP	Gross domestic product
GHG	Green House Gas

GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit, German technical cooperation agency
GOI	Government of India
GTF	Global Tracking Framework
GSI	Global Subsidies Initiative
GW	Gigawatt
GWEC	Global Wind Energy Council
IEA	International Energy Agency
IFC	International Finance Corporation
IFU	Investment Fund for Developing Countries
IISD	International Institute for Sustainable Development
INR	Indian Rupee
IPP	Independent power producer
IREDA	Indian Renewable Energy Development Agency
IRENA	The International Renewable Energy Agency
ISA	International Solar Alliance
JWG	Joint working group
KfW	KfW Banking Group Germany (original name Kreditanstalt für Wiederaufbau)
lakh	One hundred thousand (100,000) written in India as 1,00,000
LCOE	Levelized cost of energy[1] - the average lifetime costs of providing one MWh for a range of power production technologies or power savings and thus help compare and select the optimal technologies in future national energy supply.
LOI	Letter of Intent
Long-term planning	For the purposes of this programme, long-term energy planning is understood[2] as the process that sets a long-term direction for energy sector development, based on qualitative approaches and quantitative analysis.
LTA	An abbreviation used in the Appraisal Report (and therefore also in Annex 9 of this Programme Document) for "long-term advisor". But since the Indian engagement partners prefer the term long-term sector expert, this has as far as possible been used in the PD
MCEU	Danish Ministry of Climate, Energy and Utilities (formerly Danish Ministry of Energy, Utilities and Climate, MEUC)
MFA	Ministry of Foreign Affairs of Denmark
MKL	MFA Department for Multilateral Cooperation and Climate Change
MNRE	Ministry of New and Renewable Energy of the Government of India
Modelling	In the specific context of this programme, modelling[3] refers to a method to devise quantitative energy scenarios with the aid of computerised modelling tools.
MOF	Ministry of Finance of the Government of India
MOP	Ministry of Power of the Government of India
MOU	Memorandum of Understanding
MS	Member state of the European Union

[1] DEA has developed an LCOE Calculator that enables country specific comparisons of the average costs of conventional and new energy solutions, giving a holistic assessment of future costs focusing not only on project specific costs (investment, O&M, fuels, etc.), but also system and society costs.

[2] There are several steps and components that constitute long-term energy planning, with scenario analysis and modelling as foundations, accompanied with other key elements such as the development of a vision for the energy sector, assessment of resource potentials, the establishment of targets and related enabling policy, regulatory, institutional and financial frameworks.

[3] Many types of modelling approaches exist, with differences among them mainly related to their level of technological and economic representation. For example, certain models have detailed energy system representation with limited representation of economic feedbacks, while others have detailed representation of economic structure with limited representation of physical energy systems. Long-term energy scenarios are often developed using the first type of model, to understand possibilities and uncertainties around energy transitions, as physical realities are critically important in defining transition possibilities. The second type of model is important to understand the economic implications of transitions, which are often the critical factor in determining political feasibility.

MTR	Mid Term Review
NAMA	Nationally Appropriate Mitigation Actions
NAPCC	National Action Plan on Climate Change
NDC	Nationally Determined Contribution (under the Paris Agreement on Climate Change)
NEP	National Electricity Plan
NGO	Non-Governmental Organization
NITI Aayog	The National Institution for Transforming India
NIWE	National Institute of Wind Energy, Chennai (under MNRE)
OECD	Organisation for Economic Co-operation and Development
O&M	Operations and maintenance
PD	Programme Document
P4G	Partnering for Green Growth and the Global Goals 2030
POSOCO	Power System Operation Corporation Limited (under MoP)
POWERGRID	Power Grid Corporation of India Limited
PPA	Power purchase agreement
PPP	Purchasing power parity
PV	Photo voltaic
Ramping	Ramp rate is the rate at which a power plant can increase or decrease output (e.g. % per minute)
RE	Renewable Energy
RET	Renewable Energy Technology
RPO	Renewable Purchase Obligation
SC	Steering committee
Scenarios	Consistent projections of developments used to map future uncertainties, to support informed decision-making.
SDG	Sustainable Development Goal
SECI	Solar Energy Corporation of India (under MNRE)
SEforALL	Sustainable Energy for All – the formerly used acronym was SE4ALL
SMART	Specific, measurable, attainable, relevant, timebound
SSC	Strategic sector cooperation
SWOT	Strengths, weaknesses, opportunities, threats
TA	Technical assistance
TANTRANSCO	Tamil Nadu Transmission Corporation Limited
TERI	The Energy and Resources Institute
TOC	Theory of Change
TOR	Terms of reference
TQS	MFA Department for Technical Quality Support
TSO	Transmission system operator
UDP	UNEP DTU Partnership
UKaid	Logo used by DFID
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNSG	United Nations Secretary General
UPR	The Danish Council for Development Policy
USAID	United States Agency for International Development
USD	United States Dollar
VESTAS	Danish wind turbine manufacturer
VRE	Variable renewable energy
WB	World Bank
WHO	World Health Organization
WRI	World Resources Institute

1 INR = 0,0946 DKK

1 DKK = 10,57 INR

16 August 2019

The Indian Financial Year is 1 April-31 March

Contents

1. Introduction

Established in 2008, the Danish Climate Envelope is a mechanism for channelling dedicated climate funding to support international development cooperation in mitigation and adaptation activities in line with Denmark's commitment to contribute to international climate finance. The Ministry of Foreign Affairs of Denmark (MFA) is overall responsible for the Danish Climate Envelope, but the right to proposed new initiatives is divided between the MFA and MCEU. Based on initiative from MCEU the Government's coordination committee has allocated DKK 55 million from the Climate Envelope 2019 for bilateral energy cooperation with India. An additional DKK 5 million from the Climate Envelope has subsequently been reallocated by MCEU from other activities, thus increasing the INDEP budget to DKK 60 million. The additional funds will allow for a prolonged stationing of two long-term sector experts in India. The Climate Envelope is managed as an integrated part of Danish international development cooperation and follows the MFA's Aid Management Guidelines (AMG) including the Guiding Principles for the Danish Climate Envelope.

India will soon be the world's most populous country and is expected to have one of the highest economic growth rates in the coming decades. Combined with the expectation[4] that India will account for 30% of the increase in global electricity demand towards 2040, it will be one of the largest global markets for renewable energy (RE) in both the short and long-term. Specifically, to reach the proposed Indian Nationally Determined Contribution (INDC) under the Paris Agreement on Climate Change, the Government of India (GoI) presented in 2015 its intention to reach a target of 175 GW renewable energy capacity in 2022 , which meant a five-fold increase of primarily solar and wind energy. By 2030 India intends 40% of its capacity in electricity generation to come from non-fossil fuel sources. India has also set ambitious goals for its fight against climate change and in particular regarding climate mitigation. India's Nationally Determined Contribution (NDC) under the Paris Agreement commits to: a) achieving 40% share of non-fossil sources of electrical power consumption by 2030, and b) reducing emissions intensity of GDP by 33-35% by 2030 from 2005-level.

The scale of the Indian RE development plan is one of the largest in the world aiming for 100 GW of solar power, 60 GW of onshore wind, 10 GW of biomass and 5 GW of small-scale hydro by 2022. But India is also targeting new renewable energy technologies such as offshore wind, hybrid solar-wind, floating solar and energy storage.

In June 2018, India's 2022 RE target of 175 GW was envisioned by the Ministry of New and Renewable Energy (MNRE) to increase to 227 GW with higher allocations for solar and onshore wind, but now also to include offshore wind, solar-wind-storage hybrid and floating solar. However, the current official target remains 175 GW. The current RE capacity is 70 GW, so this planned expansion that is major by world standards, will make India one of the world's largest markets for RE in the coming years. Estimates from GoI entities for 2030 even mention 500 GW of RE capacity.

The Indian onshore wind industry has a nearly 30-year history and with a total installed capacity of 33 GW it is around half of the total RE capacity excluding large hydro power plants. The

[4] According to the International Energy Agency (IEA)

supply chain is well-established with 75% localization and many global companies active throughout the supply chain. Meanwhile, offshore wind development has now become interesting for the Indian government due to the cost reductions experienced in recent years, a 7,600 km coast line and an ambition to have a diverse RE generation capacity. Offshore wind targets are 5 GW for 2022 and 30 GW for 2030. By comparison, this 2030 target is twice the capacity installed at the end of 2017 in eleven European countries.

Cooperation within renewable energy has emerged as an important part of the intensified dialogue between the Indian and Danish governments. Several areas for cooperation have been identified based on the ambitious Indian targets for RE implementation and Denmark's experience and results going through a transition to RE over the last four decades.

The overall framework for Indo-Danish bilateral relations are founded in the Indo-Danish Joint Commission which is anchored at foreign minister level. Under the existing Joint Commission framework from February 2008 there are six areas focused on strategic sectors including renewable energy.

The framework for cooperation in the energy sector was formalised in in February 2008 with a Memorandum of Understanding (MOU) on "Indo-Denmark New and Renewable Energy Cooperation" signed by MNRE and the (then) Danish Ministry of Climate and Energy. This MOU was agreed to be active during the inception mission for the Strategic Sector Cooperation in December 2017 and the MOU is open-ended i.e. there is not an end date. A similar MOU was pursued with the Indian Ministry of Power (MOP) in the spring of 2018. However, due to a meeting on October 4, 2018 between Permanent Secretary of the then Danish Ministry of Energy, Utilities, and Climate (MEUC) and the MOP Secretary where they agreed on a MOP visit to Denmark, and due to increased activity regarding formulation of INDEP, MOP decided that it would be preferable to send a delegation on two thematic themes to Denmark before an MOU was agreed. MOUs of this nature must be approved at the Cabinet level of the Indian Government and thus need to go through the appropriate bureaucratic process. The process of the MOU with MOP was initiated in early 2018 and Embassy's ongoing discussions with the Indian partners continue[5].

The objectives of these MOUs are to develop strong, deep and long-term co-operation between the two countries in the energy sector, on the basis of partnership, reciprocity and mutual benefit. The MOU with MNRE covers government-to-government cooperation under a Joint Working Group (JWG) and focuses on development of new and renewable energy technologies, systems, sub-systems, and components - a high-level 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. The MOU with MOP is expected to include the establishment of a separate JWG[6] on energy co-operation with a focus on energy modelling, power markets, integration of variable renewable energy, including forecasting, operational planning procedures and tools, optimising flexibility of power systems,

[5] The MOU between MOP and MCEU is expected to be signed in the margins of the RE Invest conference in India in October by MOP and the Danish Minister of Climate, Energy and Utilities (or the EDK for MCEU).

[6] It should be noted that the interpretation of JWG and Steering Committee (SC) still differ between MNRE and MOP and there should be a JWG and SC for each ministry.

consolidation of grid codes to integrate and operate efficiently variable generation, and other areas.

The cooperation in the energy sector was also discussed in December 2018, when the two Foreign Ministers held a Joint Commission[7] meeting in New Delhi and again in January 2019 when Prime Minister Narendra Modi and former Prime Minister Lars Løkke-Rasmussen met at the Vibrant Gujarat Global Summit 2019. On this occasion, the Indian Prime Minister highlighted that *"Denmark has the skills, India has the scale"*.

A 3-year Strategic Sector Cooperation (SSC[8]) programme was formulated and approved in November 2018 and the related Cooperation Agreement was on 6 March 2019 signed by MNRE (Joint Secretary for International Relations) and the Danish Ambassador to India on behalf of MEUC. The formalisation of the SSC cooperation with MOP awaits the signing of the MOU. On 6 March 2019 MNRE and the Danish Ambassador on behalf of MCEU signed a Letter of Intent (LOI) with the main intention to establish a Centre of Excellence in India. The LOI was approved by the Minister for MNRE and MOP, the Minister for External Affairs as well as the Indian Government Cabinet, indicating a high-level commitment to initiating further activities. The intent is to build on the existing SSC[9] on offshore wind and create a partnership (together with the new proposed INDEP Programme) where Danish and Indian government agencies will work together to develop the sector in India. DEA will provide knowledge-sharing and technical assistance for both the SSC and the new INDEP Programme based on its 30 years' experience of developing the offshore wind sector.

As noted above, MOP wanted to have delegations visiting Denmark before approving the MOU to ensure that the focus areas of the MOU were strong. MOP have had delegations visiting Denmark to focus on flexibility of power plants and power market design, etc. – a delegation from the central Electricity Agency (CEA), the Central Electricity Regulatory commission (CERC), the Power Grid Corporation of India Limited (POSOCO), and other MOP agencies have visited Denmark during 11-15 March 2019. As part of the SSC project it has also been possible to arrange workshops with MOP agencies e.g. CERC and CEA, and to send CERC and CEA officials on training courses in Denmark as part of the Danida

[7] The Indo-Danish Joint Commission is convened at Foreign Minister level and is currently the highest level of forum for bilateral cooperation covering all aspects and sectors of bilateral relations.

[8] The SSC has a budget of DKK 8.5 million over three years and 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. The SSC 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. The SSC main national partners are MNRE, NIWE and SECI for the first two of the above-cited 3 outcomes, as well as MOP for the third outcome. There are close synergies between the SSC and the proposed new INDEP partnership programme, and the two interventions should eventually be seen as one combined partnership cooperation between India and Denmark. Budgeting, reporting and results framework, however, is clearly separated between the SSC and INDEP programmes as specified in Annex 10. The SSC funding will be focused on fewer outputs that are more business related and when the funding runs out at the end of 2021 the remaining activities will be funded by INDEP so no activity will be funded by two different programmes in the same funding year.

[9] The first SSC Steering Committee meeting was held in New Delhi at MNRE on 13 August 2019.

Fellowship Centre (DFC) scholarship programme, which requires minister approval, i.e. the pending MOU has not hindered approval for such activities.

Collaboration on research and innovation has been central in the development of the national Institute on Wind Energy (NIWE) in Chennai, and the Danish Technical University (DTU) has been involved since the beginning. Since 1995 DTU and NIWE (then C-WET) have collaborated in institutional development and in a number of projects. The institutional development of NIWE focused on wind turbine testing, supply of measurement equipment and training in test procedures, and certification and monitoring of wind turbine installations. Furthermore, the first wind turbine test station was established at Kayathar, Tamil Nadu, with technical and financial support from Danida in the 1990s. A new MOU between NIWE and DTU was signed in December 2018 - this cooperation will identify areas of mutual interest and collaboration on wind energy, wind-solar hybrid systems, sub-systems, devices, components, data analytics, etc. Funding for this collaboration will be found by each partner.

The INDEP Programme (and the SSC) will draw on Denmark's world-leading experiences from its low-carbon transition, which are in high demand from an increasing number of countries. Denmark was the first country in 1991 to begin the development of offshore wind as a renewable energy resource, and Danish experiences over the past 30 years are being used globally to support further development of one of the fastest growing renewable energy sources at scale. With the new cooperation between India and Denmark, the Danish Energy Agency now works with 15 countries[10], including China, Mexico, Indonesia and USA. These partnerships revolve around the areas of long-term energy planning, grid-integration of high shares of RE, electricity system flexibility and energy efficiency.

DEA has extensive experience in working with large countries such as China and Indonesia. As an example of the results achieved from a long-lasting partnership, it can be mentioned that through the partnership with China, DEA has participated in the establishment of China National Renewable Energy Centre (CNREC). The cooperation with the centre has been focused on establishment of an energy system model suite as an analytical tool for developing long term scenarios (2050) for the development of the Chinese energy sector. The results from this work have been published in the China Renewable Energy Outlook (CREO) publication. The 15 countries, which Denmark is cooperating with, account for 62% of the world's total CO_2 emissions, and all have targets to reduce the use of fossil fuels.

2. Strategic Considerations and Justification

2.1 INDEP identification and formulation process

The identification and formulation of INDEP has comprised: i) a DEA-led identification mission to India during 17-21 December 2018 with participation of MCEU and MKL; and ii) a similar DEA/MEUC/MKL formulation mission during 24 February-6 March 2019[11]. As mentioned above, Indian study visits (by MNRE and MOP agencies to Denmark held during 11-15 March and 26-29 March 2019) have further strengthened the partnership and a mission

[10] India, China, Indonesia, Vietnam, South Korea, USA, UK, Germany, Netherlands, Mexico, Turkey, Ukraine, Egypt, South Africa, and Ethiopia.

[11] A list of key persons met during the identification and formulation missions is found in Annex 12.

to India by the DEA India team during 6-11 May has further strengthened collaboration. Finally, a joint programming and SSC mission took place 13-17 August in connection with the first SSC Steering Committee meeting where the Indian commitment was confirmed, e.g. by agreeing to embed a sector expert within MNRE or its institutions and endorsing the SSC work program for 2019 and by engaging in setting priorities for 2020 work programme. As the SSC is now moving further into the implementation phase, the finalisation of the SSC work programme is underway. Annex 10 reflects the alignment between the SSC and the proposed INDEP Programme.

The MFA Programme Committee (PC) met on 6 February to discuss a Concept Note for INDEP. The PC chairman's summary concluded that the concept note was well prepared, and the PC welcomed the proposed partnership within the energy sector in India. A number of substantive comments were reflected in the PC summary and these comments have all been considered in the INDEP programme design. This has resulted in an extended timeline for the INDEP formulation process, as reflected in the Process Action plan in Annex 8, and the alignment between the SSC and INDEP in terms of the results framework has been illustrated in Annex 10. A high degree of flexibility has been built into the programme to allow cooperation to be demand responsive, and the choice of partners and interventions in the three main outcome tracks have been balanced between strategic level cooperation and the achievement of concrete outcomes and outputs. The description of present and planned support from other donors and partners has been further expanded in Annex 1. The management-set-up in India and in Denmark considers existing set-up of related activities, including the SSC in India and the DEA Energy Partnership Programme (DEPP) Advisory Group in Denmark.

An MFA appraisal mission to India was undertaken during the week of 17 June 2019 and the final Appraisal Report was submitted on 15 August 2019. The appraisal recommendations are summarised in Annex 9, where the DEA and MKL agreed follow-up to these recommendations has been summarised.

2.2 Background analyses and relevance

India's economy is largely energised by fossil fuels, mainly coal, making India the third largest emitter of energy related CO_2 emissions in the world. With a predominance of thermal generation, India's Weighted Average Emission Factor at 0.82 kg of CO_2 per kWh (net) generated is relatively high as compared to world average but has remained unchanged in recent years. With the rise in generation, CO_2 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:

Box 2.1 Key Indian climate and clean energy targets:

- Reduction in emission intensity of 33-35% 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).

Further background and context analysis information are found in Annex 1 and in a number of background documents referenced in Annex 1 and Annex 6. The identification and formulation missions have identified a number of specific challenges and opportunities that the programme is designed to respond to, including those mentioned in Box A1.1 in the Context Analysis in Annex 1.

2.3 Justification for the proposed programme in relation to OECD DAC criteria

The proposed partnership is highly relevant in the context of the OECD DAC criteria and its focus on India's NDC targets and SDGs (particularly SDG7 (affordable and clean energy) and SDG13 (climate action)), and to a lesser extent also SDG8 (decent work and economic growth), SDG9 (industry, innovation and infrastructure), SDG 11 (sustainable cities and communities, and SDG17 (partnerships). This is furthermore consistent with Danish priorities for climate change-related partnerships with transition and growth economies[12].

Table 2.1 Programme justification related to OECD DAC criteria

Criteria	Justification
Relevance	Responds to the above-cited Indian partner needs, challenges, priorities and opportunities. Highly supportive of the transition to clean energy, with work on offshore wind, long-term planning and scenario modelling, flexibility of generation and the power system, integration of variable RE – areas that are prioritised by Indian partners at high levels of decision making, recognising Denmark's skills and experience in these areas. Is fully aligned with Danish development priorities for emerging economies and guiding principles for the Danish Climate Envelope.
Impact	The collaboration with the two key line ministries MNRE and MOP that are critical for India's green energy transition has the potential to support transformational change and result in major impact in a country that will soon be the most populous in the world. Pro-active use will be made of impact drivers identified in the Theory of Change (Section 4).
Effectiveness	The government-to-government peer-to-peer partnership has the potential to effectively provide outcomes in a manner that no other development partners offer to India. The cooperation will also draw on DEA's expertise and experience under its Global Cooperation programme that now comprises 15 bilateral partnerships and which will also endeavour to provide increasing synergies with Denmark's multilateral sustainable energy and climate cooperation through MCEU and MFA MKL.
Efficiency	The programme design has a lean governance and management set-up and the high degree of flexibility inherent in the design will provide of maximum agility and demand responsiveness

[12] See page 10 Table 1 in "The World 2030".

	providing for efficient use of resources. The partnership approach, where international long-term sector experts are planned to be posted within key partner institutions and where experts from DEA, Energinet, and other short-term technical advisors based on agreed TOR on each assignment are directly paired with a peer in the involved institutions. Use of TOR, end-of-mission reporting and task sheets with specified expected output, activities and inputs will be applied for missions, larger events and for larger deliverables both in Denmark and on missions to India and elsewhere abroad. This approach has been highlighted by partners in other countries as the preferred option for Denmark's technical support due to the fact that it allows for a flexible and tailor-made assistance that to a high degree can address the specific needs and challenges of partner institutions.
Sustainability	The emphasis on capacity development in areas identified as critical and strategic to India's energy transition and alignment to set goal and targets in India's NDC and the SDGs - and the agreement to collaborate on development of a centre of excellence – are intended to enhance the sustainability of the partnership outcomes. As the collaboration also addresses key bottlenecks in the enabling framework for RE (and to some extent although this is not the main focus, EE investments), this will further contribute to sustainable outcomes and leverage.

It is further noted that within offshore wind energy there are a variety of practical, policy and regulatory barriers for enabling the mobilisation of public and private finance. The first is that the initial projects will tend to be very expensive as the supportive infrastructure (e.g. harbours large enough to dock the turbine blades and parts) will not be in place. The planning, regulatory and operational systems for establishing and making use of the offshore wind energy will also not be routine and will tend to give rise to delays (e.g. the level of integration and therefore the level of curtailment might be high). The risk premium for the first projects will also understandably be higher. To a lesser extent, as they are better established and the technology better known, these factors will also tend to pertain to other RE sources. Overall, INDEP will contribute to addressing these issues by bringing on board know-how from the relatively advanced Danish experience in offshore wind and high levels of RE-planning, development and integration. This will help ensure that avoidable mistakes are identified in advance and will thus reduce the financial penalty associated with accelerating new approaches.

2.4 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 MOP, and MNRE along with a number of subsidiary statutory bodies. Under MNRE it is primarily NIWE in Chennai, which is the focal point for wind power research and development in India; and the Solar Energy Corporation of India Ltd. (SECI), which is responsible for tendering of all types of RE including onshore wind and offshore wind. Under MOP the following bodies are particularly relevant: CEA, CERC, the load dispatch operator 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[13] cutting-across line ministries and ensuring a bottom-up approach to development. The institutional structures are further described in Annex 2, which also comprises a short description of the key INDEP partners in Figure A2.1.

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 (DISCOMS) 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 international market to enable market driven prices and reducing subsidies. It is expected that this draft policy is to be considered soon by the Indian Government, but policy directions of the newly re-elected Government will need to be monitored closely.

2.5 Lessons learned from previous engagements

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 Growth Advisor[14] at the EDK in New Delhi plays a crucial role in facilitating both the SSC and the new proposed partnership programme, and this is a very good example of how a growth advisor, the SSC concept and a major new Climate Envelope initiative can work together. The Advisor has the ongoing contacts with Indian partners and development partners, which has been and is of critical importance for supporting high-level dialogue for INDEP. The lessons include the importance of seeing India as a partner not a recipient of development assistance, 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. Experience during the first year of SSC development has also led to the conclusion that it will be necessary to keep a clear divide between promotion of Danish commercial interests and provision of policy and operationally sensitive technical cooperation. It is also important to ensure that INDEP will benefit from lessons learned under DEA's global cooperation programme with other countries, and it is noted that a mid-term review (MTR) for the bilateral cooperation with China, Mexico, South Africa, and Vietnam (Danish Energy Agency Partnership Programme, DEPP II) was completed in mid-May 2019. Recommendations from this MTR have as far as possible and relevant been reflected in this INDEP Programme Document.

[13] 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.

[14] In India the title of the Growth Advisor has been defined as "Counsellor, Energy" to avoid potential misconceptions.

2.6 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/IFC, and the Asian Development Bank. The identification and formulation missions have held meetings with each of these agencies to identify areas of synergy and emphasised the need to avoid any risk of duplication. Box A1.2 at the end of Annex 1 summarises some of the most important initiatives of other selected development partners (including multilateral partners supported by Denmark) that are relevant in the same, related or complementary areas of intervention as INDEP and where close coordination is therefore required on an ongoing basis. 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.).

It is noted that donor coordination in India is weak and mainly done at the initiative of development partners[15]. It is important that Denmark – though the Embassy in Delhi – continues to engage in the relevant donor coordination fora and processes in India (e.g. the EU energy counsellors' meetings) and MCEU and MKL should also - through their roles as supporters of multilateral agencies – work to ensure synergies and additionality of the India programme in the relevant multilateral fora.

2.7 Considerations on Danish strengths and interests

The partnership programme is 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: political agreements with broad consensus in parliament, which serve as a basis for setting and achieving ambitious long-term targets; a holistic view based upon an energy agreement as a roadmap for development of energy supply and demand; long-term energy planning including the use of models and scenarios; regulation of and targeted investments in energy efficiency, and support for renewable energy by synergies between taxation schemes and policy; public-private sector cooperation that has fostered important innovation and breakthroughs in the Danish energy concepts and -systems and led to public engagement and acceptance, as well as general public support for the energy sector transition; environmental and energy taxes that contribute to a better reflection of the environmental costs of production, use, and disposal in consumer prices on energy; an effective integration and support for renewable energy sources in Denmark combined with a well-functioning open power market in the region; maintaining a very high security of electricity supply closely linked to significant cross border connections; power generation system flexibility combined with the integration of

[15] 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.

very high levels of variable renewable energy; advancement of the Levelized Cost of Energy (LCOE) approach; a strong focus on offshore wind; and a broad and integrated one-stop-shop mandate of DEA to regulate the market and deliver on the above. Denmark has a strong interest in sharing these experiences 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 new MOU on cooperation in wind energy.

3. Presentation of the India-Denmark Energy Partnership Programme (INDEP)

3.1 Overall objectives

The partnership builds 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 transmission system operator (Energinet) offering partners wider access to acquaint with Danish experience, expertise and technology solutions; and daily programme presence in-country through Denmark's embassy and through the planned posting of international long-term sector expert with a key-partner institution[16]. In accordance with the intentions of the Letter of Intent signed by MNRE and EDK on behalf of MEUC, a Centre of Excellence (COE) will be established under the field of responsibility of MNRE with its statutory bodies NIWE and SECI as close partners (see Box 3.1). MNRE has proposed that the Centre be initiated in MNRE including the sector expert and could then be moved out if deemed relevant at a later stage.

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: India has taken ownership of the centre of excellence for offshore wind and the integration of renewable energy that promotes and creates an enabling environment for lowering the cost of offshore wind power using best available practice in planning and cost reducing measures to continue the implementation of ambitious targets (applying international experience on planning, clearances, integration into the power system, attractive and flexible procurement mechanisms and the mobilization of investment and finance). The aim will be to bring together and share knowledge from Denmark (and with time other offshore nations) to secure the cost-efficient implementation of the ambitious targets of

[16] MNRE have confirmed in August 2019 that the COE should be initiated in MNRE and that a sector expert could be stationed in the Ministry or its institutions together with the relevant officials. Regarding the field of responsibility of MOP there have been discussions about placement in the Central Electricity Agency (CEA), but this is to be confirmed during the ongoing dialogue with Indian partners and can only be finalized after the signing of the MOU.

India. The vision, set-up and intentions of the Centre of Excellence are further described in Box 3.1., Section 4 and in the LOI in Annex 11.

Outcome 2: Energy planning decision making is guided by state-of-the-art long-term energy modelling tools based on a regularly updated technology catalogue allowing a thorough power sector analysis and medium and long-term energy planning that will identify least-cost potentials and future pathways to achieve India's clean energy targets cost efficiently, maintaining high security of supply, enhancing access to energy 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**.**

Box 3.1 Concept outline for Centre of Excellence (COE)

Context – The Centre of Excellence is envisioned as a broad alliance that builds on long-term cooperation between India and Denmark on offshore wind power and other renewable energy. The concept for the centre reflects the intentions of the high-level partnership between the two countries as formalised in the Memorandum of Understanding for Indo-Denmark Renewable Energy Cooperation signed on 6 February 2008, in the agreed minutes of the two JWG meetings during 2018, and reinforced at the meeting between the Danish and Indian prime ministers on 18 January 2019. In the words of Prime Minister Modi, "*Denmark has the skills and India has the scale*"

Purpose – the Centre of Excellence aims at promoting and creating an enabling environment for making best use of offshore wind power and renewable energy in India. The aim will be to bring together and share knowledge and best practices in order to secure a successful and cost-effective implementation of the ambitious offshore wind targets of India. No physical centre is envisioned as part of the programme.

Work plan – Initially the centre will focus on four main streams of cooperation that benefit from lessons learnt and relate to best Danish and European practice on:

The four main streams have been chosen as areas of cooperation that according to Danish experience are crucial to the reduction of risk and thus promotion of investments in offshore wind energy.

Partners – The Centre of Excellence will under the Ministry of New and Renewable Energy bring together leading Indian entities including the National Institute of Wind Energy and the Solar Energy Corporation of India. From the Danish side the Ministry of Energy, Utilities and Climate, the Danish Energy Agency and the Technical University of Denmark will be involved.

Vision – In the programme period the ambition is to develop the institutional capabilities in the four working groups and for India to leapfrog the Danish and North seas experiences in offshore wind energy. In the medium to long term the vision is that the Centre will broaden to include a wider group of international governments and players, accumulating experience and best practices on offshore wind and become an international centre for offshore wind and with broader links to new and renewable energy.

3.2 Theory of change, key 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 government-to-government partnership with Denmark enhance their capability 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 as well as improve the flexibility of grid-connected generation infrastructure. Moreover, the partnership will 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 though 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 Letters of Intent, as previously described.

What are the changes the partnership wants to contribute to?: As defined by the outcomes, within wind energy the partnership through the centre of excellence will contribute to the adoption of a comprehensive and coherent approach, that leads to cost effective offshore wind power, mobilising significant investment that is on track to meet targets. On a wider scale within the energy sector, the partnership aims at contributing to energy planning decision making that is guided by state-of-the-art long-term energy modelling tools and an up-to-date technology catalogue for current and future technologies. It also aims at increasing the flexibility and integration of growing 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.

How will change happen in the specific context? In concrete terms the expected change will happen through key partners in India being exposed to the practices in Denmark and then being supported by a range of technical cooperation initiatives to transfer good practice and lessons learnt to the Indian context. This will imply a number of study tours, short secondments to Denmark and both short and longer-term inputs by Danish experts in India.

What is the role of the key partners in the change process? The key partners in India will participate in study tours and short secondments to become familiar with relevant elements of

the Danish model. They will internalise the relevant approaches and where possible apply them to their area of mandate with the support of technical advisers from Denmark.

What are the conditions that must be realized before the goal is achieved? The key conditions are that the Indian partners find elements of the Danish model that are useful and that these elements can be adjusted and successfully transferred for the Indian context.

Who are the key partners that need to be engaged for this change to happen? The key partners at the federal level are the MOP and MNRE and their agencies such as CEA, CERC, POSOCO, NIWE and SECI as well as other stakeholders such as NITI Aayog. Denmark is in a unique position to share best practises at federal level in a peer-to-peer manner. At a later stage in the program implementation period it will be relevant that state actors, NGOs and also the private sector and financing institutions are engaged for actual implementation of proposed measures and policies at federal level. The number and specific states will be clarified once relevant while inter-state agencies such as fora for regulators and dispatchers will be included at an earlier stage to create a bridge between the federal and state level; one example could be the states of Gujarat and Tamil Nadu, which are planned to host the first offshore wind farms.

What is within and beyond the influence the key programme partner? As illustrated in Figure 3.1 provided there is demand and sufficient levels of commitment by all relevant parties, the activities and outputs are to a large extent within the control of DEA with the outcomes being within the sphere of influence. The effectiveness of ongoing public sector reforms and political and macro-economic situation will influence the ultimate impacts on reduction of GHGs and mobilisation of finance and are to a large extent beyond the partnership.

What assumptions are relevant for the change to happen? A major assumption is that cooperation partners are committed to sustained engagement and willing to allocate staff time and inputs in-kind to engage effectively with DEA staff and other experts. It is also crucial that Indian partners find value in the strategic cooperation with Denmark for informed decision making to achieve Indian goals. As a result of recognising this value, all partners are expected to engage effectively throughout the programme and benefit from peer-to-peer exchanges of good practice and paths to avoid.

It is noted that the main thrust of the programme is to develop capacity in areas where the partner organisations are weak or at least less experienced and where the Danish organisations are strong or have proven experience to share and transfer. The main areas where this takes place are: i) offshore wind energy which is new for India ii) scenario planning and integration of renewable energy. Although these areas are relatively new for the Indian partners and they have gaps in knowledge and skills the Indian partners in general have significant absorption capacity in terms of numbers of staff, their qualifications and experience in renewable energy. The main issue is not the inherent absorption capacity but on whether the programme is framed and communicated in a way that gives the high-level decision makers in India the confidence and conviction that Denmark and Danish know how is the most appropriate for their situation. A number of high-level meetings have consistently reiterated this confidence, but it will be important to continue to frame and communicate and deliver so that the capacity support is found relevant and made best use of. A range of capacity development strategies will be

employed, as further elaborated below. Peer-to-peer on-the-job-training and mentoring will be combined with short courses, study tours, and remote mentoring.

The Indian partners have adopted ambitious policies and targets on renewable energy including specific targets on offshore wind energy. These policies and targets have been translated into strategies and plans at the ministry and agency level. The programme directly aims at providing know-how and access to Danish expertise that serves to enable these policies mainly through awareness raising and capacity development of key officials and agencies.

The main strategy of INDEP programme is to first engage at federal level to develop knowledge and skills - and then as the programme develops, to be guided by Indian partner demand for the further application of this knowledge and skill at state level. This is likely to happen more quickly within Outcome 1 on offshore wind energy as the potential is geographically concentrated in just two states (Tamil Nadu and Gujarat).

The assumptions of the theory of change note the importance of the political economy. India is a vast and institutionally complex country and the Danish cooperation only a very small part of the overall picture. For these reasons it will not be realistic to expect that the programme can navigate or influence the political economy other than through the planned technical support. The programme design is intended to be well-aligned to credible and technically sound Indian policies (although also quite ambitious) and thus a good basis exists for the planned level of cooperation. Because even if the ambitious targets are not met a significant contribution is expected and it might even be that in the long run a slower rate of attainment is superior. If during the implementation it becomes apparent that there are unexpected barriers, then there are through the Steering Committees and joint working groups a number of high-level avenues through which the issues can be raised.

Strategy for capacity development: INDEP is essentially a capacity development programme, matching key engagement partner needs and priorities for enhanced knowledge and experience within the INDEP strategic focus areas with the relevant Danish and international best practice in a mutual partnership that can imply learning on both sides of the partnership. The sustainability of INDEP outcomes relies heavily on the institutionalization of the built capacity and shared experience, hence the importance of aligning capacity development activities to the relevant Indian engagement partners own institutional knowledge and capacity development strategies and plans. In this regard, it is important to bear in mind that INDEP does not channel funds through partner systems and procedures. Key elements of an outline strategy for capacity development are summarised in Annex 14.

Box 3.2 Key assumptions and impact drivers

Key Assumptions:

From inputs to activities:

- Cooperation partners committed to sustained engagement and willing to allocate staff time and inputs in-kind[17] to engage effectively.
- DEA timely work planning with Indian partners and all Danish inputs well planned to ensure Indian partner input/uptake.
- Steering committee/ management structure sufficiently flexible to allow for quick remedial action when deviations occur.

From activities to outputs to outcomes:

- Indian partners understand the value of strategic cooperation with Denmark for informed decision making to achieve Indian goals.
- Indian partners engage effectively throughout the programme and value peer-to-peer exchanges of good practice and paths to avoid.
- DEA ability to ensure additionality and synergies in a field with many actors.
- Flexibility and continued attention to assumptions and risks during implementation to ensure continued alignment to Indian priority needs in a highly dynamic context.

From outcomes to impact:

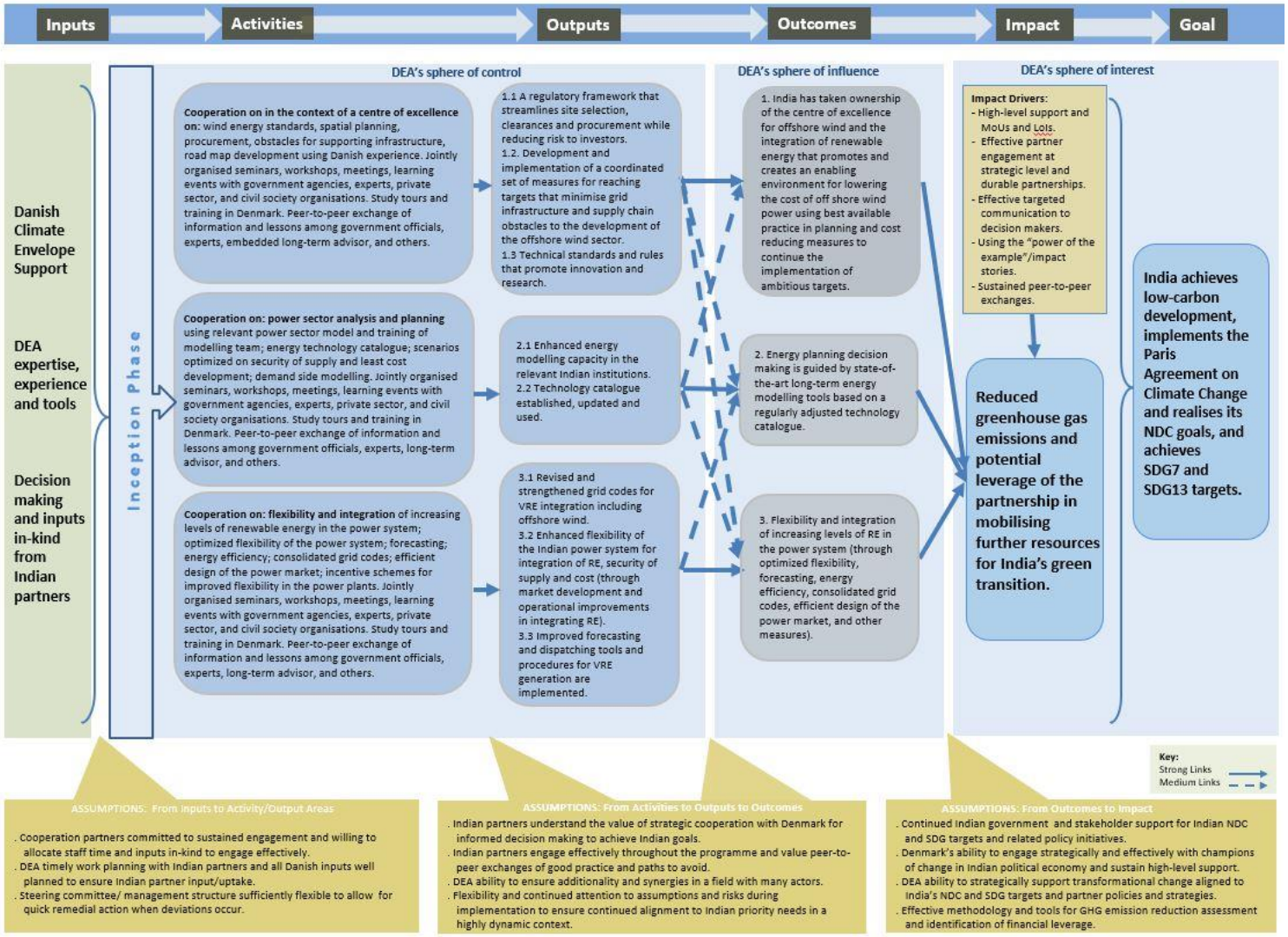
- Continued Indian government and stakeholder support for Indian NDC and SDG targets and related policy initiatives.
- Denmark's ability to engage strategically and effectively with champions of change in Indian political economy and sustain high-level support.
- DEA ability to strategically support transformational change aligned to India's NDC and SDG targets and partner policies and strategies.
- Effective methodology and tools for GHG emission reduction assessment and identification of financial leverage.

Impact drivers:

- High-level support and MOUs and LOIs.
- Effective partner engagement at strategic level and durable partnerships.
- Effective targeted communication to decision makers.
- Using the "power of the example"/impact stories.
- Sustained peer-to-peer exchanges.

[17] It is however, not considered realistic to seek a formal, quantified partner commitment to this in-kind contribution and track this during programme implementation.

Figure 3.1 Theory of Change



3.3 Choice of Partners and Development Engagements

MNRE and MOP will be the implementing partners for the programme and will lead two Development Engagements with their agencies taking an operation role as follows:

Table 3.1 Programme partners

Programme	**India-Denmark Energy Partnership (INDEP)**	**Partner**	**Main roles**
Objective	Reduced greenhouse gas emissions and leverage of the partnership in mobilising further resources for India's green transition.	MNRE/MOP	Steering and overall governance
Development Engagement 1	Implementing partner: Ministry of New and Renewable Energy (MNRE)	MNRE	
Outcome 1	India has taken ownership of the centre of excellence for offshore wind and the integration of renewable energy that promotes and creates an enabling environment for lowering the cost of offshore wind power using best available practice in planning and cost reducing measures to continue the implementation of ambitious targets.	Centre at MNRE/ NIWE/ SECI	Centre/ NIWE supporting the planning and regulatory framework SECI – tendering and procurement Cooperation on standards and certification
Output 1.1	An enabling framework that streamlines site selection, clearances and procurement while reducing risk to investors	Centre/ NIWE/ SECI	
Output 1.2	Development and implementation of coordinated measures for minimising grid infrastructure and supply chain obstacles to the development of the offshore wind sector	Centre/ NIWE/ SECI++[18]	
Output 1.3	Technical standards and rules that promote innovation and research	Centre/ NIWE/ SECI	
Development Engagement 2	Implementing partner: Ministry of Power (MOP)	MOP	
Outcome 2	Energy planning decision making is guided by state-of-the-art long-term energy modelling tools based on a regularly updated technology catalogue	CEA (POSOCO, CERC)	CEA on long-term planning, modelling, forecasting under national electricity policy and strategy CERC on regulatory issues POSOCO on load dispatch and integration, transfer of electric power on a national level NTPC on technology data and inputs MNRE on technology data
Output 2.1	Enhanced energy modelling capacity in the relevant Indian institutions	CEA (MNRE, CERC, POSOCO)	
Output 2.2	Technology catalogue established, updated and used	CEA (POSOCO, CERC, NTPC, NHPC, MNRE)+	

[18] A + or ++ indicates that other stakeholders could also be involved – this will be clarified during the inception phase.

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)	CEA (POSOCO, CERC, POWERGRID)+	CEA on federal level system changes at policy level with later decentralisation to regional and state level. CERC on regulation, market development and enabling environment POSOCO forecasting, grid integration, flexibility POWERGRID on integration and transmission
Output 3.1	Revised and strengthened grid codes for VRE integration including offshore wind	CEA[19] and CERC (POSOCO, POWERGRID)	
Output 3.2	Enhanced flexibility of the Indian power system for integration of RE, security of supply and cost (through market development and operational improvements in integrating RE)	CEA and CERC (POSOCO, NTPC)	
Output 3.3	Improved forecasting and dispatching tools and procedures for VRE generation are implemented	POSOCO (CERC)	

Additional background information on the key partner ministries and public agencies is found in Annex 2.

The private sector developers and those involved in the supply chain and grid infrastructure are also important actors as are research and civil society organisations. Private sector actors will be engaged in the programme and will gain from policy and operational measures that create a rewarding and competitive environment for investment in renewable energy. Research and civil society organisations[20] will be engaged to support initiatives especially in relation to the centre of excellence. Furthermore, state level partners and inter-state fora will be engaged in activities to ensure bridging between the federal level and the state level where actual implementation takes place. Activities with inter-state and state level involvement are planned to be study tours, workshops and seminars organized in conjunction with federal partners, data and information collection as well as barrier identification from a local perspective (e.g. for power evacuation).

3.3 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

[19] As explained by CEA at the meeting with the formulation mission on 5 March: work on grid codes is divided into three categories: i) Indian electricity grid code – CERC; ii) Grid standards – CEA; iii) Technical standards for electricity - CEA

[20] For instance, the identification mission in December met The Energy and Resources Institute (TERI), which would be highly relevant.

energy transition, will support the human rights principles of participation, accountability, non-discrimination, and transparency.

India is currently one of the most polluted countries in the world, with air pollution contributing to hundreds of thousands of deaths per year—much caused by power generation using coal and by households burning biomass fuel, such as wood and dung. The health impacts fall disproportionately on women and children. As further described in Annex 1, a recent IRENA report that builds upon a ground-breaking survey of employees, companies and institutions, shows that RE offers diverse opportunities along the value chain, requiring different skill sets, but these opportunities should be equally accessible, and the benefits equitably distributed. The report has key findings also from India which generally point to issues such as insufficient access to training of women, need for mainstreaming of gender in energy policies, and needs for enhancing access for women to finance.

The particular benefits of green energy transition and the support from INDEP cooperation for both women men and youth will be given careful attention in programme implementation, and the possibilities for gender disaggregated sub-indicators will be considered in the Inception Phase. Capacity development for environmental assessments related to offshore wind power generation will be supported thereby strengthening the process around public consultations and involvement of civil society in decision-making. Social acceptability of RE in India is generally not a major problem (the not-in-my-backyard or "NIMBY") problem seen in Denmark is not pronounced in India, but there are rapidly increasing demand and pressures on land availability which are expected to make offshore wind an increasing priority. Job creation from RE is not a responsibility as such for Indian decision makers but it is an overall critical priority for the Prime Minister and GOI[21].

Facilitating the financing and investment in offshore wind power and other aspects of the green energy transition is also a cross-cutting concern in INDEP. The detailed work planning in the Inception Phase will also consider how this concern can best be addressed in INDEP activities.

3.4 Work Planning, Monitoring and Reporting

General. Annual work plans[22] and budgets will be prepared and presented to the Steering Committees for approval. The work plans and budgets will take into account Indian priorities and the cumulative work done and what needs to be or what is realistic for the remaining period of the programme. 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. Indicators at output level have also been identified in the detailed results framework in Annex 3. It is important to carefully consider the detailed footnotes to the indicators in Annex 3, which will not be repeated here. The overall indicators are aligned to the Indian targets for RE and in that way,

[21] See https://mnre.gov.in/sites/default/files/webform/notices/OM-%20%28%20Public%20Procurement%29.pdf

[22] The Appraisal Report has recommended a two-year horizon for rolling work planning in order to maximise alignment with engagement partner planning cycles. As 2-year planning cycles only exist in MOP and only at an overall strategic policy level, planning will be aligned with those plans, elsewhere a one-year work planning horizon with discussions at half-yearly Steering Committee meetings will satisfy the need for alignment with policy targets and planning.

they follow closely and will benefit from Indian monitoring of target attainment. Some of the output indicators are specific to programme interventions and by nature are tailored to monitoring the actions of the external programme rather than being part of the internal Indian Partner M&E systems. This also allows them to be concrete and highly specific and reflect actions that relate to more than one partner. Where relevant, indicators will be gender disaggregated.

Inception Phase. The programme will begin with a six-month inception phase to further detail work plans and monitoring frameworks under each engagement. In this process capacity development needs assessments for all three outcome areas will define the work planning. Furthermore, the specific role and ToR for the Sector Experts will be developed. The INDEP Inception Phase should as a minimum include the activities listed in Annex 15. The summary budget for inception phase is found in Table 5.1 and Annex 4.

Mid-term Review. In accordance with MFA guidelines, the Programme will be subject to a mandatory Mid-term Review (MTR) managed by the MFA. This MTR is tentatively planned for 2022 and will have a mandate to recommend adjustments to programme outputs and inputs as relevant. Criteria for exit is that the know-how has been transferred as expected. Criteria for continuation are that new or expanded areas of cooperation are identified building on the success of the first phase.

Programme Management Teams. Day-to-day progress on the agreed work programme targets will be followed by the Programme Management Teams (PMTs) who will manage the day-to-day implementation of each engagement and report progress towards the results framework at output and outcome levels of this engagement.

Progress reporting to the Steering Committees. The PMTs will submit progress reports at half-yearly Steering Committee meetings and an Annual Progress Report to be approved by the Steering Committee. All reporting should, to the extent possible and when relevant, be disaggregated by gender, area, sector, etc. and forwarded to the DEPP Advisory Group in Copenhagen, which follows the DEPP countries (China, Mexico, South Africa, and Vietnam).

In the monitoring towards work programme targets, reporting through the half-yearly progress reports will use a "traffic-light" system, where:

- "green" is on-track – implementation progresses is as scheduled;
- "yellow" is partly on-track, which needs an explanation by the PMT to the Steering Committee (SC), including actions taken to get back on-track and closer monitoring of progress by the SC;
- "red" is off-track, which requires a detailed explanation by the PMT to the Steering Committee with recommendations of changes to the implementation to get the engagement back on-track. If "red" in two consecutive reporting periods, the Steering Committee may require a short PMT report as a basis for considering remedial action, including possible reallocation between outputs as deemed relevant.

This system will facilitate the Steering Committee's role as an accountability mechanism and also facilitate the PMT's own proactive remedial action when progress goes into yellow or green.

Impact indicators and the Danish Climate Envelope Core Indicators - The overall objective is "Reduced greenhouse gas emissions and leverage of the partnership in mobilising further resources for India's green transition". 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. Moreover, impacts are likely to manifest themselves concretely in the longer term, beyond completion of the five-year programme. The long-term planning and scenario modelling will be able to dimension CO_2 equivalent reduced and implied capital investment (USD) of meeting India's target of 175 GW in 2022 (as implied by the 175 GW or scenario-guided adjusted target) and also show the progress in terms of close to irreversible decisions (such as investment under procurement) and thus indicate the total likely emissions reduction and investments by 2024. The degree of the programme's contribution will need to be assessed qualitatively with all three outcomes potentially contributing 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 contribution of the programme to the offshore wind energy targets will be through improving the regulatory and tender environment as well as the grid infrastructure and supply chain and ensuring that appropriate technical standards are used by making use of experience gained in Denmark. This contribution will reduce the time taken to implement the wind infrastructure as well as reduce the risks and costs of implementation. The programme will work closely with the Indian partners and others such as the EU Delegation, GIZ, DFID, World Bank/IFC, Global Wind Energy Council (GWEC) etc. It is not possible to dimension the precise contribution except to say that experience in Denmark has led to more than halving the cost of off shore wind and it is likely that applying Danish expertise and experience in India could have a similar effect. The contribution of the programme to the wider renewable energy targets will be through providing long-term least cost scenarios for energy planning together with policies and operational tools that will allow effective and flexible integration of the renewable energy into Indian power system. As for offshore wind it is not possible or meaningful to dimension the contribution, but it would be plausible to consider that making full use of the Danish experience could at least increase the cost-efficiency of renewable energy by 30 to 50% through improved regulation, introducing energy markets, improved forecasting and operations and reduced curtailment.

Indicators[23] for DEA reporting to the MFA/MKL

Table 3. 2 Indicators for reporting to the MFA

Impact/Outcomes/Outputs ref table 3.1 above and details in Annex 3	Reporting indicator [see notes on indicators in Annex 3] [combined quantitative and qualitative analysis]
Impact	Contribution to emission reductions (tons of carbon dioxide equivalents) and mobilisation of investments for renewable energy (USD).

[23] Note the alignment between INDEP and SSC at results framework level in Annex 10 – the detailed use of indicators will be aligned in the development of SSC/INDEP work programmes.

Outcome 1	Volume of wind power investment under procurement (USD)
Output 1.1	Progress on implementation of measures for an enabling framework that streamlines site selection, clearances and procurement of offshore wind while reducing risk to investors (YES/NO updated and adjusted annually)
Output 1.2	Implementation, updating and adjustment of measures to plan and secure investments for supporting infrastructure (YES/NO updated and adjusted annually)
Output 1.3	A comprehensive and updated system of standards, rules, testing and demonstration is in place (combined quantitative and qualitative analysis)
Outcome 2	Implementation, updating and adjustment of long-term energy modelling tools and technology catalogue (YES/NO updated and adjusted).
Output 2.1	Renewable energy outlook report based on modelled scenarios published by the relevant Indian institution(s) (combined quantitative and qualitative analysis)
Output 2.2	Energy stakeholders adopt and make use of the technology catalogue (combined quantitative and qualitative analysis)
Outcome 3	Increased RE share in the electricity mix (% share) (normalised for installed capacity and weather)
Output 3.1	State-of-the-art grid codes adopted by CERC and CEA (combined quantitative and qualitative analysis)
Output 3.2	Implementation of a joint flexibility and integration action plan that develops capacity within key Indian institutions to make continuous improvements in the cost-effective integration of RE that has an impact on curtailment (YES/NO updated and adjusted annually)
Output 3.3	Forecasting accuracy and dispatching procedures have improved through use of the advanced strategies and tools (combined quantitative and qualitative analysis)

4. Management set-up

Memorandums of Understanding (MOUs). As previously mentioned, a MOU on Indo-Denmark energy cooperation was signed in 2008 by the Indian Ministry of New and Renewable Energy (MNRE) and the (then) Danish Ministry of Climate and Energy. A similar but separate MOU is expected to be signed in the margins of the RE-Invest conference in India in October by the Indian Ministry of Power (MOP) and by the Danish Minister for Climate, Energy and Utilities (or the EDK for MCEU). The objectives of these MOUs (which are approved at Cabinet level) are to develop strong, deep and long-term co-operation between the two countries in the energy sector on the basis of equality, reciprocity and mutual benefit.

Letter of Intent (LOI) on Integrated Renewable Energy. The main focus is the establishment of an Indo-Danish Centre of Excellence. As previously mentioned, the LOI was signed on 6 March 2019 between MNRE and the EDK on behalf of MEUC. This LOI sets out the intentions for the Centre of Excellence and thus forms part of the overall framework for governance of the partnership. The LOI is found in Annex 11.

Cooperation Agreements. The partnership cooperation is operationalized as Cooperation Agreements between each of the Indian implementing partners MNRE and MOP and MCEU (signed on behalf of MCEU by the EDK). These Agreements specify the obligations of the Indian and Danish partners under the partnership (including the Indian partner's affiliated institutions and authorities). Under cover of the signed Cooperation Agreement, each of the two Engagements with MNRE and MOP, respectively, are described in a Development Engagement Document (DED) with MNRE for DED 1 and with MOP for DED 2, specifying the background, objectives, outcomes and output, management arrangement, and other aspects of the cooperation.

Joint Working Groups (JWGs). Under the aegis of these MOUs, high-level Joint Working Groups (JWGs) are responsible for the overall strategic dialogue between India and Denmark in relation to the partnership as identified in the MOUs and represent the highest governance level of the partnership. Members (Denmark, India) are at the rank of Permanent Secretary, Secretary, Deputy Permanent Secretary, Joint Secretary or equivalent. The JWG on Renewable Energy has been established under the cooperation with MNRE and met for the first time on 28 February 2018 in Copenhagen and again on 4 October 2018 in New Delhi at Secretary/Permanent Secretary level. The next JWG meeting is expected to be held in the margin of the RE-Invest conference in India in October 2019. The JWG with MOP is expected to 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 RE generation, and other areas. Each MOU briefly outline the functions of the related JWG.

Steering Committees (SCs). The management set-up for the India-Denmark Energy Partnership Programme is kept as simple and lean as possible, to ensure an efficient accountability mechanism for progress and results as well as providing an effective mechanism for giving strategic directions to the programme. Due to Indian partner procedures, there will need to be two separate Steering Committees (SCs), one for each of the two Engagements (with MNRE and MOP, respectively). The model agreed for the Strategic Sector Cooperation (SSC) will be used, with overall guidance and decision-making by the SC in accordance with the signed MOU. It will be suggested to MOP to invite NITI Aayog to participate in the SC for the MOP engagement, given the focus on long-term planning and modelling which are also areas of NITI Aayog responsibility. The management structure at this level will be responsible for:

- Approving annual work plans and related overall resource allocations;
- Monitoring progress against the Theory of Change and Results Framework, based on half-yearly progress reports that are analytic and issues-oriented, identifying deviations from set targets and identifying the underlying causes and whether remedial action is needed;
- Monitoring assumptions for the Theory of Change, determining if adjustments are needed;
- Monitoring risks, determining whether changes to risk factors are required;
- Monitoring the communication of results.

Project Management Teams (PMTs). The set-up will also include PMTs with membership

from DEA[24] and EDK and participation of partner institutions[25], 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. The PMT and in particular the resident sector expert coordinates the work in the four working groups in the COE.

Working Groups (WGs) in the COE. Each working group comprises a team collaborating on the work as described under the results framework, which is a mirror of the work streams in the concept outline of the Centre of Excellence.

Two Sector Experts. Sector experts are planned on outcomes 1 and 2/3, i.e. one on offshore wind energy and one on integration of renewable energy or energy modelling, who are envisioned to be stationed in Indian government institutions with the purpose of providing an ongoing presence for day-to-day collaboration with the implementing partners and their agencies. Moreover, the sector experts will be the resident entry point for Danish knowledge and provide the Indian partners quick and direct access to information on relevant Danish energy know-how. Regarding more comprehensive issues included in the work programme, the experts will direct relevant queries to DEA, who will find the relevant Danish expert or plan a capacity building technical activity with relevant experts. The sector expert role will be an important facilitator in the cooperation and dialogue between Denmark and India, as face-to-face time and personal relations are crucial in an Indian context. The presence of Danish sector experts is expected to make the programme more efficient and effective. The sector experts will be funded by the INDEP programme and will be recruited by the Ministry of Foreign Affairs as Danida long-term advisors. One sector expert is likely to be recruited in 2020 for the offshore collaboration under MNRE while the other sector expert is expected to be recruited in early 2021 in MOP. It is expected that the sector expert positions will be filled for the remainder of the programme. Draft job profiles for the two sector expert positions are found in Annex 13 and detailed job descriptions will be agreed during the inception phase prior to recruitment actions.

Secretariat of Centre of Excellence (COE). One of the sector experts (on offshore wind) will be placed in an Indian government institution with the purpose of collaborating on the outputs of the work programme under the DED with MNRE. After the expiration of the programme (and the sector expert contract) it is expected that the Indian partners will be able and interested to organize and coordinate the COE without any direct Danish contribution in the form of embedded staff. The COE will be supported by TA from DEA and other external experts for the full duration of the programme.

In the initial phases, the COE will focus on the offshore wind sector. With time the ambition is to become an international knowledge hub on renewable energy in the South Asian region. The COE will contribute to the adoption of a comprehensive and coherent approach that leads to a

[24] At advisor/task manager level
[25] At technical/middle level management level

cost-effective offshore wind power sector, i.e. with coherent planning and risk reduction for investors. The COE work will at the outset be centred around four working groups that mirror the working groups that are set up under the North Sea Offshore Cooperation, i.e. 1) spatial planning; 2) financial framework conditions; 3) supply chain infrastructure; 4) standards and testing. The work in the working groups also mirrors the priorities in the INDEP programme and is coordinated with MNRE key staff.

Figure 4.1 Management setup for the engagement with MNRE

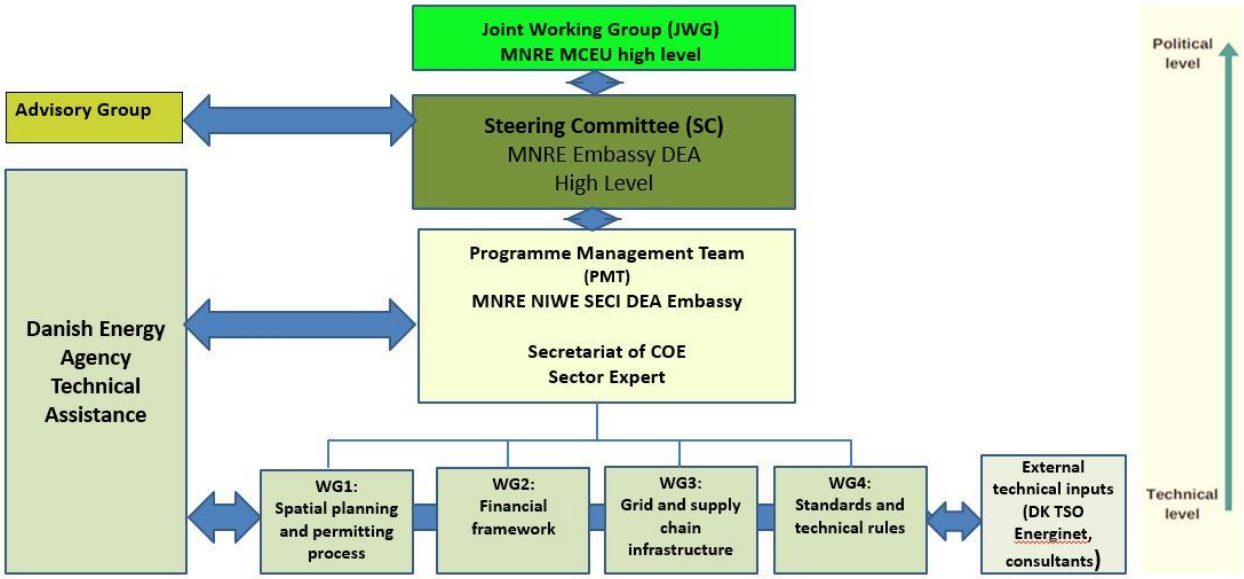
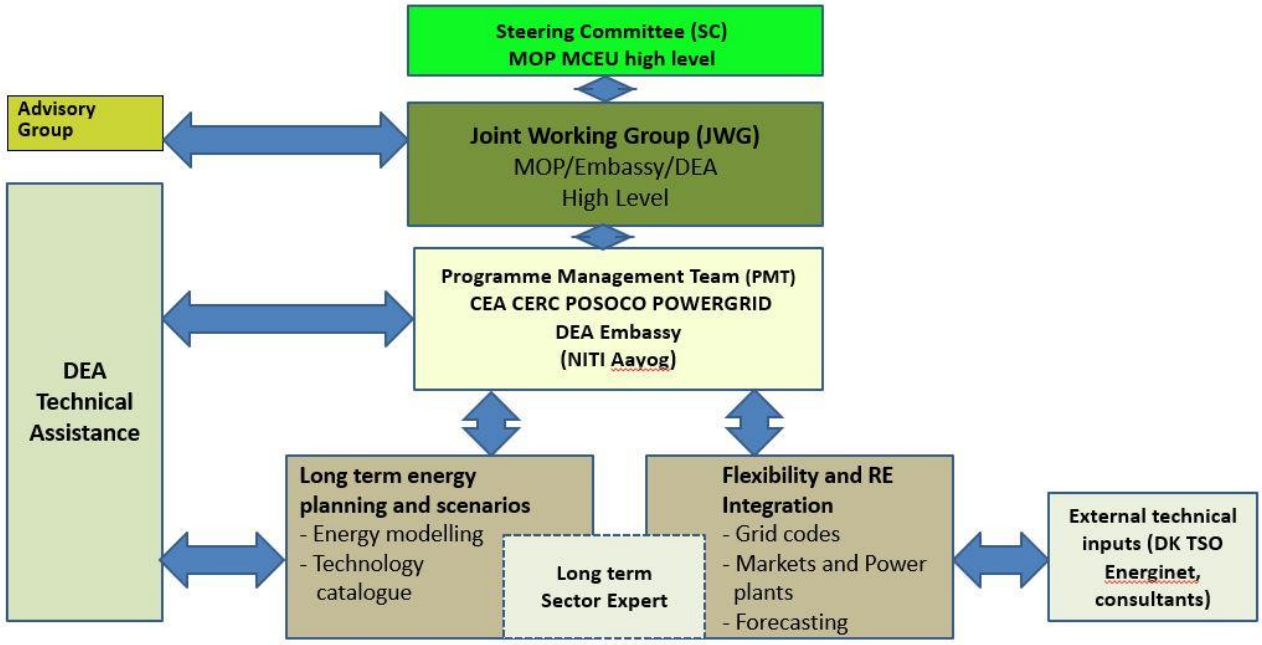


Figure 4.2 Management setup for the engagement with MOP



Advisory Group in Denmark. The programme will be included in the current Advisory Group in Copenhagen for the DEA Energy Partnership Programme (DEPP) which has high-level representation from MFA, MEUC, and DEA. The Advisory Group will discuss programme progress and will 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. The Advisory Group will approve the INDEP Inception Report but not the annual rolling work plans throughout the INDEP Programme, which will be approved by the two Steering committees.

Programme implementation. Implementation will be the joint responsibility of the partners and DEA as specified in the work plans - the partners and DEA will be responsible for drafting these annual work plans to be approved by the Steering Committees. 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.

Substantive and financial management of the programme. DEA will be responsible for the day-to-day implementation of their support activities and take responsibility for procurement and delivery of inputs, substantive and financial management, and reporting. All inputs are all provided in-kind – no funds are channelled through Indian partner systems and procedures. The Embassy of Denmark (EDK) and the EDK energy advisor will play a facilitating role especially for high-level liaison and participation in steering committees and in ensuring close coordination between SSC and INDEP.

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.

5. Inputs and Budget at Outcome Level

The total budget for the 5-year programme is DKK 60 million sourced from the Danish Climate Envelope 2019. The budget at output level is given in Annex 4. The budget provides for a total of 8.5 years of Danida long-term sector expert inputs; this input is expected to be divided between two international long-term experts to be recruited by the MFA. Other inputs will be DEA and Energinet inputs in-kind and where specific inputs by external international and Indian consultants are required such inputs will be procured through DEA under existing and/or new framework contracts. The delivery model is further described in Annex 4. Sufficient funds (DKK 0.5 million in 2020) have been allocated for tendering a framework contract(s) for the purpose of this programme. Funds will not be channelled through Indian partner systems. In line with Danida AMG provisions, an unallocated[26] reserve of 10% or

[26] The Advisory Group will be responsible for decisions to spend unallocated programme funds, which could be activated at any time during the implementation period through a proposal from one of the Steering Committees, addressed to the Advisory Group for approval. The proposals should be drafted, and quality assured by the relevant Programme Management Team and submitted to its Steering Committee. The detailed eligibility criteria should be developed during the Inception Phase and reflected in the Programme Implementation Manual, which will also contain application format and

DKK 6 million is set aside. The detailed budgets at output level (see Annex 4 Budget Details) will be updated during the Inception Period.

Table 5.1 Budget at Development Engagement /Outcome Level

Main budget items (DKK 1,000)	2019	2020	2021	2022	2023	2024	Total
Development Engagement 1/Outcome 1: A centre of excellence	33	1,555	2,745	4,148	4,014	3,199	15,695
Development Engagement 2/Outcome 2: Energy planning decision making is guided by state-of-the-art long-term energy modelling tools	347	2,596	3,956	3,388	3,167	2,843	16,296
Development Engagement 2/Outcome 3: Flexibility and integration of RE	33	3,072	4,884	3,917	3,567	2,656	18,128
DEA Programme management	22	540	540	540	540	496	2,679
Unallocated reserve of 10%	-	1,200	1,200	1,200	1,200	1,200	6,000
Mid-term Review (managed by the MFA)	-	-	-	400	-	-	400
Inception phase	105	210					315
Framework contract tendering		500					500
Grand total	540	9,673	13,325	13,593	12,488	10,394	60,000

DEA will be responsible for the organization and timely delivery of technical assistance inputs provided by DEA staff and external consultants to activities guided by demands and priorities as defined in the annual work plans. Each major TA input will be defined in specific TOR[27].

guidance for prioritisation of ideas. Eligibility criteria should directly support the INDEP objectives, goals and impact and could reinforce impact drivers identified in the Programme's Theory of Change and could include the following: i) activities that will address barriers and opportunities to mobilise and leverage of funds from other sources or engage the private sector; ii) promoting a policy agenda that accelerates implementation of a strategy, plan or policy initiative developed with support under an INDEP Development Engagement; iii) involving/activating collaboration with champions of transformational change e.g. a Civil Society Organisation and academia on e.g. awareness, consultation, analysis and monitoring; iv) supporting innovation and applied research related to topic areas under the Engagements; v) reinforcing ongoing INDEP efforts on communicating impact stories and lessons learned across the INDEP programme that would help increase Danish and international awareness (e.g. stimulating reciprocity in the partnership with Denmark, supporting cross fertilisation with e.g. other multilateral or bilateral cooperation supported by Denmark, and stimulating South-South and triangular exchanges). Only proposals encouraged by both the Development Engagement partners and DEA will be considered. Upon approval by the SC, the proposal will be submitted to the Advisory Group and depending on its assessment there could be needs for a due diligence assessment by the MFA depending on the scope and scale of the proposal and MFA guidelines.

[27] DEA will ensure that TOR and end-of-mission reporting cover preparation of missions and follow up on mission for all DEA and Energinet's tasks. TOR will be developed for missions, larger events and for larger deliverables, and will describe work related to the specific task carried out in Denmark as well.
Based on experience, it is a very cumbersome process to have written exchange and written approvals by Indian engagement partners, and there will be a very high number of DEA missions, support from home-office and other DEA inputs. So instead of ensuring Indian input on the many and detailed TOR, the DEA will make sure that the one-year work plans will be very detailed and that the SC meetings will include a thorough discussion on the needs and plans. Each TOR for consultant and experts inputs should specify the title of each assignment; the background and objectives and how the assignment relates to the DED work plan; the reference to the relevant Indian partner national strategy/action plan/ministerial work plan; the purpose, expected results, deliverables, scope of work and quality assurance for the assignment; the skills and experience required for each international and Indian consultant; the time input required by each consultant; identify the DEA task manager to whom the consultants are accountable; identify the key Indian partner staffing and capacity i.e. the partners with whom the consultants/experts need to work closely; specify local travel, events, and any

An implementation manual for the engagement will be developed during the Inception Phase. DEA has appointed a responsible country coordinator based in Copenhagen, who will serve as the DEA contact person for all matters related to INDEP.

expenses for which the consultants will be responsible; and set out a brief process action plan for follow-up from the assignment.

Annex 1: Context Analysis

The context analysis is first described in the standard AMG template then summarised in Box A1.1. Key initiatives in the India green energy transition supported by selected other major development partners are described in Box A1.2 at the end of Annex 1.

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 capital 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_2 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' role for achieving the SDGs can be compared to the role China played vs. the MDGs. NITI Aayog has been entrusted with the role to co-ordinate India's targets and monitoring 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 is 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 MJoule 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 MtCO2e 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 C compatible.

Political economy - key Entities in the Indian Power Sector:

Function	Organisations Responsible
Policy	• **Central** – Ministry of Power MoP); Ministry of New and Renewable Energy (MNRE) • **State** – State Energy Departments
Planning	• Central Electricity Authority (CEA)
Regulation	• **Central** - Central Electricity Regulatory Commission (CERC), Central Advisory Committee (CAC) • **State** - State Electricity Regulatory Commissions (SERCs), State Advisory Committee (SAC) • Forum of Regulators (FoR)
Generation	• **Central** - Central Generating Stations (CGS),
Transmission Related Bodies	• Central Transmission Utility (CTU) – Power Grid Corporation of India Ltd. (PGCIL) • State Transmission Utilities (STUs) • Private Transmission Utilities
Systems Operators	• Central POSOCO – NLDC, 5 RLDCs at regional level • State Load Despatch Centres (SLDCs)
Distribution companies	• State Electricity Distribution Companies (SEDCs) • Distribution licensee • Private sector electricity distribution companies
Generation entities	• Interstate generating units • State generating stations • Private, PPPs, CPPs, MPPs, etc.

Trading	• Trading licensee • Power Exchange
Appeal	• Appellate Tribunal for Electricity (APTEL)

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) which does major work in the energy transition including modelling. The identification mission also met with the Brookings Institution that has researched and published extensively in the energy sector. In August the mission also met with Center for Environment, Energy and Water (CEEW)

Figure 2.1 in the main text of this document illustrates the institutional set-up in the Indian energy sector.

Key documentation and sources used for the analysis:

The consultant's background work on the draft sector overview and targeted assessments of legal, policy, strategic and planning framework, institutional and coordination framework, and sector expenditure and financial overview.

Ppt slides from CEA gives key data on the Indian National Electricity Plan, which will not be repeated here. Baseline description and stakeholder analysis, May 2018 for DEA. Ea report done for DEA in December 2018 on the Power System Aspects of India.

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?

No additional studies or analytical work required.

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.

A report on Renewable Energy: A Gender Perspective published by the International Renewable Energy Agency (IRENA) examines the question of gender equity throughout the sector. Building on a ground-breaking survey of employees, companies and institutions, it finds that much remains to be done to boost women's participation and allow their talents to be fully utilised. IRENA estimates that the number of jobs in

renewables could increase from 10.3 million in 2017 to nearly 29 million in 2050. The ongoing global energy transition offers the chance to create new jobs and reshape all aspects of how energy is produced and distributed. Renewables offer diverse opportunities along the value chain, requiring different skill sets, but these opportunities should be equally accessible, and the benefits equitably distributed. The report has a number of key findings also from India which generally point to issues such as insufficient access to training of women, need for mainstreaming of gender in energy policies, and needs for enhancing access for women to finance.

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

During the inception period, further consideration should be given where relevant to gender issues where including the possibilities for using gender disaggregated sub-indicators.

4. Inclusive sustainable growth, climate change and environment

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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 as such but capacity development for environmental assessments elated to offshore wind will be included in the partnership.

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

No further studies needed.

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 targeted assessment of the institutional framework and the baseline and stakeholder study already done in May 2018 for DEA as well as the Ea study on Power System Aspects of India done for DEA in December 2018 provide information on public sector organisations relevant for the programme. 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?

No additional studies required.

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) has strong competences in long-term model-based energy scenarios and energy planning for RE deployment, including grid integration of high proportions of variable RE, power system flexibility and the one-stop-shop concept. 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[28] 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; 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.

[28] 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.

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 in December 2018 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 [29] identifies Danish strongholds and business potentials in energy technology and energy-related 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, 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. **Experience during the first year of SSC development has led to the conclusion that it will be necessary to keep a clear divide between promotion of Danish commercial interests and provision of policy and operationally sensitive technical cooperation. The overriding rationale is that the INDEP/SSC programmes will support a highly quality and sustainable pathway towards meeting India's RE targets. In so doing they will open up a competitive and rewarding market for commercial interests but not in a way that is skewed towards specifically Danish companies**.	
- where we have the most at stake – interests and values, - where we can (have) influence through strategic use of positions of strength, expertise and experience, and - 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.	- Denmark is a global leader in many aspects of the green energy transition, including RE. Denmark's interests and values are strong in this space, as mentioned above. - 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.
- 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.	- 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).
- Donor landscape and coordination, and opportunities for Denmark to deliver results through partners including through multilaterals.	- There are many donors supporting the green energy transition in India. Donor coordination exists but is weak due to the competitive environment. 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.

[29] https://ens.dk/sites/ens.dk/files/Forskning_og_udvikling/uk_total_final_eudp_strategi.pdf

Key documentation and sources used for the analysis: DEA ppt slides used during the identification and formulation missions. State of Green EUDP report - DEA on the Danish Energy Model
Are additional studies / analytic work needed? How and when will it be done? No additional studies required.
7. Stakeholder analysis
The key partners and stakeholders in the programme are identified and briefly described in Annex 2 Partners.
Are additional studies / analytic work needed? How and when will it be done? The assessment of partners is reflected in Annex 2. Additional information on capacity issues may be added in the final Programme document.

Box A1.1 Key Indian challenges and opportunities in the sector

Offshore wind:

Challenges:

- Improving weak spatial planning - MNRE plans to undertake a mapping of offshore wind potential for all of India – for Southern Gujarat the mapping has been done and for Tamil Nadu a limited mapping has been done – for the rest of India no offshore wind mapping has been done yet
- Offshore wind has not yet been officially included in the transmission planning in the CEA 5-year National Electricity Plan
- Developing domestic supply chain for offshore wind
- Marine conditions in India are very different from Danish offshore conditions (seabed depth, salinity, wind velocities during cyclones, etc.) and it is important to identify what design modifications are needed for wind turbines for Indian offshore
- Reducing risk of curtailment when connected

Opportunities:

- Updating wind maps, improving forecasting and long-term roadmap on offshore wind
- Improving the business case (costs as high as INR 10-12/kWh) - strong political pressure for making tariff for offshore comparable to onshore wind – support in this regard highly welcome (and this is one of the ideas behind the road map for offshore wind as a focus area for INDEP)
- LCOE benchmark costing of offshore wind is important to show it is competitive
- Improving the tendering process to reduce risk – e.g. ceiling rates, local content requirements, EIA, smooth tender procedures
- EIA for offshore is a gap that needs attention – and is part of what can be included in the cooperation
- Important to have a list of relevant literature/best practice information on offshore wind – the Centre of Excellence should (also) be a learning centre
- Medium-long term vision for the Centre is that it can serve as an international hub

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

Challenges:

- Need for an optimization model that can optimize RE investments, RE penetration, EE obligations – without jeopardizing the security of supply and access to energy
- Need for a power sector model that can model the whole power system on an hourly basis
- NITI Aayog's model work is for the energy sector as a whole, not only electricity (CEA does modelling for the electricity sector) – it uses the MESSAGE model, a cost optimisation model
- Guidelines from federal level to the states need to be more accurate

Opportunities:

- MOP JS expressed an interest in several areas of the Danish experience, including security of supply, the availability of data for modelling, interconnectors and power trading with other countries, energy storage, growth of the power sector and the power mix, integration of variable renewable energy, retrofitting old thermal plants for improved ramping rates, levelized cost of energy and least cost solutions
- Interest in an updated technology catalogue on energy – incl. LCOE
- Interest in a stochastic energy model that can identify weak spots in the current power sector
- NITI Aayog has a small planning team but at the moment it has been reduced to one person – there is a keen interest in strengthening this model team over the next 2 years, which is an area of interest for collaboration

RE integration and market development:

Challenges:

- Low wind speeds 8-9 months a year
- Insufficient flexibility in power plants (plant load factors 55-70%)
- There is legal a minimum of 55% of the electricity demand to be covered by conventional coal generation leading to substantial curtailment of RE
- Generators are required by MNRE/NIWE/others to do the balancing (hybrid solutions)
- Current market does not sufficiently incentivize power plants to be more flexible
- There is a need to assess grid codes
- Need for storage solutions. The Indian government is focused a lot on battery storage but there will be a need for other

existing solutions e.g. hydro/pumped storage

Opportunities:

- The India electricity sector is de-licensed (except nuclear power); state utilities/DISCOMS are not required to purchase the power generated but there is a legal preference/purchase obligation for RE
- The earlier feed-in-tariff system is being replaced by tariff-based RE auctions (in 1.2 GW bids)
- Insufficient flexibility in the grid, but transmission charges are waived for RE
- Current market does not sufficiently allow for cross-state/border balancing but there is an interest in this
- Forecasting on fluctuating RE is still not sufficiently accurate, but there is an interest in the Danish experience in forecasting

Cross-cutting mobilisation of investments and finance:

Challenges:

- Lots of power is locked into PPAs – only 3-5% is open for the market
- DISCOMS are financially stretched and tariffs are not cost reflective
- The most common risks for RE developers are availability of land, possibilities for evacuation of the power, and the creditworthiness of developers
- Need to reduce investment risk to reduce the cost of capital and hence RE prices

Opportunities:

- Modelling work (e.g. with Balmorel) needed to help generate investment scenarios that guide state and federal investment planning and demonstrate cost-effective investment potentials in the energy sector
- Need for coherent "packages" of investor-friendly policy/regulation, business models and financing instruments - connecting the dots between these elements to generate impact
- Public-private partnership models that engage the private sector will be important

Box A1.2 Key initiatives in the India green energy transition supported by selected other major development partners

General points raised by development partners:

- In 2002/2003 GOI reduced its collaboration with smaller donor countries, and 6 major donors have ODA relations with India (Germany, UK, USA, France, Japan, and Sweden).
- There is no formal donor coordination mechanism on the Indian side, but GIZ-USAID-DFID have an MOU aimed at avoiding duplication, and the three agencies have meetings at regular intervals and share work plans, etc. This works well and could be expanded with other donors. The EU delegation also undertakes some coordination for EU member states. A donor mapping (technical assistance only, not investment financing) was done in 2017 by KPMG but has not been updated.
- The coordination of efforts by different donors and multilateral development partners is limited, but as also noted by GIZ, the UK, USAID and Germany have an MOU that is intended to facilitate coordination and avoid duplication.

German GIZ:

- GIZ has been involved in the Indian electricity sector for over 20 years.
- GIZ focuses only on electricity not energy in a broader sense and the GIZ energy pillar has over 40 staff in Delhi.
- GIZ may pull-out of NIWE when its work on solar power is done and welcomes Danish support at NIWE.
- There will be a conference in September 2019 on Large-Scale Grid Integration of Renewable Energy in India (organised by GIZ/DFID/USAID and others) – Denmark is welcome. More work is needed on grid codes.
- According to GIZ, traditional ODA project cooperation involves time consuming procedures on the Indian side, with Implementing Agreements with partner ministries that can take a year (or more) to process through the Department of Economic Affairs of the Ministry of Finance (MOF). Even the selection of government participants in study tours is through MOF.

British High Commission (DFID):

- The UK has 35-year history of cooperation with India in energy and is one of the prioritised donors providing ODA. Current engagements include a GBP 15 million TA programme om power sector reform and another GBP 15 million programme is under formulation and approval. As this will involve grants the process is longer as mentioned under GIZ. Priorities of the new programme include assistance to state utilities (DISCOMS) to become financially viable, assisting CERC with market integration, and CEA with long-term electricity demand forecasting. The new programme will focus on energy efficiency; RE deployment and offshore wind; and variable RE integration into the grid (work with DISCOMS in 5 states).
- Offshore wind is intended to be a big part of the UK cooperation in the energy sector involving technological collaboration and customisation of wind turbines as well as supply chain infrastructure, tendering and site selection where the EU helped with the 1st wave and others including UK are intending to help with the 2nd and 3rd waves. There are areas where synergy with INDEP must be ensured and overlap must be avoided – an area of complementarity is DFID's detailed geotechnical studies to support site selection. DFID's model will however be more commercially focused e.g. they intend to provide financing for geotechnical studies which will then be outsourced to consultants.

World Bank (WB)/International Finance Corporation (IFC):

- Main WB activity is their lending programme with TA on sector development – India is one of their largest energy programmes amounting to USD 4.5 billon current loan portfolio excl. IFC.
- The focus is away from large projects on generation and transmission and more on supporting market development (e.g. focus on distribution and fiscal stability of the DISCOMs in 8 states) and on RE (evacuation of RE, grid development and solar/hydro (USD 1 billion portfolio)) as well as battery storage and catalytic financing such ESCOs – overall the new focus is on underwriting the early risks for market movers

- TA focuses on VRE integration / distributed solar / DISCOMS on governance and human resources. IFC provides transition advisory services for both public and private sectors.
- IFC/WB concessional finance targeted where the commercial finance cannot enter and as a lender of last resort where it is commercial, but WB is not cheaper than other sources that India can access.
- WB ESMAP analysis and technical assistance has contributed to the design of the India Energy Efficiency Scale-up Program to help the government transform the energy efficiency market through sustainable business models, capacity building, and by maximizing finance for development. ESMAP, which is supported by Denmark, has also in the past provided assistance to India in different ways.

Asian Development Bank (ADB):

- India is one of ADB's largest borrowers with 25-30% of lending in the energy sector amounting to a portfolio in the order of 1 billion USD per year, and GOI wishes to increase this to about 4 billion USD/year.
- Focus is on solar, small/large scale hydro, transmission capacity for RE, distribution system enhancement, and energy efficiency.
- ADB has a private sector department (like IFC) that lends directly to the private sector - it is very active in India in wind and solar.
- ADB also helps facilitate concessional finance through the Green Climate Fund and the Climate Investment Funds.
- The obstacle is not so much finance but how to access it – project quality varies, and investors' cost of risk translates into lending rates – ADB sees a need to improve the quality of RE feasibility studies.

EU Delegation/EIB:

- Targeted support for development of the offshore wind sector in India has been provided by EU through two programmes:
    1. The FOWIND programme (Facilitating Offshore Wind in India. The consortium was awarded the grant of EUR 4.0 million by the delegation of the European Union to India in December 2013 and the activities ran until March 2018. The consortium was led by the Global Wind Energy Council (GWEC) with other implementing partners being the Centre for Study of Science, Technology and Policy (CSTEP), DNV GL, the Gujarat Power Corporation Limited (GPCL) and the World Institute of Sustainable Energy (WISE). NIWE joined the consortium as knowledge partner on 15 June 2015.
    2. The FOWPI programme (First Offshore Wind Project of India). The programme, which was awarded in December 2015 through an open tender process, has been extended to June 2019, includes a wide range of technical work packages. Danish consulting company COWI has been the project leader and WinDForce has provided technical and management support.
- The EUR 3.35 million, 3-year, EU-India Clean Energy and Climate Partnership's (CECP) overall objective is to ensure a secure, clean, affordable and reliable energy supply for all and to progress in the implementation of the Paris Agreement. The CECP aims at deepening the ongoing, broad energy cooperation (clean energies, energy efficiency) and strengthening dialogue on climate action between the EU and India. It will contribute to support India's implementation of its NDC and to enhance resilience to climate change. And, cooperation will be fostered between public and private actors in India and the EU, particularly in the area of research and innovation and showcasing EU businesses' technologies and innovations.
- EU is moving from a donor-recipient relationship to a partnership approach, as also reflected in the title.
- As part of the inception period the EU lead consultants PWC have had the responsibility of getting information (either through one-on-one meetings or survey) on relevant projects and activities from each of the EU member states (MS) and the key Indian partners (MNRE, MOP, other line ministries and agencies), in order to maximise synergies and avoid overlap.
- The EU counsellor's meeting (attended by the INDEP formulation mission) was held to invite the MS to inform about their ongoing and planned activities in energy and climate change and to react to the PWC preliminary list of challenges, gaps, and tentative areas of proposed activities. The CECP will identify 5 pilot interventions to be supported. The counsellor's meeting noted that there is a need for better

mapping of what EU MS do in these areas., there is a need for a strategy to combine the strengths of these interventions by EU MS., and this should benefit EU MS businesses (including SMEs) in the Indian market.

The International Energy Agency (IEA[30]):

- IEA with NITI Aayog and the ADB has held a series of workshops in 2018 on Low Carbon Transition Strategy for Renewable Energy Integration in the Indian Power Sector and a joint publication was issued by IEA with key information about RE integration, technical flexibility enhancement and power market design and investment framework.
- IEA is mapping initiatives in within the energy sector and recently visited India for a week in this regard. The IEA has set up an office at TERI with a permanent Lead Country Analyst position. The Growth Advisor keeps in regular contact with the IEA staff and incoming IEA delegations.
- The IEA Energy Efficiency in Emerging Economies (E4) Programme, which is supported by Denmark, has India as one of its key partner countries.

The International Institute for Sustainable Development (IISD) Global Subsidies Initiative (GSI):

- IISD/GSI's India country programme undertakes research and policy engagement on energy subsidies for fuel consumers, fuel producers and renewable energy.
- With Danish funding, a major report on India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India was published in 2017, and
- IISD-GSI has found that India's fossil-fuel subsidies fell sharply by nearly 70 per cent, from USD 29 billion in FY14 to USD 8 billion in FY17.
- GOI has sought to gradually reduce kerosene subsidy expenditure by increasing product prices and restricting the volume of subsidized fuel supply. If kerosene subsidies are being gradually removed, a share of the subsidy savings may be reinvested in helping the most vulnerable households access electric lighting through off-grid solar technologies This idea, referred to as a "kerosene to solar subsidy swap" or a "subsidy swap." Is being pursued in India with Danish funding.

UNEP DTU Partnership

- UNEP DTU Partnership and Indian Energy Efficiency Services Limited (EESL) on 10 January 2019 signed a new agreement for long-term cooperation.
- The agreement establishes a framework between EESL and UNEP DTU Partnership's Copenhagen Centre on Energy Efficiency, to support faster and further energy efficiency improvement in India. This will be done through experience and knowledge sharing, joint international funding application, national policy study, as well as showcasing business models of energy efficiency actions.
- EESL is the world's largest public energy service company and leads the market-related activities of the Indian National Mission for Enhanced Energy Efficiency, one of the eight national missions under the Prime Minister's National Action Plan on Climate Change.

The International Renewable Energy Agency (IRENA):

- India has in January 2019 joined IRENA as a member.
- Denmark supports IRENA in the area of long-term energy planning.

The Global Green Growth Institute (GGGI):

- Denmark supports GGGI
- GGGI's India programme appears mainly focus on access to electricity and climate change adaptation although target setting seems in progress

[30] In March 2017, India joined the IEA as an Association country. India has formally signalled its intentions to become a full member of IEA, which will require a change of the IEA Treaty.

Annex 2: Partners

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) 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), Power Grid Corporation of India (POWERGRID) and the Central Electricity Regulatory Commission (CERC).

An associated partner may be the National Institution for Transforming India (NITI Aayog) which 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. While NITI Aayog will not be an implementing partner with a separate DED, it will be suggested to MOP to invite NITI Aayog to participate in the Steering Committee for the MOP engagement, given the focus on long-term planning and modelling which are also areas of NITI Aayog responsibility.

Criteria for selecting programme partners

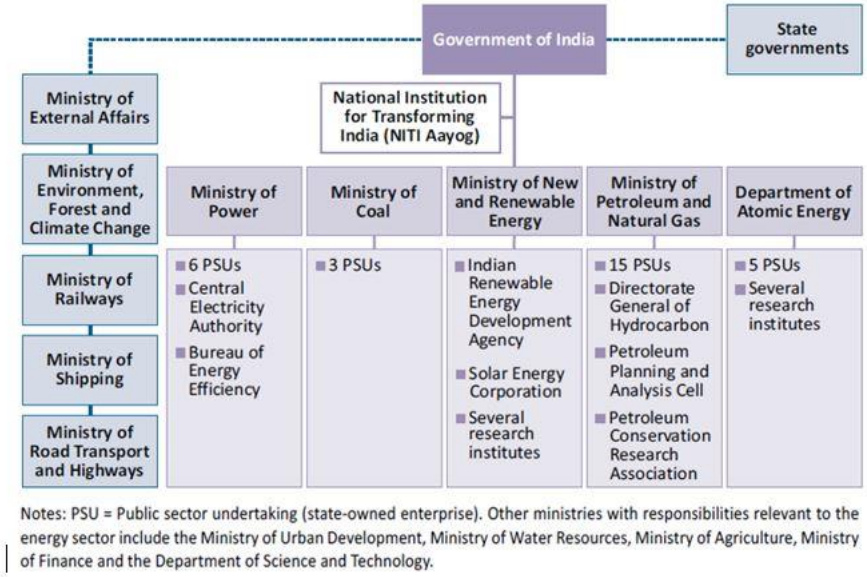
The most critically important stakeholders are the proposed main partners for the two Development Engagements, i.e. MNRE and MOP. As mentioned previously, there is already a signed MOU with MNRE and a signed LOI on the Centre of Excellence, and an MOU with MOP is expected to be signed soon. NITI Aayog has in its meetings with the identification and formulation missions expressed its interest in cooperation with DEA/Denmark, including strengthening its modelling capacity. These partners and the above-mentioned nodal agencies under the line ministries are of critical importance to the partnership programme due to their statutory mandates in the sector and their expressed interest in the partnership. The programme partners are within the federal government administration while other partners outside of this scope (e.g. states, inter-state fora, NGOs and think-tanks) will be involved when relevant and where they can contribute to the programme. This will be further considered in the inception phase.

The institutional set-up is schematically illustrated in Figure A2.1 below:

Figure A2.1 – Illustrations of the institutional set-up in the Indian energy sector

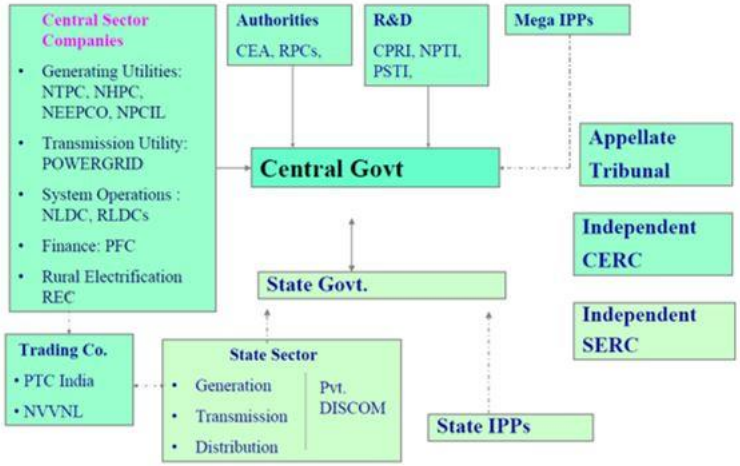
Sources: Indian Energy Exchange, stakeholder analysis report prepared for DEA, May 2018, and the MNRE website

Overall GOI structure for all types of energy:



Notes: PSU = Public sector undertaking (state-owned enterprise). Other ministries with responsibilities relevant to the energy sector include the Ministry of Urban Development, Ministry of Water Resources, Ministry of Agriculture, Ministry of Finance and the Department of Science and Technology.

Institutions related to MOP:



Institutions related to MNRE:

Autonomous Bodies under MNRE Administrative Control

- National Institute of Wind Energy (NIWE)
- Solar Energy Corporation of India (SECI)
- The Indian Renewable Energy Development Agency (IREDA)
- National Institute of Solar Energy (NISE)
- Sardar Swaran Singh National Institute of Renewable Energy (SSS NIRE)

Table A2.1 Brief summary of 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 has been the main Indian ministry for bilateral dialogue since the Indo-Danish MOU on Renewable Energy from 2008. MNRE is also the 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.	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, including the Centre of Excellence. Decision making and regulatory powers within its mandate, staff time expertise and experience (in-kind), data, information, reports, communication channels for information and results.	MNRE is the national ministry, but it is small compared to many other Indian line ministries; the support and priority given at decision making level is critical to overcoming capacity constraints.	Support for capacity development of staff of MNRE and its nodal agencies of NIWE and SECI – the Centre of Excellence should develop into a national and possibly regional centre of knowledge and experience on offshore wind.
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 including the centre of Excellence. Staff time and technical expertise and experience (in-kind), data, information, reports, communication channels for		Capacity development and the establishment of a centre for excellence that can develop into a regional hub

				information and results.		for knowledge and experience on offshore wind.
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. SECI is a Corporate Public Sector Undertaking (CPSU) under the administrative control of MNRE. As per February 2019, GOI has decided to designate SECI as a Renewable Energy Implementing Agency.	Medium	High	Institutional anchoring of programme activities on tendering of RE and market development.		Capacity development on tendering and the role of SECI in the Centre of Excellence.
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 large hydro power generation, transmission and distribution. MOP is responsible for the Administration of the Electricity Act, 2003, the Energy Conservation Act, 2001 and to undertake amendments to these Acts.	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.	MOP is the national ministry with a very large staff-the support and priority given at decision making level is critical to overcoming capacity constraints.	Support for capacity development of staff of MOP and its nodal agencies of CEA, CERC, POSOCO.

CEA	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. 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.	Medium.	High	Regulatory powers within its mandate, staff time expertise and experience (in-kind), data, information, reports, communication channels for information and results.		Support for capacity development of CEA staff.
POSOCO	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 Grid; providing operational feedback for national grid planning.	Medium	High	Staff time expertise and experience (in-kind), data, information, reports, communication channels for information and results.		Support for capacity development of POSOCO staff.

CERC	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. 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.	Medium	High	Regulatory powers within its mandate, staff time expertise and experience (in-kind), data, information, reports, communication channels for information and results.		Support for capacity development of CERC staff.
NITI Aayog	Aayog is Hindi for "policy commission". It GOI'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, and communication channels for information and results.	NITI Aayog has a particular capacity constraint on modelling that INDEP is intended to address.	Support for capacity development of NITI Aayog staff.

Annex 3: Results Framework

The results framework highlights the ambitions for the programme in terms of the individual outcomes, outputs and target years. For some outputs there is both SSC and INDEP targets as these programmes work jointly within the same outcomes. Hence, a clear separation between target years is established for ensuring separate budgeting and reporting for the two programmes. Further details are outlined in Annex 10.

Programme		**India-Denmark Energy Partnership (INDEP)**	
Objective		Reduced greenhouse gas emissions and leverage of the partnership in mobilising further resources for India's green transition.	
Impact Indicators		Contribution to emission reductions (tons of carbon dioxide equivalents) and mobilisation of investments for renewable energy (USD). [31][combined quantitative and qualitative analysis]	
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	Emissions (CO_2 tons) and investment (USD) on track for meeting India's target of 175G 2022 (as implied by the 175GW or scenario-guided adjusted target) and following best practice.[32]
Development Engagement 1		**Partner: Ministry of New and Renewable Energy (MNRE)**	
Outcome 1		**India has taken ownership of the centre of excellence for offshore wind and the integration of renewable energy that promotes and creates an enabling environment for lowering the cost of offshore wind power using best available practice in planning and cost reducing measures to continue the implementation of ambitious targets.**	
Outcome indicator		Volume of wind power investment under procurement (INR/USD)[33] (as a contribution arising from the promotion of a comprehensive, coherent and cost-effective approach by the centre of excellence that meets best available practice and contributes to meeting political targets as implied the 5 GW or scenario-guided adjusted target) [34] [combined quantitative and qualitative analysis]	

[31] 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. Moreover, impacts are likely to manifest themselves concretely in the longer term, beyond completion of the five-year programme. The long-term planning and scenario modelling will be able to dimension CO_2 equivalent reduced and implied capital investment (USD) of meeting India's target of 175GW in 2022 (as implied by the 175 GW or scenario-guided adjusted target) and also show the progress in terms of close to irreversible decisions (such as investment under procurement) and thus indicate the total likely emissions reduction and investments by 2024. The degree of the programme's contribution will need to be assessed qualitatively with all three outcomes potentially contributing 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 NDC.

[32] As noted above, the measurement of the target will be based on a combined qualitative and quantitative assessment of the contribution of the programme taking into account the degree to which installed capacity is on track for meeting targets and the degree to which the programme has increased the cost-efficiency of implementation and operation of renewable energy

[33] Under procurement means that an instruction to produce tender and procurement documents has been taken (already 1 GW is under the process). This is judged as a good indication of what will happen – a close to irreversible decision is taken once contracts are awarded but given the time span for this process a lesser threshold of "under procurement" has been chosen for deciding the volume of wind power that the programme has contributed to.

[34] The degree of the contribution of the programme will need to be assessed qualitatively and reported on as a narrative. The criteria to be used include: i) the achievement of the outputs which would indicate that the programme has made substantial

Baseline	Year	2022	Input from the Centre of Excellence is requested in MNRE's preparation of the next phase of development of offshore wind (YES)
Target	Year	2024	Wind power under procurement that meets best available practice contributes to meeting political targets (as implied the 5 GW or scenario-guided adjusted target)
Output 1.1		**An enabling framework that streamlines site selection, clearances and procurement while reducing risk to investors.**	
Output indicator		Progress on implementation of necessary measures for an enabling framework that streamlines site selection, clearances and procurement of offshore wind while reducing risk to investors (YES)[35] [combined quantitative and qualitative analysis]	
SSC	Year	2019	Offshore wind is not yet tendered in India
SSC Target	Year 1	2020	MNRE has published the first offshore auction in India where input from Danish experiences can be seen (YES)
SSC Target	Year 2	2021	De-regulation of procurement based on the lessons learned from the first tender and Danish experience (YES)
INDEP Baseline	Year 1	2022	Input from the Centre of Excellence is taken into account in MNRE's preparation of the next phase of development of offshore wind (YES)
Target	Year 2	2023	Permitting process of the development of offshore wind has been streamlined and happens in a planned procedure (YES)
Target	Year 3	2024	The first offshore wind project is on track to be connected to the grid and Danish experiences have contributed to the approval framework (YES)
Output 1.2		**Development and implementation of coordinated measures for minimising grid infrastructure and supply chain obstacles to the development of the offshore wind sector**	
Output indicator		Progress on implementation of necessary measures for minimising grid infrastructure and supply chain obstacles to the development of the offshore wind sector while reducing risk to investors (YES)[36] [combined quantitative and qualitative analysis]	
SSC	Year	2019	No infrastructure ready to integrate offshore wind
SSC Target	Year 1	2020	Centre of excellence has established a convening forum for improvement of grid infrastructure and supply chain development for offshore wind and facilitates a multi-stakeholder set of measures
SSC Target	Year 2	2021	Increased awareness and exposure to Danish model for developing supply chain infrastructure and technology solutions to relevant authorities
INDEP Baseline	Year 1	2022	Centre of Excellence has a central role in activities, such as exchanges or seminars, which expose Indian partners to relevant stakeholders within grid infrastructure and port development (YES)
Target	Year 2	2023	Centre of Excellence plays a determining role in activities, which expose Indian partners to key decision makers within grid infrastructure and port development (YES)
Target	Year 3	2024	Port and grid infrastructure have significantly improved to enable sustainable

contribution to the speed and quality of implementation and ii) the view of the Indian partners and stakeholders (perhaps obtained by survey) on the contribution of the programme.

[35] The indicator comprises a number of elements: i) adoption of integrated spatial planning and site selection, ii) adoption of streamlined permitting procedures, iii) improved tendering processes. The indicator is chosen to measure a combination of progress in all these areas (and or updated priorities) year by year. The annual update is a further indication of the relevance and demand driven nature of the programme interventions for the Indian partners.

[36] Capacity and convening forums for continuous improvement of grid infrastructure and supply chain development for offshore wind that improves the coordination and development of regional infrastructure will need to be developed. Many of the activities needed for improvement of grid infrastructure and supply chain development are concurrent between federal and state and between many different ministries as well as the private sector and civil society. The use of a multi-stakeholder approach also allows for harmonisation of all relevant national and international interventions.

			development of the first offshore wind project (YES)
Output 1.3		**Technical standards and rules that promote innovation and research.**	
Output indicator		A comprehensive and updated system of standards, rules, testing and demonstration is in place[3738] [combined quantitative and qualitative analysis]	
Baseline	Year	2019	Standards and rules are not harmonised with international practice
Target	Year 1	2020	Review of current standards and technical rules undertaken
Target	Year 2	2021	Assessment of prioritised improvements and adjustments
Target	Year 3	2022	A comprehensive and updated set of standards and rules drafted and submitted for approval in line with international best practice
Target	Year 4	2023	Experience exchange on setting up testing and demonstration facilities for national innovations has taken place
Target	Year 5	2024	Testing and demonstration of national innovations is taking place
Development Engagement 2		**Partner: Ministry of Power (MOP)**	
Outcome 2		**Energy planning decision making is guided by state-of-the-art long-term-energy modelling tools based on a regularly adjusted technology catalogue.**	
Outcome indicator		Implementation, updating and adjustment of long-term energy modelling tools and technology catalogue (YES/NO updated and adjusted). The long-term energy modelling tools and technology catalogue are updated by the relevant Indian institutions (indicating that the tools and catalogues are being used for decision making) [qualitative analysis]	
Baseline	Year	2019	Energy planning not guided by technology catalogues
Target	Year	2024	At least one further update of the renewable energy outlook and technology catalogue is planned and budgeted for after 2024.
Output 2.1		**Enhanced energy modelling capacity in the relevant Indian institutions.**	
Output indicator		Renewable energy outlook report based on modelled scenarios published by the relevant Indian institution(s)[39] [combined quantitative and qualitative analysis]	
Baseline	Year	2019	There is a 5-year national electricity plan (2017-2022) but no long-term energy outlook available
Target	Year 1	2020	Agreed framework for energy modelling in India and a capacity development action plan
Target	Year 2	2021	Initial model runs undertaken and long-term data collection process initiated
Target	Year 3	2022	Intermediate model runs undertaken and long-term data collection process consolidated
Target	Year 4	2023	Renewable energy outlook report published based on modelled scenarios
Target	Year 5	2024	The renewable energy outlook report is used to guide decision making
Output 2.2		**Technology catalogue established, updated and used.**	
Output indicator		Energy stakeholders adopt and make use of the technology catalogue[40] [combined quantitative and qualitative analysis]	
Baseline	Year	2019	No systematic, shared framework for technology parameters (incorporating: energy and technical; environment and cost aspects)

37 Testing and demonstration is at exchange of information level only to avoid commercial sensitivity

[38] The indicator for this output measures progress in developing a system of standard, rules, testing and demonstration – a sequence of activities from year to year are identified and progress measured against reaching the planned sequence.

[39] The indicator for this output measures progress in developing a framework of energy modelling from model to energy outlook report – a sequence of activities from year to year are identified and progress measured against reaching the planned sequence.

[40] The indicator for this output measures progress in developing a technical catalogue that is necessary for modelling as well as for tendering and other purposes – a sequence of activities from year to year are identified and progress measured against reaching the planned sequence.

Target	Year 1	2020	Mapping of technologies and structure for technology catalogue completed
Target	Year 2	2021	Stakeholder workshops and/or forums to share state-of-the-art technology knowledge
Target	Year 3	2022	First technology catalogue for prioritised technologies published and disseminated to stakeholders
Target	Year 4	2023	Technology catalogue used by stakeholders for energy modelling and LCOE calculations
Target	Year 5	2024	Expanded and updated technology catalogue completed
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		Increased RE share in the electricity mix (% share) (normalised for installed capacity and weather) (as a contribution arising from the promotion of state-of-the-art forecasting, grid codes, market development and operational improvements in integration and flexibility of RE that contributes to meeting political targets as implied the 175 GW RE or scenario-guided adjusted target) [combined quantitative and qualitative analysis]	
Baseline	Year	2019	A normalised baseline would need to be established (estimated 2017: 10% electricity production (CEA))
Target	Year	2024	% share of RE on track to reach targets (as implied the 175 GW target or scenario-guided adjusted target)
Output 3.1		**Revised and strengthened grid codes for VRE integration including offshore wind**	
Output indicator		State-of-the-art grid codes adopted by CERC and CEA[41] [combined quantitative and qualitative analysis].	
Baseline	Year	2019	Indian electricity grid code regulations are in place but not optimised for future technology integration (e.g. offshore wind) and higher share of renewable energy. Key stakeholders, barriers and existing grid code regulations have been identified as part of baseline analysis.
Target	Year 1	2020	Analysis of current grid codes for connecting and operating and current compliance testing and verification guidelines with recommendations for enhancement.
Target	Year 2	2021	Grid codes and compliance testing and verification guidelines drafted, and consultation events held
Target	Year 3	2022	Grid codes and compliance testing and verification guidelines are submitted for approval.
Target	Year 4	2023	Grid codes and compliance testing and verification guidelines are approved.
Target	Year 5	2024	Grid codes and compliance testing and verification guidelines are implemented
Output 3.2		**Enhanced flexibility of the Indian power system for integration of RE, security of supply and cost (through market development and operational improvements in integrating RE).**	
Output indicator		Implementation of joint flexibility and integration measures that develop capacity within key Indian institutions to make continuous improvements in the cost-effective integration of RE that has an impact on curtailment (YES/NO updated and adjusted annually)[42]	

[41] The indicator for this output measures progress in developing grid codes integration of RE – a sequence of activities from year to year are identified and progress measured against reaching the planned sequence. CERC is named as the specific organisation in charge of regulation.

[42] The joint workplan for regulation comprises a number of elements: i) market development; ii) flexibility in the operation of power plants; iii) scheduling and dispatch operational strategies and tools. The indicator is chosen to measure a combination of progress in all these areas (and or updated priorities) year by year. The annual update is a further indication of the relevance and demand driven nature of the programme interventions for the Indian partners. The use of a "joint" workplan also allows for harmonisation of all relevant national and international interventions.

		[combined quantitative and qualitative analysis].	
Baseline	Year	2019	A key feature of the Indian power system is that there is capacity to undertake market operations that: are day-ahead but not yet translated into real time energy trade framework; technical minimum operational load of 55% for thermal power plants.
Target	Year 1	2020	Analysis of opportunities and constraints for enhancing cost effective integration of RE. Identified key barriers addressed and process initiated for power market enhancements. Baseline established on flexibility and operation of thermal power plants.
Target	Year 2	2021	Relevant stakeholders agreed on recommendations regarding transitioning from PPA-based power transactions to more power traded on power market. Project initiated for improving flexibility of key identified thermal power plants.
Target	Year 3	2022	Action plan on track and a continuous process of improvement is taking place in terms of implementing recommendations and making adjustments that have an impact on curtailment.
Target	Year 4	2023	Action plan on track and a continuous process of improvement is taking place in terms of implementing recommendations and making adjustments that have an impact on curtailment.
Target	Year 5	2024	Action plan on track and a continuous process of improvement is taking place in terms of implementing recommendations and making adjustments that have an impact on curtailment.
Output 3.3		**Improved forecasting and dispatching tools and procedures for VRE generation are implemented.**	
Output indicator		Forecasting accuracy has improved through use of the advanced strategies and tools [combined quantitative and qualitative analysis].	
Baseline	Year	2019	The base information for a baseline is prepared by NIWE.
Target	Year 1	2020	Mapping of current forecasting and dispatching systems. Work plan for improving forecasting and dispatching and comparison between procedures between Denmark and India and how synergies could be exploited.
Target	Year 2	2021	Forecast accuracy and dispatching procedures improved year on year.
Target	Year 3	2022	Forecast accuracy and dispatching procedures improved year on year and contributing to reduced curtailment.
Target	Year 4	2023	Forecast accuracy and dispatching procedures improved year on year and contributing to reduced curtailment.
Target	Year 5	2024	Forecast accuracy and dispatching procedures improved year on year and contributing to reduced curtailment.

Annex 4: Budget Details

The draft budget at output level is presented in Table A4 below. It is based upon the INDEP TA delivery model briefly summarised below and the detailed budget notes found under the table.

Delivery model for INDEP: INDEP will provide technical assistance (TA) to build capacity with partnership programme partners i) to provide convincing input for governmental energy, climate/low carbon policies, strategies and plans and ii) to deal with implementation aspects of offshore wind energy and high shares of variable energy in the national power systems in a cost-efficient manner. Expertise and experience derived from Denmark's green transition will form the backbone of the INDEP programme and be activated in a Government-to-Government cooperation that takes best possible advantage of the peer-to-peer partnership approach between the DEA and the partnership institutions.

As an integral part of its government-to-government modality, INDEP will provide for international Sector Experts to be posted with the key-partner institutions on long-term contracts. These resident sector experts will provide TA through day-to-day collaboration and guidance, relation building as well as local knowledge gathering. They are supplemented by TA from DEA specialists in Danish and international energy sector public planning and regulation. This again will be supplemented by external expertise procured for short-term assignments supporting the overall objectives, outputs and outcomes of the programme. It is planned that two long-term sector experts will be contracted for the majority of the programme period duration and be embedded in the two partner ministries or their agencies. The MNRE sector expert will head the secretariat under the Centre of Excellence while the specifications of the MOP sector expert will be further clarified during the inception phase and after the signing of the MOU with MOP.

TA from DEA: The parties to the Development Engagements are responsible for implementation of the Development Engagements with DEA being responsible for providing the necessary input contributed by Denmark. The Work Programmes agreed to by Steering Committees, will guide the inputs delivered by the DEA and other experts. TOR will be developed for missions, larger events and for larger deliverables, and will include work related to the specific task carried out in Denmark as well.

Non-DEA TA: The budget split between DEA staff, national and international consultants reflects the modality of the programme, which builds on government-to-government collaboration. For this reason, most of the TA input to the programme will be provided by DEA staff with government experience from the Danish green transition. When DEA staff TA is not possible or relevant (e.g. due to specific skills required, time restrictions, local knowledge requirements about the context, etc.) TA will be delivered through services of external consultants. When TA is needed from consultants, TOR for each TA input and mission will specify the agreed outputs related to the work programme and the expected inputs and outputs from the consultants. TOR will also describe the duration of agreed missions/short term stay by international/Danish experts required to execute the assignment. In order to identify which type of TA needs to be procured, the following possibilities will be used: a) Where relevant and possible, Indian national consultant input may be procured; b) Where relevant, international specialists may be procured; c) If specialist knowledge directly related to the areas of work carried out by Energinet is required, expertise from Energinet may be procured, e.g. for expertise within power markets developments, or grid codes and forecasting.

Procurement of TA: Procurement of consultants will be carried out by DEA and follow EU procurement rules. DEA will tender out framework contract(s) with one or more international service providers to deliver TA for the programme including Indian national consultant inputs. DEA will carry out the tender for the framework contract during the inception phase.

Table A4 - Budget at Output Level

Budget at output level (all figures DKK 000)	2019	2020	2021	2022	2023	2024	Total DKK
Output 1.1	11	269	616	1,404	1,342	1,032	4,674
Output 1.2	11	269	616	1,628	1,578	1,271	5,373
Output 1.3	11	1,018	1,514	1,116	1,093	896	5,648
Sub-total Outcome 1	**33**	**1,555**	**2,745**	**4,148**	**4,014**	**3,199**	**15,695**
Output 2.1	95	1,485	2,181	2,050	1,944	1,668	9,424
Output 2.2	252	1,110	1,775	1,337	1,223	1,175	6,872
Sub-total Outcome 2	**347**	**2,596**	**3,956**	**3,388**	**3,167**	**2,843**	**16,296**
Output 3.1	11	470	929	890	799	439	3,537
Output 3.2	11	1,943	2,790	1,939	1,796	1,493	9,972
Output 3.3	11	660	1,165	1,088	971	724	4,619
Sub-total Outcome 3	**33**	**3,072**	**4,884**	**3,917**	**3,567**	**2,656**	**18,128**
Unallocated reserve (10 %)	-	1,200	1,200	1,200	1,200	1,200	6,000
Inception Phase	105	210	-	-	-	-	315
DEA Programme Management	22	540	540	540	540	496	2,679
Framework contract tendering	-	500	-	-	-	-	500
MFA Mid-term Review	-	-	-	400	-	-	400
Total	**540**	**9,673**	**13,325**	**13,593**	**12,488**	**10,394**	**60,000**

Budget notes:

1. The INDEP Programme duration is 5 years (November 2019-October 2024).
2. The above budget includes all costs, incl. all technical assistance (TA) and travel expenses.
3. Technical assistance from DEA amounts to 5 person years per year on average.
4. Limited funding is allocated for output 1.1 and 1.2 until 2022 (budget in table is mainly for long-term sector expert) and for Outcome 3 in 2019 in the INDEP budget as these are financed through the SSC project to ensure separate budgeting and reporting between the two programmes, see also Annex 10.
5. The hourly rate for DEA inputs is based on the standard used for all DEA work and will be reflected in the contract between the MFA and DEA.
6. The balance between DEA time input in the home office and abroad will be governed by these principles: technical assistance will follow the demand from the Indian partners in a manner that allows for time spent with the partner. This will be determined and monitored through the DEA time registration system recording hours spent with partners and hours without partner contact. The time with partner

contact is connected to programme activities, including delegation visits, stationing of staff from the partner country as well as engagement with partners. All of these activities are allocated as time with partner. Time at home is spent on analysis, preparation and debriefing of missions and delegations, development of TOR and feedback and approvals of externally outsourced technical assistance deliverables, reporting, internal coordination, etc. The issue of sufficient time spent with partner will also be addressed by the mid-term review to assess if all partners are satisfied with current levels. If necessary, changes can be proposed for the remaining programme period.

7. The basis for time registration of inputs is 1400 hours per year of technical assistance per full-time employee from the Danish Energy Agency and 1655 hours per year for sector experts.
8. Two International Sector Experts are planned to be funded through this programme. Please see Annex 13 for the outline job descriptions. The sector experts will be recruited by the MFA as Danida advisors and employed by the MFA. The budget line for the sector experts include salary, allowances, housing and expenditures. The budget frame of DKK 1,450,000 per year has been confirmed on 24 May with the MFA TQS unit for international recruitments. The actual costs of sector expert deployments will depend upon the incumbent (as school fees etc. depend upon the family situation). It is assumed that the Indian Partner institutions will provide furnished office space for the sector experts as an in-kind contribution to the partnership. Detailed TOR will be developed for the sector experts during the inception phase.
9. Technical assistance from international and national consultants is included in the above budget with an amount of DKK 13,050,000 including travel expenses and reimbursables.
10. DKK 400,000 is factored in for MFA-administered Mid-term Review scheduled for 2022.
11. The unallocated reserve is 10% of the total grant amount. The Advisory Group will be responsible for decisions to spend unallocated programme funds, which could be activated at any time during the implementation period through a proposal from one of the Steering Committees, addressed to the Advisory Group for approval. The proposals should be drafted, and quality assured by the relevant Programme Management Team and submitted to its Steering Committee. The detailed eligibility criteria should be developed during the Inception Phase and reflected in the Programme Implementation Manual, which will also contain application format and guidance for prioritisation of ideas. Eligibility criteria should directly support the INDEP objectives, goals and impact and could reinforce impact drivers identified in the Programme's Theory of Change and could include the following: i) activities that will address barriers and opportunities to mobilise and leverage of funds from other sources or engage the private sector; ii) promoting a policy agenda that accelerates implementation of a strategy, plan or policy initiative developed with support under an INDEP Development Engagement; iii) involving/activating collaboration with champions of transformational change e.g. a Civil Society Organisation, think-tanks and academia on e.g. awareness, consultation, analysis and monitoring; iv) supporting innovation and applied research related to topic areas under the Engagements; v) reinforcing ongoing INDEP efforts on communicating impact stories and lessons learned across the INDEP programme that would help increase Danish and international awareness (e.g. stimulating reciprocity in the partnership with Denmark, supporting cross fertilisation with e.g. other multilateral or bilateral cooperation supported by Denmark, and stimulating South-South and triangular exchanges). Only proposals encouraged by both the Development Engagement partners and DEA will be considered. Upon approval by the SC, the proposal will be submitted to the Advisory Group and depending on its assessment there could be needs for a due diligence assessment by the MFA depending on the scope and scale of the proposal and MFA guidelines.

12. The budget item for DEA Programme Management is an estimate that includes contractual administration, management of unallocated reserves, service of ministers and executive management, etc. The Advisory Group may consider reallocations.

Annex 5: Risk Management Matrix

Contextual risks[43]:					
Risk Factor	**Likeli-hood**	**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	India has demonstrated achievements in subsidy reform and the business case for RE and the political concern about security of energy supply in the face of rapidly growing demand, will mitigate against these risks. The INDEP programme itself can limit the future capacity expansion of fossil fuels for electricity production. The focus areas (including on scenario planning, flexibility in power plants, VRE integration and a technology catalogue) are intended to have strong emphasis on least-cost solutions of supply through RE deployment and also improved EE.	Medium	The price of fossil energy has strong implications for RE deployment and EE improvements and the reliance on coal in India is high.
Programme affected by political instability or unrest, leading to lack of engagement and commitment.	Unlikely	Medium	The focus of INDEP is at the planning and regulatory experts and decision-making levels and no physical construction on the ground is included.	Low	India is a stable democracy, but local unrest could of course potentially affect programme activities.
Social unacceptance of RE deployment.	Unlikely	Low to medium	Interviews with key Indian officials and experts during INDEP formulation have shown that social acceptability of RE does not seem to be a major concern in India.	Low	In Denmark the "not-in-my-backyard (NIMBY)" 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	Possible	Medium	The political robustness of the Indian political	Low	Indian general elections have taken

[43] 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).

to the green energy transition downscaled due to changes of government and/or political priorities.	but unlikely		commitments to NDC and SDG targets is assessed as high irrespective of the election outcome. It is also noted that the business case for RE in India and the concern about security of supply in the face of growing Indian energy demand increasingly reduces this risk.		place in April-May 2019 and the Modi-Government was re-elected.
India's NDC and national sectoral policies and strategies with which the programme will align, prove to be overly ambitious or are not enacted.	Not unlikely	High	The INDEP programme's focus on planning and scenario modelling, flexibility and VRE integration and RE technology catalogue, will all assist in making decisions on ambitions and targets more well-informed and more realistic. India's achievements in access to electricity have also demonstrated how high-level determination and political support can result in achieving ambitious targets.	Medium	India's levels of ambition in the green transition are very high and some RE targets are considered by experts to be too ambitious for the short timeframe.
Programmatic risks[44]:					
Risk Factor	**Likeli-hood**	**Impact**	**Risk response**	**Residual risk**	**Background to assessment**
Delay in signing of cooperation agreements from MNRE and MOP could be included as a programmatic risk factor, which will delay the programme implementation from the beginning.	Likely	Medium	Keeping Cooperation Agreement formats simple and lean. Close ongoing liaison by the EDK with MNRE and MOP, including in September upon UPR and Minister approval in Denmark while awaiting Danish parliament Finance Committee approval. Use of the SSC as bridging to INDEP start-up. Used the SSC Steering Committee meeting in August to stress importance of signing Cooperation Agreements.	Medium	The processing of Cooperation Agreements by the Indian Implementing Partners could take time after to approval procedures on the Danish side have been completed, thus delaying the start of programme implementation.
Indian Government	Unlikely	High	The Indian partner institutions have been	Low	Denmark is a small development partner

[44] 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.

entities might not engage as expected.			identified and selected based upon their expressed and prioritised interest in the unique value added of what Denmark has to offer though government-to-government, authority-to-authority partnership cooperation. Indian partners will through in-kind contributions allocate staff time to ensure commitment to the cooperation. Memoranda of Understanding and Letters of Intent combined with high-level visits both in India and Denmark, facilitate a common understanding and high-level support of the partnership 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. This is further supported by senior level study visits.		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. The election in India resulted in a re-election of the government. Political priorities could of course change – but in terms of commitment by both partners to the goals of INDEP, this is unlikely.
Continued focus on INDEP outcomes from the Indian side is critical to sustainable outcomes of the partnership and therefore also a potential risk factor.	Possible	High	Continued close dialogue and Indian engagement partner ownership at high levels. Effective Steering Committees and Programme management Teams. Capacity development.	Medium	Taking into account the dynamics of the Indian system and that fact the chosen outcomes are not individual priorities of the Indian side, but part of wider policies, the relevance of the INDEP inputs should be monitored and adjusted continuously.
Limited capacity of Indian partners could impede the ability to engage with DEA and other Danish inputs thus hampering uptake	Likely	High	As above, committed and engaged partners have been selected who see the value of engagement. The partnership has a strong focus on capacity development/technical cooperation peer-to-peer support throughout the programme. This will be facilitated through clear TOR for each	Medium	Developing the capacity of political decision maker and practitioners in the green energy transition is key to the success of this programme and the sustainability and impact of its outcomes. The effectiveness of the

of technical know-how and experience and overall implementation progress and results.			DEA/Danish technical input reflecting the need for counterpart capacity to engage for effective peer-to-peer exchanges and development of outputs. Several Indian study visits by senior officials to Denmark have already demonstrated the value of "seeing is believing" and the high-level dialogue between Indian and Danish decision makers clearly supports the priority given by Indian partner institutions.		partnership is highly dependent on partner staff capacity to engage with Danish experts in a peer-to-peer manner and through study visits including by senior level decision makers to see first-hand what can be learned from the Danish experience.
Acceptance of the specific placement of long-term sector expert in MOP has not yet been finalised.	Likely	High	The dialogue with MOP is ongoing and the detailed clarification of how the long-term sector expert is to be organizationally related to MOP will be determined as early as possible in the Inception Phase.	To be determined in inception.	Even though a different physical location than the MOP offices could be chosen, it must be ensured that the long-term sector expert has a counterpart within the ministry and a group of co-workers with whom to build capacity.
Institutional structures within MNRE and MOP to absorb and internalize capacity development inputs from DEA and consultants under INDEP are critical to sustainable outcomes.	Needs to be assessed during inception.	Needs to be assessed during inception.	A capacity development strategy has been outlined in the PD Annex 14, and development of a capacity development action plan is a high priority during the inception phase.	To be determined in inception.	Effective uptake of capacity development support is critical to sustainable outcomes.
Ineffective work planning and monitoring if it were to occur, could result in delays and/or non-achievement of outputs and outcomes.	Likely	High	The INDEP Theory of Change (see Section 3) and results framework (Annex 3) will guide the dynamic work planning and the use of SMART indicators for monitoring. Indicators for reporting are identified (see Table 4.2). The management set-up builds upon the SSC model and is considered to be as lean as possible in the Indian institutional context (see Section 4).	Medium	In a demand-driven programme operating in a highly dynamic context as is the case in India, there will inevitably be risks associated with work planning and monitoring. The INDEP programme has been designed with the maximum flexibility possible given MFA AMG rules and the management set-up

					is considered lean and effective.
Institutional risks[45]:					
Risk Factor	**Likeli-hood**	**Impact**	**Risk response**	**Residual risk**	**Background to assessment**
The programme could duplicate existing activities and sources of finance and/or fail to recognise interfaces and synergies with other initiatives in a crowded arena.	Likely	High	Careful consideration has been made in programme design of other relevant bilateral donor and multilateral development partner support (See Box A1.2 in Annex 1). 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 continue to engage in donor coordination fora in India (e.g. the EU energy counsellors' meetings) and MCEU and MKL should also - through their roles as supporters of multilateral agencies – work to ensure synergies and additionality of the India programme in the relevant multilateral fora.	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. Coordination is particularly important with the UK/DFID, German GIZ, the World Bank and Asian Development Bank and the EU. Denmark is a small development partner, but the unique value added of authority-to-authority peer-to-peer partnership cooperation is a key feature of the programme and something no other development partner provides. Furthermore, Denmark's unique knowledge on offshore wind, power plant flexibility, forecasting and modelling is recognised by Indian and international partners. However, donor coordination in India is weak and continuous attention to synergies and will be important.
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 have as far as possible been designed with SMART indicators and measurable targets. A communication strategy (Annex 7) will ensure that results and achievements are communicated effectively to key audiences, and impact drivers	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 partnership cooperation.

[45] 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).

			will be used proactively.		
Unrealistic expectations to programme impact in terms of CO_2 emission reductions and financial leverage.	Likely	High	The Danish Climate Envelope has emission reductions as a core indicator for mitigation programmes, but it is important to have realistic expectations in this regard. The programme is based only on technical cooperation with objectives of medium and long-term energy planning and integration of increasing levels of renewable energy in the power system and does not comprise any investments on the ground. As a result, it is difficult to set specific targets for programme impact on CO_2 emission reductions, which are set and assessed with the relevant caveats concerning contribution vs attribution (see explanation of indicators and targets in Annex 3).	Medium	As the programme is funded from the Climate Envelope, there are expectations regarding emission reductions and financial leverage that are core indicators under the envelope.
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 (limited) opportunities for procurement of consultancy inputs – these will be announced through DEA. It is also extremely important that the partnership cooperation focuses on the government-to-government cooperation and is not perceived by Indian partners to be promoting Denmark's commercial interests. The commercial value of the programme is not limited to country-specific companies as the potential is to create a huge future sustainable commercial market. It is a technical cooperation programme government-to-government, peer-to-peer. 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	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 op commercial opportunities. This general issue is also mentioned in the Danish government strategy "The World 2030", the Danish Government's Strategy for Economic Diplomacy from March 2018 and is part of the mandatory context analysis in Annex 1.

			in these areas. There are other avenues for promoting commercial interests, including. The Trade Council in India consisting of the Commercial Section at the Danish Embassy in New Delhi and the Danish Trade Commission in Bangalore.		

Annex 6: List of supplementary materials

#	Documents / Material	Source
1.	Letter of Intent on Centre of Excellence on Integrated Renewable Power signed on 6 March 2019 by MNRE and EDK on behalf of MCEU	EDK
2.	Draft Cooperation agreement with MNRE	DEA EDK MNRE
3.	Draft Cooperation agreement with MOP	DEA EDK MOP
4.	Draft Development Engagement Document 1 (DED1) with MNRE	EDK DEA MNRE
5.	Draft Development Engagement Document 2 (DED2) with MOP	EDK DEA MOP
6.	INDEP Appraisal Report and annexes as of 16 August	MFA DEA
7.	CEA ppt presentation 5 March 2019 on the National Electricity Plan	Central Electricity Authority
8.	DEA ppt presentation 5 March 2019 to CEA	DEA
9.	Material from the Vibrant Gujarat Global Summit January 2019	DEA EDK
10.	End-of mission Report for INDEP Formulation and Identification Missions December 2018, March 2019, May 2019 and August 2019	Internal process documents prepared by consultant and by DEA
11.	MOU between NIWE and DTU	Signed in December 2018
12.	Power System Aspects of India	Ea Energy Analysis, 10 December 2018
13.	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
14.	The joint Danish-Indian Cooperation on Climate and Energy	Danish Energy Agency, 2018
15.	Strategic Sector Cooperation (SSC) - full project document and preliminary draft work plan	Ministry of Foreign Affairs of Denmark, 6 November 2018
16.	Draft National Energy Policy, 27 June 2017	NITI Aayog
17.	MOU between MNRE and the then Danish Ministry of Climate and Energy.	Signed in February 2008
18.	Draft MOU between MOP and MEUC	23 March 2018 & revised May 2019
19.	Background and stakeholder analysis.	for DEA 18 May 2018
20.	End of mission reports SSC missions Dec 2017, Dec 2018, January 2019, March 2019, May 2019, August 2019	(DEA internal documents).
21.	The Indian Power Sector, Low Carbon Transition Strategy for renewable Energy Integration	NITI-IEA-ADB workshop report 2018.
22.	Tracking SDG 7 the Energy Progress Report, May 2018	WB/IEA/IRENA/WHO/UN Statistics Division
23.	Variable Renewable Energy Sources Integration, Energy Transition towards 2030	Deloitte, 2018.
24.	Greening the Grid (series of publications)	Ministry of Power with USAID
25.	India's INDC to UNFCCC	Government of India
26.	National Electricity Plan, January 2018	Central Electricity Authority, Ministry of Power
27.	India's Energy Transition: Mapping subsidies to fossil fuels and clean energy in India, November 2017	IISD GSI
28.	Solving India's Renewable Energy Financing Challenge: Which	Climate Policy Initiative and Indian

	Federal Policies can be Most Effective?	School of Business
29.	REmap India, 2017	IRENA
30.	India Energy Outlook, 2015	IEA
31.	Reaching 175 GW RE by 2022	NITI Aayog, 2015
32.	State Renewable Energy Overview	NITI Aayog

Annex 7: Plan for communication of Results

What? (the message)	**When?** (the timing)	**How?** (the mechanism)	**Audience(s)**	**Responsible**
News that India-Denmark Energy Partnership Programme (INDEP) approved. Results and impact stories, replicable examples of good practice. Denmark's partnership with India and its intended contributions to the objectives of the UNSG Climate Summit New York, 2019. INDEP contributions to India's NDC and to SDG 13. INDEP contributions to SDG 7.	When INDEP approved by all parties. During implementation as soon as available. Climate Summit New York, 2019. UNFCCC COPs. SEforALL Forums and Vienna Energy Forums.	Press release and news item 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 INDEP approved. Results and impact stories, replicable examples of good practice. Contributions made toward to goals of India's NDC and relevant SDGs	As above	MCEU website and State of Green.	Danish resource base. International development partners.	MCEU
News that INDEP approved. Contributions made toward to goals of India's NDC and relevant SDGs Results and impact stories, replicable examples of good practice.	As above	DEA website and State of Green. Proactive sharing of INDEP results and lessons in the DEPP Advisory Group. Proactive facilitation of exchanges between INDEP and other DEA partnership countries (South-South and triangular knowledge sharing).	The Danish professional community/resource base /Danish enterprises. International development partners. Other DEA partner countries.	DEA

News that INDEP approved. Results and impact stories, replicable examples of good practice. Contributions made toward to goals of India's NDC and relevant SDGs	When INDEP 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
INDEP Formulation:			
Final draft PD & DEDs to appraisal team	3 June	MKL	With DEA MCEU and INDEP formulation consultant
Appraisal:			
Appraisal	16-21 June	TQS responsible. EDK to plan meetings for appraisal team	
Working meeting DEA/ MCEU/ MKL/ EDK with TQS appraisal team to discuss comments to appraisal report	5 August	DEA	
Final Appraisal Report	15 August	TQS	
MOU with MOP:			
Signing of MOU between MOP and EDK	As soon as possible by EDK or at RE-Invest by Danish Minister	EDK	Expected no later than 2 November 2019
Approval:			
SSC Steering Committee meeting	13 august	EDK DEA	1st SC JS level
Follow-up on any further adjustments needed of PD and DED1 and DED 2	Mid-august	EDK DEA MCEU MKL	With INDEP formulation consultant
Deadline for submission of the INDEP Programme Document to the TQS secretariat of the Council for Development Policy (UPR)	26 August	MKL with DEA and MCEU	Final deadline for the final Programme Document. DED1 and DED2 will not be submitted to UPR but will be available for UPR members on request
Presentation to the Council for Development Policy (UPR)	11 September	DEA/ MCEU in liaison with MKL	
The Danish Minister for Development Cooperation approves the programme	September, as soon as possible after UPR meeting	Minister for Development Cooperation/MKL	
Document (Aktstykke) for Parliament Finance Committee (FIU)	2 October	Draft by MKL with inputs by DEA/ MCEU	
Approval of INDEP grant by FIU	10 October	MKL	
Register commitment in MFA's financial systems within budgeted quarter	October	MKL	
Follow-up in the Indian government system for additional formalities before INDEP can start	After FIU approval	EDK	
Implementation:			

Signing of Cooperation Agreements with MNRE and MOP, respectively	Late October/early November	EDK with MNRE and MOP	Signing of Cooperation Agreements or approval through signed minutes of JWG meetings
Signing of contract MFA MKL with DEA	Late October/early November	MKL/DEA	
Start of INDEP programme	Early November	DEA with MNRE and MOP	
Inception Phase	November 2019 to April/May 2020	DEA and EDK with MNRE and MOP	6-month Inception Phase to include meetings in Project Management Teams to prepare work plans and Inception Report
Inception Report including first year work plans approved by Programme Steering Committees in India. Inception Report approved by the Advisory Group in Copenhagen	May 2020	DEA with MCEU, MKL, EDK and MNRE and MOP	
Half yearly meetings of Steering Committees in India	2020, 2021, 2022, 2023, 2024	DEA with MEUC, MKL, EDK and MNRE and MOP	DEA half yearly progress reports and annual reports submitted to Steering Committees. Coordination with high-level meetings of Joint Working Groups under MOUs with MNRE and MOP
Half yearly meetings of Advisory Group in Copenhagen	2020, 2021, 2022, 2023, 2024	DEA with MEUC, MKL	Based on DEA half yearly progress reports
Mid-term Review (MTR)	Early 2022	MKL with TQS	MTR Review Aide Memoire to make recommendations on adjustments to results framework and resource reallocation as relevant and to recommend on exit strategy
Final meeting of Steering Committees in India	2nd quarter 2024	DEA with MEUC, MKL, EDK and MNRE and MOP	DEA final progress and results report submitted to Steering Committees, with a focus on results and achievements, lessons learned and exit
Meeting of Advisory Group in Copenhagen	2nd quarter 2024	DEA with MEUC, MKL	To conclude on results and achievements, lessons learned based on DEA final progress and results report

Annex 9: Table of follow-up Actions taken on TQS Appraisal Recommendations

Title of (Country) Programme	**India-Denmark Energy Partnership (INDEP)**
File number/F2 reference	**F2.2018-36387**
Appraisal report date	**15 August 2019**
Council for Development Policy meeting date	**11 September 2019**

Summary of possible recommendations not followed

The Indian context is highly dynamic, which requires a flexible and adaptable programming process. Indian priorities and processes have changed several times throughout the ongoing dialogue during the last 1.5 years, however the Indian partners remain very committed to the programme and the overall objectives. Commitment from both partners to the joint cooperation has been demonstrated at many occasions such as re-confirming the embedding of a sector expert in the ministries during the recent SSC Steering Committee meeting; during the preparations of the MOU with MOP; financing of high-level delegation visit to Denmark in March 2019 from own funds; and minister approval for participation of 10+ Indian officials in DFC courses. It has, however, been the deliberate choice of DEA, and based on advice from EDK in New Delhi, to await the more detailed discussions and planning with the partners until the MOU has been signed. In line with this, the programme document has intentionally not been shared with the Indian partners, as it is not conducive to share a document as extensive as the PD in an Indian context. The draft TOR for the long-term sector experts have been shared with the partners but have not yet been finalised.

<u>The following recommendations will not be followed:</u>

The appraisal is recommending a **2-year planning cycle**. Based on DEA's knowledge, the Indian institutions do not have a 2-year planning cycle. The energy sector in India is highly dynamic and DEA has chosen to maintain the structure based on experience from SSC and DEPP programmes in other countries, using detailed one-year work plans. DEA will make sure that work plans are linked to the Indian planning cycle.

The appraisal recommends **performing an extensive gap analysis with regard to energy modelling practices and tools at state level during the inception phase**. This will not be a valuable exercise for the INDEP as the energy modelling and planning for energy policymakers is done at federal level. A gap analysis at federal level is ongoing and will continue throughout the initial phases of the INDEP programme.

Overall conclusion of the appraisal

The two Development Engagement Documents (DED's) are well justified and relevant for the Indian trajectory towards reduced emissions of Greenhouse Gas (GHG) by increasing the proportion of renewable energy in the Indian energy mix within the electricity sector. The Programme Document is well structured and comprehensive, but it reflects that the preparation phase has left a number of items for further detailing during the inception phase before the description of outputs and activities can reach the level commonly expected as the

basis of a five year engagement.

The programme has two Engagements with corresponding DED's: one with the Ministry of New and Renewable Energy (MNRE) regarding offshore wind, and one with the Ministry of Power (MOP) regarding energy planning and grid integration of renewable energy. Both engagements support specific Indian targets. For offshore wind, the target is 5 GW of offshore wind by[46] 2022 and up to 30 GW by 2030, with the EOI for the first 1 GW announced. For renewables, the target is 175 GW by 2022 and 55/% of renewable electricity by 2030. As targets and some enabling measures exist, the Danish inputs should focus on gaps and barriers in the current Indian implementation scenario, where Danish experience can add value to the Indian processes. No overlapping activities from other donors have been identified.

The Programme Document clearly states that the current DED's are concerned with the electricity sector only, which has well defined targets and is responsible for about 50% of India's GHG emissions. The core partner ministries are consequently those responsible for electricity.

The DED's are based on an approach where a Long Term Advisor (LTA) is placed in each of the partner ministries, and acts as a channel for task specific inputs from the Danish Energy Agency (DEA) as well as being a bridgehead for unique Danish skills and competencies and a valued resource within each Ministry. The LTA at MNRE has been designated a "Centre of Excellence" for offshore wind.

The appraisal team has made the following main observations:

- There is high level political and institutional commitment to the project, both from MNRE and MOP. An MoU has been signed with MNRE and a similar MoU with MOP is expected to be signed in the near future. The appraisal mission also showed that the strong commitment needs to be fleshed out to agree on further details of the engagement.
- The Indian side has until now been involved in dialogue at the level of Development Engagement Document (DED), while the more detailed programme document has not been shared. The formulation team has clarified that this is intentional, as it is not deemed conducive to share a document as extensive as the PD in the Indian context. Further discussions based on the DED's during the inception phase will lead to more detailed plans for implementation during the inception phase.
- The general concepts envisaged by the Programme Document and DED's are accepted by the partners (MNRE and MOP), but the specific content, including TOR's for the LTAs has not been discussed in detail.
- The interventions regarding offshore wind, energy modelling and grid integration of RE are welcome, but not sufficiently specified in terms of needs assessments and scope.
- The primary interests of the Indian side are related to implementation and demonstration, both of which require involvement at state level, in addition to central government involvement.
- The capacity building aspects of the programme are not sufficiently analysed and specified to secure institutionalisation of the built capacity.
- The budget is stated to be based on providing 5 full time staff from DEA on average, as

[46] https://www.offshorewind.biz/2018/06/19/india-sets-2022-and-2030-offshore-wind-targets/

well as other inputs. Insight into the budget details have shown that DEA input is planned to be 5 man-years per year equally distributed over the 5 years. The AT expects that actual resource allocation will be more flexible and more targeted to the needs according to more detailed work plans developed during the inception phase.

Based on interactions with the Indian government and stakeholders, who all stress the highly dynamic development of the Indian energy sector, the Appraisal team agree that a traditional five year planning horizon is not feasible to address current concerns related to the programme. The dynamics of the Indian system, rather require revolving two year plans as a management approach. The Indian electricity sector is under rapid transformation, and the appraisal mission learned that the partner ministries operate under a system of 2-year rolling plans with biannual revisions. The dynamics of the Indian system thus indicate that revolving two year plans would be the preferable management approach. This is in accordance with the intention to devise a flexible programme.

The AT welcomes the intention of managing and implementing the INDEP and the SSC as an integrated approach, but also wishes to underline that activities and budgets must be clearly separated in order to facilitate transparent budgeting and reporting of the two separate commitments from MFA. This should as far as possible be clarified before the approval of the INDEP programme.

A function such as that of the SSC Advisor, with a continuous presence and visibility amongst stakeholders is deemed to be crucial to the further development and impact of the programme, and should be considered as part of the programme. This could be either by extension of the SSC Advisor position throughout the programme period or by ensuring that e.g. the DEA project manager (for example) has sufficient resources to maintain a high level of continuous dialogue with the core stakeholders of the programme.

The overall conclusion of the appraisal is that the proposed thematic programme is *recommended for presentation to the external Danida grant committee* taking the recommendations of this report into consideration, notably that the inception phase is extended to allow for sufficient detailing of the activities and outputs together with the Indian partners (including alignment with current rolling plans of the partner institutions).

Recommendations by the appraisal team	**Follow up by the responsible unit**
Country programme/Programme Level:	
1. Include possibility of state level engagements	
Describe the vision of moving to state level more clearly in the Theory of Change, and describe more clearly how state level actors will be included in capacity development activities. Consider to introduce state level interventions as anticipated outputs in the planning in dialogue with Indian partners.	The vision of the DEA of how to work with the Indian key partners at state level as well as potential activities have been detailed further in the PD. State level outputs will be considered where relevant at an implementation stage after the inception phase based on Indian partner dialogue and demand.
2. Develop results framework and indicators to a more operational level	

Develop the results framework during the inception phase based on more specific planning, and apply it as a primary management and monitoring tool.	The results framework has been updated on the basis of the most recent dialogue with key Indian partners. During the inception phase the first annual work plan for INDEP will be developed, detailing the results frameworks in the two DEDs with specific outputs, activities, resources, specific baselines for the outputs to be produced, and operational indicators that will be used in monitoring and results reporting. The results framework will be used as a management and monitoring tool, supplemented by yearly progress reports and work plans as described in the management structure in the PD.
3. Clarify roles of LTA's and their organizational relation to partner institutions	
It should be clarified during the inception phase how the LTA's are organizationally related to their ministries, to DEA and to the Embassy, and what role the LTA's play in defining interventions from the DEA organization. Part of this clarification must involve a more precise description of the role of the SSC adviser at the embassy.	The roles of both the long-term sector experts and the SSC advisor will be further clarified during the inception phase based on continued dialogue with the Indian partners.
4. Approach to capacity building and institutional anchoring	
A section describing the approach to capacity development should be included in the project. The section should describe main principles for how capacity development can be institutionalized through linkages to existing Indian structures and procedures.	A section on capacity building has been added to the PD and annex 14 contains key elements of an outline strategy for capacity development which will be further developed during the inception phase.
5. Revolving planning in alignment with partner institutions	
The programme should be managed with 2 year planning horizons, to be revised annually and linked to the Indian planning cycle, which in the partner ministries is based on revolving 2 years plans for their own activities. The plans should include specific work plans for all relevant budget components, and also anticipated contributions from the Indian counterparts, for example in the format of TOR's.	Based on DEA's knowledge, the Indian institutions do not have a 2 year planning cycle. INDEP has a five year horizon but every year, detailed one-year work plans will be developed, discussed and endorsed by the steering committee for each partner ministry and updated at the beginning of every year. This is also the common practice in other SSC and DEPP programmes. The one-year work plans will be linked to the Indian planning cycle. TOR will be developed for all relevant budget components.
6. Approval and budget allocation process for the revolving plans	
General procedures for development and approval of	This has been further elaborated in the PD.

(bi)annual workplans should be defined in the programme document – including the role of the Advisory Group in Copenhagen.	More detailed procedures for project implementation including for the Advisory Group will be included as part of the implementing manuals during the inception phase.
7. Work plans for DEA include TOR's for all work by DEA	
Based on the annual work plans the TOR's for DEA inputs should be defined and agreed with the Indian counterparts. In line with the recommendations from the DEPII review the TOR should cover not only work during missions but also describe how the DEA staff will support the work from the home-office. This should be reflected directly in the project document.	This point has been clarified in the PD. The DEA will ensure that TOR and end-of-mission reporting covers preparation of missions and follow up on mission for all DEA and Energinet's tasks. TOR will be developed for missions, larger events and for larger deliverables, and will describe work related to the specific task carried out in Denmark as well. Based on experience, it is a very cumbersome process to have written exchange and written approvals by our Indian partners, and there will be a very high number of DEA missions, support from home-office and other DEA inputs. So instead of ensuring Indian input on the many and detailed TOR, the DEA will make sure that the one-year work plans will be very detailed and that the SC meetings will include a thorough discussion on the needs and plans.
8. Clarify relation and distinction between SSDC and INDEP	
Prepare a common PD and/or results framework for SSC and INDEP during the inception phase where separate activities, outputs and budgets relating to each grant can be identified.	The results framework in the PD has been updated to reflect the distinction between SSC and INDEP and will be further elaborated during the inception phase. The alignment framework between the SSC and the INDEP programmes is specified in Annex 10.
Thematic Programme Level:	
9. Clarify concept and vision for the Centre of Excellence for Offshore Wind	
It is recommended to align expectations to and the concept of the centre of excellence with MNRE, and (as part of the inception phase) to define a vision for the institutional setup for the centre, perhaps in phases to move from a virtual to a physical centre. It should be considered that the working groups associated with the centre of excellence could develop into a more permanent entity, forming the physical embodiment of the centre of excellence.	DEA and MNRE are in a process to align expectations of the centre of excellence, in particular the work programme for the four work groups, which will become more concrete during the inception phase. It is not an INDEP ambition that the centre should become a physical centre. The vision is to create a knowledge hub with broad participation. The long-term vision is for our Indian partners to see the value of the centre and develop it according to their own visions. Once the INDEP programme expires, it is the

	ambition that the Indian partners will be able to operate the centre without external involvement.
10. Needs assessment for energy planning models	
It is recommended to perform an extensive gap analysis with regard to energy modelling practices and tools, and to extend the analysis to state level during the inception phase.	A gap analysis is ongoing and will continue throughout the initial phases of the INDEP programme. No value is perceived for the INDEP programme of a state level analysis, as the modelling used for country wide energy planning is done at federal level. Energy planning in the 29 states and 7 Union Territories in India would require more resources and is less relevant when considering the main goals and outcomes of INDEP.
11. Include the inception phase in the budget with clear outputs, possibly extend time	
The programme should be initiated by a structured inception phase, during which the co-operation agreements with MNRE and MOP, the TORs for the two LTA's and the first (bi)annual work plans are agreed. The inception phase should be described and budgeted as an activity in the programme document.	The PD has been updated with a description of the inception phase along with a dedicated budget for the inception phase. A list of activities to be completed during the inception phase is included in Annex 15.
Engagement Level At the current level of detail, engagement level recommendations are not relevant	

I hereby confirm that the above-mentioned issues have been addressed properly as part of the appraisal and that the appraisal team has provided the recommendations stated above.

Signed in Copenhagen…… on the ……..…….……..….

……

Jan Riemer, Appraisal Team leader/TQS representative

I hereby confirm that the responsible unit has undertaken the follow-up activities stated above. In cases where recommendations have not been accepted, reasons for this are given either in the table or in the notes enclosed.

Signed in Copenhagen on August 26, 2019

Henriette Ellermann-Kingombe, Head of Unit/Mission

Annex 10: Alignment between the SSC and INDEP

The alignment framework between the SSC and the INDEP programmes is specified below for both reporting and funding as well as for results framework. The SSC and INDEP programmes are divided in terms of reporting and financing for specific outputs and years as illustrated in the table below where outputs 1.1. and 1.2 are under the SSC programme for 2019-2021 while outputs 3.1-3.3 are under the SSC programme in 2019. Subsequently, these outputs move to the INDEP programme. This is also reflected in the results framework where results are defined for both the SSC and the INDEP period for the same outputs for reporting and budgeting purposes.

Reporting and funding source	2019	2020	2021	2022	2023	2024
Output 1.1	SSC	SSC	SSC	INDEP	INDEP	INDEP
Output 1.2	SSC	SSC	SSC	INDEP	INDEP	INDEP
Output 1.3	N/A	INDEP	INDEP	INDEP	INDEP	INDEP
Output 2.1	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP
Output 2.2	INDEP	INDEP	INDEP	INDEP	INDEP	INDEP
Output 3.1	SSC	INDEP	INDEP	INDEP	INDEP	INDEP
Output 3.2	SSC	INDEP	INDEP	INDEP	INDEP	INDEP
Output 3.3	SSC	INDEP	INDEP	INDEP	INDEP	INDEP

INDEP	**Adjusted SSC**	**Current SSC**	
Objective: Reduced greenhouse gas emissions and leverage of the partnership in mobilising further resources for India's green transition.		**Main objective of SSC project:**	Mitigate climate change while fostering technological development and sustainable economic growth by supporting a green transition in the Indian power sector
Outcome 1: India has taken ownership of the centre of excellence that promotes and creates an enabling environment for lowering the cost of offshore wind power using best available practice in planning and cost reducing measures to continue the improvement of the ambitious targets. .	**Outcome 1:** India has experienced some benefits of implementing a de-risking regulatory framework in the offshore wind sector and is committed to continue the process in the framework of the Centre of Excellence	**Outcome 1:**	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
Output 1.1: An enabling framework that streamlines site selection, clearances and procurement while reducing risk to investors.	Output 1.1:		
	Sub-output 1.12: Knowledge transfer on methods of financial modelling and levelized cost of energy for the determination of tariffs for offshore projects	Output 1.1	Capacity building on offshore wind spatial planning, screening process and site identification within Indian authorities
	Sub-output 1.1.1: Increased awareness and exposure to the Danish Government de-risking process for offshore wind development, including	Output 1.2	Increased awareness and exposure to the Danish Government de-risking process for offshore wind development, including the Danish one-stop-shop model for offshore wind

	the Danish one-stop-shop and planning model for offshore wind		
	Sub-output 1.1.3 Capacity improved within MNRE/NIWE/SECI [or new institution tasked to regulate commercial aspect including tenders and power purchase agreements] on the development of an efficient offshore wind tendering process through a combined series of integrated activities	Output 1.3	Capacity improved within MNRE/NIWE/SECI [or new institution tasked to regulate commercial aspect including tenders and power purchase agreements] on the development of an efficient offshore wind tendering process through a combined series of integrated activities
	Sub-output 1.1.4: Technical inputs to review a standard tender document for offshore wind	Output 1.4:	Technical inputs to review a standard tender document for offshore wind
Output 1.2: Development and implementation of coordinated measures for minimising grid infrastructure and supply chain obstacles to the development of the offshore wind sector		**Outcome 2:**	The supply chain of the Indian offshore wind industry is developing enabled by an organised roadmap and efficient support mechanisms
	Sub-output 1.2.1: Technical inputs to support MNRE in the development of coordinated measures for minimising grid infrastructure and supply chain obstacles	Output 2.1:	Technical inputs to support MNRE in the development of an offshore wind roadmap
		Output 2.2:	Knowledge transfer on methods of financial modelling and levelized cost of energy for the determination of tariffs for offshore projects
Output 1.3: Technical standards and rules that promote innovation and research			
INDEP	**Adjusted SSC**	**Current SSC**	
Outcome 2: Energy planning decision making is guided by state-of-the-art long-term energy modelling tools based on a regularly adjusted technology catalogue	none	none	
Output 2.1: Enhanced energy modelling capacity in the relevant Indian institutions			
Output 2.2: Technology catalogue established, updated and used			
INDEP	**Adjusted SSC**	**Current SSC**	

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 3:** Indian electricity grid code regulations are in place but not optimised for future technology integration (e.g. offshore wind) and higher share of renewable energy.	**Out-come 3:**	More efficient grid integration and operation of variable renewable generation including system flexibility and consolidated grid codes
Output 3.1: Revised and strengthened grid codes for VRE integration including offshore wind	Output 3.1: Key stakeholders, barriers and existing grid code regulations have been identified as part of baseline analysis.	Output 3.1:	Technical and regulatory codes for renewable energy plants (including offshore wind power systems) have been reviewed and joint recommendations for improvements have been suggested
Output 3.2: Enhanced flexibility of the Indian power system for integration of RE, security of supply and cost (through market development and operational improvements in integrating RE)	Output 3.2: Relevant stakeholders agreed on transitioning from PPA-based power transactions to more power traded on power market.	Output 3.2:	Enhanced flexibility in power systems integration and operation of more variable renewable generation
Output 3.3: Improved forecasting and dispatching tools and procedures for VRE generation are implemented	None		None

Annex 11: Letter of Intent on the Centre of Excellence for Integrated Renewable Power

Letter of Intent

Between

The Ministry of New and Renewable Energy, Government of the Republic of India

And

The Ministry of Energy, Utilities and Climate, Government of the Kingdom of Denmark

(hereinafter referred to as 'the Parties')

The Government of the Republic of India and the Government of the Kingdom of Denmark share a mutual vision in leading the global low-carbon energy transition and advancing the implementation of the Paris Agreement and the 2030 Agenda for Sustainable Development for effective and impactful clean energy solutions. The Parties acknowledge that clean, affordable, reliable supply of electricity is instrumental to sustainable economic growth and thus agree to promote a mutually beneficial Government-to-Government cooperation in the renewable energy sector on the basis of equality and reciprocity.

The Parties intend to establish **Centre of Excellence for Integrated Renewable Power** in India under the framework of the Memorandum of Understanding (MOU) for Renewable Energy Cooperation signed February 6, 2008. The proposed Centre of Excellence will focus on the following areas:

- Renewable energy resource assessments with focus on onshore and offshore wind
- Hybridisation of wind, solar, hydro, storage
- Integration of renewable energy incl. high level of wind energy
- Testing and R&D
- Skill development / capacity building

Furthermore, other renewable energy themes can become part of the cooperation, if mutually decided upon by the parties.

The present letter of intent shall not impose any legally binding obligations or budgetary contributions on either of the parties

Signed in English, in New Delhi on 6/3/2019

On behalf of the Government of the Republic of India

Joint Secretary, Ministry of New and Renewable Energy
Anjani Nandan Sharan

On behalf of the Government of the Kingdom of Denmark

Ambassador of Denmark
Peter Taksøe-Jensen

Annex 12: List of key Persons met during the Identification and Formulation Missions

Identification Mission 16-21 December 2018:

Name:	Title/Function:
Embassy of Denmark in New Delhi (EDK):	
Peter Taksøe-Jensen	Ambassador
Stephan Skare Enevoldsen	Counsellor, Energy
Kamilla Kristensen Rai	Counsellor, Urban Development
Aashima Sachdeva	Junior Expert, Economic-Political Department
Emil Hummel	Intern, Economic-Political Department
NITI Aayog (National Institution for Transforming India, Government of India, New Delhi):	
R.P. Gupta	Additional Secretary
Rajnath Ram	Joint Adviser (Energy)
Ministry of New and Renewable Energy (MNRE), New Delhi:	
Bhanu Pratap Yadav	Joint Secretary
Anjani Nandan Sharan	Joint Secretary
National Institute of Wind Energy (NIWE), MNRE, Chennai, Tamil Nadu:	
Dr. K. Balaraman	Director General
Dr. G. Giridhar	Deputy Director General & Head, Renewable Energy Projects
Dr. Rajesh Katyal	Deputy Director General & Division Head, Wind & Solar Resource Measurements
A. Senthil Kumar	Director & Division Head, Standards and Regulation
S.A. Mathew	Director & Division Head, Certification and IT
Dr. P. Kanagavel	Additional Director & Division Head, Skill Development and Training
K. Boopathi	Additional Director & Division Head, Research and Development
J.C. David Solomon	Director & Division Head, Testing and Research Station
M. Saravanan	Deputy Director (Technical), Testing and Research Station
Central Electricity Authority (CEA), Ministry of Power (MoP), New Delhi:	
Prakash Mhaske	Chairperson
Pardeep Jindal	Chief Engineer
Central Electricity Regulatory Commission (CERC), New Delhi:	
Saroj Kumar Jha	Secretary
Geethu Joshi	Chief (Economics)
Rashmi Somasekharan Nair	Deputy Chief (Regulatory Affairs)
Ravindra Kadam	Advisor (Renewable Energy)
National Load Despatch Centre, Power System Operation Corporation Ltd. (POSOCO, a Government of India enterprise, New Delhi):	
K.V.S. Baba	Chairman and Managing Director
K.V.N. Pawan Kumar	Manager
Tamil Nadu Transmission Corporation Ltd. ((Tantransco) Chennai:	
A Aximilium Jayamary	Director, Operation
The Energy and Resources Institute (TERI), New Delhi:	
Dr. Ritu Mathur	Director, Integrated Assessments and Modelling Division
A.K. Saxena	Director, Electricity and Fuel Division
Aman Agarwal	Research Associate, Integrated Policy Analysis, Integrated Assessments and Modelling Division
Council on Energy, Environment and Water (CEEW) (met only by Asger Garnak, MEUC):	
Dr. Arunabha Ghosh	CEO of the Council on Energy, Environment and Water (CEEW)
European Union Delegation to India and European Investment bank (EIB), New Delhi:	
Henriette Færgemann	First Counsellor, Environment, Energy, Climate Change
Edwin Koekkoek	Counsellor, Energy and Climate Action
Donal Cannon	Head of Regional Representation for South Asia, EIB
World Bank (via video link from the Embassy of Denmark):	

Simon Stolp	Lead Energy Specialist, South Asia (Washington DC – met via link to WBG office Singapore)
Mani Khurana	Senior Energy Specialist, World Bank, New Delhi
International Finance Corporation, New Delhi	
Bhanu Mehrotra	Sector Lead, Solar and Wind Power, Transaction Advisory
Pradeep Patro	Regional Lead - Development Partner Relations, South Asia
Asian Development Bank (met only by Asger Garnak, MEUC)	
Jiwan Acharya	Senior Energy Specialist, ADB India Resident Mission
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, New Delhi:	
Markus Wypior	Dy. Cluster Coordinator, Indo-German energy programme Officer responsible for implementation, Green Energy Corridors
British High Commission, New Delhi:	
Nishant Kumar Singh	Senior Advisor, Energy Security
Udit Mathur	Senior Advisor, Low-Carbon Growth, Energy Climate and Growth Unit
Climate Policy Initiative (CPI) (met only by Asger Garnak, MEUC):	
Dhruba Purkayastha	Director, US-India Clean Energy Finance (USICEF)
International Solar Alliance (ISA) (met only by Asger Garnak, MEUC):	
Cecile Martin Phipps	Strategic Management & Operations Director (seconded by Government of France)
VESTAS:	
Amar Variawa	Director, Marketing & Public Affairs, India and SE Asia, Mumbai
Brookings Institution, India, New Delhi:	
Dr. Rahul Tongia	Fellow

Formulation mission 24 February-6 March 2019:

Name:	**Title/Function:**
Embassy of Denmark in New Delhi (EDK):	
Peter Taksøe-Jensen	Ambassador
Sofie Dyhr Crump	Political Counsellor, Head of Political and Economic Section
Sune Kåre Sørensen	Political Advisor
Stephan Skare Enevoldsen	Counsellor, Energy
Morten	Ag Head of The Trade Council & Innovation Centre Denmark
Aishwarya Joshi	Junior Trade Advisor, Economic-Political Department
Kamilla Kristensen Rai	Counsellor, Urban Development
Christoffer Dahl	Intern, Growth Advisor Team
The Danish Trade Commission, Bangalore: (via video conference)	
Harish Muthanna	Trade Commissioner, Energy
NITI Aayog (National Institution for Transforming India, Government of India, New Delhi):	
Surender Singh Sur	Joint Adviser (Energy)
Rajnath Ram	Joint Adviser (Energy)
Bansidhar Bandi	Young professional, Energy, Climate Change, and Overseas Engagements
Ministry of New and Renewable Energy (MNRE), New Delhi:	
Bhanu Pratap Yadav	Joint Secretary, Wind Energy
Prabir K. Dash	Scientist, Offshore Wind
Veena Sinha	Director, International Relations
National Institute of Wind Energy (NIWE) – under MNRE - Chennai, Tamil Nadu (via videoconference):	
Dr. K. Balaraman	Director General
Dr. Rajesh Katyal	Deputy Director General & Division Head, Wind & Solar Resource Measurements
A. Senthil Kumar	Director & Division Head, Standards and Regulation
S.A. Mathew	Director & Division Head, Certification and IT
K. Boopathi	Additional Director & Division Head, Research and Development

M. Saravanan	Deputy Director (Technical), Testing and Research Station
Solar Energy Corporation of India (SECI), New Delhi – a GOI enterprise under MNRE:	
Shailesh Kumar Mishra	Director (PS)
Pratik Prasun	Deputy Manager (C&P)
Ministry of Power (MoP), New Delhi:	
Archana Agrawal	Joint Secretary, International Cooperation
Suman Chatterjee	Director
U. R. Prasad	Deputy Chief, Economy, Central Electricity Regulatory Commission (CERC)
Abhash Ranjan Mohanty	Additional General Manager (Commercial), NTPC Ltd (GOI Enterprise)
A total of 10 other staff members	from agencies under MOP (CEA, CERC, NTPC etc.) no business cards given
Central Electricity Authority (CEA) – under MOP- New Delhi:	
Prakash Mhaske	Chairperson
Pardeep Jindal	Chief Engineer, PSPA – I
Praveen Gupta	Chief Engineer, IRP
Ammi R. Toppo	Director, IRP
B.S Bairwa	Director, PSPA – I
P.E. Kamala	Director, IRP
D.N Vasudev	Deputy Director, IRP
Apoorva Anand	Deputy Director, IRP
European Union Delegation to India, New Delhi:	
Henriette Færgemann	First Counsellor
Edwin Koekkoek	Counsellor, Energy and Climate Action
Several energy counsellors	From embassies of EU Member States (no business cards given)
World Bank:	
Simon Stolp	Lead Energy Specialist, South Asia
Mani Khurana	Senior Energy Specialist, World Bank, New Delhi
International Finance Corporation, New Delhi	
Bhanu Mehrotra	Sector Lead, Solar and Wind Power, Transaction Advisory, IFC
Asian Development Bank Resident Mission:	
Jiwan Acharya	Senior Energy Specialist, ADB India Resident Mission
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, New Delhi:	
Dr. Winfried Damm	Head of Indo-German Energy Programme
Markus Wypior	Dy. Cluster Coordinator, Indo-German energy programme Officer responsible for implementation, Green Energy Corridors
British High Commission, New Delhi:	
Nishant Kumar Singh	Senior Advisor, Energy Security
Udit Mathur	Senior Advisor, Low-Carbon Growth, Energy Climate and Growth Unit

Formulation mission 5 May – 11 May 2019:

Name:	**Title/Function:**
Embassy of Denmark in New Delhi (EDK):	
Stephan Skare Enevoldsen	Counsellor, Energy
Aashima Sachdeva	Political economic associate
Jakob Williams Ørberg	Counsellor for Innovation, Research and higher Education
NITI Aayog (National Institution for Transforming India, Government of India, New Delhi):	
Rajnath Ram	Joint Adviser (Energy)
Harendra Kumar	Joint Advisor (energy efficiency, coal sector)
Bansidhar Bandi	Young professional, Energy, Climate Change, and Overseas Engagements
Poonam Kapur	Economic Officer
Shafqat Mubarak	Young professional (energy)
Aakriti Kapoor	Young professional (energy)

Ministry of New and Renewable Energy (MNRE), New Delhi:	
Bhanu Pratap Yadav	Joint Secretary, Wind Energy
Prabir K. Dash	Scientist, Offshore Wind
Veena Sinha	Director, International Relations
Chalapathi Rao	Scientist
B K Panda	Director
National Institute of Wind Energy (NIWE) – under MNRE - Chennai, Tamil Nadu (via videoconference):	
Dr. Rajesh Katyal	Deputy Director General & Division Head, Wind & Solar Resource Measurements
Mr Krishnan	Assistant Director (technical)
Solar Energy Corporation of India (SECI), New Delhi – a GOI enterprise under MNRE:	
Sanjay Sharma	General Manager
Pratik Prasun	Deputy Manager (C&P)
Ministry of Power (MoP), New Delhi:	
JS Dewangang	Joint Secretary, International Cooperation
Suman Chatterjee	Director
Central Electricity Authority (CEA) – under MOP- New Delhi:	
Prakash Mhaske	Chairperson
Pardeep Jindal	Chief Engineer, PSPA – I
Praveen Gupta	Chief Engineer, IRP
Ishan Sharan	Director – PS & LF (CEA)
POWERGRID – under MoP	
Mukesh Khanna	Assistant General Manager
POSOCO – under MoP	
N Nallarasan	Deputy General Manager (NLDC)
CERC – under MoP	
Shilpa Agarwal	Joint Chief Engineering
S.c. Shrivastava	Chief Engineering
U R Prasad	Deputy Chief, Economy
And other members of the institutions under MOP that we did not get the names of	

Annex 13: Outline Job Profiles for Long-term Sector Experts

This annex outlines job profiles for the two long-term sector experts to be funded under INDEP. An abbreviation used in the Appraisal Report (and therefore also in Annex 9 of this Programme Document) is LTA for "long-term advisor". But since the Indian engagement partners prefer the term long-term sector expert, this has as far as possible been used throughout the PD. Early in the Inception Phase it will be clarified how the long-term sector experts are to be organizationally related to their ministries, to DEA and to the Embassy and its energy counsellor, and what role they will play in defining interventions from DEA. The outline job profiles below will then be developed into specific job descriptions, and a detailed plan will be made for the MFA's recruitment of the long-term sector experts, and recruitment will proceed as soon as possible.

Job Profile

Long-term Energy Adviser, MNRE

India-Denmark Energy Partnership Programme

(INDEP), India

1 The INDEP Programme

1.1 Background in short:

India is one of the fastest growing large economies of the world. India's economy is largely energised by fossil fuels, mainly coal, making India the third largest emitter of energy related CO^2 emissions in the world. 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 with a goal to phase in RE power generating capacity of at least 40% of the total installed electricity generation capacity by 2030, including an ambitious target to reach 175 GW renewable energy capacity by 2022. In addition, the Indian government has announced offshore wind targets of 5 GW by 2022 and 30 GW by 2030. India has shown interest in the knowledge that Denmark possesses on offshore wind, e.g. when Prime Minister Narendra Modi and Prime Minister Lars Løkke-Rasmussen met at the Vibrant Gujarat Global Summit 2019, the Indian Prime Minister highlighted that "*Denmark has the skills, India has the scale*".

1.2 The programme in short:

The India-Denmark energy partnership is supported by the 5- year INDEP programme funded by the Danish Climate envelope. This builds on a 3-year Strategic Sector Cooperation (SSC) programme, which was formulated and approved in November 2018. On 6 March 2019 the Indian Ministry for New and Renewable Energy (MNRE) and the Danish Ambassador on behalf of the Ministry for Energy, Utilities and Climate (MEUC) signed a Letter of Intent (LOI) with the main intention to establish a Centre of Excellence in India on offshore wind and the integration of renewable energy. The India-Denmark partnership is carried out as a government-to-government collaboration. The partnership builds 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 Danish Energy Agency (DEA) and the Danish transmission system operator (Energinet) offering partners wider access to acquaint with Danish experience, expertise and technology solutions.

The ambition is to establish a Centre of Excellence (COE) to promote and create an enabling environment for making best use of offshore wind and other renewable power in India, where Denmark will support work by Indian government agencies to develop the sector in India. The aim will be to share knowledge and best practices in order to secure a successful and cost-effective implementation of the ambitious offshore wind targets of India. DEA will provide knowledge and technical assistance based on its 30 years' experience of developing the offshore wind sector in Denmark. The COE will be placed at the MNRE and will assist in coordinating work in the offshore sector with the participation of National Institute of Wind Energy (NIWE) and the Solar Energy Corporation of India (SECI)

More specifically the COE will convey best available knowledge for developing:

- An enabling framework that streamlines site selection, clearances and procurement for offshore wind, e.g. marine spatial planning
- A coordinated roadmap for reaching targets that minimise grid infrastructure and supporting infrastructure obstacles, and encourage economies of scale
- Share knowledge about how offshore wind can be developed in the most cost-effective way
- Technical standards and rules that promote innovation and research.

The vision of the COE in the medium to long term is to broaden to include a wider group of international governments and actors, accumulating experience and best practices on offshore wind and become an international centre for offshore wind. Over time the COE might become a centre also focusing on new and renewable energy technologies and to renewable energy's role in the electricity system.

1.3 Requirements and expectations from the relevant parties

The role of the sector expert is to be the anchor point for the Centre of Excellence (COE) on offshore wind power and heading a secretariat for the COE. The Danish expert is the focal point for Danish knowledge and key to the COE for coordination between the partner organizations. Other tasks are to lead the planning of various events, workshops and seminars hosted by the COE.

MNRE will allocate sufficient resources to host and collaborate with the sector expert as part of the COE, i.e. providing a work station within the partner institution, allowing access to relevant materials, information and data for supporting capacity building and allocation in-kind of hours of partner staff to collaborate with the expert.

1.4 Expected composition of the selection committee

Applicants for the position will be selected for interview by the Danish Ministry of Energy, Utilities and Climate, the Danish Energy Agency and the Danish Ministry of Foreign Affairs, in collaboration with MNRE, who will also be represented at the job interview. Mercuri Urval will participate in the process of appointment by conducting personality tests and interviews with the selected candidates, as well as taking part in the final interview. The final interview panel consists of: representatives from Ministry of Energy, Utilities and Climate, the Danish Energy Agency, a representative from MNRE, representative(s) from the Danish Ministry of Foreign Affairs and the consultant from Mercuri Urval A/S in charge of the recruitment process.

2 The position

2.1 Title:

Senior Adviser (N1)

2.2 Place of service:

Ministry of New and Renewable Energy, New Delhi, India

2.3 Terms of employment:

Contract period: 2 years with a possibility for a one-year extension. Attractive remuneration package reflecting family status. Contribution to a pension scheme, health insurance and reimbursement of school fees. House rent allowance through the salary. Grant for relocation. For more details please refer to Danida's Staff Regulations – Advisers on Long-term Assignments (http://amg.um.dk/en/Technical-guidelines/technical-assistance/).

2.4 Area of responsibility/tasks

The main responsibility of the adviser will be to serve 1) as an in-house expert on offshore wind energy to build capacity in MNRE, NIWE and SECI; 2) coordinate progress and contribute to the work under the Centre of Excellence (COE). The sector expert will be the in-house entry point for Danish knowledge and stakeholders and provide the Indian partners quick and direct access to information on relevant Danish energy know-how. Regarding more comprehensive issues included in the work programme, the expert is expected to direct relevant queries to DEA, who will find the relevant Danish expert or plan a capacity building technical activity with relevant experts. The sector expert will be an important facilitator in the cooperation and dialogue between the DEA and MNRE. The presence of a Danish sector expert is expected to make the programme more efficient and effective.

As adviser on offshore wind energy the Senior Advisor is expected to:

- Provide technical assistance and build capacity in the MNRE and related agencies (SECI and NIWE) on offshore wind energy in general, but in particular government practices and regulation in close cooperation with Danish Energy Agency experts as well as other international and local experts;
- Contribute to strengthening the capacity of MNRE and relevant agencies in setting up the regulatory structure that will govern the development of offshore wind energy in India in a cost-efficient way;
- Coordinate the work under the four work streams that have been agreed for the development of offshore wind in India, i.e. support drafting TOR for technical assistance, organise workshops, plan events, etc.
- Identify Indian needs and facilitate technical assistance from the India team in Denmark.

As adviser for the Energy Partnership Programme, the Senior Adviser is also expected to:

- Keep updated on Indian energy sector development and provide input to policy dialogues relevant for the partners and the Energy Partnership Programme. Inputs may include the preparation of short policy briefs or background notes as required and establishing a personal network with development partners, civil society organisations and private sector;
- Participate in the working groups under the programme and follow up on progress in programme activities;
- Advise on the INDEP implementation in a cohesive and coordinated manner that aligns with Indian plans and priorities;
- Actively explore synergies between the INDEP Programme and the multilateral fora, and other cooperation, where Denmark is active;
- Coordinate with the Danish Embassy in India to explore synergies between the INDEP Programme and the activities carried out by the Embassy.

2.5 Success criteria

- Successfully translate best practices within offshore wind energy into concrete inputs and assistance to MNRE, NIWE and SECI;
- Expedient delivery of technical inputs required for the completion of programme activities related to offshore wind and renewable energy in cooperation with the DEA;
- Successfully coordinate with Indian partners and stakeholders and DEA;
- Successfully validate and communicate results based on assessments of impact of programme activities;

- Successfully ensure ownership, legitimacy and effectiveness of programme activities through proactive engagement with a wide range of actors across government, business and organizational sectors.

3 Profile/Qualifications

3.1 Requirements and expectations concerning the formal qualifications of the candidate

- Solid knowledge of Danish energy policy and the Danish offshore energy sector is a requirement
- A master level degree or corresponding qualifications in energy/environmental management, economics, political science, engineering and/or subjects relevant to renewable energy could be relevant
- Extensive experience working with one or more related fields such as: regulation of offshore wind energy, promotion of offshore wind energy investments, renewable energy planning
- Project management and coordination experience and experience from delivery of technical assistance, exchange visits and technical secondments
- Experience from developing countries, preferably India will be an advantage
- Knowledge of the energy technology providers an advantage
- Fluency in English, written and spoken, is required. Fluency in Danish is an advantage.
- Good written and verbal communication skills

3.2 Requirements and expectations concerning the personal qualifications of the candidate:

- Openness towards and understanding of different cultures and capacity to work in a different cultural setting
- Inter-personal skills with a high level of initiative and diplomacy
- Ability to work as part of an interdisciplinary team with relations to different ministries and stakeholders
- Proactive and flexible attitude, adaptability, social sensitivity, with respect for other cultures
- Capacity to manage and facilitate working processes involving parties at different levels

Job Profile

Long-term Energy Adviser, MOP

India-Denmark Energy Partnership Programme

(INDEP), India

1 The INDEP Programme

1.1 Background in short:

India is one of the fastest growing large economies of the world. India's economy is largely energised by fossil fuels, mainly coal, making India the third largest emitter of energy related CO2 emissions in the world. 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 with a goal to phase in RE power generating capacity of at least 40% of the total installed electricity generation capacity by 2030, including an ambitious target to reach 175 GW renewable energy capacity by 2022. India has shown interest in the knowledge that Denmark possesses on renewable energy, e.g. when Prime Minister Narendra Modi and Prime Minister Lars Løkke-Rasmussen met at the Vibrant Gujarat Global Summit 2019, the Indian Prime Minister highlighted that "*Denmark has the skills, India has the scale*".

1.2 The programme in short:

The India-Denmark energy partnership is supported by the 5-year INDEP programme funded by the Danish Climate envelope. This builds on a 3-year Strategic Sector Cooperation (SSC) programme, which was formulated and approved in November 2018. The India-Denmark partnership is carried out as a government-to-government collaboration. The partnership builds 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 Danish Energy Agency (DEA) and the Danish transmission system operator (Energinet) offering partners wider access to acquaint with Danish experience, expertise and technology solutions.

INDEP builds on three tracks; 1) offshore wind power, 2) long-term planning and energy modelling and 3) integration of RE and flexibility. Tracks 2 and 3 are under MOP and will be the focus areas for the sector expert through collaboration with relevant MOP institutions such as Central Electricity Authority (CEA), Central Electricity Regulatory Commission (CERC) Power System Operation Cooperation Limited (POSOCO) and Power Grid Corporation of India Limited (PowerGrid).

1.3 Requirements and expectations from the relevant parties

The role of the Danish sector expert is to be the focal point for Danish knowledge and key to the coordination between the partner organizations. The sector expert will share Danish experiences and knowledge within a green transition to enable Indian partners to exploit the lessons learnt in Denmark.

MOP will allocate sufficient resources to host and collaborate with the sector expert, i.e. providing a work station within a relevant partner institution, allowing access to relevant materials, information and data for supporting capacity building and allocation of hours to collaborate with the expert.

1.4 Expected composition of the selection committee

Applicants for the position will be selected for interview by the Danish Ministry of Energy, Utilities and Climate, the Danish Energy Agency and the Danish Ministry of Foreign Affairs, in collaboration with MOP, who will also be represented at the job interview. Mercuri Urval A/S will participate in the process of appointment by conducting personality tests and interviews with the selected candidates, as well as taking part in the final interview. The final interview panel consists of: representatives from the Ministry of Energy, Utilities and Climate, the Danish Energy Agency, a representative from MOP, representative(s) from the Danish Ministry of Foreign Affairs and the consultant from Mercuri Urval A/S in charge of the recruitment process.

2 The position

2.1 Title:
Senior Adviser (N1)

2.2 Place of service:
Ministry of Power or institutions under the Ministry, New Delhi, India

2.3 Terms of employment:
Contract period: 2 years with a possibility for one-year extension. Attractive remuneration package reflecting family status. Contribution to a pension scheme, health insurance and reimbursement of school fees. House rent allowance through the salary. Grant for relocation. For more details please refer to Danida's Staff Regulations – Advisers on Long-term Assignments (http://amg.um.dk/en/Technical-guidelines/technical-assistance/).

2.4 Area of responsibility/tasks
The main responsibility of the adviser will be to serve 1) as an in-house expert on energy planning and integration of renewable energy to build capacity in institutions such as MOP, CEA, CERC, POSOCO and PowerGrid; 2) coordinate progress and contribute to the knowledge-sharing work with regards to energy planning and integration of renewable energy.
The sector expert will be the in-house entry point for Danish knowledge and stakeholders and provide the Indian partners quick and direct access to information on relevant Danish energy know-how. Regarding more comprehensive issues included in the work programme, the expert is expected to direct relevant queries to the DEA, who will find the relevant Danish expert or plan a capacity building technical exercise with relevant experts.
The sector expert will be an important facilitator in the cooperation and dialogue between the DEA and MOP. The presence of a Danish sector expert is expected to make the programme more efficient and effective.

An adviser on energy planning and integration of renewable energy the Senior Adviser is expected to:

- Provide technical assistance and build capacity in the MOP and related agencies (CEA, CERC, POSOCO and PowerGrid) on energy planning and integration of renewable energy, but in particular energy modelling, flexibility, market design and forecasting in close cooperation with Danish Energy Agency experts as well as other international and local experts
- Contribute to strengthening the capacity of MOP and relevant agencies in setting up the regulatory structure that will govern the energy planning and integration of renewable energy in India in a cost-efficient way
- Coordinate the work for energy planning and integration of renewable energy in the India-Denmark partnership, i.e. support drafting ToRs for technical assistance, organise workshops, plan events, etc.
- Identify Indian needs and facilitate technical assistance from the India team in Denmark

As adviser for the Energy Partnership Programme, the Senior Adviser is also expected to:

- Keep updated on Indian energy sector development and provide input to policy dialogues relevant for the partners and the Energy Partnership Programme. Inputs may include the preparation of

short policy briefs or background notes as required and establishing a personal network with development partners, civil society organisations and private sector
- Participate in the working groups under the programme and follow up on progress in programme activities
- Advise on the Partnership Program implementation in a cohesive and coordinated manner that aligns with Indian plans and priorities
- Actively explore synergies between the bilateral Partnership Programme and the multilateral fora, and other cooperation, where Denmark is active.
- Coordinate with the Danish Embassy in India to explore synergies between the bilateral Partnership Programme and the activities carried out by the Embassy.

2.5 Success criteria

- Successfully translate best practices within energy planning and integration of renewable energy into concrete policy inputs and assistance to MOP, CEA, CERC, POSOCO and PowerGrid
- Expedient delivery of technical inputs required for the completion of programme activities related to energy planning and integration of renewable energy in cooperation with the DEA
- Successfully coordinate with Indian partners and stakeholders and DEA
- Successfully validate and communicate results based on assessments of impact of programme activities
- Successfully ensure ownership, legitimacy and effectiveness of programme activities through proactive engagement with a wide range of actors across government, business and organizational sectors

3 Profile/Qualifications

3.1 Requirements and expectations concerning the formal qualifications of the candidate

- Solid knowledge of Danish energy policy and energy planning and integration of renewable energy is a requirement
- A master level degree or corresponding qualifications in energy/environmental management, economics, political science, engineering and/or subjects relevant to renewable energy could be relevant
- Extensive experience working with one or more related fields such as: long-term modelling of energy systems, power market design with regards to integration of renewables, operational flexibility of the power system and thermal power plants.
- Project management and coordination experience and experience from delivery of technical assistance, exchange visits and technical secondments
- Experience from developing countries, preferably India will be an advantage
- Knowledge of the energy technology providers an advantage
- Fluency in English, written and spoken, is required. Fluency in Danish is an advantage.
- Good written and verbal communication skills

3.2 Requirements and expectations concerning the personal qualifications of the candidate:

- Openness towards and understanding of different cultures and capacity to work in a different cultural setting
- Inter-personal skills with a high level of initiative and diplomacy
- Ability to work as part of an interdisciplinary team with relations to different ministries and stakeholders
- Proactive and flexible attitude, adaptability, social sensitivity, with respect for other cultures
- Capacity to manage and facilitate working processes involving parties at different levels

Annex 14: Key elements of an outline strategy for capacity development

During the Inception Phase capacity development needs assessments should be undertaken for all 3 outcome areas and the relevant engagement partners, based on the planned key activities and outputs and with due regard to the engagement partner institutions' own knowledge and capacity development strategies and plans. Based on the key elements listed below and other relevant information including engagement partners' strategies for capacity and competence development, a specific action plan for capacity development should be developed and included in the Inception Report as a separate annex.

- Elements of capacity development should be important impact drivers for INDEP, including effective targeted communication to decision makers, using the "power of the example" and impact stories, and sustained peer-to-peer exchanges.
- Capacity development outcomes should be institutionalized through alignment to engagement partner institutions' specific structures and procedures.
- Capacity development should focus on institutional needs and priorities and provide learning opportunities for individual partner staff members in an institutional context. There should therefore be clear procedures for sharing and institutional uptake and internalisation of knowledge and experience gained by individuals.
- The Centre of Excellence is in itself a key element of the capacity development strategy intended to potentially develop into a national and even regional/international hub of best practice knowledge and experience.
- INDEP builds in large measure on a peer-to-peer cross-learning approach and for key activities and outputs each TOR for DEA expert inputs should identify the key Indian partner staffing and capacity i.e. the partners with whom the experts need to work closely and specify the skills and experience required for each international expert so as to ensure a targeted and effective peer-to-peer interaction and cross-learning on-the-job.
- On-the-job peer-to-peer knowledge development should be specified in the job descriptions for the long-term sector experts to be recruited.
- "Seeing is believing" – hence the importance of well-prepared study visits to Denmark and other destinations abroad and in India and of the importance of ensuring the selection of participants in study visits on the basis of job relevance and institutional uptake potential.
- Experience shows the lasting importance of sharing learning experiences together on study visits and courses abroad so it will be advantageous to include participants from different engagement partner institutions, including state level and inter-state agencies in each of such activities.
- Courses in Denmark under the Danida Fellowship Centre and with DTU have already proven valuable under SSC for Indian participants and such learning opportunities should be defined in the INDEP capacity development actions plans.
- Attention should be given when selecting participants for courses abroad to their potential as trainers of colleagues and peers, in a "training-of-trainers" approach.
- While the core of INDEP is government-to-government, peer-to-peer partnership, it will be important to further identify relevant NGOs and selected think tanks such as CEEW, Shakti Foundation, C-Step, TERI, etc. as a supplement to the direct peer-to-peer and consultant-to-partner staff interactions on the job.
- Capacity development should be a priority area for support under INDEP unallocated funds where, as elaborated elsewhere in this PD, eligibility criteria could include:

involving/activating collaboration with champions of transformational change e.g. a Civil Society Organisation and academia on e.g. awareness, consultation, analysis and monitoring; supporting innovation and applied research related to topic areas under the Engagements; v) reinforcing ongoing INDEP efforts on communicating impact stories and lessons learned across the INDEP programme; supporting cross fertilisation with e.g. other multilateral or bilateral cooperation supported by Denmark, and stimulating South-South and triangular exchanges.

- Cross-fertilisation between INDEP/SSC and other bilateral energy partnership programmes supported by DEA should also be facilitated through sharing of lessons of best practice and impact stories, but it is important that this is driven by the Indian engagement partners' expressed interest in which of the other bilateral partner countries they feel it is relevant to be inspired by. The particular relevance of learning from EU member states achievements should be addressed and facilitated by DEA.
- The capacity development strategy sees facilitation of the systematic use of knowledge products developed by multilateral development institutions as important and many of these institutions are supported by Denmark through multilateral channels (e.g. IEA, World Bank ESMAP, IRENA, IISD, UNDEP-DTU Partnership, CTCN, etc.); synergies can thus be achieved between Danish bilateral and multilateral cooperation.
- The capacity development action plans should include a rolling plan for communication of results, based on further elaboration of the PD Annex 7 and with due consideration of the Indian engagement partners' communication platforms and tools in both Indian and English language versions and including social media used by the Indian partners.
- An explicit exit strategy for Danish and international technical cooperation under INDEP (and SSC) should be part of the capacity development actions plans.

Annex 15: List of activities to be completed in the INDEP Inception Phase

After the approval of INDEP funding by the Finance Committee of the Danish Parliament and the signing of the contract between the MFA and DEA and based on the agreed Cooperation Agreements with MNRE and MOP respectively, the Inception Phase will be launched, most likely in early November 2019, with a duration of six months (until May 2020). DEA with MNRE and MOP will take responsibility for implementing the Inception Phase, which will be reported in an Inception Report that will be discussed by the two Steering Committees and presented to the Advisory Group in Denmark for approval. The Inception Phase should include but not necessarily be limited to the following:

- Establish programme management team(s) for each development engagement.
- Confirm membership of the two Steering Committees.
- DEA and MNRE will continue the ongoing process to align expectations of the centre of excellence, in particular the work programme for the four work groups, which will become more concrete during the inception phase.
- A gap analysis on energy modelling practices and tools is ongoing and will continue throughout the Inception Phase and the initial phases of the INDEP programme.
- While the primary engagement programme partners are within the federal government administration, other possible partners outside of this scope (e.g. inter-state fora, NGOs and think-tanks) will be further considered in the Inception Phase and will be involved when relevant and where they can contribute to the programme.
- Formulate the first annual work plan for INDEP, detailing the results frameworks in the two DEDs with specific outputs, activities, budgets, specific baselines for the outputs to be produced, and operational indicators that will be used in monitoring and results reporting. Develop TOR for inputs to major activities by DEA staff and consultants – and to a relevant extent, for Indian engagement partner in-kind inputs – to deliver the work plan key activities and outputs. Detail and target the DEA and consultant input resource allocation to the needs of the detailed work plans. As part of formulating the first annual work plan for INDEP develop strategy for capacity development considering the engagement partner institutions' own knowledge and long-term strategies.
- Prepare a common document identifying the detailed results frameworks for SSC and INDEP, respectively, where separate activities, outputs and budgets relating to each grant can be clearly identified.
- As early as possible in the Inception Phase, develop TOR and tender documents for the DEA tender for consultant framework contract(s).
- Clarify how the long-term sector experts are to be organizationally related to their ministries, to DEA and to the Embassy and its energy counsellor, and what role they will play in defining interventions from DEA. Develop the outline job profiles in Annex 13 of the PD into specific job descriptions, formulate a detailed plan for the MFA's recruitment of the long-term sector experts, and proceed with recruitment.
- Develop an INDEP plan for communication of results (further development based on the PD Annex 7) and include this as an annex in the Inception Report.
- Complete an implementation manual detailing the roles and responsibilities of the different levels of the management structure, as well as core administrative procedures, including information flows that maximise efficiency and effectiveness, formats for progress reporting etc. that facilitate the Steering Committees' role as accountability mechanisms, and detailed

eligibility criteria for use of unallocated funds with application format and guidance for prioritisation of ideas. Include detailed procedures for the Advisory Group

- Prepare work plans with related resources for discussion at the two Steering Committees and present with the Inception Report to the Advisory Group in Denmark for approval. Finalise Inception Report based upon agreed adjustments.