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28th Lalit Doshi Memorial Lecture

by CSEP Chairman and Distinguished Fellow

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INTRODUCTION

Mrs. Pratima Doshi, members of the Doshi family, Ambassador Vijay Nambiar, other trustees of the Lalit Doshi Memorial foundation, Shri Vipin Sharma, ladies and gentleman.

It is a privilege for me to be here today to deliver the 28th Lalit Doshi Memorial Lecture. Many have preceded me on this stage, all with a very distinguished record of public service, and when I look back at the names, I am not just humbled, but also struck by the testimony that this list confers on Lalit Doshi's contribution to public policy and national development. Edmund Burke, the British political philosopher and Parliamentarian said: "Nobody made a greater mistake than he who did nothing because he could do so little." Reading about what Shri Lalit Doshi achieved in his 27 years of public service makes clear that he made no such mistake. Whatever the challenge and however steep the odds, he made an effort to move the needle. And, he made a difference.

I met Shri Lalit Doshi a couple of times when he was the Joint Secretary in the Ministry of Petrochemicals and I was an adviser to the public sector oil company Oil India. I had just returned from a four-year stint with an American multinational, and aside from the 18 months that I had spent as an IAS probationer before resigning from the service, I was relatively inexperienced in the workings of government entities. My responsibility was to develop the Strategic Plan for Oil India and by extension, to offer thoughts on how India might approach the development of its indigenous hydrocarbon resources. I sought the advice of many senior officials. In this context, my meeting with Shri Doshi is etched in my memory. He was generous with his time and views and I remember thinking that it was because of officers like him that the Indian Civil Service deserved the accolade of being the steel frame of good governance.

My subject today, is "Energy Aatmanirbharta: Meeting Emergent Challenges." My focus will be on providing a road map for India to meet the overarching objective of access to affordable, reliable, secure and clean energy for all its citizens.

UNPACKING ENERGY AATMANIRBHARTA

Let me start by clarifying my interpretation of the word "Aatmanirbharta." I use it in the literal sense of "self-reliance" and not, as some commentators on energy have stretched it to mean, "self-sufficiency."

I am not suggesting that self-sufficiency is not a worthwhile objective, which of course, it is. But given the nature of the energy market, there is an economic threshold beyond which the opportunity cost of finding and developing our indigenous resources does run counter to the national interest. In certain circumstances, it matters less who owns the energy asset and/or where it is located, and more whether one has the rights of access and strategic autonomy to safeguard against unexpected disruptions.

I provide this definitional clarity because I will later outline a 10-point action plan for meeting emergent challenges. This plan flows from this interpretation.

INTERNATIONAL CONTEXT AND IMPLICATIONS FOR INDIA

The world international energy market has been radically transformed over the past few years. This is the result of complex cross-cutting, global challenges: the COVID-19 pandemic; climate change; Ukraine conflict and the possibility of President Putin crossing the Nuclear Rubicon; and economic recession. These are just some of the shocks that have hit the global system. While these are disparate shocks, they have interacted with each other to create what Adam Tooze, the *Financial Times* correspondent, defined as a "polycrisis". He attributed this word to the French philosopher Edgar Morin. It is a situation in which the impact of the whole overwhelms the impact of the sum of the parts. In consequence, it is not possible to find a single cause for the crisis and thereby prescribe a single remedy.

Were my talk on the altered contours of this international order, I would have provided details of this transformation. But, the focus of my talk is on India. I will therefore limit myself to outlining the five consequential issues that emerge from this international order, and which I believe the decision-makers in India consider when contemplating how best to meet emergent challenges.

1) First, the inescapable reality that the world is moving towards an ecological abyss. Fortunately, the debate on this subject is over. The most hardened critics of this scientific prognostication have accepted the reality of global warming. Even the former US President Donald Trump, who pronounced that climate change was the greatest scientific hoax ever perpetrated on mankind has now changed his tune. All segments of society—government, business and society—are now publicly committed to the pathway of decarbonisation.

   Unfortunately, such public statements of intent are not matched by action and implementation. The recently concluded COP27 in Sharm el-Sheikh that was supposed to detail the action plans on the decisions taken at COP26 in Paris the previous year did little more than agree to set up a compensatory fund to support the poor countries most affected by global warming. And on that too, they could not agree on the quantum of the fund, its contributors and the governance structure. A recent cover story of the *Economist* was captioned "Good bye to 1.5 degrees".

   This is an alarming trend for India. We all know that India is not responsible for the increase in global temperatures. But this does not take away from the fact it will be amongst the worst impacted. 250 million people live along its coastline and rising sea levels will threaten their livelihoods. Millions more in Uttar Pradesh, Bihar and other parts of northern India will face the trauma of droughts and floods triggered by the melting of the 10,000 odd Himalayan glaciers. Scientists estimate that the life spans of city-dwellers in India will reduce by 7.6 years because of air pollution.

   The hard truth is India cannot afford the incrementalism of multilateral summitry. It cannot develop now and clean up later.

2) The second development of consequence is Deglobalisation. This may not be the right word to describe the consequences of the Ukraine conflict; the technology and trade Cold War between the USA and China; the militarisation of the South China seas over Taiwan, and the drawing down of a second Iron Curtain.

Globalisation may not be dead but only temporarily comatose. But what is indubitable is that the above geopolitical and geoeconomic events have knocked the notion that the world is "flat" or a "global village" on its head. This led to three developments of particular significance for India and its energy sector.

One, the tightening of the energy embrace between Russia and China. The two countries signed a "no limits" friendship agreement a week or so before Russian tanks trundled into Ukraine. Later, Russia committed to building a second gas pipeline to China. The first one has been pumping gas into China since 2019. China is currently one of the largest buyers of Russian crude oil and Chinese Energy Co Ltd, has a near 15% shareholding in the Russian national oil company, Rosneft which incidentally is also the largest shareholder of the former Essar refinery, now called Nayara in Jamnagar.

This energy embrace places India in a somewhat piquant situation. Many questions will have to be discussed and resolved. How reliable will a post-Ukraine weakened Russia that is in hock to our adversary China be regards supplies of Russian crude oil, gas and military spares? How might Russia respond if India gets into another geopolitical imbroglio with China? Might the fact that Rosneft is subject to Western sanctions expose Nayara to trading constraints? These are just some illustrative examples.

Two, a shift in Saudi Arabia's foreign policy. Karen Young, a senior research scholar at the Center on Global Energy Policy at Columbia University has written that Saudi Arabia will henceforth regard relations with the West and in particular USA as transactional and not strategic. She believes that Crown Prince Mohammed Bin Salman is determined to follow a "Saudi First" approach that results in the country securing a leadership position in a "revived," "non-aligned world," and the international energy market. This shift in foreign policy has implications for India's energy strategy. This is because Saudi Arabia is and will remain a critical supplier of crude oil and gas and a strategically important business partner.

Three, it has brought into sharp focus the disproportionate impact of individual leaders on the international oil market. Two examples will illustrate this point.

In February this year, President Putin ordered Russian troops into Ukraine. This was his singular call driven by his ambition to recreate "Imperia Rus" - the greater Russia empire built by his namesake Prince Vladimir in the 10th century. The impact of this act was to totally upend the international oil and gas market. In June, for instance, the price of gas in Europe peaked at the unprecedented level of USD 500/per barrel of oil equivalent. Europe is currently facing an extremely "cold" winter in part only because of low ambient temperatures. It is also because consumers have had to lower thermostats and ration energy consumption.

Earlier in March 2020, Crown Prince MBS took the unilateral decision to flood the oil market with Saudi Oil at the same time the world was shutting down because of COVID-19. This was an ego-driven move to hold onto market share. The price of oil crashed so much so that one day in April 2020, it fell into negative territory. This meant that traders with crude oil contracts had to pay buyers to offload their obligation.

There are several other leaders around the world with plenipotentiary control over their petroleum resources. President Maduro of Venezuela; Ayatollah Khamenei of Iran; the monarchs of Kuwait and the UAE face few checks or balances and their decisions have global ramifications.

The point is that there is now a new variable to consider when analysing the international petroleum market — the personal predilections of these autocrats.

The Government of India and in particular the Ministry of Petroleum have never found it easy to call the international oil market. This is because the market is influenced by not just the fundamentals of demand, supply and inventories, but also by the non-fundamentals of geopolitics, exchange rate movements and Wall Street speculators. Now their task has been made more complex by the addition of this variable. Who knows but they might wish to consider inviting a psychologist who understands the mental mindsets of autocrats into their offices the next time they are deliberating the future trajectory of the international oil market.

3) The third international development of consequence is the recognition that the clean energy chain, like the oil market, is oligopolistic — it is concentrated in the hands of a few countries.

The electric vehicle (EV) value chain offers an illustrative example.

Lithium, nickel, cobalt and copper are critical for the manufacture of these vehicles. The production and processing of these minerals is however dominated by a small handful of countries. Australia mines 50% of global lithium; Indonesia 35% of nickel; Democratic Republic of Congo 50% of cobalt and Peru and Chile 38% of copper. China processes and smelts 60% of lithium, 70% of cobalt, 40% of nickel, and 47% of copper. It meets 70% of the global demand for EV batteries.

Another revealing example is semi-conductors, a critical component for affecting the clean energy transition. The Korean companies Samsung and Hynix together produce 44% of the world's memory chips, and the Taiwan Semiconductor Manufacturing Company (TSMC) fabricates 37% of the world's logic chips and 92% of the most advanced chips. Were TSMC's fabrication facilities to fall into an earthquake crevice or get destroyed by military action, one-third of the world's computing power would be lost.

The fact is that new centers of energy power have been created with China in nodal position. India cannot afford the consequential supply chain vulnerability.

4) The fourth development is the confirmation of the cost competitiveness of renewables. Technology has brought this about. Many studies confirm this trend. Bloomberg has, for instance, calculated that the average global cost of solar electricity dropped from USD 360/MWH in 2010 to USD 60/MWH in 2019/2020. And that of cost of offshore wind electricity from USD 190 to USD 90 over the same period. The study also concluded that the cost of a lithium-ion battery dropped from USD 1,000 per kilowatt in 2010 to less than USD 180 in 2019–2020.

   These figures are dated and contested. My reason for showing them is therefore to highlight a trend and to make the point that it is only a matter of time before renewable power will be cheaper than thermal power.

5) My fifth and final observation reflects an age-old conundrum. Energy sits at the nub of every politician's deepest dilemma. It has never been easy for them to strike a balance between their constituent's short-term demands for secure, affordable and clean energy and the environmental imperatives of sustainable development. The international developments in recent times have brought this dilemma into sharper focus and established that when political push comes to environmental shove, the latter is opportunistically set aside.

   President Biden had in his pre-election campaign pledged not to permit petroleum companies to drill for oil on federal lands. He forgot this pledge in the run-up to the elections for the US Congress in November this year and issued new licenses. His overriding interest was to gain electoral kudos by bringing down the retail price of petrol and diesel. More revealing and visual was his fist bump greeting of Crown Prince MBS on the tarmac of Riyadh airport. Earlier in the year, Biden had said he would not deal with MBS because CIA had reported he had a hand in the murder of the Saudi journalist Jamal Khashoggi. Biden forgot this commitment in his quest to persuade the Saudis to increase oil production and bring down oil prices.

   European and UK leaders have been no less opportunistic. Faced with a shortage of energy because of the sanctions on Russian gas and spiraling prices, they stepped off the treadmill of decarbonisation. Several countries reopened coal-mines that had been mothballed and allocated additional funds to expand and create new fossil fuel infrastructure. This was despite the forewarning by scientists that these steps would add approx 300 mt of greenhouse gases and prolong the life of the fossil fuel industry.

   Indian leaders face a similar dilemma. They too have to crack several conundrums — the clashing priorities of industrial growth and environmental protection; economic efficiency and social equity; political populism and political statesmanship. How they do it is dependent on particular pressures and the social, economic and political context.

INDIA: ENERGY BACKDROP

Let me now provide a sketch of the current contours of India's energy landscape. Given the constraints of time, it has to be no more than a sketch.

1. We are the world's third largest consumer of energy. But on a per capita basis, our energy consumption is one-third of the global average and almost 1/10th that of US consumption.

2. The pace of growth of energy consumption has been amongst the fastest in the world because of our large population, rapid economic growth, and policy of subsidising consumption of LPG, diesel and kerosene. Poor demand management and inefficiency of usage have contributed to this pace of growth. 80% of our energy basket comprises of coal, oil and solid biomass.

3. We have the fifth largest deposits of coal in the world. Next to China, we are the second largest producer. Coal provides 55% of our commercial energy requirements. We do have oil and gas in 26 sedimentary basins. These are located in complex geology and harsh topography. In consequence, they are difficult to locate and even when located, difficult to produce on a commercial basis. Consequently, the gap between domestic consumption and domestic supply has widened. Today, we import around 4.2 mb/d of oil, which is around 83% of our domestic consumption.

4. Non-fossil electricity generation capacity is 150 GW out of a total of 388 GW (of which solar is approximately 60 GW; large hydro 45 GW; wind 40 GW; bio-power 11 GW; nuclear just under 7 GW; and small hydro 5 GW). The target is to generate 500 GW by 2030, accounting for more than 50% of total electricity consumption.

5. Finally, energy transitions unfold over decades. Thomas Edison illuminated the lower half of the island of Manhattan in the mid 1880's. It was not until the mid-1930's that all of the factories in the US had converted from steam power to electric power. This was because these factories had not been designed to use Edison's revolutionary new technology. Most factories had to be redesigned; some rebuilt. The hard reality is that the Indian economy is built on fossil fuels. The transition to a new non-fossil fuel energy system will require massive investment and it will take decades. Until then, India will remain dependent on coal, oil and gas.

Against this international and domestic backdrop, let me provide my 10-point road map programme to meet the challenges of Energy Aatmanirbharta.

WHAT INDIA MUST DO: A 10-POINT PROGRAMME

1) We must overhaul the current siloed structures of energy decision-making. Today there are six ministries directly engaged with aspects of energy: the Ministries of Petroleum and Natural Gas; Coal; Power; New and Renewable Energy; Atomic Energy; and the government's think tank– NITI Aayog. In addition, there are separate Ministries that are responsible for domains impacted by energy, such as water, food and environment, to mention just three. Each of these Ministries is headed by a minister and has a phalanx of bureaucrats. Each knows what needs

to be done for their particular domain and, by and large, they do their job well. No one, however, has oversight and accountability (other than the PM) over the totality of the energy system and the collective and systemic impact of the separate decisions taken by these different ministries. This institutional lacuna must be filled. To do that first, the ministerial siloes must be perforated and an institutional structure created that enables the formulation and implementation of energy policy within an integrated and holistic framework. Second, an omnibus ministry of energy established with Petroleum, Coal, Renewables and Power run as departments under this Ministry. And third, if indeed the second suggestion of creating an omnibus Ministry is infeasible because it would require a major administrative overhaul and /or cut into the interests of powerful vested interests, then to create a department of energy resources and security in the PMO. Such a department should have, inter alia, responsibility for formulating an integrated energy strategy; developing clear, transparent monitoring and evaluation systems to ensure financial, technical and human resources are optimally allocated and utilised; incubating new areas of research; creating an integrated energy data centre; and acting as the ombudsman of energy regulation.

2) The goal of Energy Aatmanirbharta must receive legislative sanction. Parliament should pass a bill. Call it the "Energy Responsibility and Security Act," or simply, the "Energy Aatmanirbharta Act." Energy is in the interstices of every aspect of the economy. It is critical to our future. Energy Aatmanirbharta should therefore be elevated to a national priority. Its implementation, through a redefined, restructured, integrated, administrative framework, should be backed by legislative sanction.

3) Oil and gas imports account for over 80% of our oil requirements. We need to alleviate the consequential supply chain vulnerability. Here are six suggestions specifically focused on oil and gas:

- The revenue-sharing model for fresh exploration should be replaced with a profit-sharing model. Investors in oil and gas exploration are currently required to share a percentage of their revenues even before they have recovered their costs. This is a deterrent, as oil and gas exploration are a highly risky, capital-intensive activity. Potential investors want assurance that if they take the risk of exploration, the first call on the revenues that they generate from a commercial discovery can be allocated towards the recovery of this risk capital. While there is no guarantee that this change will trigger a flow of private capital, there is high probability that without such a change, there will be no substantive incremental interest in oil and gas exploration.
- Several of our producing fields are aging with declining rates of oil and gas recovery. Mumbai High offshore field is a notable example. Its average rate of recovery is around 28%, or maybe even less now. That means for every 100 molecules in the reservoir, we are able to produce only around 28. I am told average global recovery rate for fields of comparable geology is around 40% plus. Enhanced oil recovery techniques exist–some off-the-shelf, others only through strategic partnerships. The government's endeavour should be to find appropriate technology and partners to increase the recovery rate to at least the global average.
- We currently hold around 10 days of strategic petroleum reserves. In addition, our oil marketing companies have a storage capacity equivalent to another 65 days of consumption.

Given the inherent volatility of the oil market, we should expand our strategic reserves to 30 days, so that at any one time we have around three months of supplies in storage somewhere in the country.

- Gas is a relatively clean fuel. It is a versatile product, and there exists a diversity of supply sources outside of the Middle East. The USA, Russia and Australia are, for instance, important exporters. It is currently very expensive, but this is an aberration. We should prepare for a different price scenario and accelerate the creation of the requisite gas import facilities and pipeline grid to ratchet up the gas market share.
- As already indicated, Saudi Arabia's influence over the direction of the petroleum market will increase over time. It is the only country with significant surplus producible reserves of low-cost oil. We must therefore assiduously nurture our relations with such countries. Our diplomats must add the arrow of oil diplomacy to their quiver.
- Attractive merger and acquisition opportunities will arise as international companies reorient their asset portfolio towards renewables and away from petroleum. China will be our main competitor for these opportunities. To beat them, we should place the weight of India Inc. behind our bids. The office of the PM should be the architect of such a bidding strategy.

4) Coal presents a conundrum. It is the cheapest of fuels; 52% of our electricity is generated from coal; millions owe their livelihood to the coal economy; and powerful political and business interests have vested interests in the sector. But it is the dirtiest of fuels. It has to be phased out if we are to meet our net zero carbon emission commitments. If not, it will strengthen the currently unhealthy linkage between economic growth, energy demand, and environmental degradation.

There is no simple answer to cracking this conundrum. But the following incremental steps should be considered:

a) Intensify R&D in green technologies like coal gasification and carbon capture and storage (CCS)
b) Upgrade/close down old thermal plants and those running on subcritical and inefficient turbines
c) Decide against approving new thermal plants
d) Introduce carbon taxes to reflect the externalities of carbon emissions
e) Establish systems for measuring and monitoring the carbon emissions of industries

5) The generation of electricity from renewables has increased impressively. The Government has announced that 50% of India's electricity requirements will be met by renewables by 2030. To meet this target, three conditions will have to be fulfilled. The transmission will have to be upgraded to absorb electrons on an intermittent basis — the sun does not shine at night; the wind does not blow all the time — and the battery storage capacity will have to be increased. This will require massive investment by predominantly the Government. Two, the planning and procurement of renewables will have to be integrated into the mainstream of power system planning and procurement. In parallel, the balance sheets of the state distribution companies (Discoms) will have to be sorted out. Else, there will be no sanctity to the Power Purchase agreements signed between them and the renewable companies. And three, as energy is a concurrent subject, the Central and State governments will have to conjointly

remove the blockers related to land acquisition, regulatory and contract uncertainty, and red tape.

6) Demand management and conservation has been a neglected part of the energy equation. It is however arguably the most effective and inexpensive means of reducing energy dependence. Europe has managed to ride out the current crisis of energy shortage and high prices in large measure by the simple act of turning down the thermostat.

A lot can be said on this subject. It should be the basis for a separate lecture. Here let me list a few steps to give you a sense of the scale and potential:

a) Reduce the consumption of diesel in agriculture
b) Redesign existing buildings and factories
c) Standardise building regulations and emission norms for industry
d) Expand public transport system and
e) Ensure all new construction is green

7) The supply chain of the minerals, metals and chips critical for the green transition are concentrated in a few countries, and in particular China. This presents a major vulnerability for India. There is no straightforward means by which this vulnerability can be tackled in the short term, but a beginning has to be made.

   For a start, India must remove the current obstacles to the private sector mining of cobalt, nickel, copper, and heavy rare earth metals. The studies done by our scholars at CSEP have confirmed that India has substantive reserves of these minerals and metals, but it has done little to expedite its mining and processing. This must change and the ecosystem and incentive structure should be directed towards attracting private investment into this sector. This said there is no getting away from the fact that the lead time from exploration to mining and processing facilities can be as long as 15 years. So, during this interim period (and longer), we have to find ways of securing and safeguarding the supplies of essential minerals and metals. That means diversification of supplies away from China. The burden of finding alternative supply channels will rest with our technocrats and diplomats. The latter should also add the arrow of mining and mineral diplomacy to their quiver.

8) Clean energy will require a very different human resource skill set than what we have at present. There will be less need, for instance, for maintenance workers on oil rigs than for technicians on solar farms. We must anticipate this HR gap, and the training and skilling facilities required to bridge it.

9) Technology is critical. Green hydrogen, modular nuclear reactors, 3rd generation bio, Carbon Capture and Sequestration (CCS) and battery storage; these are the disruptive and frontier technologies that we will have to access. Technology by itself is not however sufficient. We must also ensure that technologies are efficiently utilised. That will require the establishment of an appropriate and enabling ecosystem. The clean energy fund of the government should in particular be managed by people with domain expertise.

10) Finally, and this suggestion lacks the specificity of the nine that I have just outlined. But it is possibly the most important. And in my view an appropriate conclusion to this talk. The need for Political statesmanship, that is, leaders that a decade or so on can look back on decisions that they took today and remark with satisfaction that this was the right thing to have done. There is no simple, straight path from where we are today to the goal of Energy Aatmanirbharta. The path is a labyrinth. It will twist and turn. There will be obstacles. Some will be familiar, others unexpected. None will be insuperable; all can be overcome. But only if our leaders keep the longer-term goals in sight; only if they hold fast to principles; only if they are determined and persistent. “To govern is to choose.” Our leaders have many choices. How they choose will determine our energy fate.