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<p>Key results:</p> <p>1) Increase the capability in power sector planning for variable renewable energy;</p> <p>2) Enhance the power system ability to integrate the renewable energy generated in the power system in a cost-effective way;</p> <p>3) Assess and review options for wind project development in Egypt.</p> <p>Justification for support:</p> <p>There is an interest among the Egyptian Energy authorities for gaining insight into the Danish experience with integration of renewable energy, specifically wind, into the power system. Solar and wind resources are abundant in Egypt and will play a large and increasing role in the power supply. Increasing the shares of variable renewable energy will be a challenge in the decarbonisation of the energy system and will require changes in the planning and operating the power system. The current Integrated Sustainable Energy Strategy (ISES) for 2035 puts forward an ambition target of 42% renewable energy in the power supply in 2035, coming from the current 8%. Moreover, Egypt is in the SDG perspective a central player in the region in general, and in specific in the UNFCCC negotiations in the Arab group. Institutional reforms, new legislation, liberalisation and unbundling of the power market and abandoning of fossil fuels subsidies by 2022 will be introduced in the coming years. The general framework and strategies are in place for reaching the targets. Focus is now on implementation.</p> <p>Additionally, the costs of renewable energy, especially wind power and solar PV, have decreased since the ISES was prepared and approved. The prospects for an even higher uptake than 42% of renewable energy in the electricity supply of Egypt are therefore very good. Subsequently it could be relevant to look at the ISES in regards to a specific focus on the power sector and provide tools for planning for variable renewable energy uptake and for operations of the system with high shares of renewable energy.</p> <p>Major risks and challenges:</p> <p>COVID-19 crisis will be of long duration and impede regular and close contacts between Egyptian and Danish partners. The risk has been partially mitigated during Inception phase and will be further mitigated by using virtual tools to the largest possible extent. Additionally, efficient technical assistance requires detailed information about the Egyptian power sector. Lack of access to the data will affect the quality of the TA and knowledge transfer negatively. It is assumed that partners will provide the required information.</p>	File No.	2020-27639																						
	Country	Egypt																						
	Responsible Unit	GDI																						
	Sector	23110 – Energy policy and administrative management																						
	Partner	Ministry of Electricity and Renewable Energy in the Power Sector																						
		<i>DKK mio.</i>	2020	2021	2022	2023	Total																	
	Commitment	10																						
	Projected ann. disb.	1.1	3.9	3.2	1.8	10																		
	Duration	36 months 1/9 2020 to 31/8/2023																						
	Previous grants	DKK 1.25 mio. (inception phase project)																						
	Finance Act code	§06.38.02.14																						
	Head of unit	Rasmus Abildgaard Kristensen																						
	Desk officer	Lisbeth Jespersen/Tilde Hellsten																						
	Reviewed by CFO	Christina Hyttel Hedegård																						
Relevant SDGs [<i>Maximum 1 – highlight with grey</i>]																								
<table border="1"> <tr> <td> No Poverty</td> <td> No Hunger</td> <td> Good Health, Wellbeing</td> <td> Quality Education</td> <td> Gender Equality</td> <td> Clean Water, Sanitation</td> </tr> <tr> <td> Affordable Clean Energy</td> <td> Decent Jobs, Econ. Growth</td> <td> Industry, Innovation, Infrastructure</td> <td> Reduced Inequalities</td> <td> Sustainable Cities, Communities</td> <td> Responsible Consumption & Production</td> </tr> <tr> <td> Climate Action</td> <td> Life below Water</td> <td> Life on Land</td> <td> Peace & Justice, strong Inst.</td> <td> Partnerships for Goals</td> <td></td> </tr> </table>							 No Poverty	 No Hunger	 Good Health, Wellbeing	 Quality Education	 Gender Equality	 Clean Water, Sanitation	 Affordable Clean Energy	 Decent Jobs, Econ. Growth	 Industry, Innovation, Infrastructure	 Reduced Inequalities	 Sustainable Cities, Communities	 Responsible Consumption & Production	 Climate Action	 Life below Water	 Life on Land	 Peace & Justice, strong Inst.	 Partnerships for Goals	
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Strategic objectives:																								
The Strategic Sector Cooperation within energy and climate between Denmark and Egypt has the objective of accelerating the green transition in Egypt through exchanging experiences in energy system planning and operational integration of variable renewable energy.																								
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The Ministry of Electricity and Renewable Energy (MoERE) is the key partner for the programme and responsible for the overall coordination. MoERE and its affiliated institutions and EgyptEra are committed to work with Denmark and the Strategic Sector Cooperation program. The above-mentioned partners have participated in the dialogue with the Danish Energy Agency and the Danish Embassy for the formulation of the program in both Cairo and Copenhagen.																								
Summary:																								
This project addresses integration of variable renewable energy into the power system in Egypt. The deliverables that Denmark will contribute with is complementary modelling software for optimisation of the dispatch and of the investment in the power system (supply and transmission system at the same time), as well as other tools planning for renewable energy. The tools are useful analysing topical issues like renewable energy (RE) friendly transmission grid planning, the role of biomass, electric vehicles and the potential for small-scale RE-development.																								
Budget:																								
Personnel – Danish Authority						6,214,979																		
Reimbursable Costs for Danish Authority Staff						1,484,398																		
Activities, Including Capacity Development						595,000																		
Consultancies* (max. 30% of grand total)						1,425,000																		
Unallocated funds (max 20% of grand total)						280,623																		
Total DKK						10,000,000																		

MFA File No: [insert]

**Project Document for Strategic Sector Co-
operation in the Energy sector**

between

Egypt and Denmark

10 08 2020

General information		MFA File no.
Project Title	Egyptian-Danish Strategic Energy Sector Cooperation	
Partner Country	Egypt	
Project duration	36 months – 1/9/2020 to 31/8/2023	
Thematic focus	Integration of Renewable Energy in the Power Sector	
Partner Public Authority Contact person and contact details	<p>Ministry of Electricity and Renewable Energy and affiliated organisations:</p> <p>Ministry of Electricity and Renewable Energy</p> <p>Maha Mostafa, Undersecretary of State for Research, Planning and International Cooperation</p> <p>Mobile; +20 100 1360052</p> <p>Email; maha.mostafa.moeeg@gmail.com</p>	
Responsible Danish Public Authority Contact person and contact data	<p>Danish Energy Agency (DEA - Energistyrelsen)</p> <p>Niels Bisgaard Pedersen, Advisor</p> <p>Mobil; +45 23 39 36 66</p> <p>E-mail ; nbp@ens.dk</p>	
Danish Embassy Head of Representation Sector Counsellor	<p>Embassy of Denmark in Egypt</p> <ul style="list-style-type: none"> • Svend Olling, Ambassador • Kamil Kuninski, Sector Consellor 	
Summary of background analysis and key strategic choices (max 2 pages)	<p>There is an interest among the Egyptian Energy authorities for gaining insight into the Danish experience with integration of renewable energy (RE), specifically wind, into the power system.</p> <p>By combining the Danish Energy Agency's know-how in planning and regulation of the power sector with the Danish TSO Energinet's expertise in operating and planning for a variable renewable energy friendly power system, there is a solid basis for transfer of knowledge and experience that will benefit Egypt in absorbing large amounts of renewable energy in the future.</p>	

<p>The Egyptian power sector</p>	<p>The Egyptian power sector was faced with a number of challenges with shortages of power supply in the period 2011-14, but the current Government has invested in infrastructure and today Egypt has surplus power supply mainly based on fossil fuels, notably natural gas. Egypt has also formulated new ambitious targets and strategies for the development of renewable energy and thus begun the transition to a low carbon economy through increased use of its vast renewable energy resources.</p> <p>Solar and wind resources are abundant in Egypt and will play a large and increasing role in the power supply. Increasing the shares of variable renewable energy will be a challenge in the decarbonisation of the energy system and will require changes in the planning and operating the power system.</p> <p>The current Integrated Sustainable Energy Strategy (ISES) for 2035 puts forward an ambitious target of 42% renewable energy in the power supply in 2035, coming from the current 8%.</p> <p>Institutional reforms, new legislation, liberalisation/unbundling of the power market and abandoning of fossil fuels subsidies by 2022 will be introduced in the coming years. The general framework and strategies are in place for reaching the set targets. Focus is now on implementation.</p> <p>The costs of renewable energy, especially wind power and solar PV, have decreased since the ISES was prepared and approved. The prospects for an even higher uptake than 42% of renewable energy in the electricity supply of Egypt are therefore very good. Subsequently it could be relevant to look at the ISES in regards to a specific focus on the power sector and provide tools for planning for variable renewable energy uptake and for operations of the system with high shares of RE. An updating of the model framework for the integrated energy sector (using the TIMES model for Egypt) is currently being implemented by MoERE in cooperation with the EU Commission.</p>
<p>Key Partners</p>	<p>The key institution in the transition process for the power sector is the Ministry of Electricity and Renewable Energy with affiliated institutions, i.e. the Egyptian Electricity Holding Company, Egyptian Electricity Transmission Company and New and Renewable Energy Authority. The independent electricity regulator EgyptERA (Egyptian Electric Utility and Consumer Protection Regulatory Agency) is also key in the transition process for the power sector.</p> <p>MoERE, EEHC, EETC, NREA and EgyptERA will be important players in achieving Egypt’s targets for the renewable</p>

<p>Thematic focus</p>	<p>energy, and therefore key partners for the Egyptian- Danish SSC program.</p> <ul style="list-style-type: none"> • The Ministry of Electricity and Renewable Energy is responsible for the development of the power sector and coordination at the strategic and legislative levels. • EEHC is the owner of the EETC, 90% the power generation plants and nine power distribution companies in Egypt. It is responsible for the production, transmission and distribution of power in Egypt. • EETC is the transmission system operator in Egypt and responsible for planning of the transmission system, the dispatch of power, operation of the Egyptian power market and integration of renewable energy at the operational level. • NREA is the renewable energy agency and previously project developer, and owner, of renewable energy plants. It is the focal point for renewable energy planning in Egypt. Its role is under transformation towards to regulation, certification and testing of renewable energy. • EgyptERA is the regulator of the power sector. It is responsible for setting rules and procedures for exploitation of of renewable energy, issuing of renewable energy certificates, setting tariffs and calculation of subsidies to renewable energy technologies. <p>The Strategic Sector Cooperation will focus on integration of variable renewable energy into the power system with MoERE as the key partner for the programme and responsible for the overall coordination. MoERE and its affiliated institutions and EgyptEra are committed to work with Denmark and to the Strategic Sector Cooperation program.</p> <p>The above-mentioned partners have participated in the dialogue with the Danish Energy Agency and the Danish Embassy for the formulation of the program in both Cairo and Copenhagen.</p> <p>The deliverables that Denmark will contribute with is complementary modelling software for optimisation of the dispatch and optimisation of the investment in the power system (supply and transmission system at the same time), as well as other tools planning for renewable energy (LCoE calculator and technology catalogues for renewable energy). The tools are useful analysing topical issues like RE friendly transmission grid planning, the role of biomass, electric vehicles and the potential for small-scale RE-development.</p>
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<p>The Danish private sector</p>	<p>The Egyptian power sector has embarked on a process of unbundling the power transmission from generation with the aim also to create an independent market operator. Hence support to key stakeholders using best practices in transforming from a regulated to a liberalized market is in high demand.</p> <p>Regarding the operational integration of Variable Renewable Energy (VRE), Denmark can further support with knowledge sharing in balancing a system with high shares of VRE including short term forecasting methodology for power provision of RE and ancillary services, as well as increasing the flexibility in thermal power plants.</p> <p>In order to utilise the abundant wind resources efficiently, NREA has suggested a performance evaluation of the Zafarana wind sites. Since the late 90ties, where Denmark assisted with the development of the sites, the wind resources have changed and the capacity factor of the turbines have decreased. If feasibility studies on the Zafarana wind sites haven't already been conducted, an independent assessment of how to proceed with the Zafarana sites going forward could be valuable. Likewise, NREA is suggesting an assessment of the wind-atlas Danish Technical University previously developed.</p> <p>Danish private enterprises in energy are present in Egypt in a number of areas and sees great potentials in Egypt's green transition. The Danish affiliated wind turbine manufactures are present in Egypt and actively involved. There is an interest in investing in other related types of clean energy infrastructure in the country from the Danish Investment Fund for Developing Countries (IFU) and institutional investors with access to preferential financing. There is also a potential for increasing export of energy equipment to Egypt in the fields of energy efficient pumps and other technologies from Danish companies.</p>
<p>Linkages to UN Sustainable Development Goals</p>	<ul style="list-style-type: none"> • SDG 7: Affordable and Clean Energy – Ensure access to affordable, reliable, sustainable and modern energy for all. Larger share of RE will deliver sustainable and modern energy and increased security of supply. • SDG 13: Climate Action – Take urgent action to combat climate change and its impacts. Larger share of RE will mitigate climate change and assist Egypt to reduce CO2 emissions from energy consumption and comply with the Paris Agreement.

	<ul style="list-style-type: none"> • SDG 17: Partnerships for the goals – Strengthen the means of implementation and revitalise the global partnership for sustainable development.
<p>Project logic (Theory of Change) ½ - 1 page</p>	<p>The theory of change of DEA’s engagement with MoERE, EEHC, NREA, EETC and EgyptERA is that if MoERE and other involved institutions are empowered to implement an appropriate framework in the integration of renewable energy and efficient grid integration, Egypt is better positioned to reach its renewable energy goals.</p> <p>By building capacity and providing the involved institutions with the tools and methodologies to optimise the management of RE in the power system, the enabling environment for the low-carbon energy transition is established leading ultimately to a large RE-share in the energy mix.</p> <p>Further to that end, by provision of capacity building of those institutions in charge of implementing the regulations for RE-integration, the project will assist Egypt in mitigating its greenhouse gas emissions (GHG) as set out in domestic policy targets and in the national determined contributions (NDC) commitments.</p> <p>Interventions successfully resulting in strengthened policies and planning frameworks and in scale up of climate-relevant technologies such as wind, infrastructure and markets will result in GHG-emissions reductions (impact) in support of Egypt achieving low carbon, climate resilient development and being able to comply with the Paris agreement.</p> <p>The theory of change is based on the assumption that the Danish experience with the green transition, including the integration of variable renewable energy into the power system can support Egypt in reaching its ambitious targets for a green transition. Through the partnerships it is the aim that the partner institutions will be strengthened to:</p> <ul style="list-style-type: none"> • Improve planning, regulation and implementation frameworks combating barriers for increased use of variable renewable energy in the power sector. • Ensure regulation compliance, and enable cost-efficient integration and operation of renewable energy into the national power systems. <p>Another assumption is that the Egyptian partners recognize the Danish experience within wind power and continue to make an active choice to pursue the ambitious but challenging targets of the cooperation.</p>

	The changes will happen because policy makers are convinced about the merits of renewable energy compared with conventional technologies, are ready to remove barriers and strengthen the enabling framework for renewable energy investments and committed to achieve the renewable energy goals of Egypt.
Main objective of SSC project	The Strategic Sector Cooperation within energy and climate between Denmark and Egypt has the objective of accelerating the green transition in Egypt through exchanging experiences in energy system planning and operational integration of variable renewable energy (VRE)
Outcome 1	Increased capability in power sector planning for variable renewable energy
Output 0.1	Program Management
Output 1.1	Selected models and tools transferred to MoERE and affiliated organisations
Output 1.2	Training and capability development in application of tools.
Output 1.3	Analysis of topical areas related to variable renewable energy (VRE), scenarios for VRE uptake and submission of Renewable Energy Outlooks
Outcome 2	Enhanced power system ability to integrate the renewable energy generated in the power system in a cost-effective way
Output 2.1	Danish and European experiences with liberalisation of power markets are transferred to Egyptian partners.
Output 2.2	Methodologies developed for short term forecasting of VRE, provision of ancillary services and securing stability and flexibility of the power system
Outcome 3	Options for wind project development in Egypt assessed and reviewed
Output 3.1	Assessment of prerequisite for performance evaluations of selected Zafarana sites
Output 3.2	Review of requirement for wind resource assessments, including offshore wind resources.

<p>Assumptions and risks</p>	<p>The identified risks related to a successful implementation of the SSC are:</p> <p><i>COVID-19 crisis</i> will be of long duration and impede regular and close contacts between Egyptian and Danish partners. The risk will be mitigated during Inception and by using virtual tools to the largest possible extent. Medium risk.</p> <p><i>Lack of ownership to the cooperation from key partner institutions.</i> The Danish support is of great interest. All direct partners demonstrate a genuine ownership to the cooperation as has confirmed commitment by participation and engagement in the meetings during the program preparation. Minor risk.</p> <p><i>Change in relative energy costs.</i> If fuel costs and various technology costs change, it might change the interests in and the incentives for investments in some specific renewable energy sources. Minor risk, RE technologies will continue to decrease.</p> <p><i>Data and information unavailable:</i> Efficient technical assistance (TA) in planning and operation requires detailed information about the Egyptian power sector. Lack of access to the data will affect the quality of the TA and knowledge transfer negatively. It is assumed that partners will provide the required information. Medium risk.</p> <p><i>Non-adoption of recommendations:</i> TA provided is not included in new regulation and guidelines by partners. Based on current commitment this risk is considered as minor.</p> <p><i>Lack of capacity in partner institutions:</i> If the partner institutions do not ensure sufficient commitment to receive the TA, there is a risk that the results will not be sustainable. Minor risk.</p>
<p>Management set-up</p>	<p>The cooperation is anchored in MoERE, as the key partner. EEHC, NREA, EETC and EgyptERA will be designated to the various activities in the program.</p> <p>The SSC program will be managed by a Steering Committee with Egyptian and Danish representation having the overall strategic dialogue between Denmark and Egypt in relation to energy cooperation. The composition and functions of the Steering Committee is described in the Annexed Agreement for a ‘Strategic Sector Cooperation on Energy and implementation of in-kind Technical Assistance between Egypt and Denmark’</p> <p>MoERE and the Danish ambassador in Egypt will Co-chair the Steering Committee.</p>

	<p>Project Management Teams with participation of partner institutions, DEA and Energinet.</p> <p>DEA will in close cooperation with the Royal Danish Embassy in Cairo, manage the day-to-day implementation of the programme, including preparing material for the Steering Committee.</p>
Contributions from Danish Public Authority	<p>DEA will contribute with:</p> <ul style="list-style-type: none"> • Overall project management and administration • Danish experts, incl. Energinet experts. • Costs of Danish experts including local transport and accommodation. • Costs for study tours (airfare, hotel, visa, per diem, local transport, on a case by case basis). • Contracting consultancy services. • Costs of special arrangements such as seminars, workshops etc. • Drafting project documents. <p>The Embassy of Denmark to Egypt hosts the Sector counsellor:</p> <ul style="list-style-type: none"> • The counselor will be the daily contact to the Egyptian partners and will drive progress on daily project activities. • The counselor will coordinate closely with DEA's project manager and team
Contributions from partner authority	<ul style="list-style-type: none"> • Staff and experts that matches the Danish deliverables • Access to relevant data, legislation, regulations, practices, procedures and any other necessary information • Support for coordination and logistics • Support for organisation of workshops and seminars • Infrastructure and facilities where relevant for presentations and capacity building.
Budget	DKK 10 millioner