

Year Plan he is going to raise the installed capacity of cement production in the country to a sky-high position for achieving self-sufficiency.

Will the Minister of Steel and Mines ensure that the deposits of limestone in the 'No-Industry Districts' of Madhya Pradesh, that is, Raigarh and Sarangar, will be exploited for necessary cement production ?

The total quantum of deposit of stromatolite limestone in both these districts has been explored in detail.

May I know whether detailed geological prospecting has been made in these two districts and what is the outcome of the detailed survey ? What is the result of the regional probing exploration done in these two districts so that Government of India can take a firm stand to locate industries in these two 'no industry' districts ?

SHRI ARIF MOHAMMAD KHAN : Sir, in Raigarh, 26.73 million tonnes of limestone has been proved, a probable estimate of about 37.16 million tonnes and 59.33 million tonnes under positive category.

DR. VASANT KUMAR PANDIT : Sir, several surveys have been made in regard to the finding out the lime deposits and all the surveys have been for grade which is being used for large, medium and mini-cement plants. Recently, the Khadi and Village Industries Corporation has developed a new compound made of low grade lime and that cement is also used for many other purposes including low cost constructions. I want to know whether these surveys reveal lower grade of lime which can be used for the above purposes and whether such surveys have been done in the districts of Vidisa and Guna which are backward areas.

SHRI ARIF MOHAMMAD KHAN : About Vidisa no information on low grade limestone is available with me.

PROF. N. G. RANGA : He had asked about the use of low grade lime.

SHRI ARIF MOHAMMAD KHAN : The question was about the use of lime in the cement plants. Cement plants are dealt with the Ministry of Industry. As far as our Ministry is concerned, no investigation for low grade limestone has been carried out in the District of Vidisa.

DR. VASANT KUMAR PANDIT : I have asked about the lower grade lime which can be used for the construction purpose.

SHRI ARIF MOHAMMAD KHAN : I would again repeat that no investigation has been carried out in Vidisa District either of high-grade or of low grade limestone.

Commercial Production of Photo Voltaic Devices

*894. **SHRI PRATAP BHANU SHARMA :** Will the PRIME MINISTER be pleased to state :

(a) whether know-how for the commercial production of Photo voltaic devices have been developed in our country;

(b) if so, the details thereof; and

(c) how many companies are manufacturing these systems in the country ?

THE MINISTER OF STATE IN THE DEPARTMENTS OF SCIENCE AND TECHNOLOGY, ATOMIC ENERGY, SPACE, ELECTRONICS AND OCEAN DEVELOPMENT (SHRI SHIVRAJ V. PATIL) : (a) to (c) A Statement is laid on the Table of the House.

STATEMENT

(a) Yes, Sir.

(b) and (c) Several Industrial units, laboratories of CSIR, Defence and Atomic Energy and educational institutions such as I.I.Ts are engaged in improvements of photo-voltaics including preperation of basic silicon material.

Central Electronics Limited (CEL), a public sector undertaking under the Department of Science & Technology, has been engaged in R & D, technology development and manufacturing of solar photovoltaic cells, modules and systems. Using Imported high purity silicon material, CEL has already supplied solar cells, modules and systems for various applications in remote, unmanned and unelectrified areas and off shore well head platforms. A pilot plant with a capacity of 600 KW per year has been established. This is being enhanced to 3 MW per year in the coming years.

Bharat Heavy Electricals Limited has also initiated the production of solar cells, modules and systems for various terrestrial applications. Both Bharat Heavy Electricals Limited and Bharat Electronics Limited

have made space qualified solar cells for applications in our space programmes.

श्री प्रताप भानु शर्मा : अध्यक्ष जी, माननीय मन्त्री जी ने जो जवाब दिया है उससे स्पष्ट हो जाता है कि पिछले दो तीन वर्षों में हमारी सरकार ने ऊर्जा के वैकल्पिक साधनों के विकास के लिए जो कार्य किए हैं, निश्चित रूप से उस के लिये हमारी प्रधान मन्त्री बधाई की पात्र हैं। जहाँ पहले ऊर्जा के वैकल्पिक साधनों के विकास के लिए एक करोड़ भी खर्च नहीं होता था, हमारी सरकार इस साल 37-38 करोड़ रु. खर्च कर रही है। अतः वे निश्चित रूप से बधाई की पात्र हैं। मैं सेन्ट्रल एलेक्ट्रानिक्स लिमिटेड के इंजीनियर्स और सेल के इंजीनियरों को बधाई देना चाहता हूँ जिन्होंने ऊर्जा के वैकल्पिक साधन सौर ऊर्जा के विकास के सम्बन्ध में सराहनीय कार्य किया है। मैं माननीय मन्त्री जी से जानना चाहता हूँ जहाँ तक सौर ऊर्जा के विद्युतीय प्रयोग का सवाल है, फोटो वालटेइक सेल्स से, तो उसका उत्पादन करने की टेक्नालाजी हासिल कर ली है पर उसको कैसे कम लागत में बनाया जा सकता है, कामशियल प्रोडक्शन के विकास के लिए, हमारी सरकार किस तरीके से आगे कार्यवाही करने का प्रावधान रखती है?

मैं यह भी जानना चाहता हूँ जिस तरह से हम जापान से या अन्य देशों से, जहाँ पर सोलर टेक्नालाजी विकसित हो चुकी है, एडवांस्ड टेक्नालाजी हासिल कर रहे हैं, क्या इस विषय में भी फोटो वालटेइक डिवाइस का आगे विकास करने के लिए टेक्नालाजी हासिल करने को हमारी सरकार ने कोई पहल की है ?

श्री अटल बिहारी वाजपेयी : पहले यह बता दिया जाए कि फोटो वालटेइक डिवाइस क्या है, क्योंकि हम उन अज्ञानी सदस्यों में से हैं जो न सवाल समझ पा रहे हैं और न जवाब समझ पायेंगे।

अध्यक्ष महोदय : वाजपेयी जी, मेरी भी बड़ी हासत है।

वाजपेयी जी मैं आपका साथ दे रहा हूँ।

SHRI SATYASADHAN CHAKRA-BORTY: As you were nodding your head, we thought, you have followed it.

अध्यक्ष महोदय : मैं उन्हीं की बात पर हाँ कर रहा हूँ।

श्री हरिकेश बहादुर : अध्यक्ष महोदय, जवाब नहीं आ रहा है।

अध्यक्ष महोदय : जवाब लाजवाब है।

श्री शिवराज वी. पाटिल : अध्यक्ष महोदय, फोटो वालटेइक डिवाइस वह सिस्टम है, जिसमें सूरज के प्रकाश का उपयोग किया जाता है। सूरज का प्रकाश एक ऐसा साधन है, जो हजारों सालों तक जीवित रहेगा। फोटो वालटेइक सिस्टम में सूरज की किरणों से ताप नहीं विद्युत बनाई जाती है। इसमें कुछ ऐसी सिलिकॉन प्लेट्स लगाई जाती हैं, जिन पर सूरज की किरणें पड़ने से वह विद्युत ऊर्जा में रूपान्तरित हो जाती है। फिर उस विद्युत ऊर्जा का उपयोग किया जाता है। इतना वालटाइक सिस्टम के बारे में बताने के बाद सम्मानीय सभासद की मात्मात के लिए यह बताना चाहूंगा कि इस में सबसे अहम चीज कीमत कम करने की ही है। कीमत को कम करने का प्रयास शासन की ओर से हो रहा है। बड़े पैमाने पर इस डिवाइस को बनाकर इसकी कीमत को हम कम कर सकते हैं या इस के लिए बेसिक मैटिरियल यहां बनाकर उसकी कीमत को कम किया जा सकता है। ये सब चीजें यहां पर बन रही हैं, मगर कम कीमत करने के लिए पांच मेगावाट की एक दूसरी फैक्ट्री बनाना चाह रहे हैं, जहाँ पर बड़े पैमाने पर इसको बनाया जाएगा। नेशनल सिलिकान फैसिलिटी हम देश में इस्टैबलिश करने जा रहे हैं। सिलिकान प्लेट लगाने के बाद हम उस का उपयोग करेंगे। दूसरा सवाल माननीय सदस्य का नयी टेक्नालाजी को लेने का है। हम देश में उस टेक्नालाजी को बनाने की कोशिश कर रहे हैं और अगर हमें वह कहीं से मिलती है, तो उसे लेने में हमें कोई दिक्कत नहीं है।

श्री प्रताप भानू शर्मा : अध्यक्ष महोदय, इस तरह से अनुसंधान और विकास परिषद टेक्नालोजी को डेवलप कर रही हैं, इसके काम-शियल प्रोडक्शन के लिए एन० आर० डी० सी० संस्था द्वारा प्राप्त रिपोर्ट की ओर माननीय मंत्री का ध्यान आकषित करना चाहता हूँ। यह रिपोर्ट जुलाई, 1983 की है, इसके पृष्ठ 73 पर "अर्थ-आंगर", जो कि जमीन में छेद करने के लिए बनाया जाता है, के बारे में लिखा है कि उसकी लागत प्रति यूनिट 3 रु. है। मेरे विचार में यह कीमत कभी 15 साल पहले रही होगी, लेकिन आज के जमाने में किसी भी हालत में उसकी कीमत 100 रु. से कम नहीं होगी। इसका वजन भी ढाई या तीन किलो होता है। इसी प्रकार पृष्ठ-115 पर लिखा है -

"Solar still is a device developed by the Institute to obtain good quality water by the use of solar energy. The device is very much useful for the petrol pump and the laboratory situated at remote places."

एक 10×10 का मकान बनाकर और उसके ऊपर "रिफ्लेक्टर मिरर" रख कर सौर ऊर्जा के तापीय प्रयोग सेड्वेपोरेट करके डिस्टिल वाटर प्राप्त करते हैं। उसकी लागत भी आज के जमाने में किसी भी हालत में 5 हजार रु० प्रति यूनिट से कम नहीं आती है, लेकिन इसमें लिखा है 350 रुपए। कहने का तात्पर्य यह है कि जो टेक्नालोजी हमारे विभिन्न रिसर्च इन्स्टीचूट डेवलप कर रहे हैं, उनको आधुनिक और आज के वर्तमान दामों के हिसाब से बनाया जाए, जिससे जो भी इन्डस्ट्रियल इन्टरप्रिन्योस लेना चाहे, उसको सही जानकारी हो तथा सही इस्तेमाल हो। इसके बारे में माननीय मंत्री जी क्या कर रहे हैं या सरकार का क्या करने का इरादा है ?

श्री शिवराज बी. पाटिल : अध्यक्ष महोदय, जो बात सम्माननीय सभासद द्वारा बताई गई उसमें कोई दो मत नहीं है। लेकिन जिसकी चर्चा वह कर रहे हैं, वह फोटो वालटेइक से

अलग है। सूरज की किरणों का उपयोग हम तापीय ऊर्जा बनाने के लिए कर सकते हैं और विद्युत बनाने के लिए भी कर सकते हैं।

जो चर्चा उन्होंने की है वह ताप के सम्बन्ध में है, थर्मल एनर्जी के सम्बन्ध में है, इलेक्ट्रिकल एनर्जी के सम्बन्ध में नहीं है।

एन०आर०डी०सी० ने अपनी किताब में जो लिखा है, उस की जांच पड़ताल कर के ही बतला सकता हूँ। लेकिन जैसा वह उल्लेख कर रहे थे, वह फोटो-वोल्टेक कैटेगरी में नहीं आता है, दूसरी कैटेगरी में आता है।

वह चाहते थे कि कीमतें कम हों, यह सही बात है। हमारा प्रयास है कि कीमतें कम करें और इस के लिए बड़ी मात्रा में इस का उत्पादन बढ़ाने जा रहे हैं, इस में जो वस्तुएं उपयोग में आती हैं उन को बनाने के लिए यहां पर इण्डस्ट्री बना कर, उस में जो कैमिकल्ज लगते हैं उन को बना कर, सारी चीजों का उपयोग कर के इन की कीमतें कम कर के लोगों के पास पहुंचाने की कोशिश कर रहे हैं।

SHRI CHANDRAJIT YADAV : If mass production energy is possible from the solar source, it will be a very major breakthrough and for a country like India, it will be a kind of revolution in the field of energy. I would like to know from the Prime Minister whether a proper study has been made and whether any country has succeeded in getting energy from the solar source on a mass scale; if so, what is the relative cost? Next, what are the possibilities in India? Whether it has been studied keeping in view the Indian conditions and whether it is possible to have mass production of energy from this source, and if so, what will be the relative cost and what are the plans of Government and what are they thinking to do in this respect?

SHRI SHIVRAJ V. PATIL : It is a very good question and I would like to go into more details.

As far as this technology is concerned, it is not developed throughout the world. Major attempts have been made only in two countries in this field—one is United States of America and the other is Japan. Of course

there are other countries, which are also doing some technological development in this field. But, solar energy is very important in India or in those parts of the world, where sunlight is available in abundance. As the developed world and other countries are having other sources of energy, their attention is not attracted to this kind of energy. So, attempts have to be made in those parts of the world, where sunlight is available in abundance, to develop appropriate technology. India is one of such countries and we are paying attention to develop this kind of technology.

Of course today, cost-wise, solar energy cannot compare well with other energies. But, as I have explained just a few minutes before, our attempt is to reduce the cost. How do we do this? We can achieve this by developing an appropriate technology which will help us in reducing the costs; by developing proper material which can be produced at a low cost; by developing other appliances which can also help us to reduce the costs and by combining all these factors, we would like to see to it that the cost of technology, cost of appliances, etc. are reduced further.

Now, we would like to move in this direction in such a manner as not to depend on other countries, but to depend on ourselves, not to emulate what is being done in other countries, but to give this technology to other parts of the world, if possible.

Moreover, this technology has to be used in such parts of our country where the electrical source cannot be taken. In hilly areas, in valleys, in the ocean where electric wires cannot be easily taken, other means of energy have to be provided and in such cases, cost cannot be considered an important factor. In such areas, this technology may be used. We are keeping all these factors in view and we are trying to develop this technology.

DR. KARAN SINGH : It is a matter of satisfaction that some attention is being given to solar energy, because apart from the fact that sunlight is widely available, it is a type of energy resources, which is totally pollution-free, unlike thermal energy. I would like, just to ask the hon. Minister whether, when he is developing these special areas for solar technology, special attention is being given, e.g., to a place like Ladakh where the precipitation is only 3" a year. There is sun-

light throughout the year, and because of the rarefied air, the sunlight is also very strong. It would seem to me to be an ideal place for the development of solar energy on a large scale.

There would be other areas, may be, of that nature : may be, the Jaisalmer desert areas and so on. Are these specialrid areas, particularly the high altitude areas like Ladakh being given special attention the development of solar energy ?

SHRI SHIVRAJ V. PATIL : We have already sent some devices to the Ladakh area, Barmer and Rajasthan desert areas. There, these devices are being used. As and when we develop appliances, we on make these instruments available in those areas on an increasing scale.

PROF. MADHU DANDAVATE : The photo voltaic devices... Hon. Minister ; Are you attentive to me ? I am addressing a question to you, if you don't mind. Can I catch your ear ?

I would like to know this from the hon. Minister : In these photo voltaic devices which are going to be produced on a commercial scale, the photo energy will be converted into electrical energy ; and, therefore, the utilisation of energy will depend upon the extent of voltage that is developed in these devices. Can I know from the hon. Minister—in this type of devices which are going to be produced on a commercial scale, what is the extent of voltage that is developed by converting photo energy into electrical energy ? And in case the voltage is already known, to what purposes would it be used ?

SHRI SHIVRAJ V. PATIL : If it is too technical a question, I would like to get the information and give it. But for the information of the hon. Member who is a professor in Physics, I would like to say that the photo voltaic energy can be used for heating the house, for refrigeration purposes, for bringing out water from the tube-wells and for running small mills also.

I am very happy to inform that our scientists have developed a vechiles, a rickshaw which can be run with the photo voltaic energy. They have put a panel on the top of it ; and that top turns the photo voltaic energy in to mechanical energy, which is used for running the rickshaw also.

As far as the creation of voltage is concerned, I will inform the hon. Member later on.

PROF. MADHU DANDAVATE : The voltage may be laid on the Table of the House.

SHRI SHIVRAJ V. PATIL : I will lay it on the Table of the House, and on the lap of the hon. Member.

MR. SPEAKER : Don't electrocut him.

SHRI C.P.N. SINGH : I would like the hon. Minister to inform this House whether the technology at the CEL has been updated. In 1982, the commercial production started for the photo voltaic silicon cells which are formed into arrays, and then the modules. At that stage, production was 50 kw per year, and it was to be increased in 1984-85 to 1 MW. The technology developed at the CEL was a technology which was nascent. But to-day in U.S.A. and Japan, the amorphous technology for converting these cells and generating power is far more productive; and the energy output is higher. Will the hon. Minister inform the House and me whether this amorphous technology which Japanese Government and some private Companies of the U.S.A. had agreed to transfer and work together in RD is being negotiated for by CEL?

Secondly, there was the NASPED programme in October, 1980, by which there were going to be a lot of demonstrative units set up in India, including Ladakh. As far as my information goes, not only solar energy but wind energy would be far more cost effective in Ladakh owing to the constant high wind velocity. But that is upto the Ministry concerned.

Finally I would like the Minister to inform the House that after 1982 December how many photo voltaic demonstration devices have been set up in the country from January, 1983 to March, 1984.

SHRI SHIVRAJ V. PATIL : Our approach is to use non-conventional sources of energy, photo voltaic energy, wind energy, bio-gas energy and to meet the demand for electricity and power in our country. It is a fact that the technology with regard to the photo voltaic is developing in some coun-

tries; in some parts of the world, mono-crystal technology is used, poly-crystal technology is used. In Japan, they are trying to develop amorphous technology and the ribbon technology also. I am told that the amorphous technology and the ribbon technology has not reached the final stage; it is still in the process of development. Our attempt, as I have already said, is to develop the crystal technology, amorphous technology and the ribbon technology in our country; and if, it is available from outside the world, we will not hesitate to get it; it depends upon its availability; if it is not available, then we will not wait for the technology to come from outside; we will ourselves develop it. As far as production of the appliances and sending them to Ladakh and other areas are concerned, I will pass on the figures to the hon. member.

Supply of Sulphuric Acid to Coastal Chemicals Private Limited by Hindustan Zink Limited

*895. **SHRI K.A. SWAMI :** Will the Minister of STEEL AND MINES be pleased to state :

(a) whether the Hindustan Zink Ltd. Visakhapatnam has been supplying its by-product (Sulphuric acid) to Coastal Chemicals Pvt. Ltd. through direct pipelines for manufacturing Alum;

(b) if so, the terms and conditions of such supply;

(c) the stipulated amounts of such supply;

(d) whether the Coastal Chemicals Pvt. Ltd. has been diverting the byproduct to Pragati Fertilizers Limited and others in violation of the agreement; and

(e) if so, the details thereof?

THE MINISTER OF STATE IN THE MINISTRY OF ENERGY (SHRI ARIF MOHAMMAD KHAN) : (a) to (e) A statement is laid on the Table of the House.

STATEMENT

The Hindustan Zink Ltd., a public sector company under the administrative control of the Department of Mines, has entered into a 10 years contract in August, 1974 for supplying sulphuric acid to M/s. Coastal