

*Chapter 12*  
***India's Mission Of Providing Clean And Affordable  
Energy: Analyzing The Prospect Of KUSUM And  
NEMMP***

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## *Introduction*

Climate change is an issue which has been discussed for decades. It is a broad issue which covers a variety of sub-issues which might be a cause or result of climate change or even both. Resource inequality is one such issue. Inequitable distribution and excess use of resources have resulted in an over-exploitation of resources all over the globe. The global population is set to grow by 28 percent and is predicted to use 71 percent more resources per capita by 2050. Without urgent steps to increase efficiency, the global use of metals, biomass, minerals such as sand, and other materials, will increase from 85 to 186 billion tons per year by 2050. The Sustainable Development Goals will not succeed without greater resource efficiency. Resource efficiency policies and initiatives can cut resource use by 26 percent and reduce greenhouse gas emissions by an additional 15-20 percent, by 2050.<sup>156</sup>

This increase in resources can be explained in terms of the expansion of population and consumer trends. The world has seen a rise in population since the beginning of the Industrial age which in turn brought about a change from the use of non-renewable to renewable resources. With the urban and modern ways of life becoming more famous, the need of material-use increased exponentially. As a result, the stock of natural resources like fossil fuels, land under forest cover decreased to critical levels. This, in turn, affected the poor and the rural people who depend on such natural resources.

New technologies like electricity, developed in the urban, where on the other hand, the tribal and rural faced trouble while gathering resources necessary for their survival. Not only this, but such natural resources also act as a form of fuel for the basic activities of a

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<sup>156</sup> UN Environment Programme, *Assessing Global Resource Use*, International Resource Panel, (December 3, 2017), <https://www.resourcepanel.org/reports/assessing-global-resource-use>

household. People who don't have access to such forms of fuel which serves as a source to keep a household warm come under what is known as 'fuel poverty'. To carry out their everyday lives, access to energy and its different forms is an 'absolute' necessity for a large population of people all around the world.

In situations where people do have access to energy, it is often the poorest that end up paying disproportionate shares of income for energy, not least because the higher upfront investments in energy-efficient equipment are more difficult to bear for low-income households.<sup>157</sup> If clean and modern energy sources like electricity are provided in rural areas, then there is a chance that it may further lead to a more inequitable society, especially when we consider the gender aspect. Women generally in rural areas, in the form of productive activity, spend time collecting wood and water for their respective households and the introduction of modern energy sources will put a stop on the productive activities taken up by women.

Along with this, even if access to electricity is somehow provided, it will lead to a similar problem of environmental degradation. If countries still use coal as the main source for providing electricity, even then, the carbon emissions produced are unfit for the environment. There cannot be a trade-off between air quality and cheap access to electricity.

To tackle the problem of inequalities and environment at the same time while providing cheap, energy access to electricity to the entire population, we need to integrate several 'Sustainable Development Goals' to bring about a 'Win-Win' situation for all classes of society. The goals which need to be considered are, 'No Poverty'; 'Affordable and Clean Energy'; 'Reduced Inequalities' and 'Climate Action'.<sup>158</sup> For achieving these goals, strong policies need to be implemented across the globe with efficient monitoring systems and laws to support the policies and bind the government institutions legally. Policymakers can address the interlinkages between energy, poverty, and inequality by combining energy access with the promotion of productive energy use while acknowledging 'fuel poverty' and supporting energy efficiency investments by low-income households.

In India, the maximum use and exploitation of resources occur in the agricultural and transport sectors where illegal storage and selling of electricity is a common thing practiced by all sections of society. The Indian Government, to enhance the energy sector, brings forward two policies, namely KUSUM (Kisan Urja Suraksha evam Utthan Mahabhiyan) and NEMMP (National Electric Mobility Mission Plan) in the agricultural and transport sector respectively. These policies can revolutionize both the sectors if implemented

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<sup>157</sup> UNDP; *Interlinkages among Energy, Poverty and Inequality*; (February 12, 2018); [https://sustainabledevelopment.un.org/content/documents/17480PB\\_8\\_Draft.pdf](https://sustainabledevelopment.un.org/content/documents/17480PB_8_Draft.pdf)

<sup>158</sup> UNDP; *Sustainable Development Goals*; <https://www.undp.org/content/undp/en/home/sustainable-development-goals.html>

efficiently but also carry the risk of increasing the level of inequality between different classes of society.

## *Kisan Urja Suraksha evam Utthan Mahabhiyan*

As a part of Intended Nationally Determined Contributions (INDC), India has committed to increase the share of installed capacity of electric power from non-fossil fuel sources to 40% by 2030. The Cabinet had approved scaling up of solar power target from 20,000 MW of grid connected solar power projects to 1, 00,000 MW by 2022.<sup>159</sup> (1) To achieve this target, existing solar energy and other renewable energy generation plants have to be upgraded. New plants may be developed, preferably by farmers, who could use their barren or uncultivable land for such solar energy plants, which could serve as a source of income as well as will provide them excess energy to be used in the future.

### *Guidelines and Implementation*

At present, around 30 million agricultural pumps are installed in India, of which 10 million are diesel pumps. These diesel pumps have to be replaced by solar water pumps and solarize grid-connected agriculture pumps. Solarization of diesel pumps will lead to a reduction on the dependency on conventional resources and at the same time will reduce the burden on the Distribution Companies (DISCOMs). The Government of India, on July 22, 2019, approved a scheme with the name Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM KUSUM), which aims to provide energy and water security to farmers. Following are the major components of the approved scheme:

Component-A: Setting up of 10,000 MW of Decentralized Ground / Stilt Mounted Grid Connected Solar or other Renewable Energy based Power Plants. Component-B: Installation of 17.50 Lakh Stand-alone Agricultural Pumps; and Component C: Solarization of 10 Lakh Grid Connected Agricultural Pumps<sup>160</sup>

The Component-A and Component-C will be implemented initially on pilot mode for 1000 MW capacity and one lakh grid-connected agriculture pumps respectively and Component-B will be implemented in a full-fledged manner. It is a 140 thousand crore scheme to replace diesel pumps and grid connected electric tube wells for irrigation by Solar Irrigation Pumps (SIP) with a buy back arrangement for farmer's surplus solar energy at a

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<sup>159</sup> Ministry of New and Renewable Energy; *Guidelines for Implementation of Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (PM KUSUM) Scheme; (July 22, 2019);*  
<https://mnre.gov.in/sites/default/files/webform/notices/KUSUMguidelines.pdf>

<sup>160</sup> Ministry of New and Renewable Energy; *Guidelines for Implementation of Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (PM KUSUM) Scheme; (July 22, 2019);*  
<https://mnre.gov.in/sites/default/files/webform/notices/KUSUMguidelines.pdf>

remunerative price. Farmers will be contributing 10 percent of the capital cost, along with which 30 percent will be provided by the banks in the form of loans and the remaining 60 percent will be borne equally by the Central and State Governments.

Renewable energy based power plants (REPP) of capacity 500kW to 2 MW will be setup by individual farmers/ group of farmers/ Farmer Producer Organizations (FPO) or other such groups. The REPP will be preferably installed within five km radius of the substations to avoid the high cost of sub-transmission lines and to reduce transmission losses. According to the scheme, the REPP would be implemented primarily on barren or uncultivable land. Agricultural land is also permitted under the scheme given that the solar plants are installed in stilt fashion (i.e. raised structure for installation of Solar panels) and with adequate spacing between panel rows for ensuring that farming activities are not affected. Ministry of New and Renewable Energy (MNRE) will be responsible for allocating initial capacity of 1000 MW for Pilot Project to DISCOMs based on their demand and preparation for implementation. These pilot projects will be monitored during implementation and also on completion to evaluate their success and a detailed report will be prepared for further recommendations for scaling up the capacity under this component. Such evaluation may be done internally or through an external agency as per the decision of the MNRE. Under Component B, individual farmers will be supported to install standalone solar Agriculture Pumps for replacement of the existing diesel Agriculture pumps/irrigation systems in off-grid areas, where grid supply is not available, provided that these areas use micro-irrigation techniques to save water.

This scheme also supports the manufacturing of the components, to be used in the production of solar panels and modules. The guidelines make it mandatory to use indigenously manufactured solar panels with indigenous solar cells and modules. The motor-pump-set, controller and balance of the system are also to be manufactured indigenously. This scheme can check groundwater-overexploitation, offer farmers day-time uninterrupted power supply, reduce the carbon footprint of agriculture, curtail farm power subsidy burden and most of all, provide a new source of risk-free income for farmers. But even after these benefits, there are some problems which might affect the efficiency of the scheme and produce adverse effects on both the farmer and the environment.

## *Drawbacks of the scheme*

A SIP owner might utilize the scheme for personal benefits. A farmer might 'encash' free solar energy by irrigating water intensive crops or by increasing cropping intensity. He might extract more groundwater and sell the extra water at a cheap price to neighbors. This will lead to the overexploitation of groundwater, which the scheme itself aims to reduce. Consider the case of Punjab, earlier, around 1980's the groundwater was available to farmers around a depth of 50-60 ft. but due to indiscriminate water exploitation after the

availability of electric pumps, the groundwater level has decreased drastically, lowering the water level to about 200 ft. With reliable day-time free solar power, SIP's can be way more lethal for the aquifers.<sup>161</sup>

India's agricultural sector relies largely on un-metered connections which make the implementation of Component C a mammoth task, as it requires an un-metered connection. Even before the announcement of this scheme, there were cases of the inability of the DISCOM's to pay any on-grid beneficiary. It presents another big problem in its capability to pay millions of additional prosumers for the next 25 to 28 years. Even though the production of indigenous cells and modules is mandated, but the production of such factories is almost one-tenth of the required capacity. Even after certain efforts by MNRE, the manufacturing process has still not gained enough pace, which might delay the entire program and adversely impact its implementation. Apart from this, economically, there are several disparities and inequalities among the farmers which might be increased and need to be addressed to ensure better efficiency of the scheme.

## *Suggestions and solutions for a better implementation of the scheme*

KUSUM should aim to reduce the existing disparities among states regarding the deployment of solar pumps and irrigation access. The biggest problem lies with the farmers with different size of landholdings and incomes. KUSUM should provide greater financial assistance to smaller farmers belonging to socially disadvantaged groups. Small and marginal farmers might be provided with a higher capital subsidy whereas large farmers might be provided with long-term loans with interest subsidies. As mentioned earlier, many farmers already have access to SIP. Under the scheme, these farmers will also get similar subsidy rates and regular income on selling the surplus energy to DISCOM's. A different subsidy rate for such farmers will ensure a balanced level of competition and will at the same time prevent the exploitation of resources. Moreover, instead of selling-off the surplus amount of energy, a farmer can also utilize the excess amount of energy in the post-harvesting processes, which will enhance farm incomes through local value addition. More approaches must be included in the program and proper metering must be ensured to keep a tight check on the exploitation of resources, especially groundwater.

KUSUM has the ability to bring about a revolution in the agricultural sector from an era of inequitable distribution of resources and unreliable supply to one of affordable, reliable

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<sup>161</sup> *The Hindu*; Paddy, tube wells and depleting groundwater: Why Punjab's water resources are under strain; (August 17, 2019); <https://www.thehindu.com/news/national/other-states/paddy-tube-wells-and-depleting-groundwater/article29112950.ece>

and equitable access to energy and water if the Government succeeds in implementing it efficiently all across India.

## *National Electric Mobility Mission Plan*

The Government of India launched the National Electric Mobility Mission Plan (NEMMP) in 2020. This plan aims to promote hybrid and electric vehicles in the country and ensure fuel security. The main target under this plan is to achieve 6-7 million sales of hybrid and electric vehicles by the start of 2020. The scheme will save about 9500 Million liters of Crude Oil equivalent to Rs. 62000 Crore savings.<sup>162</sup> In order to provide a major push for early adoption and market creation of both hybrid and electric vehicles, the Government has also launched a scheme with the name Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME India) under NEMMP 2020 in the Union Budget for 2015-16 with an initial outlay of Rs. 75 Crore, which will allow such vehicles to become the first choice of consumers and will gradually lead to a replacement of the vehicles which use conventional resources like oil or natural gas as forms of fuel.

### *Implementation of the scheme*

The Phase-I of the scheme was initially launched for 2 years beginning from April 1, 2015, but was subsequently extended from time to time and the last extension was allowed up to March 31, 2019. Implementation was based on four focus areas, namely Demand creation, Technology Platform, Pilot Project and Charging Infrastructure.<sup>163</sup> After the implementation of Phase-I, it was concluded that a sufficient number of charging infrastructure is required to achieve the expected outcome of the plan which should be given more focus in Phase-II of the scheme.

The Phase-II of the Scheme began from April 1, 2019, which aims to offer an upfront incentive on the purchase of electric vehicles and establish the necessary charging infrastructure required. The guidelines which encourage the faster set-up of charging infrastructure also aim to generate employment/income opportunities for small entrepreneurs. Apart from this, the Government has also introduced several other incentives to promote electric mobility in the country, Under the new Goods and Services Tax (GST) rules, the rates of GST on Electric Vehicles has been kept in the lower bracket of 12% (with no cess) as against the 28% GST rate with cess up to 22% for conventional

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<sup>162</sup> Ministry of Heavy Industries and Public Enterprises; *National Electric Mobility Mission Plan*; (August, 2012); <https://dhi.nic.in/writereaddata/Content/NEMMP2020.pdf>

<sup>163</sup> Ministry of Heavy Industries and Public Enterprises; *National Electric Mobility Mission Plan*; Press Release; (July 8, 2019); <http://pib.gov.in/newsite/PrintRelease.aspx?relid=191337>

vehicles.<sup>164</sup> Ministry of Power has also allowed the sale of electricity as a form of ‘service’ for charging of electric vehicles.<sup>165</sup> This would provide a huge investment in charging infrastructure. Ministry of Road Transport Highways has also issued notification regarding exemption of permit in case of battery-operated vehicles.<sup>166</sup>

## *Drawbacks of the scheme*

Even though this plan appears to be ambitious, but due to certain limitations and flaws, NEMMP may fail to achieve its desired output by 2020. These are mainly on account of higher cost of acquisition, challenges relating to batteries (these include issues relating to price, range, performance, etc.), consumer acceptability, performance standards of xEVs (Hybrid and Electric Vehicles) in comparison to traditional IC engine-based vehicles (range, speed, acceleration, etc.) lack of charging infrastructure, etc. Moreover, not many auto-mobile companies present the public with a variety of options when it comes to Electric and Hybrid vehicles. The Government has to consider all sections of society and all types of vehicles including 2-wheelers, 3 wheelers and large vehicles like trucks and buses. In urban areas, we have people with a budget of around 2-3 lakhs to even people who can spend crores on a luxury car. If the companies fail to provide options to all sections of society, then the acceptability of this scheme will fail to spread across the country. Similarly, in rural areas or small towns, people use 2-wheelers much more frequently than 4 wheelers like cars or SUVs. Facilities like education and healthcare have failed to reach the most remote corners of the country and it took the country around 70 years to provide the basic needs. This raises a serious question regarding the set-up of charging infrastructure for 2 and 3 wheelers in the villages.

Lastly, the electricity provided for the charging infrastructure is produced from coal. Using a conventional source in place of an alternate conventional resource should not be the case here. Coal produces more carbon emissions than petroleum. The increasing demand by the automobile industry will, on the contrary, make the conditions worse than before. It will also lead to more burden on the suppliers to provide electricity to both the stations inside and outside the household. The incentives provided by the Ministry of Power refer to the supply of electricity as a form of ‘service’ for public charging stations and not the private ones to be installed inside a household. Moreover, if people install private charging

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<sup>164</sup> Central Board of Indirect Taxes and Customs; Central Goods and Services Tax (CGST); (2017);

[http://www.cbic.gov.in/resources//htdocs-cbec/gst/CGST\\_13092018.pdf;jsessionid=5D42D79D2B44A0B83FA3B7EFBDA75435](http://www.cbic.gov.in/resources//htdocs-cbec/gst/CGST_13092018.pdf;jsessionid=5D42D79D2B44A0B83FA3B7EFBDA75435)

<sup>165</sup> Ministry of Heavy Industries and Public Enterprises; National Electric Mobility Mission Plan; Press Release; (July 8, 2019); <http://pib.gov.in/newsite/PrintRelease.aspx?relid=191337>

<sup>166</sup> Ministry of Heavy Industries and Public Enterprises; National Electric Mobility Mission Plan; Press Release; (July 8, 2019); <http://pib.gov.in/newsite/PrintRelease.aspx?relid=191337>

stations, they might store excess energy and sell it to reap extra income. These issues need to be addressed in Phase-II if the government wishes to get the desired output by the end of 2020.

## *Suggestions and solutions for a better implementation of the scheme*

The Government has given incentives to the manufacturers for the selling of Electric and Hybrid Vehicles but it should incentivize the manufacturers to produce models which can be afforded by the different sections of society. A game changer can be the use of solar energy for the working of the charging infrastructure. Solar energy can be used in the daylight hours not only for direct energy generation but also for storage purposes which can then be used during the night hours. This will phase out the conventional resources of coal, petrol and natural gas at the same time, largely reducing the emissions produced. Moreover, if this technology is made mandatory, then this will increase the usage of solar panels and modules in households. The energy stored can then be used in other household activities. Reducing carbon emissions from the automobile and the residential sector will largely reduce the carbon emissions.

Introducing solar panels in the rural area will prevent the current switch from bio-fuels to coal. The same concept of storage of solar energy can be used in the villages. Introduction of this technology will not only benefit the energy sector but also the manufacturing sector. Promoting indigenous manufacturing of solar panels and modules will increase the profits of the Indian manufacturing sector and at the same time bring in more job opportunities. The phase out of coal must be a gradual process as a sudden shift from coal to renewable sector might lead to massive unemployment as the coal sector involves a large part of the Indian population. Considering such incentives will bring out a better efficiency in the working of the NEMMP.

## *The Case of Norway*

Norway is a country which has experienced a swift and successful transition from vehicles which used conventional resources to electric or hybrid vehicles. This became possible due to the efforts of the Government which introduced several policies to bring about a transition. The Norwegian government presented a great number of incentives for the manufacturers and the consumers at the same time. Some of the policies included exemption from 25% VAT on purchase, company car tax reduction reduced to 40%, Fiscal



compensation for the scrapping of fossil vans when converting to a zero-emission van, maximum 50% of the total amount on toll roads and ferry fares for electric vehicles, etc.<sup>167</sup>

The government similarly incentivized indigenous companies for the manufacturing of the solar equipment required and also invited companies like Tesla to bring in a variety of options for different sections of society. Though Norway reduces its carbon emissions by utilizing electric vehicles but on the other hand, it gathers funds exporting the same conventional resources. Even though this can be debated upon, the benefits of the introduction of electric vehicles outweigh the impact of export of conventional resources. The same logic cannot be applied to the terrain of India. But what the Indian government must and should do is bring a reform in the incentives presented to the common residents. A person from a middle-class economy, who is receiving 24 hrs. electricity all day will not think about switching to renewables. The government should keep people into the focus rather than the services provided to the people.

## *Conclusion*

Both KUSUM and NEMMP have the potential to bring about a revolution in their respective sectors and carry a huge chance and potential for the development of the solar energy sector. The government must seize this opportunity and develop the renewable sector as much as possible to ensure an equitable distribution of clean and affordable energy.

*RIGHTS OF SEXUAL WORKERS IN INDIA: A MILESTONE TO BE ACHIEVED*

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<sup>167</sup> Norwegian EV Policy; (June, 2018); <https://elbil.no/english/norwegian-ev-policy/>