Charting energy - Why India needs a national mission to map fossil fuels and renewables

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Knowing one's strengths and weaknesses is important to realize one's potential, and India's energy sector is no different. It is in the midst of a churn with the coal sector undergoing rapid reforms, the electricity act being amended, a specific law for renewable energy being considered and a new concession regime for oil and gas on the cards. It is likely to grow significantly as India provides its citizens access to modern energy and the benefits that come with it. The India Energy Security Scenarios (IESS) tool from the Planning Commission predicts that India's energy demand will grow three to five times by 2047. Energy will be a key driver for "Make in India", one of the flagship programs of the current Government. Recently, the minister for coal, power and renewables has stated that he wants to rapidly increase India's energy supply and produce 1 billion tons of coal and 2 trillion units of electricity by 2019 – roughly doubling current production, and deploy 100 gigawatts(GW) of solar power capacity by 2022, a fivefold increase over the original solar mission target.

If India has to achieve these ambitious goals and simultaneously not let its energy import bill further sour its trade balance, one key requirement is to know its "strengths" by really understanding the geographic distribution and potential of various domestic energy and "weaknesses" in the form of constraints involved in exploiting them. Developing such an understanding confers many benefits. Firstly, it facilitates an integrated and realistic approach to energy planning and policy formulation based on economically extractable reserves and considering constraints such as deep forests, rivers and densely populated regions that may prevent their exploitation.

Second, it is crucial for integrated development of not only energy resources but also associated requirements such as land, water and infrastructure such as transmission lines, railways and pipelines, which are necessary for the energy to be meaningfully used. For example, the total land requirement for the power generation capacity in 2047 as envisaged by IESS could be well in excess of 10,000 sq km, and mapping resource locations would enable identifying whether and where such land is available. Third, having credible resource information along with development of associated infrastructure would significantly de-risk private sector investments, thus reducing costs and potential for contractual disputes such as in the case of the Krishna-Godavari basin. Fourth, such information can help to actualize the ambitious targets set by the minister for the near future. For all these reasons, a national energy resource mapping mission (NERMM) to geographically map and integrate energy resource data with other relevant information would be welcome.

To be sure, some pieces of the resource mapping exercise are already underway in different sub-sectors. The Central Mine Planning and Development Institute (CMPDI) has classified Coal India Ltd.'s (CIL) reserves using the internationally accepted UNFC classification. The National Institute of Wind Energy (NIWE) is assessing the solar resource potential, and a national solar atlas should be available in a few months. The NIWE is also about to issue a tender for creating a high resolution wind resources map at 100 m height which would be corroborated by installation of 500 new wind-resource mapping towers.

However, some gaps need to be plugged and these initiatives have to be brought into a coherent programme to realise these benefits. For example, CMPDI still classifies non-CIL coal reserves using the old Indian standard, which only tracks coal availability and not whether it can be economically extracted, though extractable reserves could be as low as 35 per cent of what is available. In the renewables space, India's offshore wind potential is still poorly understood, and the potential of distributed solar energy for electricity or heating from rooftops in densely populated areas, such as cities, must be systematically evaluated. The New Exploration Licensing Policy (NELP) regime has increased the pace of awarding conventional oil-and-gas concessions, but it has not necessarily helped to improve our understanding of the extractable hydrocarbon reserves, and there is little understanding about India's unconventional hydrocarbon reserves.

Further, the real power of this information is when resource information of various types is geographically mapped and overlaid with information regarding land availability and use, forest cover, rivers, water availability, transmission lines, railway networks, pipelines etc. through a rich multi-layered GIS interface. Having such cross-linked information available at the click of a button can greatly assist integrated planning of the sector based on ground realities of energy resources, natural constraints and infrastructure requirements while potentially minimizing conflicts and delays. For example, it will help to ensure that energy resources are exploited only in regions that can support such exploitation and develop transmission or railway networks along with power plants or coal mines. Such publicly available information will also be a great asset to energy sector researchers, and correspondingly enrich energy policy discourse.

The technical expertise for an NERMM is mostly available in agencies such as CMPDI and NIWE. Therefore, it should be relatively easy to create a well-designed and empowered program that can draw on the available expertise and integrate it under one umbrella. Since the mission is to identify and map natural resources in the country, it should be a government-owned and funded program, that leverages private expertise where necessary. An effective NERMM will be foundational to ensuring India's energy security and powering its development aspirations for the future.

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