Input to National Energy Policy from Environment and Climate Change Perspective

For NITI Aayog

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Acronyms

BHEL - Bharat Heavy Electricals Ltd

CAMPA- Compensatory Afforestation Fund Management and Planning

CBET- Cross-border electricity trade

CCGT- Combined Cycle Gas Turbine

CCS- Carbon capture and storage

CEA- Central Electricity Authority

CNG- Compressed Natural Gas

GIM- Green India Mission

GW- Gigawatt

IGCC- Integrated gasification combined cycle

INDC- Intended Nationally Determined Contributions

LCSIG- Low Carbon Strategies for Inclusive Growth

NEP- National Energy Policy

NMT- Non-Motorized transport

MW- Megawatt

SUV- Sport Utility Vehicle

USC- Ultra Supercritical

UMPP- Ultra mega power plant

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1. Guiding Principle in Framing Policy

Policy-making is the process by which governments translate their vision into programmes and actions to deliver 'outcomes'- desired change in the real world. Policy making needs to be forward looking; outward looking; innovative, flexible and creative; evidence-based; inclusive; based on lessons from experience; incorporate ongoing evaluation and review and effectively communicative.

India's energy policy should plan for the long term, but meet the needs of the short term and protect environment. To that end, this document has provided detailed policy recommendations in the subsequent sections on the 3 key areas of NEP namely 1) air Pollution in the transport sector, 2) energy sector and its implication for climate change and 3) CAMPA and GIM to address climate change. We hope that this document will provide an important input to NEP to achieve its objective.

Energy policy is closely linked with policies for the environment, transportation, urban planning, climate policy and several others; some have direct linkage and some have an intangible but significant impact.

2. Air Pollution: Transport

2.1 Public transport

Estimates have shown that the public transport system in India has a potential to reduce energy requirements by approximately 60%. It needs to be promoted with high priority. Providing efficient public transport services requires several measures such as 1) increasing capacity for manufacturing of buses and other public transport vehicles, 2) classification of public transport and NMT as essential services, 3) subsidies to public transport on a sustained basis, which is ad-hoc currently, 4) increasing number of small vehicles such as tempos with efficient engines in small towns as buses require broader and proper roads. 6) promotion of technological innovation, business models and other strategies to bring down the cost of hybrid and electric public transport vehicles for large scale adoption. Adoption of advanced technologies like use of hybrid fuel cell buses and other public transport systems need to be critically examined from a long-term perspective.

The public transport network is inherently multi-modal and should provide seamless connectivity between modes and impose minimum time penalty at the interchange points. Each city should have its own Policy for public transport to take into account its existing public transport services, geographical features and constraints, city growth plan, environmental and social equity requirements, availability of road space and its economic base. International experience suggests that network planning is more important than the choices between modes. The mode choice should take into account amongst other factors its life cycle cost and not only the initial cost.

To discourage the use of private vehicles, congestion pricing (city wise analysis required) – surcharging users on demand based pricing could be an option to be explored. Due consideration may be given to imposition of congestion charges after providing alternative modes of transportation, to reduce the hardship on people at large. Parking and traffic restrictions after carrying out city wise analysis can also be looked upon to regulate the use of private vehicles. To reduce urban air pollution, CNG vehicles need to be promoted which also require special focus on expanding retail stations. Efficient implementation of fuel efficiency regulation required to be administered for limiting the level of air pollution.

2.2 Private transports

An analysis of total emission over the life of the different modes of transport options is critical to decide about the appropriate mode of transport. Policy to promote electric and hybrid vehicles through procurement of best available technologies should be introduced. Other policy options should be explored to arrive at optimal solutions and incentives to decide whether to support expensive technology or to give subsidies. Also, come out with innovative project financing for construction of mass transport system such as metro rail. Further widening taxation differential between cars (higher tax for big cars/ SUVs) will promote adoption of more fuel efficient cars.

2.3 Non motorised transport

Energy consumption of transport, particularly urban transport is directly proportional to the no of trips by motorised vehicles as well as the trip length. Therefore, it is necessary to reduce the number of vehicular trips which uses energy and causes pollution. Therefore, promoting non-motorised transport is one of the key interventions. Currently, the facilities of walking and cycling are inadequate in most of our cities and wherever they are, they are not maintained. They are often an obstruction or an obstacle to walking as anyone who has tried walking on the footpaths can confirm. As far as the trip length is concerned, we know a

compact city is better than an urban sprawl and most cities in India are going for an urban sprawl at present.

2.4 City planning

Smart city planning needs to be integrated with planning for land use, transportation and buildings. City based emission reduction road map can be developed in the major cities, which should be suitable to the local circumstances.

Another concept, which is being promoted in the western countries but yet not practiced in India, is compact city and transit oriented development policy. Transit oriented development ensures transit-supportive land uses; increases density around transit stations; creates pedestrian-oriented design and manages parking, bus, and vehicular traffic.

Broad leaf trees are a very good agent for blocking the pollution and are catching the pollution in the sense that the larger particles get stuck to the leaves and that gives a degree of relief. Also, for the tropical or warm countries, it is good to have good shade along the sidewalks. Bangkok and many other cities in Thailand and also in the new capital city of Mayanmar, they have tried that and it is comfortable enough to walk.

3. Energy Sector and Climate Change

3.1 Phasing out the old, inefficient coal fired power plants

In terms of carbon emissions, it makes sense for the government to have a very aggressive program for phasing out/replacing the old inefficient plants. The government has made significant progress in power generation and capacity addition; at this stage, it would be appropriate to have aggressive programs for phasing out say 10-20 thousand MW of the inefficient BHEL generation plants 100/120 MWS and that's a low hanging fruit in terms of say reducing carbon emissions and air pollution. Incentives for adoption of the potential clean coal power generation technologies such as Ultra-supercritical (USC), IGCC, A-USC, New Cycles –CCGT, FUEL Cell, etc. need to be included in the policy.

3.2 Greening of Grid

The proposed target of 175 GW of power generation capacity from renewables will lead to a massive increase in Solar and Wind capacities that will add intermittency into the grid at large scale. Strategies for managing this intermittency from renewable energy resources vary across the country and the grid required to evacuate the power is highly influenced by the degree of interconnections, the renewable energy resources and the availability of flexible generation capacities. Policy interventions to bring in some flexibility in the role of a fossil

fuel fired power plants will be required. These plants will also be required to run as reserves in order to balance the volatility of the renewable till we get storage at affordable costs. For example, in Germany many of coal fire power plants are no longer needed because they have 80 GW capacity of renewable (40 GW solar & 40 GW wind) and it is just sufficient to meet their energy requirement. There are days when there is no sunshine or almost no wind blowing then coal fired plants are required, but at the end this is a complete change in the energy sector and also affects how the way we run fossil fuel fired power plants. Flexible plants such as open cycle gas turbines may be preferred in some instances.

3.3 Geographic concentration of power plants

Many new power plants are being proposed in areas that are already critically polluted and have issue of water availability. It is therefore proposed that a well performing CEA would identify sites, which would consider sites suitable for long term options without impacting operations and are environmentally optimum, which currently is being practiced while identifying UMPP sites.

Many wind turbines which have been erected before 2000 were located at the best sites; these wind turbines are of much smaller capacity and are outdated. The wind turbines available now are much larger with capacities to generate over 1.8 MW. Thus the old plants are wasting potential wind power. A policy to encourage modernisation of such plants should be introduced.

NEP should also propose siting norms, for which it is imperative to carry out holistic planning incorporating domestic resource availabilities including imports, energy demand at load centers and environmental factors, while considering the economic life of the plant. It is also proposed to use satellite imagery and domain knowledge to facilitate this national level exercise.

3.4 Positive externalities of decarbonizing energy sector

As per LCSIG (Low Carbon Strategies for Inclusive Growth) report, the cost of de-carbonising (excluding the cost of health and other externalities such as savings in terms of energy use) is not prohibitive. Therefore, it is proposed that NEP should accelerate the transition from fossil fuel to greener fuels. INDCs have a larger agenda of 30-35 % reduction in the carbon intensity. To achieve this ambitious INDC target NEP should clearly spell out the broad road map about how to achieve the 175 GW renewable target by year 2020-22 and reducing the carbon intensity by 35% by 2030 considering the many policies suggested by LCSIG report.

3.5 Energy Storage technology

Given India's huge solar and wind energy potential, which are intermittent resources, it becomes imperative for India to focus its R&D activities in the development of energy storage technology solutions that are cheap and sustainable for large scale energy storage.

3.6 Clean Coal Technologies

India's proven coal reserves are estimated to be 302 billion tonnes (as on 01.04.2014) and are likely to last for at least 200 years. However, the extractable coal reserves with growing use of coal will last for no more than 50 years. Moreover, Indian coal is known for high ash contents and low calorific value. Two major technological solutions we need to work on are (1) washing of coal with minimum or no water consumption and (2) gasification of coal for power generation, through IGCC and in-situ coal gasification. These technologies will bring down both particulate as well as gaseous pollutants.

Most of current the coal based power generation technology is based on sub-critical boilers where large quantities of land and water are required for ash disposal. Ash and power plant exhaust have been found to contain significantly large quantum of mercury. It is proposed that these issues be tackled by introduction of appropriate technological interventions at top most priority. It is also proposed to set water consumption norms for the energy sector in particular for thermal power plants. There is a need to look at the international best practices in this regard and provide economic signals to the power plants to minimize water consumption. The NEP may also examine whether future coal based power plants should adopt carbon capture and storage technologies or at least be ready for CCS so that it may be implemented in future, if required.

3.7 Cross-border electricity trade (CBET)

South Asia Region has a huge hydro-power potential of 350 GW - India: 153 GW, Nepal: 83 GW, Pakistan: 59 GW, Bhutan: 30 GW and Afghanistan: 29 GW. This huge hydro power potential, a clean energy, can be harnessed in a sustainable manner through cross border electricity trade among the South Asian nations bringing benefits to all the participating countries of the region as the trade will lead to optimized utilization of region's renewable and fossil energy resources available in each country. Trade will lead to reduced carbon foot-prints by using a larger share of green power. Such trade has also possibilities to transform economies of exporting as well as importing countries. Already there is evidence of that in Bhutan and Bangladesh respectively. It is possible to extend these benefits to Nepal, Sri lanka and Pakistan with concerted action. India can reduce C02 emissions while meeting its large demand.

One key point to be considered in case of harnessing cross border hydro potential is that the development of hydro power potential has a long gestation period and therefore timely implementation is essential to keep the costs low and derive benefits earlier.

3.8 Addressing data gaps with regard to climate change impacts on the energy sector

There is inadequate information available with regard to the climate change impacts on the energy sector. We know in general the implications it would have on the performance of the power sector, in terms of thermodynamic efficiency reduction.. Clearly, there is a need for research and generation of scientific data to propose concrete recommendations and this is clearly an area where policy needs to address the information gaps.

4. CAMPA and GIM

4.1 Biomass energy

As per INDCs 175 GW of renewable capacity is to be installed by 2022 out of which the prescribed share of Biomass energy is 30 GW. GIM and CAMPA can play a major role in meeting this target of biomass energy. There is a need to bring advanced technologies for biofuels production for eg: technology for converting hardwood/trunk to diesel/biofuels is available in the global market and can be used in India, this would lead to a sharp reduction in cost of biofuels/biomass energy production. Normally in biofuels generation lignin or seed part of trees/plants is used and the process is quite cost intensive.

4.2 GIM to enhance carbon sink

The mission aims at responding to climate change by a combination of adaptation and mitigation measures by enhancing carbon sinks in sustainably managed forests, wetlands (mangroves, coral reefs, sea grass and salt marshes) and other ecosystems, adaptation of vulnerable species/ecosystems to the changing climate and adaptation of forest-dependent communities. Wetlands like coastal flats and playas have sparse vegetation, resulting in limited carbon turnover; whereas salt marshes have high primary productivity matching tropical forests.

Out of total 69 million hectares of forest area, 65 million hectares are under Forest Department, the rest 4 million hectares are with various councils and private lands. There are nearly 20 million hectares of degraded forest lands. Therefore mapping of the degraded areas within the forests can be carried out to to plan for restoring the degraded areas. Mapping of degraded, wastelands should be carried out separately to identify spots for carrying out plantation activities. Policies and programmes need be designed to mobilize and incentivise local communities for such restoration and maintenance.

4.3 CAMPA to enhance carbon sink

CAMPA funds are almost un-utilized so far due to some procedural blocks. Efficient Utilization of CAMPA money can enhance carbon sinks. Efficient management of forests could be done through sustainable harvesting of mature trees and replacing the felled plants through new plantation activities. This will ensure improved carbon dioxide sequestration. The industries should be asked to carry out the plantation activities before submitting the proposal for clearing a forest land for their projects.

5. Acronym for National Energy Policy

The acronym “NEP” was already taken in the “National Environment Policy 2006” therefore it may be prudent to have another acronym for National Energy Policy. This new energy policy may be given an acronym “NIEP”(National Integrated Energy Policy) which also traces its root to the politically co-shared “Integrated Energy Policy-IEP”.