

**ORAL ANSWERS TO STARRED QUESTIONS AND
SUPPLEMENTARY QUESTIONS AND ANSWERS
THEREON**

GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA

STARRED QUESTION NO.31
ANSWERED ON 06.02.2024

GRID PROBLEMS OF RENEWABLE ENERGY

31. SHRI JAWHAR SIRCAR:

Will the Minister of **POWER** be pleased to state:

(a) the reasons as to why grid problems are continuing to bother renewable energy, despite the unified national network of 117 GW;

(b) the problems of integration of renewable energy in the grid built for scales and stability of thermal and hydro power generation;

(c) the progress in implementing Renewable Energy Source Grid-Connected Generation system (RES-GGS) and whether there is any plan to soften the higher initial investment cost; and

(d) whether the very-delayed payments are received and passed on by DISCOMs continuing to create deep financial difficulties for renewable energy?

A N S W E R

THE MINISTER OF POWER AND NEW & RENEWABLE ENERGY

(SHRI R.K. SINGH)

(a) to (d) : A Statement is laid on the Table of the House.

STATEMENT REFERRED TO IN REPLY TO PARTS (a) TO (d) IN RESPECT OF RAJYA SABHA STARRED QUESTION NO. 31 FOR REPLY ON 06.02.2024 REGARDING GRID PROBLEMS OF RENEWABLE ENERGY ASKED BY SHRI JAWHAR SIRCAR.

(a) to (c) : It is incorrect to say that there has been any problem in Grid stability due to the addition of RE capacity. Grid continues to be stable. The Government have added 196.558 GW generation capacity since 2014, which includes 104.059 GW of RE capacity increasing the total generation capacity by 70 % from 248.554 GW in March 2014 to 428.299 GW in December 2023. In order to accommodate this substantial capacity addition, Government of India planned and added 189052 circuit Km (ckm) of transmission lines in the same period. This has resulted in increase of inter regional transfer capacity from 36 GW in 2014 to 116.540 GW till date.

In addition to this 24,000 ckm of transmission lines are under construction and 17,860 ckm is under bidding. CEA has drawn up a plan of transmission augmentation to handle a total RE capacity of 500 GW and transmission capacity is being added accordingly. While Government are adding transmission system at a rapid pace, the renewable energy capacity is also being increased rapidly. The RE capacity has gone up from 75.5 GW in 2014 to 180.80 GW upto December, 2023. In addition, 103.66 GW is under implementation and 71.65 GW is under bid.

Wind and Solar energy is variable and intermittent. Thirteen (13) Renewable Energy Management Centres (REMCs) have been setup for better forecasting and real time monitoring of Renewable Energy generation. The variability is balanced by load dispatch centres through resources like Hydro and Thermal. Flexibilization of significant capacity of Thermal Power plants has already been done and the same is being implemented in the balance Thermal plants. The current level of Variable RE (VRE) penetration is quite low. Out of 1624.34 BUs energy generated in 2022-23, only 173.8 BUs(10.7%) were generated by Solar and Wind.

Solar and Wind which are inverter based generators, need to respond as per the CEA Technical Standards for connectivity during transmission line faults in the grid. A few incidents of some of these generators going out of the grid in the Rajasthan RE-complex had occurred in the past. The Grid was however stable. These incidents were inter-alia traced to inverter level protective system settings which have been changed and such incidents have been minimized.

As far as cost of electricity from RE sources is concerned, it is cheaper than conventional energy sources. The Solar tariff discovered in recent bids is around Rs 2.50 per kWh and Wind tariff is around Rs 3.18 per kWh. While aggregating the demand of various DISCOMs for tariff based competitive bidding from various coal based thermal generating stations, the price discovered was around Rs 5.30 per kWh.

(d) : The total outstanding dues of GENCOs were Rs 139947 crores (including dues of RE GENCOs at Rs 17232 crores) in 2021-22. The Government have put in place rules, [Electricity (Late Payment Surcharge and Related Matters) Rules, 2022], which ensured payment of legacy dues in instalments as well as the current dues in full. Non payment of dues results in regulation of access to the market. As a result, the GENCO legacy dues have now reduced from Rs.1,39,947 crores to Rs. 49451 crores (Rs 3116 crores of RE GENCOs).

भारत सरकार
विद्युत मंत्रालय

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राज्य सभा
तारांकित प्रश्न संख्या-31
6 फरवरी, 2024 को उत्तरार्थ

नवीकरणीय ऊर्जा की ग्रिड संबंधी समस्याएं

*31. श्री जवाहर सरकार:

क्या विद्युत मंत्री यह बताने की कृपा करेंगे कि:

- (क) 117 गीगावाट के एकीकृत राष्ट्रीय नेटवर्क के बावजूद नवीकरणीय ऊर्जा की ग्रिड संबंधी समस्याओं के जारी रहने के क्या कारण हैं;
- (ख) ताप और जल विद्युत उत्पादन के पैमाने और स्थिरता के लिए निर्मित ग्रिड में नवीकरणीय ऊर्जा के एकीकरण से संबंधित क्या समस्याएं हैं;
- (ग) नवीकरणीय ऊर्जा स्रोत ग्रिड-कनेक्टेड जेनरेशन सिस्टम (आरईएस-जीजीएस) के कार्यान्वयन में कितनी प्रगति हुई है और क्या उच्चतर प्रारंभिक निवेश लागत में कमी लाने की कोई योजना है; और
- (घ) क्या वितरण कंपनियों को बहुत विलंब से भुगतान किए जाते हैं और जिन्हें वे विलंब से आगे भेजते हैं, जिसके परिणामस्वरूप नवीकरणीय ऊर्जा में गहरी वित्तीय कठिनाईयां पैदा होती हैं?

उत्तर

विद्युत और नवीन एवं नवीकरणीय ऊर्जा मंत्री
(श्री आर.के. सिंह)

(क) से (घ) : वितरण सभा पटल पर रख दिया गया है।

“नवीकरणीय ऊर्जा की ग्रिड संबंधी समस्याएं” के बारे में राज्य सभा में दिनांक 06.02.2024 को उत्तरार्थ तारांकित प्रश्न संख्या 31 के भाग (क) से (घ) के उत्तर में उल्लिखित विवरण।

(क) से (ग): यह कहना गलत है कि आरई क्षमता बढ़ने से ग्रिड स्थिरता में कोई समस्या आई है। ग्रिड स्थिर बना हुआ है। सरकार ने वर्ष 2014 से 196.558 गीगावाट उत्पादन क्षमता जोड़ी है, जिसमें 104.059 गीगावाट आरई क्षमता शामिल है, जिससे कुल उत्पादन क्षमता मार्च, 2014 में 248.554 गीगावाट से 70% बढ़कर दिसंबर, 2023 में 428.299 गीगावाट हो गई है। इस पर्याप्त क्षमता वृद्धि को समायोजित करने के लिए, भारत सरकार ने योजना बनाई और इसी अवधि में 189052 सर्किट किमी (सीकेएम) पारेषण लाइनें जोड़ीं। इसके परिणामस्वरूप अंतर क्षेत्रीय अंतरण क्षमता वर्ष 2014 में 36 गीगावाट से बढ़कर अब तक 116.540 गीगावाट हो गई है।

इसके अलावा 24000 सीकेएम पारेषण लाइनें निर्माणाधीन हैं और 17860 सीकेएम की बोली चल रही है। सीईए ने 500 गीगावाट की कुल आरई क्षमता को संभालने के लिए पारेषण वृद्धि की एक योजना तैयार की है और तदनुसार पारेषण क्षमता बढ़ाई जा रही है। जहां सरकार तेजी से पारेषण प्रणाली जोड़ रही है, वहीं नवीकरणीय ऊर्जा क्षमता भी तेजी से बढ़ाई जा रही है। आरई क्षमता 2014 में 75.5 गीगावाट से बढ़कर दिसंबर, 2023 तक 180.80 गीगावाट हो गई है। इसके अलावा, 103.66 गीगावाट कार्यान्वयनाधीन है और 71.65 गीगावाट बोली के अधीन है।

पवन और सौर क्षमता परिवर्तनशील और अनिश्चित है। नवीकरणीय ऊर्जा उत्पादन के बेहतर पूर्वानुमान और वास्तविक समय की निगरानी के लिए तेरह (13) नवीकरणीय ऊर्जा प्रबंधन केंद्र (आरईएमसी) संस्थापित किए गए हैं। परिवर्तनशीलता को हाइड्रो तथा थर्मल जैसे संसाधनों के माध्यम से भार प्रेषण केंद्रों द्वारा संतुलित किया जाता है। महत्वपूर्ण क्षमता के लिए ताप विद्युत संयंत्रों का अनुकूलन पहले ही किया जा चुका है और इसे शेष ताप विद्युत संयंत्रों में लागू किया जा रहा है। परिवर्तनशील आरई (वीआरई) प्रवेश का वर्तमान स्तर काफी कम है। वर्ष 2022-23 में उत्पन्न 1624.34 बीयू ऊर्जा में से केवल 173.8 बीयू (10.7%) वीआरई द्वारा उत्पन्न की गई थी।

सौर और पवन जो इन्वर्टर आधारित जनरेटर हैं, उन्हें ग्रिड में पारेषण लाइन खराबी के दौरान कनेक्टिविटी के लिए सीईए तकनीकी मानकों के अनुसार प्रतिक्रिया देने की आवश्यकता होती है। पिछले दिनों राजस्थान आरई-कॉम्प्लेक्स में इनमें से कुछ जनरेटर के ग्रिड से अलग होने की कुछ घटनाएं घटी थीं। तथापि ग्रिड स्थिर था। इन घटनाओं का पता अन्य बातों के साथ-साथ इन्वर्टर स्तर की सुरक्षात्मक प्रणाली सेटिंग्स से लगाया गया था, जिन्हें बदल दिया गया है और ऐसी घटनाओं को न्यूनतम कर दिया गया है।

जहां तक आरई स्रोतों से बिजली की लागत का संबंध है, यह पारंपरिक ऊर्जा स्रोतों की तुलना में सस्ती है। हाल की बोलियों में प्राप्त सौर टैरिफ लगभग 2.50 रुपये प्रति किलोवाट है और पवन टैरिफ लगभग 3.18 रुपये प्रति किलोवाट है। विभिन्न कोयला आधारित थर्मल उत्पादन स्टेशनों से टैरिफ आधारित प्रतिस्पर्धी बोली के लिए विभिन्न डिस्कॉमों की मांग को समेकित करते समय, कीमत लगभग 5.30 रुपये प्रति किलोवाट थी।

(घ) : जेनकोज का कुल बकाया वर्ष 2021-22 में 139947 करोड़ रुपये (आरई जेनकोज के 17232 करोड़ रुपये के बकाया सहित) था। सरकार ने नियम [विद्युत (विलंब भुगतान अधिभार और संबंधित मामले) नियम, 2022] लागू किए हैं, जिससे पिछले बकाया का भुगतान किश्तों में, के साथ-साथ वर्तमान बकाया का पूरा भुगतान सुनिश्चित हो गया है। बकाया राशि का भुगतान न करने से बाजार तक पहुंच का नियमन हो जाता है। परिणामस्वरूप जेनकोज का बकाया 139947 करोड़ रुपये से घटकर अब 49451 करोड़ रुपये (आरई जेनकोज का 3116 करोड़ रुपये) हो गया है।

SHRI JAWHAR SIRCAR: Sir, I had asked a question in relation to the variable characteristic of renewable energy. As you know, solar energy goes up in spikes and then falls down. As you know, wind energy also has its variations. Renewable energy *per se* has a strong variability factor which the Minister himself has mentioned. But the answer to my question is, 'No'; there is no problem of grid stability. Would the Minister like to hold on to the statement which is contradicted by several issues mentioned in his own reply? The reply is unusually big and there it mentions that generators are going out of grid.

MR. CHAIRMAN: Please ask the supplementary.

SHRI JAWHAR SIRCAR: Would the Minister like to clarify or will the Minister like to stand by such a categorical statement?

MR. CHAIRMAN: Now, both the hon. Minister and yourself happen to be former bureaucrats.

SHRI RAJ KUMAR SINGH: We also happened to be batch mates. Sir, if my batch mate has cared to read what I have written carefully, he will find that I have said that the grid, as of today, is totally stable. It is true that renewable energy is variable. But, there are ways of managing it and that is what we are doing, and that is why our grid is stable. God forbid if our grid became unstable because we have one grid connecting the whole country, the whole country will be aware of it. Did any of the Members feel any instability at all in the grid? They would not have because we are managing the variability by a number of methods. One way of managing variability is that we have set up thirteen renewable energy management centres whose sole task is to keep monitoring the generation in various renewable energy sources especially solar and wind. Then, we have hydro and we have flexibilized our thermal capacity. We have 55000 Megawatts of thermal capacity that has been flexibilized to ramp up and ramp down as per the requirement. And they are all on automatic generation control so that the ramp up and ramp down happens automatically and that is why you do not see any flickers despite the fact that so much of renewable energy is being faded. So, as of now, the grid is totally stable and we are managing the variability of RE. That is the answer.

SHRI JAWHAR SIRCAR: Sir, I had asked specifically about renewable energy system based grid RES-GGS. I had asked specifically about the health of DISCOMs which

are in a terrible state and everybody knows that DISCOMs are in a terrible state but the Minister has chosen not to reply to RES-GGS.

MR. CHAIRMAN: Put your supplementary.

SHRI JAWHAR SIRCAR: On DISCOMs, he replies to me on GENCOs.

MR. CHAIRMAN: What is your supplementary?

SHRI JAWHAR SIRCAR: Sir, my supplementary is this. What is his position on the new technology, RES stable renewable energy grids? And what is the health of DISCOMs which is going through a terrible phase? The DISCOMs are unable to honour their commitment because their bills are delayed. Instead of going in for DISCOMs, he has gone in for GENCOs.

SHRI RAJ KUMAR SINGH: Sir, again, I think I will have to correct my learned colleague, my batch mate. Firstly, there is no such thing called RES-GGS. There is no such thing as renewable energy source grid connected generation system; there is no such system. What happens is that the renewable energy capacities have inverters and they are connected to the grid where the dispatch centres manage the variability in connection with hydro and thermal. We are also adding storage capacities. So, the storage capacity is also something which responds to the variability. Now, as far as the second thing is concerned as to his question and reply, he says that he had asked the question about the viability of DISCOMs and the reply talks about something else. Now, I will just read out the question. His question says whether the very-delayed payments are received and passed on by DISCOMs continue to create deep financial difficulties for renewable energy. I have responded to that. I have pointed out that the total outstanding dues of all GENCOs including renewable energy was Rs. 1 lakh 39 thousand crores. That has been brought down by the methods, by the rules which we have put in place. That has been brought down to about Rs. 42,000 crores. It has been brought down from Rs. 1,39,000 crores to Rs. 42,000 crores and that is legacy dues. The current dues are totally up to date and that is responding to his question. He wants to know about the health of the DISCOMs. I am happy to inform him and the learned House that the health of the DISCOMs has improved tremendously under this Government. In 2014, the AT&C losses of DISCOMs was 27 per cent. Today, it is 15.41 per cent. That is the indicator of the health of the DISCOMs and how it has improved.

SHRI JAWHAR SIRCAR: Sir, I want to...

MR. CHAIRMAN: The two batch mates may interact over a cup of coffee. Now, Shri Karthikeya Sharma. ...(*Interruptions*)... Nothing will go on record.

SHRI KARTHIKEYA SHARMA: Sir, through you, I would like to ask the hon. Minister about the current provisions for small scale solar plants and renewable energy based electricity plants to connect with the grid. What assistance is provided by the Ministry?

MR. CHAIRMAN: Hon. Minister, keep in mind my coffee aspect.

SHRI RAJ KUMAR SINGH: I will be happy to host him. Sir, we have come out with something called the Green Energy Open Access Rules. Under the Green Energy Open Access Rules, we provided that any capacity above 100 mega watts can connect to the grid and get open access to wherever they want to transfer the energy and the transmission will also be free up to June 2025. If it is installed up to June 26th, it will be 75 per cent free and if it is installed up to June 27th, it will be 50 per cent free. That is the provision.

DR. AMEE YAJNIK: Sir, I would like to tell the hon. Minister that his reply is very elaborate. It mentions the RMECs and it also mentions the dues of the DISCOMs that have gone down. I have seen the policy initiatives in the last two to three years and they are bearing some kind of a fruit. I would like to know whether given the intermittency, the variability of the renewable energy and the challenges for the common grid, the emission training or the emission part in real forecast is being taken care of and whether we are going to strengthen that in the short term plan so that we have the grid strengthened for the renewable to enter into the main grid.

SHRI RAJ KUMAR SINGH: Mr. Chairman, Sir, it is a very pertinent question and we have put in place measures for exactly what the hon. learned Member has suggested. We have set up 13 renewable energy management centres, for this very purpose, for forecasting so as to ensure accurate scheduling. The generators have also been put under the obligation of putting up forecasting systems themselves. So, by and large, our scheduling continues to be quite accurate despite the availability and, of course, we are adding storage by and by. Currently, storage is expensive and that storage is actually the answer to the availability. That is the real answer to the risk because then you can store. The variability gets cancelled out. But it is expensive.

We had a grid for about 1000 mega watt hours of storage. The rate came out to be about Rs. 10 per kilo watt hour. That means for making solar, it comes to about Rs. 2.50 paise per unit. If you store it for one hour, it costs Rs. 10. So, that is how expensive it is. Pumped hydro is cheaper. So, we are adding lots of pumped hydro. We already have about 4,714 mega watts of pumped hydro in operation. By 2030, we will have about 26,690 mega watts of pumped hydro which comes to about 1,75,000 mega watt hours of storage. We will add battery storage as well. Currently, our battery storage capacity is 160 mega watt hours. By 2030, it will 12,360 mega watt hours.

डा. अशोक कुमार मित्तल: सर, वर्तमान में रिन्यूएबल एनर्जी की installed capacity 178 गीगावाॅट है, जिसमें 72 गीगावाॅट सोलर से आती है और 44 गीगावाॅट विंड से आती है। भारत सरकार का जो 500 गीगावाॅट का लक्ष्य है, उसको पूरा करने के लिए 45 से 50 गीगावाॅट की कैपेसिटी हमें ऐड करनी होगी। दूसरी तरफ सरकार द्वारा सोलर पीवी पर 40 प्रतिशत और सोलर पीवी सेल्स पर 25 प्रतिशत की बेसिक कस्टम ड्यूटी लगायी हुई है और जब हम 500 गीगावाट की capacity add करेंगे, तो हमारे existing grid system भी इस renewable energy को integrate करने के लिए fully equipped होने चाहिए। महोदय, आपके माध्यम से मेरा माननीय मंत्री जी से प्रश्न है कि सोलर एनर्जी की जो कॉस्ट है, उसकी कीमत बढ़ती जा रही है - capacity addition के बाद - One nation, One grid के माध्यम से renewable energy की storage - जैसे pump storage और battery storage को प्रोत्साहन देने के लिए सरकार क्या प्रावधान कर रही है?

SHRI RAJ KUMAR SINGH: Mr. Chairman, Sir, to respond to the second part of his question first, I have already pointed out that we are adding storage. For 1,000 MW hours of storage which we had bid out, we are providing VGF. Then, we have also provided VGF for 4,000 MW hours of storage. This is for battery storage. We believe, for pumped hydro storage, no VGF will be necessary, because the price of storage from pumped hydro comes approximately about Rs. 5. So, that is bearable. You have Rs. 5 for storage and Rs. 2.5 for solar. So, the delivered cost will be about Rs. 7.5. That is bearable and we are adding storage.

Secondly, the hon. Member mentioned about the Customs Duty. Mr. Chairman, Sir, it was necessary. It was necessary, because when we started our journey, we started expanding our renewable energy capacity at a very rapid pace — our pace of renewable energy capacity addition was one of the fastest in the world. We had the manufacturing capacity of about 20 GW of modules in our country. That met only a part of our requirements and almost 90 per cent used to be imported. Now, the country we were importing from started dumping in order to kill our nascent manufacturing industry. So, we put safeguard duties. That did not work. So, we put Customs Duty. As a result of that, Sir, you will be happy to know and the House will

be happy to know that our domestic manufacturing capacity has gone up from 20,000 MW to 50,000 MW and it will go to about 100,000 MW by the end of 2030. They have already started exporting to other countries. Very soon, we shall be one of the major exporters as well, apart from meeting our requirements.

MR. CHAIRMAN: Q.No.32