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**PAPER**

OCTOBER 2018

173

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ISBN : 978-93-88262-49-1

# India: Energy Geo-Politics

## ABSTRACT

In the last four decades, India's geo-political identity has evolved from being the leader of the non-aligned movement - a representative of the developing poor nations of the world to becoming a member of the G-20, the world's leading industrialized and emerging economies. The change has also been evident on its evolving position on climate change as it became a signatory to The Paris accord. However, the paper argues that key tenets of self-reliance, economic progress with equity and social justice, embedded in the political economy continue to not only impact India's energy policy but also influence external strategic vectors such as dependence, resilience and identity to inform India's position in multilateral bargaining environments.

*(This paper was originally published as Chapter 5 of 'Energy and Geostrategy 2018' / Spanish Institute for Strategic Studies and Spanish Committee of the World Energy Council Spanish Energy Club / April 2018.)*

## INTRODUCTION

Having adopted a state led Planned Economy Model, the Indian economy between 1947 and 1980 – in spite of its ambitious Five Year Plans – had grown at an annual average rate of 3.5 percent. Given an annual population growth of over 2 percent, the country's per person income, consequently, had lumbered on at a sub 2 percent rate of growth. The economic reforms initiated in the early 1990s changed the picture. India's economy now began to grow at an annual average of over 6 percent. Population growth having declined to under 2 percent per year, per capita income grew at an average over 4 percent in the last three decades.<sup>1</sup>

Between 2000 and 2014, India's energy consumption doubled implying an improved quality of life for an increasing number of Indians.<sup>2</sup> India too caught the world's attention as a region of rising energy consumption. India's rising economic heft also saw energy demand rise in tandem with its neighbour, China, making comparisons between the two common.

However, geo-politically, given its long legacy as the leader of the non-aligned movement, India remained a reluctant power, hesitating to imagine a larger geo-political role for itself even as it came to terms with its increasing economic clout. Even so, in the face of a rising energy demand, several forays for acquiring energy assets abroad – were acts bound to lead to a wide range of interpretations as to its actions and motives.

The geo-political narrative of the nineties tended to frame the Indian approach to securing energy supplies, particularly oil supplies as 'mercantile' and 'realist'.<sup>3</sup> Meanwhile, in spite of the much-touted economic reforms, the interference of the State in energy pricing continued, leading most to conclude that India's half-hearted economic

reforms would continue, along with China's, to threaten the emergence of a rule based multilateral order for global energy governance. The dominant role of the state in the domestic energy sector as well as the competition between Indian and Chinese national oil & gas companies (NOCs) to acquire hydrocarbon assets around the world only served to strengthen this belief.<sup>4</sup>

But then came 2008. Global growth stagnated. Even as China and India continued to grow, albeit slower, a deceleration in energy demand growth and the collapse of oil and gas prices globally, reduced the strategic as well as commercial value of the hydrocarbon assets held by Indian and Chinese NOCs overseas. Simultaneously, global pressure on reducing carbon-di-oxide (CO<sub>2</sub>) emissions, and the emergence of competitive low carbon technologies further eroded the validity of this narrative.

In the emerging energy geo-political narrative, India now is the key to global energy decarbonisation plans. The hope is that much of India's yet-to-be installed energy infrastructure could be based on low carbon energy sources. India's energy demand is still projected to account for 30 percent of the world's incremental energy demand over the next two decades. However, the emphasis has shifted to how this demand can be met from non-fossil fuels.<sup>5</sup>

This chapter seeks to examine the core values that inform geo-political narratives on energy and contextualize them in the framework of the political economy that the authors insist, will eventually shape India's energy policy. The paper will argue that key values such as self-reliance (in resource and in technology), development (economic progress) and social justice (energy justice) embedded in the local dimensions of energy policy, have historically influenced, and will continue to influence strategic vectors such as dependence, resilience

and identity and inform India's position in multilateral bargaining environments.

## **STRATEGIC VECTORS IN INDIA'S ENERGY SYSTEM**

### **Resilience**

Resilience, the ability to adapt to changes in the energy markets, is among the key goals of any energy security policy. Notwithstanding the characterisation of 'energy security' as a public good, well integrated markets have shown remarkable capability to adapt to unexpected changes in the fundamentals of demand and supply, thereby delivering energy security to nations.

India, however, has traditionally prioritised bureaucratic regulation and control over markets to mediate changes in the supply of and demand for energy. A recent energy policy document authored within the Government accepts that the Indian approach has been 'uncritically pro-state' and 'reflectively anti-market'.<sup>6</sup> This approach, however, has constrained the resilience of the Indian energy system. Energy choices determined by the immediate demands placed upon it by the political economy, have often been in conflict with long term energy planning. These in turn have nurtured systemic rigidities that inhibit India's ability to respond to changes in global, regional and domestic energy markets, or to attract investment in energy production and energy infrastructure such as gas pipelines, or leverage favourable energy price environments (as in the years between 2014 to 2018) to the country's benefit.

Difficult to believe as it may be, when India became an independent country in 1947, the Indian energy sector was dominated by the private sector. However a looming food grain shortage nudged the country into favouring policies that saw energy as a means for food security. The

consequence was that the state began intervening to become the dominant player in the energy sector.<sup>7</sup>

When India was partitioned in 1947, 85 percent of the population of erstwhile undivided British India, was left with only half of the 400,000 cubic foot per second (cusecs) of water carried by its canals.<sup>8</sup> Of the 24 million hectares of land irrigated by state owned canals, India's share fell to less than half. Food security now became the foremost concern for Indian planners.

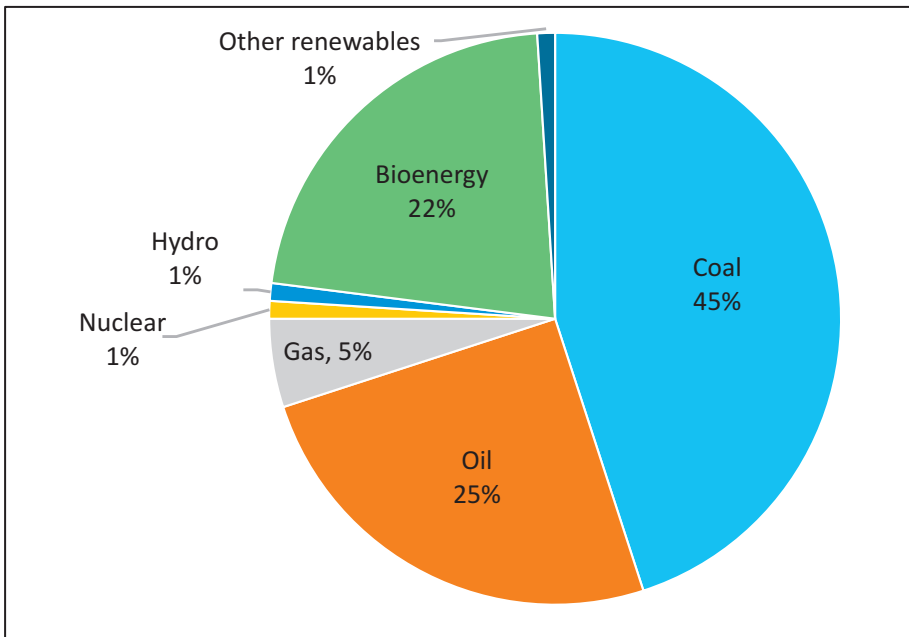
In the first five-year plan, the planning commission of India recommended doubling of the area under irrigation through the provision of 'cheap electricity' so that water could be pumped from wells and tanks to irrigate all arable land for food production. Five, 'five-year' plans along with two annual plans in the first three decades after independence (1947-80)<sup>9</sup> devoted themselves to policies that focused on increasing electricity generation and distribution just to increase land areas that could be irrigated by pumping ground water or through canals.<sup>10</sup>

The focus on food ensured that electricity sector policies were loaded to favour the state led strategic objective of food security. The objectives of efficiency, commercial viability and profitability of the sector became secondary. To be fair, the overall policy thrust did ensure that India's food security increased dramatically on account of input (water and fertiliser) intensive agriculture during the period that came to be labelled as the 'green revolution. However, it embedded certain rigidities in the Indian energy system that continue to contribute to some of India's macro-economic distortions. To this day agriculture and energy policies have got locked in an embrace that has not only worked to the detriment of both sectors, but also put paid to India's potential as a possible manufacturing power.



The political economy of food production, farm employment and the socio-economic stability of rural India became inseparable from the supply of cheap electricity, making tariff reform extremely challenging. It also meant that coal would remain the fuel of choice for power generation; and that high industrial and commercial power tariffs would subsidize agriculture as well as domestic consumption of electricity. Even today, coal accounts for over 44 percent of primary energy supply<sup>11</sup> and generates over 80 percent of all electricity supplied in India.<sup>12</sup> This critical dependence of most of the more productive rural regions on energy for ground water extraction has also determined and constrained India's position in multilateral bargaining environments, particularly those related to trade and climate change.

**Chart 1: India's Primary Energy Basket (897 mtoe) by share of fuels**



*Source: world energy outlook 2017*

Low productivity, a disproportionately large population dependent upon agriculture (subsisting on small farms or as labour) has limited the

ability of the farm sector to generate surplus. Policy makers have had to work overtime to ensure adequate farm produce prices, while simultaneously keeping food price inflation under control. These twin problems have been resolved by holding back the price of inputs such as electricity and fertiliser.<sup>13</sup> In the process, regulated non-market pricing has been the guiding principle governing the sale of fuels such as domestic coal, diesel and natural gas.

The use of domestic coal strengthens 'self-reliance', one the most consistent energy security values reiterated most in India's energy policy documents. This has continued even as investment promotion policies admit that regulated prices compromise the resilience vital for energy security and jeopardize transition towards a low carbon economy.

Under normal circumstances, natural gas would be expected to be promoted as the bridge fuel towards low carbon growth. However, unskilled labour in coal mining supports over 7 million households<sup>14</sup> in impoverished eastern Indian provinces of India. The employment of unskilled contract labour, at the cost of economic efficiency, ensures that low quality domestic coal of ash content as high as 45% remains the fuel of choice. True, that the Union's budget for financial year 2015-16, doubled the environmental cess on coal to Rs 400 per tonne of coal mined (equivalent to \$10 per tonne of CO<sub>2</sub>).<sup>15</sup> However, low labour costs for mining allow the Indian coal industry to absorb additional social and environmental costs and still deliver electricity at acceptable tariff levels from older state owned power plants operating on depreciated assets.

Yet, close to 300 million people yet have no access to power. Cross subsidies ensure that average electricity tariff in India is above that in similar countries (i.e. countries having coal based electricity). High industrial and commercial tariffs partially compensate for lower (in many cases zero) agricultural tariffs. Thus electricity tariffs in India are

burdened by the incorporation of several costs attributable to the political economy even when they translate into inefficiencies in distribution and supply of power.<sup>16</sup>

The dependence on a single fuel for 80 percent of electricity generation means that even a small temporary shortfall in coal production or transport can impose costs on the Indian economy. Diversification of the fuel basket for power generation has been a part of energy policy since the 1960s when coal based thermal capacity exceeded hydro power generation. However the share of thermal coal based power generation has continued to increase at the expense of generation using other fuels.

Cleaner burning natural gas currently may accounts for about 8 percent of power generation capacity, but feeds only 5 per cent of India's electricity<sup>17</sup>. The price of imported gas is high compared to domestic coal on heat value basis which means that gas cannot accommodate additional costs. This substantially reduces the ability of natural gas to commercially compete with domestic coal in power generation. Over 25 GW of gas fired capacity installed for supplying cleaner power runs far below capacity contributing just about 5 percent to India's total power generation.<sup>18</sup> Typically the average tariff for imported natural gas based power is 70-80 percent higher than the average tariff for domestic coal based power.<sup>19</sup> Renewable energy (solar and wind) based generation benefits from provisions such as capital and import subsidies, interstate transmission subsidies, 'must run' status and renewable purchase obligations (RPOs). Natural gas has not received a comparable policy push.<sup>20</sup> Unlike renewable energy, for which the integration and intermittency costs are socialised, natural gas is left open to competition from low cost coal. The value of natural gas is essentially evaluated primarily on the basis of the criterion of affordability rather than environmental acceptability. Consequently the prospect of India

becoming a 'gas based economy',<sup>21</sup> as suggested by some policy pronouncements, remains rather limited.

While solar powered water pumps are being introduced as a low carbon alternative, the economic viability of this scheme in the long term remains uncertain especially on a national scale. The cost of solar pumps may be higher than those of standard electric or diesel pumps by at least an order of magnitude.<sup>22</sup> It is conceivable that subsidies on power tariffs can be recast as capital subsidy for solar pumps to incentivise the production of the public good of lower CO<sub>2</sub> emissions. However, in that case, the low marginal cost of pumping water with solar pumps would continue to exacerbate ground water depletion just as it has with electric pumps at zero or negligible electricity tariffs.<sup>23</sup>

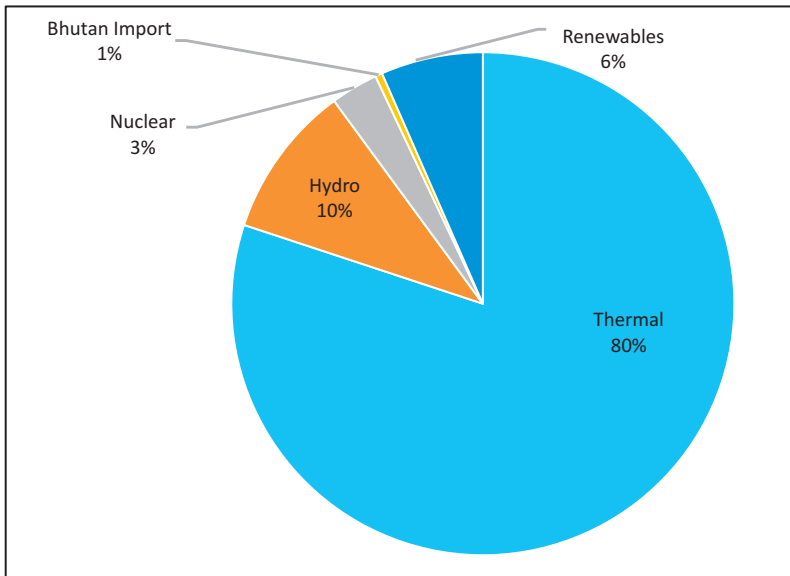
By some estimates the socialised cost of integrating intermittent renewables is greater than the cost of accommodating natural gas as a low carbon bridge fuel that could provide spinning reserve to allow for better integration of intermittent renewable power into the grid.<sup>24</sup> This raises the question as to whether the normative value assigned to adding on renewable capacity is driving India's low carbon pursuits rather than rational calculations on balancing the grid. The question is best answered by referring to India's Nationally Determined Commitments (NDC) following the Paris Agreement.

India's commitments on CO<sub>2</sub> emissions reduction from energy supply and use as per its NDCs<sup>25</sup> include -

- (A) An offer of a non-conditional reduction in CO<sub>2</sub> emission intensity by 33-35 percent by 2030 from 2005 levels, and
- (b) An increase in the share of non-fossil fuel energy capacity to 40 percent by 2030, conditional on the availability of technology and financial assistance.

India's offer is presented within the context of its low per person emissions of 1.56 tonnes<sup>26</sup> per capita - attributable to a lifestyle based on conservation of resources and moderation in resource use. India's low per person emissions arise primarily from India's low per person energy consumption levels, These, at 690 tonnes of oil equivalent (mtoe) in 2016 were only about a fourth of that of China.<sup>27</sup>

**Chart 2: Power generation share by fuel 2016-17.**



Source: central Electricity.

The probability of India meeting both commitments with or without external technical or financial assistance is reasonably good.

India's CO<sub>2</sub> emission intensity for energy use has been increasing (from 2 kg/kgoe of energy use in 1990 to about 2.5 kg/kgoe in 2016) as more and more households gain access to modern energy sources viz. electricity (for lighting) and liquid petroleum gas (LPG, for cooking).

India's CO<sub>2</sub> emission intensity per unit of Gross Domestic Product (GDP) has been decreasing (from 0.6 kg/GDP[\$-PPP] in 1990 to 0.3

kg/GDP in 2016) on account of improvements in efficiency of energy use and an economic growth that so far has come from an expansion of the services over the more energy intensive manufacturing sector.<sup>28</sup>

As long as services dominate India's economic activity (currently services account for over 50 percent of India's GDP), this trend is likely to continue as gains in efficiency are expected from all energy consuming segments. On the other hand if the policy to 'make in India' succeeds with a substantial increase in the share of manufacturing in India's gross domestic product (GDP), India's CO<sub>2</sub> intensity per unit of GDP could increase. The push to catch up with the rest of the world in building physical infrastructure such as roads, ports and railway lines will have the same effect. The IEA estimates that if the 'make in India' policy succeeds in increasing the share of manufacturing in India's GDP to 30 percent from the current 16 percent, energy demand would be 15 percent higher than the business as usual (service dominated) case with concomitant increase in CO<sub>2</sub> emissions.<sup>29</sup>

However, the prospects for energy intensive manufacturing to take-off in India are limited. Production factor costs, particularly energy and land costs are not favourable for developing a globally competitive traditional manufacturing sector. About 15 million job seekers enter the labour market each year but India's record in creating jobs in this sector is not very encouraging. Out of a workforce of over 600 million in 2013-14, only about 17 million had formal jobs while about 300 million were self-employed.<sup>30</sup> It can even be argued that with global supply chains coming under threat from protectionist trade policies as well as the advent of automation and additive manufacturing under the Fourth Industrial Revolution, countries like India can no longer ride the Chinese model of manufacturing cum export led growth to prosperity. Alternative modes for growth and employment, with a lower carbon footprint, will need to be explored.<sup>31</sup>

As of 2016, 30 percent of power generation capacity was based on non-fossil fuels (hydro, nuclear, biomass, wind and solar). Going forward, in terms of anticipated capacity addition by 2040, solar photovoltaic is expected to make the second largest contribution after coal.<sup>32</sup> The target of 40 percent of non-fossil fuel based capacity in power generation is thus well within reach. However, after making allowance for low plant load factors<sup>33</sup> the contribution of India's ambitious renewable capacity towards reduction in emission intensity will depend on the actual energy non-fossil sources can eventually put into the grid. As it is, given the state of the electricity grids, producers of intermittent renewable power, such as wind and solar, experience considerable difficulty in finalizing power purchase agreements with distribution companies. Electricity demand peaks five to six hours after sun-set and development of storage and balancing capacity is yet to take off. The integration of intermittent renewable sources into the electricity grid would thus require concomitant investments in one or all of the options below:

- (i) Creation of sufficient spinning capacity to compensate for intermittency.
- (ii) Creation of sufficient storage capacity.
- (Iii) Creation of intelligent smart grids that could respond to fluctuations in supply.

All of these would entail capital investments raising the cost of supply and putting a question mark on the goal of affordability.<sup>34</sup>

Large capacity additions apart, India's contribution to reduction in CO<sub>2</sub> emissions is expected to arise primarily from reduction in emission intensity. A 33 percent reduction in CO<sub>2</sub> emission intensity is expected to reduce CO<sub>2</sub> emissions from 4.3 giga tonnes (GtCO<sub>2</sub>) to 4.2 GtCO<sub>2</sub> in 2030.<sup>35</sup> Overall this does not constitute too significant a deviation from

the business as usual path and thus India seems to have followed most nations in committing business as usual decarbonisation in response to the non-binding Paris Agreement. It thus seems that the optimism generated by the Paris Agreement pins its hopes on countries 'ratcheting up' their carbon reduction ambitions as called for by the agreement. Expectedly, India's move in this regard will also depend on the extent to which other large economies are prepared to walk the talk.

In 2016 fossil fuels accounted for over 75 percent of India's primary energy basket (including traditional fuels such as fire wood).<sup>36</sup> Paradoxically, even as present decarbonizing policies continue, 2040 is likely to see the share of fossil fuels increase marginally to 77 percent. This must be understood in the light of the fact that in the event these policies being rolled back, the share of fossil energy would become 82 percent.<sup>37</sup> The increase would be due to 60 million new households gaining access to grid based electricity for the first time.

India's CO<sub>2</sub> emission intensity for energy use crawled from 2 kg/kgoe of energy use in 1990 to about 2.5 kg/kgoe over 25 years. The slow rate of growth of modern fuels by Indian households had to some extent been the result of low income levels. However, India's subsidy regimes also contributed their share by making any expansion of energy supply difficult in situations where the production and distribution of energy became a loss making enterprise for both private as well as state-owned commercial entities.<sup>38</sup> Non supply of power actually helped trim the losses of many of India's state owned distribution companies.

This dilemma is now being addressed more and more through the provision of energy subsidies directly as cash payments to consumers. Despite initial hurdles, the implementation of schemes of Direct Benefit Transfer (DBT) reduces the burden of commercial entities of mediating uncertain energy subsidies. To the extent these methods free



commercial entities from price interventions, they will certainly have an interest in expanding the supply of energy.

A lower carbon intensity means that more primary energy must be converted to high quality carriers such as electricity even if it means incurring the economic costs and the inevitable conversion losses.<sup>39</sup> Conversion deepening and increasing conversion losses of the energy system is not necessarily unique to the current low carbon energy transition. The problem for India is that it has to pursue the transition at relatively low levels of per person income. This further limits India's ability to use markets as an instrument of change.

Therefore, energy policy is constrained to use top down regulatory control rather than market-led choices to make the transition towards a low carbon economy. On the positive side, these interventions have led to the enforcement of setting developed country regulatory standards for emission of pollutants from coal based power plants and for emissions from transport vehicles. While the modalities for these may need strengthening, however, the trend towards higher quality fuel use is unmistakable.

At the same time regulating energy prices to maintain them at «affordable» levels determines domestic political choices as well as calls for intense multi-lateral bargaining. The dominant policy discourse remains that economic progress is impossible without affordable energy because energy demand is a consequence of economic progress rather than its cause. Energy is presumed to remain unaffordable to large majority of Indian consumers indefinitely even at projected economic growth rates above 7-8 percent.<sup>40</sup>

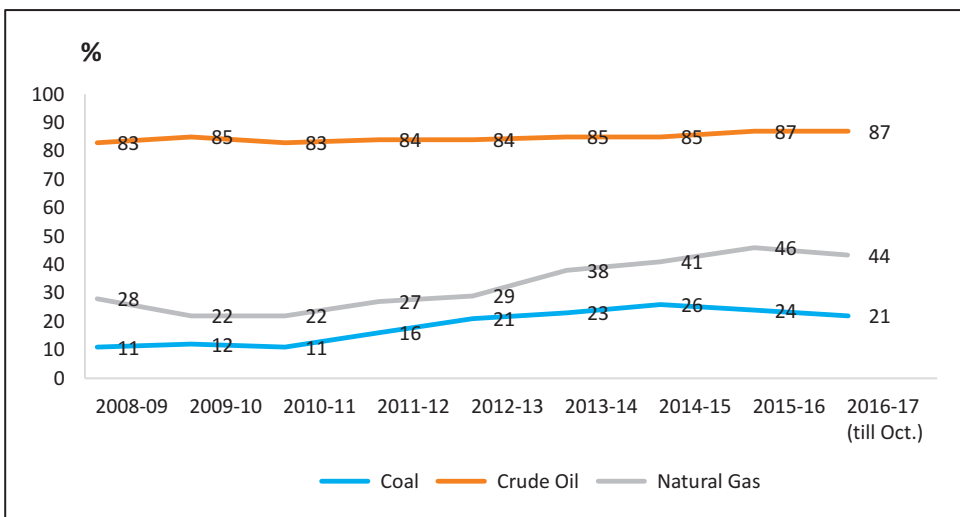
However, since the country remains dependent on energy imports, the problem of affordability is resolved through cross subsidies. High energy tariffs are imposed on industrial and commercial energy consumers even if it reduces the competitiveness of industry and

commerce that is vital for economic development. It also constrains investment in energy supply and energy delivery infrastructure limiting access to energy for the most deprived sections of society. The perverse outcome of this contradiction is that ‘no energy’ or ‘minimal energy’ consumption has emerged as the only affordable option for millions of households.

### Dependency: Resources

Dependence on imported energy sources has always been seen as a source of strategic weakness by Indian policy makers. Energy imports accounted for over 32 percent of India’s primary energy basket in 2015.<sup>41</sup> The import of fossil fuels accounted for over 27 percent of total imports by value in 2016. Out of this oil accounted for nearly 67 percent.<sup>42</sup> India is currently the third largest importer of oil behind China and the United States, the fourth largest LNG importer after Japan, South Korea and China and the second largest importer of coal behind China. Roughly 80 percent of India’s oil consumption, 50 percent of natural gas consumption and 15 percent of thermal coal consumption is imported.

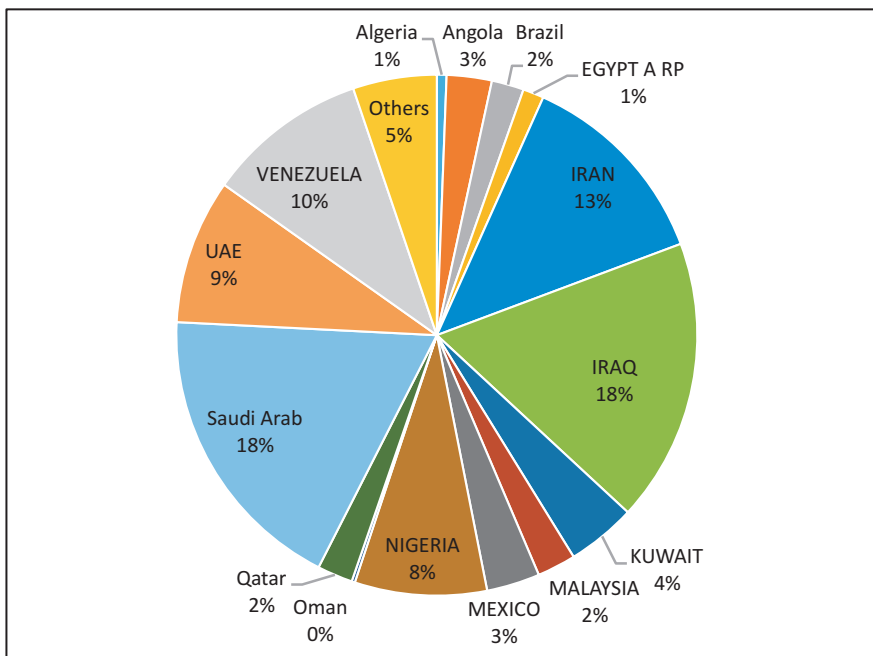
**Chart 3: Share of Imports in Energy Supply (Fossil Fuels).**



Source: Websites of respective government ministries.

India's policy response to limit risk arising from imported energy is predicated on the rather dubious presumption of market failure. Essentially markets are assumed to be incapable of delivering energy security. Equity oil investments, diversification of import sources, increasing domestic production and reducing overall demand for energy through efficiency improvements are strategies emphasised in policy documents to hedge against market risks.

**Chart 4: Oil Import Sources 2016-17.**



*Source: Ministry of Commerce & Industry, Government of India.*

In the early years as an independent country, India was eager to consolidate its hold over the oil & gas industry dominated by a few Anglo-American companies.<sup>43</sup> This was in line with India's industrial policy resolution of 1948 and 1956 which clearly underlined the Government's aspiration and future plans for core industries like petroleum with all future development reserved for public sector undertakings.<sup>44</sup> However until the oil crisis of the 1970s, import and

distribution of petroleum products remained under the control of the International Oil Companies (IOCs). As oil consumption began to grow in India, the first energy survey committee report submitted in 1965 warned against a pro-oil shift of the Indian economy and advised caution over continuing with an 'imported energy' trend.<sup>45</sup> Low oil prices had entrenched the use of oil in India even where it could have been substituted by domestic coal. Oil and oil based feedstock use continued in rail transport, agriculture and fertilizer industries. The subsidisation of diesel resulted in widespread use of inefficient and outdated diesel motors and engines in agriculture and road transportation.

When the organisation of petroleum exporting countries (OPEC) raised prices overnight in 1973 following the geo-political crisis in the Persian Gulf, India's import bill increased by a billion dollars.<sup>46</sup> India just recovering from the war with Pakistan was also coming to terms with the termination of US aid. So the shock was severe. However all pronouncements about reducing oil imports in policy documents did little to dent India's increasing dependence. Higher duties imposed in 1973 on the consumption of oil proved ineffective with consumption being inelastic to price increases. They did, however, have the unintended consequence of generating 'wind-fall' revenues for the government that came in handy to make up for national fiscal deficit. Thus began an addiction that has stayed since.<sup>47</sup>

With the direct tax base not expanding at the required level, these duties have become the preferred means for governments at both the federal and regional level to garner revenues for cash strapped administrations. Today petroleum product prices in India are among the highest in world even at market exchange rates and much higher at purchasing power parity rates. The tax on petrol (gasoline) equalled a carbon price of \$60 per tonne of CO<sub>2</sub> in 2014.<sup>48</sup> The average Indian has to

spend over 80 percent of a day's wages to buy a litre of petrol in 2017 which is high even when compared to that of an average Nigerian who has to spend about 30 percent of a day's wages.<sup>49</sup> High prices are also the reason why per person petroleum consumption is among the lowest in the developing world.

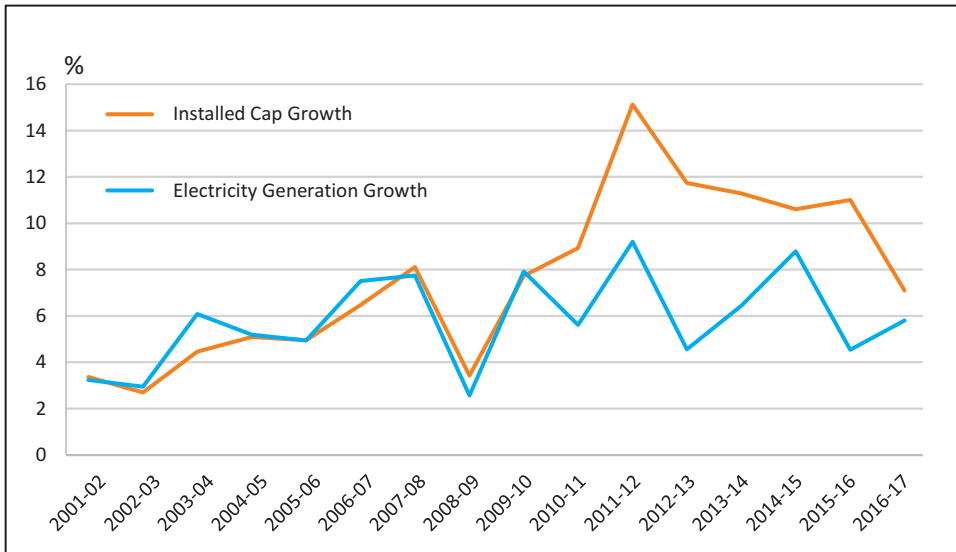
In the last decade (2006-16), crude oil production increased by 15 percent while consumption increased by 62 percent. In the same period, gas production remained stagnant barring a short spurt between 2009 and 2012; however, consumption increased by 38 percent. In spite of sufficient coal reserves, thermal coal imports grew 3 times faster than imports of coking coal, rising from 8.7 million tonnes (MT) in 2004 to 212 MT in 2014.<sup>50</sup> While the import of hydrocarbon resources was driven largely by inadequate resource endowment coupled with inadequate exploration, coal imports rose due to the inability of the domestic coal mining industry, dominated by state owned Coal India Limited (CIL), to meet growing demand for coal. With domestic coal production not keeping pace, a reduction in import duty on coal was necessary to keep price of imported coal low.<sup>51</sup> A reduction of ash content in imported coal enabled import of coal from certain countries.<sup>52</sup>

India's attempt to attract world class mining companies to invest in coal mining has not had the desired outcome. The manner of auctioning coal blocks, the small size of the blocks put up for auctions, the control on coal prices along with the absence of long term leases were among the many reasons why Indian coal blocks did not attract long term risk capital from overseas investors.<sup>53</sup>

The key factor that differentiates India from other large importers of energy is that India, remains a country with a perpetual trade deficit. Its ability to import energy is limited by its trade earnings and foreign

currency reserves. Low oil prices since 2015 have substantially reduced India's exposure to oil price risk. But the spectre of 1974, 1991 and 2008 continues to haunt policy makers. In 1991 high oil prices along with inadequate foreign exchange reserves pushed India to the brink of a serious economic crisis. The lesson was a difficult one. So enhancing domestic production of energy and reducing import dependence remains an article of faith.

The government has set a target for reducing oil imports by 10 percent and increasing coal production to 1.5 billion tonnes (BT) by 2022.<sup>54</sup> Given current global oversupply of oil and gas, the prospects for new domestic discoveries or production do not seem very bright. Nevertheless, State owned upstream companies are being pushed to increase domestic oil production through enhanced oil recovery technologies in existing wells.<sup>55</sup> The Government has recently come out with an integrated Hydrocarbon Exploration Licensing Policy (HELP) that aims to reduce the regulatory burden of the previous policy to make it more attractive. However, given low international oil and gas prices and the perception of high exploration as well as regulatory risks in India, interest remains muted. The government has also announced that it will stick to its 1.5 BT target for domestic coal production even though the growth in demand for domestic coal is stagnant on account of lower than expected demand growth for electricity. The 32 MT increase in coal production achieved in 2014-15 which was more than the cumulative increase in production of 31 MT during the previous four years provides the spur for such a «target».<sup>56</sup> It is also testimony to the fact that production and supply of energy are driven more by state interventions rather than market led forces of demand and supply. Production targets, an inheritance from the planning era are of little relevance if the goal were to build a competitive modern coal industry.

**Chart 5: Year on year growth rate of electricity capacity and generation.**

Investment in equity oil has probably been the most visible and consistent policy response for hedging against market failure. A report commissioned by the Prime Minister of India to address the issue of energy security in 2000 recommended the ‘intensification of exploration efforts and securing acreages in countries having ‘high attractiveness for ensuring sustainable long term supplies’ such as Russia, Iran, Iraq and North Africa.<sup>57</sup> The Integrated Energy Policy Report released in 2006 did comment that ‘obtaining equity oil, coal and gas abroad only contribute towards diversifying supply sources and not towards energy security’ but then went on to recommend ‘investing in equity oil’ to enhance energy security in subsequent sections.<sup>58</sup> A new division on ‘energy security’ was created in the Ministry of External Affairs (MEA) of the Government of India in 2011 and designated as ‘the nodal point for energy security related matters involving coordination with line ministries, the Planning Commission, Indian missions and posts abroad, international organizations and foreign missions’ also emphasized facilitation of energy equity investment and bilateral energy deals in energy exporting countries in Africa, Latin America, Central Asia and South East Asia.<sup>59</sup>

The quest for self-reliance through equity oil investments by India can hardly be said to be an original approach devised to pursue material interests. India was merely following ‘classic moves’ deployed by industrialised nations when their share of imported oil was growing.<sup>60</sup> India’s policies towards oil equity investments as stated in its Five Year Plans in the early 2000s also show marked similarity with policies of China, suggesting both might have been drawing from the same sources.

The presumption that ‘equity oil’ produced outside the country was equivalent to oil produced domestically and therefore secure and available at lower prices is itself questionable.<sup>61</sup> As the world market prices oil according to its opportunity cost, the opportunity cost of oil would be roughly the same as that of purchasing globally traded oil whether produced domestically or obtained through equity oil. ‘Equity oil’ belonging to Indian NOCs is almost entirely sold into the global oil market and thus makes no contribution to security of supply.<sup>62</sup> Foreign oil assets acquired under low oil price scenarios have benefitted its NOCs commercially when prices swing the other way. But by the same token they have also exposed the same NOCs to serious political and market risks in adverse circumstances.<sup>63</sup> But since India accounts for a significant share of marginal demand for oil, oil prices and therefore profits from equity oil investments would be high only when the Indian economy is growing strongly and consuming large quantities of oil. In other words equity oil will add to economic income when it is least needed by India and subtract from it when it is most needed. This is the opposite of what a hedge is supposed to do.

Furthermore as most of India’s equity oil investments are in countries that are not considered to be democratic or transparent, India’s property rights in foreign oil assets are most at risk as oil prices increase. If the host country is economically sophisticated, it can appropriate rents from an increase in oil (energy) prices through



windfall or other taxes.<sup>64</sup> This was the case in Indonesia where India had equity investments in thermal coal. Though equity investments were held by private companies, the unexpected increase in the regulated price of thermal coal by Indonesia had a national impact on India as it substantially altered the viability of imported coal based ultra-mega power plants (UMPPs) that were being jointly developed under a private public partnership model. If the host Government of the country in which India has oil or coal equity investments is non-transparent and autarkic it can nationalise India's hydrocarbon assets. This may be the outcome of oil equity investments made in South Sudan.

Despite the insufficiency of the concept of 'equity oil' as a measure of energy security, it continues to find favour in policy circles. Vaguely defined concepts of 'national security' and 'energy security' offer commercial interests an excellent allegory for using state power to bolster and protect commercial interests – whether of NOCs or private companies. Government diplomatic support reduces transaction costs in accessing resources overseas also increasing the possibility of success. NOCs probably understand quite well that their equity oil supplies are no more secure from political or logistical disruptions than long-term contract supplies or market purchases. In fact, for State owned companies, investments abroad provide considerable commercial merit if they can help safeguard investments and profits from predatory rent or tax seeking Governments at home.

Given India's challenging geological prospects and declining production from existing fields, it also makes commercial sense for Indian NOCs to throw their weight behind any policy that encourages investments abroad. With prices for domestic gas (and even oil until 2004) being regulated, investments in the upstream sector outside India have had better prospects for profits. Expansion abroad helps diversify their portfolio and can also help increase international competitiveness

through the development of new capabilities in areas such as extraction of shale oil and gas or ultra-deep water drilling.

In the mid-2000s there was fear that Indian (and Chinese) investment in equity oil was 'locking up' resources and therefore contributing to global energy insecurity. There was also fear that hydrocarbon equity investments in politically turbulent countries were offering a sense of legitimacy to repressive regimes. This may not, however, have been an accurate portrayal. India had to work with the 'late-comers dilemma' in the global upstream oil industry where most of the low hanging fruit in terms of attractive hydrocarbon prospects were taken IOCs. Indian NOCs were forced to settle for few 'leftover' assets in politically and economically difficult regions that western companies had shunned. These assets often had little upside profitability and thus they were of minimal interest to IOCs.<sup>65</sup>

Diversification of sources of oil supply to increase supply security is yet another strategy that has received geo-political interpretations. India's dependence on oil imports from Persian gulf countries has historically accounted for over 60 percent of total imports. This has hardly changed in the last two decades. In 2001, the Persian Gulf accounted for 66 percent of oil imports and in 2016 the region accounted for 64 percent of imports.<sup>66</sup> However there has been a shift by way of rising imports from Africa and South America. In 2001 South America accounted for 7 percent of oil imports but in 2016 the region accounted for 15 percent of Indian oil imports. South America's gain has come at the expense of Africa whose share in imports fell from 22 percent in 2001 to 13 percent in 2016. The largest gain in import share from South America was Venezuela whose share increased from just over 4 percent in 2001 to 10 percent in 2016.

Though there is some change in the relative shares of import sources (by region and by country) the total number of countries from which oil

is imported into India has remained stable at about 15-20 for the last two decades. Lack of significant change in the pursuit of diversification does not necessarily compromise India's energy security at least in the context of oil. When there is a threat of disruption or instability in the Persian gulf, the price of oil would rise sharply well before the crisis actually unfolds and the oil market would make no distinction between oil from the Gulf and oil from supposedly secure places. A disruption somewhere is a disruption everywhere as far as the oil market is concerned and would be reflected in the global price of oil. India with oil from 'secure' or 'diverse' regions cannot beat the oil market as far as access and prices are concerned.<sup>67</sup>

It is more likely that marginal changes in diversification of oil import sources by India reflects economic rationalisation at the refinery level rather than geo-political securitisation at the country level as it is commonly believed. In contrast to the electricity sector, down-stream petroleum operations are driven by commercial rationality primarily because most of the crude oil is sourced from international markets. Furthermore the complex refining capacities added by the private sector enabled India to increase the share of relatively cheap inferior grade crude from countries such as Venezuela. State control over sourcing decisions, especially on the private sector that has 40 percent market share in refining is anyway limited.<sup>68</sup> Investments in refining by the private sector have enabled India to not only become self-sufficient in petroleum refining but also emerge as a major exporter of petroleum products to industrialised nations that have stringent environmental standards for petroleum products. It has also aided India's own push for cleaner transport fuels.

### **Dependence: Technology**

Historically nuclear energy has been portrayed as the source of energy that would liberate India from its strategic weaknesses such as

dependence on imported energy resources, dependence on imported technology (for power generators or upstream oil and gas exploration and production technologies) and take India into a future of abundant and cheap energy. The limited potential of hydro-power which was and the finiteness of coal resources were emphasised to promote nuclear energy. In 1955 Homi Bhabha the father of India's three stage nuclear programme stated that:

«We have come to the inescapable conclusion that the resources of hydro- electric power and conventional fuels in India are insufficient to enable it to reach a standard of living equivalent to the present US level».<sup>69</sup>

Bhabha's three stage programme involved using uranium to fuel pressurised heavy water reactors (PHWRs) in the first stage followed by reprocessing spent fuel to extract plutonium. In the second stage plutonium was to be used in fast breeder reactors (FBRs) and the third phase involved the use of thorium in breeder reactors. The primary goal was to develop nuclear energy based on thorium of which India had abundant resources and replace uranium that was relatively scarce in India. In 1970 the Department of Atomic Energy (DAE) set up to carry out the three stage plan projected that India would have 43 GW of nuclear generating capacity by 2000.<sup>70</sup> In 2008 after India signed the '123 nuclear agreement' with the United States, the DAE made the case for import of Light Water Reactors (LWRs) under the '123 agreement' even though it signalled a departure from the three phase programme that was rooted in self-reliance. The DAE argued that 'India would face a shortfall of 412 GW of electricity by 2050 and the only way to address the shortage was to import LWRs.'<sup>71</sup>

As of 2016, installed capacity of nuclear energy is still at 6780 MW which contributed roughly 3 percent of electricity supply. Apart from a version of LWRs imported from Russia<sup>72</sup> no LWRs have been imported

from western companies under the 123 agreement so far and the prospects for such imports in the future remain uncertain. For western nuclear companies that are commercially oriented, even if the economics were favourable, the legislation on liability in India makes the compliance burden too onerous.

Despite these setbacks, Indian policy documents continue to emphasise the three phase plan. For example India's NDC to the Paris Agreement indicates that nuclear capacity would be increased tenfold to 63 GW by 2030. Going by statements by the DAE, it is likely that most of the additional nuclear energy capacity will be indigenously developed PHWRs but the draft energy policy of 2017 states that import of LWRs from western companies will be pursued to 'increase nuclear capacity in the short term taking advantage of foreign credit'. It also argues that 'nuclear energy must be promoted even if its share in the overall energy mix is not high enough now as it is the only base load power source offering green energy'. The plan to import of LWRs is justified as a short term measure that would eventually accelerate India's shift to the second phase of its three phase programme based on thorium based FBRs that would use domestic thorium. India's first FBR of 500 MWe has failed to meet the target date set for it to 'go-critical' many times in the past. 2017 was the last target that was missed which has since been revised to early 2018. Despite persistent setbacks to the fast breeder programme, the draft energy policy of 2017 brims with optimism for India's nuclear future with the expectation that 'the second stage has the potential for a 500 GWe power base that would supply energy for a few centuries'.

Experts are divided on whether India's thorium based FBR dream will be realised. According to some experts, FBRs are seen to be economically unviable, susceptible to accidents and abandoned by industrialised countries that invested heavily in the technology.

According to others, especially those from the Indian nuclear fraternity, India possess unique and exceptional indigenous knowledge on FBRs and has a very high probability of success.

The divergence between the promise and reality of nuclear energy may be overlooked as it is a feature that India shares with most of the countries in the World but the compromise on the value of self-reliance in both resource and technology that India has emphatically reiterated to justify investment in nuclear energy raises some questions.

From an economic stand point, moving out of the idea of self-reliance has benefitted the nuclear industry. India's import of uranium which accounted for only 0.2 percent of energy imports (in terms of value in US\$) has substantially improved the plant load factor (PLF) of indigenously developed reactors. Today nuclear energy has the highest specific generation value (gigawatthours of energy generated for megawatt of capacity) which makes it the most efficient mode of power generation in India. Renewable energy that accounts for 33 GW or 14 percent of installed capacity contributes less than 6 percent of power generation while nuclear power that accounts for less than 2 percent of capacity contributes over 3 percent of power generation.<sup>73</sup>

Yet another dilemma is apparent in India's much admired solar programme. India has set itself a target of installing 175 GW of renewable energy capacity by 2022 out of which 100 GW is expected to come from solar energy. The emphasis is on self-reliance as solar energy freely available in the country for almost 365 days in a year. However over 80 percent of the solar panels that are required to capture freely available solar energy and convert it into electricity are from China or Chinese owned companies based elsewhere.<sup>74</sup>

The domestic solar energy industry involved in installing solar energy generation capacity prefers imported low cost solar panels that are often

available with low cost financing. Low cost imported panels and low cost financing are said to be driving what has come to be labelled 'strategic-under bidding' for solar projects that generate head-line grabbing low tariffs.

'Strategic-under bidding' for projects put up for competitive bidding has already undermined the economic viability of power generation projects in the past. Ultra mega power projects (UMPPs), awarded under competitive bidding under a public private partnership model, not only failed to take-off on the scale expected, but also saddled lending institutions with a trail of non-performing assets. While the bidders failed to factor in fuel price risks, the broken electricity distribution sector ensured that anticipated demand or electricity did not materialize. 'Strategic Underbidding'<sup>75</sup> only ends in protracted post award re-negotiation, allegations of malfeasance, and eventually the cancellation of contracts and awards that have plagued India's efforts to privatize its coal and thermal power sectors in the not too distant past. Is it possible that some of the solar projects with very low tariff bids end up suffering the same fate?

The small group of local solar manufacturers producing solar modules with imported silicon ingots and wafers would have high import duties on solar panels. The government has imposed import duties on solar panels and made domestic content in solar installations mandatory. However, these provisions are contested at the World Trade Organisation (WTO). So far most of the WTO rulings related to the import of solar panels have gone against India. The claim by Indian manufacturers that imported panels compromise on quality has not substantially reduced the import of solar panels. India's dilemma here reflects the conflict between its geo-political ambition to be counted as a leader in addressing climate change and its domestic compulsion to revive domestic manufacturing and create jobs.



By taking on high capacity installation targets, has India inadvertently chosen to become a consumer rather than a producer of new energy technologies. India's green energy goals have thus come to be framed rather restrictively as a narrow energy policy rather than a more comprehensive industry and technology policy. By contrast China's pursuit of low carbon growth insists on positioning the country as a producer of low carbon energy technologies. India's bold ambitions on addressing climate change suggest the influence of a more pro-active foreign policy over its still reticent energy policy. However, as far as India's unmistakable domestic messaging goes, raising its coal production to 1.5 BT by 2022<sup>76</sup> and the determined acceleration of projects to increase rural energy access through grid based electricity and petroleum based cooking fuels (LPG)<sup>77</sup> suggest that India is well aware of the limits and may be deftly playing a two level strategic hedging game.<sup>78</sup> At home the goal of development and access to energy cannot be compromised, even as it continues to reassure international audiences that it is a responsible emerging power prepared to punch above its weight in addressing climate change.

## Identity

India's position in climate negotiations and other multilateral negotiating platforms such as the WTO is followed with interest across the world as its stand is expected to influence the future of the emerging multilateral world order.<sup>79</sup> Though India's early positions in climate negotiations were regarded as destabilising, India's position in the last decade, culminating in its commitments to the Paris Agreement are held up as models for the rest of the world. This has also followed the altered perception of India from being a part of the global trade union campaigning for the establishment of economic and social justice to one associated with the pursuit of power and prestige.



At the United Nations Conference on Human Environment in 1972, Prime Minister Indira Gandhi had squarely blamed poverty for pollution. The idea that addressing poverty will also address pollution defined India's position in climate negotiations until a decade ago. India sought to be exempted from action on reducing CO<sub>2</sub> emissions that would compromise on its policies for poverty alleviation. This included but was not limited to providing grid based electricity to millions of households. India's claim that it had the right to development through increased access to modern energy sources was not appreciated by the international community. India found itself labelled a 'nay-sayer' in multilateral negotiations and its stand was criticised as being based on 'third world moral imperatives'.<sup>80</sup> India was also accused of acting against its own interests because a significant part of India's population were exposed to natural calamities such as floods and droughts – apparent manifestations of climate change.

It was only in 2005 that India indicated a shift in its position where it expressed willingness to discuss efforts to reduce emissions subject to availability of financial resources and technology. At a G8 forum in 2008 India endorsed a statement that the maximum permissible global temperature increase was 2°C above pre-industrial levels.<sup>81</sup> This was despite the fact that there was a possibility of the statement being used to enforce commitments on limiting CO<sub>2</sub> emissions. In 2009, India announced that it was ready to reduce carbon emission intensity by 25-30 percent from 2005 levels.<sup>82</sup> In 2015 India's NDCs consolidated voluntary offers made earlier with a new commitment on the share of non-fossil fuels that was subject to availability of finance and technology.<sup>83</sup>

The gradual shift in India's positions at climate negotiation reflects the change in its identity as a non-aligned 'leader of the poor' (G 77) to 'member of the affluent club' aligned with the interests of industrialised

nations (G 20).<sup>84</sup> In this new ‘avtar’ India seeks to find commonalities with industrialised nations that allow it to pursue its own interests rather than allow itself to be overwhelmed by interests of industrialised nations. It is a conscious choice made to enhance prospects for India’s strategic quest towards power and wealth even if it may at times impose certain domestic costs. The ultimate determinant for India, however, remains whether its 1.3 billion people can be taken along a low carbon path leading to a better quality of life or will they be left behind.

Within the South Asian context, India’s identity is more of a regional hegemonic power rather than a responsible global economic power. In the eyes of India’s relatively small South Asian neighbours India’s unresolved conflicts in the region particularly its conflict with Pakistan constrains the development of regional energy security options such as shared cross-border infrastructure and cross border energy trade that can contribute not only to regional economic progress but also strengthen national energy security. India’s hegemonic power over decision making in institutions such as the South Asian Association for Regional Energy Cooperation (SAARC) is seen as the primary reason for the slow pace of progress in regional energy initiatives.<sup>85</sup>

Significant differences in energy resource endowments and consumption patterns among countries in South Asia make a strong case for regional integration through trade. Historically the strongest case for regional trade is made for electricity particularly import of hydro-electricity by India (the largest market accounting for over 80 percent of electricity consumption in the region) from small neighbours such as Bhutan and Nepal which have abundant hydropower resources. Bilateral agreements between India & Bhutan, India & Bangladesh and India & Nepal facilitate electricity trade between the respective pairs of countries. The share of electricity traded across borders remains small. Electricity flow from Bhutan and Nepal account for less than 0.5 percent

of India's electricity demand and very often India is a net electricity exporter to these countries.<sup>86</sup>

Critics of electricity export to India from Bhutan and Nepal tend to focus on the narrative of a large hegemonic power sucking up their natural resources leaving environmental costs behind. In reality India is more of a 'benevolent hegemon' as it procures electricity from Bhutan at relatively high tariffs that are not justified commercially. India's purchase of hydro-electricity from Bhutan accounts for 27 percent of government revenue and 14 percent of Bhutan's GDP.<sup>87</sup> More recently the flow of relatively cheap coal based electricity from India to Bhutan, Bangladesh and Nepal has invited criticism as India is seen to be expanding markets for coal based power. The fact is that it is 'everyday economic rationality' driving the direction of flow of electricity in South Asia. In the absence of thermal power from India, the alternative for hydro-power based Nepal and Bhutan during seasons of lean river flows is either 'no-power' or 'expensive power' from oil fuelled generators. For Bangladesh which is facing a growing deficit of gas supply for power generation, the oil based alternative is about three times more expensive than coal based power from India.<sup>88</sup>

Economies of scale arising from shared infrastructure for bulk crude oil and LNG procurement and large scale refineries leading to significant cost reductions for countries in South Asia have been pointed out by many development funding agencies but none have gone beyond the drawing board. India's supply security concerns on account of the presence of Pakistan on the pipeline map in the proposed Iran-Pakistan-India (IPI) or the Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipelines have been labelled 'deal breakers' in negotiations. The criterion of affordability imposed by India in early negotiations on gas delivered through the IPI pipelines was interpreted by Pakistan as a deliberate attempt by India to stall progress. During negotiations on the

IPI pipeline in 2000, Iran is said to have offered a price of less than \$1/mmbtu but this was seen as unaffordable by India.<sup>89</sup>

The low carbon era may in fact open up new strategic opportunities for regional cooperation in South Asia. Unlike the era dependent on fossil fuels that required natural endowment of resources, the transition to low carbon energy sources requires a knowledge intensive industrial production base (quality) and a large energy consumption base (quantity) both of which are necessary to reduce the cost of the transition. Consumers as controllers or enablers of the quantity and quality of energy flows will matter more than producers of energy. This would put India at a significant strategic advantage over its small neighbours in South Asia.

The scale of India's grid capacity and the scale of its electricity consumption is larger than that of its neighbours by orders of magnitude. As the dominant holder of grid capacity as well as electricity demand India could potentially control the grid with adequate balancing and storage capacity.

## CONCLUSIONS

India has initiated the transition from an energy path that was focussed on primarily increasing the quantity of energy resources to one that also seeks to improve the quality of energy resources. This necessarily means that the influence of new values on environmental quality and energy use efficiency will increase on India's energy choices in the future.

However the historic emphasis on values such as economic progress, self-reliance and the quest for social justice are likely to remain dominant influences on India's stated strategic preferences. The draft energy policy of 2017 for example reiterates traditional core values even when it makes the case for investment in renewable energy:

«Improved energy security, normally associated with reduced import dependence is also an important goal of policy. Today India is heavily dependent on oil and gas imports while also importing coal. In so far as imports may be disrupted, they undermine energy security of the country. Energy security may be enhanced through both diversification of the sources of imports and increased domestic production and reduced requirement for energy. Given availability of domestic resources of oil, coal and gas and the prospects for their exploitation at competitive prices there is a strong case for reduced dependence of imports. In due course, we may also consider building strategic reserves as insurance against imported supplies’. ‘Reduction of imports and in emissions can be both be achieved through an expansion of renewable energy consumption».


The influence of contextual factors such as domestic resource endowments and existing bilateral relationships in the draft energy policy suggest continuation of a reactive rather than proactive rationality in evaluating policy options. The policy emphasis on core values such as self-reliance that associates increase in energy security with decrease in imports may also be read as an extension of reductionist focus on securitisation.

In pragmatic terms, as in all other countries, domestic compulsions and contradictions embedded in the political economy temper Indian policies when it comes to actual action limiting the range of options available. Growth in the share of imports of both resources and technology dilutes the policy of self-reliance. Then, in a world defined by trade and inter-dependence, there is little or no value in the pursuit of self-reliance.

The value of affordability as a policy goal leads to the far greater salience of direct methods of addressing energy poverty (through

subsidies and price controls) in a democracy characterised by inadequate levels of development. The indirect method of increasing energy supply and access through reliance on markets for economic growth finds little resonance with the large majority of the population given the context of relatively short electoral cycles.<sup>90</sup>

The contradiction here is that direct methods of increasing energy access through subsidies cannot be financed without reliance on markets for growth. This is captured by the Indian electricity system, saddled as it is with large financial liabilities imposed by policies that seek to increase electricity access through subsidies. India's low carbon pursuit in the context of the commercial viability of the Indian electricity sector thus becomes a substantial economic challenge.

It would then be most appropriate to conclude with a question. As global energy, policies seek to consciously become more and more interventionist in the pursuit of a globally pursued energy transition, will attributes such as the entrenched role of the state in the energy sector, that had been portrayed as strategic weaknesses, become sources of strategic strength for the transition to a low carbon economy? India as a large consumer of renewable energy technologies is already lowering the cost of using new technologies given that costs depend critically on scale of deployment. The entrenched role of the state in the energy sector in India is what will be counted upon to facilitate socialisation of the cost of integrating intermittent renewable energy into the grid. The role of the state in promoting the nuclear energy industry in India will be similar.<sup>91</sup> The 'soft power' of the narrative of a large, relatively poor developing country committing investments to address climate change is a compelling geo-political goal for the state. India is more likely than not to attain the goal. However, it will do so on its own terms and in its own time, negotiating all the contradictions and rigidities in its situation. 

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10. 1978 to 1980 had been a Rolling Plan introduced by the Janata Government instead of the Sixth Plan. The Congress reintroduced the

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- 38.
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