

GOVERNMENT OF INDIA  
MINISTRY OF NEW AND RENEWABLE ENERGY  
**RAJYA SABHA**  
**UNSTARRED QUESTION NO-1096**  
ANSWERED ON-07/12/2021

**RESEARCH & DEVELOPMENT IN RENEWABLE ENERGY SECTOR**

1096. LT. GEN. (DR.) D. P. VATS (RETD.)  
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Will the Minister of New & Renewable Energy be pleased to state:

- (a) the status of Research and Development (R&D) in the field of renewable energy in the country in comparison to other countries;
- (b) whether Government has signed any agreement with National and International Institutions for promoting R&D, if so, the details thereof during the last three years and the current year;
- (c) the details of the potential development in the said sector; and
- (d) the outcome of R&D activities?

**ANSWER**

**THE MINISTER OF NEW & RENEWABLE ENERGY AND POWER**

**(SHRI R.K. SINGH)**

- (a) Research & development in the field of renewable energy in the country is being carried out at various research institutes/ universities/ laboratories and industries. Research projects for technology development and demonstration in various areas of new and renewable energy such as solar thermal systems, solar photovoltaic systems, biogas systems, waste to energy systems, wind energy systems, hybrid systems, storage systems, hydrogen and fuels cells, geothermal, etc. are taken up with the ultimate aim of increasing share of renewables in the energy mix of the country.

Research in renewable energy is also being carried out in cutting edge technologies such as perovskites solar cell, hydrogen fuel cells, organic solar cells, a-Si solar cells, RE forecasting.

- (b) The details of the Agreements/ MoUs signed during the last three years and the current year relating, inter alia, to research are given in **ANNEXURE**.
- (c) Research in areas of renewable energy like solar manufacturing, thermal storage systems, solar reflector materials, hydrogen storage materials, energy storage, wind turbine components & sub systems, RE forecasting etc. is being carried out with the overall objective of improving efficiency, reducing prices and developing new technologies.
- (d) Continuous R&D efforts in the area of renewable energy has resulted in enhancement of overall efficiency, cost reduction, and better reliability of renewable energy systems/ projects being deployed in the country.

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**MEMORANDUM OF UNDERSTANDINGS (MoUs)/AGREEMENTS  
SIGNED WITH FOREIGN COUNTRIES/INSTITUTIONS/ORGANISATIONS IN LAST  
THREE YEARS**

<b>S. No.</b>	<b>Country</b>	<b>Parties to MoU/Agreement</b>	<b>Date of Signing</b>
1.	Guyana	MoU signed between Ministry of New and Renewable Energy and Ministry of Public Infrastructure of Guyana for cooperation in renewable energy	30 <sup>th</sup> January 2018
2.	France	National Institute of Solar Energy (NISE) and Commissariat a l'Energie Atomique et aux Energies Alternatives (CEA), the National Solar Energy Institute (INES), France for cooperation in renewable energy	10 <sup>th</sup> March 2018
3.	Morocco	MoU between Ministry of New and Renewable Energy and Ministry of Energy, Mines and Sustainable Development of the Kingdom of Morocco for cooperation in renewable energy	10 <sup>th</sup> April 2018
4.	Peru	MoU between Ministry of New and Renewable Energy and the Ministry of Energy and Mining of the Republic of Peru for cooperation in renewable energy	11 <sup>th</sup> May 2018
5.	Bahrain	MoU between Ministry of New and Renewable Energy of the Republic of India and the Ministry of Electricity and Water Authority of the Kingdom of Bahrain for cooperation in renewable energy	15 <sup>th</sup> July 2018
6.	Germany	Implementation Agreement concerning the project Indo-German Solar Energy Partnership– PV Rooftop (IGSP- PVRT 2) was signed between MNRE and Deutsche Gesellschaft Fur Internationale Zusammenarbeit (GIZ)	3 <sup>rd</sup> August 2018
7.	France	MoU between the Solar Energy Corporation of India Limited (SECI), Government of the Republic of India and The Agence Francaise De Development for cooperation on renewable energy	3 <sup>rd</sup> October 2018

8.	France	MoU between the Solar Energy Corporation of India Limited (SECI), a Central Public Sector Undertaking of Government of the Republic of India; Commissariat á l'Énergie Atomique Et Aux Energies Alternatives (CEA), French state-owned research entity and Blue Storage SAS, a French Company for cooperation on e-vehicle charging infrastructure	3 <sup>rd</sup> October 2018
9.	Tajikistan	MoU between the Ministry of New and Renewable Energy of the Government of the Republic of India and the Ministry of Energy and Water Resources of the Government of the Republic of Tajikistan for cooperation in renewable energy	8 <sup>th</sup> October 2018
10.	Denmark	MoU between National Institute of Wind Energy (NIWE) and Denmark Technical University (DTU) for cooperation in wind energy	17 <sup>th</sup> December 2018
11.	Denmark	(i) Cooperation Agreement between Ministry of New and Renewable Energy of the Republic of India and Ministry for Energy, Utilities and Climate of the Kingdom of Denmark on Strategic Sector Cooperation in the field of Renewable Energy with a focus on Offshore Wind Energy and (ii) Letter of Intent (LoI) to establish an Indo-Danish Centre of Excellence for Integrated Renewable Power in India	6 <sup>th</sup> March 2019
12.	France	Memorandum of Agreement (MoA) between National Institute of Solar Energy (NISE) and Commissariat á l'Énergie Atomique Et Aux Energies Alternatives (CEA) for cooperation on Hydrogen energy and fuel cells	22 <sup>nd</sup> August 2019
13.	Guinea	MoU between Ministry of New and Renewable Energy and of the Ministry of Energy of the Republic of Guinea for cooperation in renewable energy	2 <sup>nd</sup> August 2019
14.	Saudi Arabia	MoU between Ministry of New and Renewable Energy and Ministry of Energy of the Kingdom of Saudi Arabia on cooperation in the field of Renewable Energy	29 <sup>th</sup> October 2019
15.	Germany	Implementation Agreement concerning the project Indo-German Energy Programme- Access to Energy in rural areas (IGEN-ACCESS II) between MNRE and Deutsche Gesellschaft Fur Internationale Zusammenarbeit (GIZ)	1 <sup>st</sup> November 2019

16.	Germany	Implementation Agreement concerning the project – Promotion of Solar Water Pumps (PSWP) between MNRE and Deutsche Gesellschaft Fur Internationale Zusammenarbeit (GIZ)	1 <sup>st</sup> November 2019
17.	Uzbekistan	(MoU) between the National Institute of Solar Energy (NISE), Ministry of New and Renewable Energy (MNRE), Government of India and the International Solar Energy Institute (ISEI) Government of Uzbekistan for cooperation in the field of Solar Energy	10 <sup>th</sup> December 2020
18.	France	MoU between the Ministry for the Ecological Transition of the French Republic and The Ministry of New and Renewable Energy of the Republic of India on Renewable Energy Cooperation	28 <sup>th</sup> January 2021
19.	USA	MoU between the National Institute of Wind Energy (NIWE) under the MNRE, Govt. of India and the University of Massachusetts, (UMA), Amherst, Massachusetts for cooperation in the field of offshore wind and turbine blades testing.	22 <sup>nd</sup> September 2021
20.	Germany	Implementation Agreement concerning the project Indo-German Solar Energy partnership- (IGSP-IN-SOLAR) between MNRE and Deutsche Gesellschaft Fur Internationale Zusammenarbeit (GIZ)	30 <sup>th</sup> September 2021