Chapter Title: NO WONDER CHINA AND INDIA ARE PURSUING GREEN GROWTH STRATEGIES SO VIGOROUSLY

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CHAPTER 5

NO WONDER CHINA AND INDIA ARE PURSuing GREEN GROWTH STRATEGIES SO VIGOROUSLY

The argument so far is that ecomodernization will proceed because of its superior attributes, namely in decoupling economic activities from their natural moorings and thereby being able to benefit from technological advantages in terms of greater eco-efficiencies and lower costs. But what drives these changes is normally left unexplored. In the Ecomodernist Manifesto there is a great lacuna at the core, with a big question mark: is it solely a moral imperative that will drive the transformations described in food, water, energy and resource production?

This is where China and India enter the picture. In addition to adopting an ecomodernizing platform (= green growth) for their own benefit, their actions in doing so have powerful repercussions on the world as a whole. As China becomes the world’s renewables superpower, it expands the market for renewables and low-carbon technologies, which in turn leads to greater specialization and further efficiencies being captured, leading to lower costs and lower prices that translate into further specialization and greater efficiencies – and lower costs. And so on, round and round, in a process best captured by non-mainstream economists as circular and cumulative causation (C and CC).

The core of my argument is that China and India are adopting ecomodernizing strategies for their own benefit (enhancing energy, spillover food, resources and water security), but that as they do so they drive spill over effects around the world in terms of reducing costs, captured in the

1. See Toner (2001) for an illuminating discussion of Circular and Cumulative Causation and why it disappeared from mainstream economic analysis. The concept was used by Kaldor (1970) in his Address to the Scottish Economic Society on regional policies.
learning curve. And these reducing costs make it more likely for firms in other parts of the world to pursue similar strategies, bypassing the difficulties encountered in use of fossil fuels, thereby reinforcing the ecomodernizing tendencies that are already underway. The advantages in terms of lower carbon emissions are indeed a fortunate side-effect of this process. This is a most convenient truth.

We started the discussion with the process of ‘shifting wealth’ (OECD) or Great Convergence, which in turn creates enormous energy and resource demands that feed insecurity if the conventional ‘business as usual’ model is pursued. Instead China is pursuing a ‘green growth’ strategy, as is India with a lag of a few years, through which decoupling is being achieved and energy and resource security is being enhanced. China and India are utilizing their newfound positions of prominence in the manufacturing world to pursue fresh strategies of green growth.

**CHINA AND ITS GREEN GROWTH STRATEGY**

China has been setting ambitious targets for the development of its green economy, starting with the 11th Five Year Plan (FYP) (2006–2010) then in the 12th FYP (2011–2015), where the targets for 2015 can be checked against real accomplishments, and now in the 13th FYP covering the years 2016 to 2020. The headline report is that China intends to be far and away the world leader in water, wind and sun power generation by 2020, with installed power generation capacity of 750 GW – or three quarters of a trillion watts of clean and renewable power. If this trend continues (and there is every reason for believing that it will not just continue, but intensify) then China would be the world’s first country to build 1 trillion watts of clean, renewable power before 2025, that is, within the next decade. That means saved carbon emissions from coal-fired plants that would be generating 1 trillion watts of dirty power; it means saved import payments for fossil fuels (coal, oil, gas) to the tune of 1 trillion watts of power capacity; and of course the intangible benefits of creating the world’s most competitive export platform for clean, green energy systems. Above all it means that China will be able to drive the modernization of its economy with clean power as it becomes one of the most electrified industrial systems on the planet.

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2. For a review of the Great Convergence that links it through demographic trends to the earlier Great Divergence, see Korotayev et al. (2016).
Target of 750 billion watts of clean, green power in China by 2020

No other country comes close to this Chinese target of installing 750 GW of clean energy from water, wind and sun by 2020. By contrast the EU was able to install 12.8 GW of new wind capacity in 2015 to bring the total installed wind capacity to 142 GW.  

China’s 2020 targets

- Solar 160 GW
- Wind 250 GW
- Hydro 340 GW
- Total 750 GW

Just in the past five years, China has added over 200 GW of clean energy capacity, or an average of over 40 GW per year. This supports the assertion that China is likely to reach a renewable power capacity exceeding 1 trillion watts (1 TW) before the year 2025 – or within a decade. This will be a milestone of enormous significance.

As China resorts increasingly to green power, so it will drive emulation around the world. So it is likely that by the late 2020s the world as a whole should have built several terawatts of clean power (largely solar and wind) and should be enjoying the newfound energy and resource security that would come from this. The impact on the fossil fuel industries will be profound, as the shift to renewables for power generation can be expected to kill off the coal industry; the shift to EVs in transport can be expected to drastically reduce oil consumption and thereby have profound effects on the oil majors; and the shift to intensive food production without fertilisers, pesticides or herbicides can be expected to have profound effects on the agricultural chemicals industry. These are just some of the disruptions that can be anticipated.

Examining the case of energy first, with my collaborator Dr Hao Tan I have been following the changes in China’s production of electric power as proxy for its shift in energy generation more generally. We see a significant change in China’s energy patterns headlined by a strong shift towards the use of renewables, namely electric power generation from renewable sources

4. The 13th FYP for energy issued in late 2016 downgraded these targets slightly. The revised targets are: solar 110–150 GW, wind 210–250 GW, hydro unchanged at 340 GW,
such as wind, solar PV and water (hydro). This is captured most clearly in
the changing proportions of power generated from WWS sources vs power
generated from thermal sources – as shown in Figure 5.1.

This chart makes it very clear where China’s energy system is headed. China
is increasing its proportion of electric power generating capacity utilizing WWS
sources from around 21 per cent in 2006–2007 to 32 per cent in 2015 and an
anticipated 36 per cent by 2020.5 Once China has passed the 40 per cent mark
for proportion of power generated from WWS sources in the 2020s, it could
be safely assumed that it will continue in this vein through logistic industrial
dynamics and will pass the 50 per cent mark sometime in the 2030s, if not before.
It would by then have a predominantly green electric power generation system –
the first major industrial country in the world to achieve that distinction.

Like all industrial powers that preceded it, China initially built a power
system needed to drive its manufacturing system utilizing fossil fuels, mainly
coal. The coal-driven electric power system grew rapidly – particularly after
2001 when China joined the WTO, as seen clearly in Figure 5.2.

with total 660–740 GW. These revised targets which are introduced no doubt to ensure
fulfilment by 2020, are still well in advance of those of any other country.

5. See the discussion by Hao Tan and myself in our book on China’s Renewable Energy
Revolution (Mathews and Tan 2015).
There are two striking features of this chart worth noting. One is the rapid rise in coal consumption by the electric power generation system – particularly after 2001 when China joined the WTO and declared, in effect, that it was ‘open for business’. This is the ‘black face’ of China that is responsible for so much particulate pollution, making the air in cities like Tianjin and Beijing frequently unbreathable.

The other striking feature is the levelling off in coal consumption around 2012/2013, with coal consumption actually falling in the years 2014 and again in 2015, showing that the trend is a strong one. This reveals the power exercised by government in China, where the authorities are not afraid to intervene in the economy to correct what is viewed as a major anomaly. There is indeed a ‘new normal’ operating here.6

The shift towards greater coal consumption as revealed in changes to estimates of coal consumption released in 2015 is shown in Figure 5.3 – which reveals that China’s dependence on coal in the past was even worse than widely believed. But the revised data also reveal that the levelling off and reduction in coal consumption in the last two years is maintained.

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6. See the paper by Green and Stern (2016) making this point with regard to China’s dramatic turn to clean sources of energy.
Now if China were to continue with its early dependence on fossil fuels, particularly coal, then the country would become more and more dependent on imports and on extracting coal and fossil fuels from the world’s geopolitical hotspots. This would have serious repercussions and be a major threat to world peace. Instead, as revealed in Figure 5.1, we see that from a low of 21 per cent in 2007, the proportion of electric power generating capacity utilizing renewable WWS sources increased to reach 32 per cent by 2015. So China has already emerged as the world’s powerhouse for renewables. After building up its renewables capacity faster than any other country through unprecedented investments in wind power, then solar PV power, and in the smart grid, it now exceeds all countries in terms of its total renewables capacity based on water, wind and sun. It has an official target for renewables capacity of 550 GW by 2017, and should (if present trends continue) be exceeding 750 GW by 2020 (the official target of the ND&RC). Reaching 750 GW by 2020 would make China the undisputed superpower of renewables. At this rate it would be at or above 1000 GW – or 1 TW – by 2025 or earlier – that is, within a decade. So within less than a decade China would have revolutionized the

7. In terms of electricity generated, in 2015 renewables WWS sources accounted for 25 per cent of total power generated.
world’s energy system, as well as its own, by building a formidable renewable power system. China is meeting, and surpassing, the ‘terawatt challenge’.8

And it is doing so through strength in manufacturing. Its rapid expansion of a renewables sector is based on reliance on the manufactured energy sources of wind, solar PV and hydro – water, wind and sun. Nuclear power is part of the mix as well, but on nothing like the scale of power from water, wind and sun. These are safe sources, they are reliable and above all they are scalable (and infinitely expandable) because they are products of manufacturing, not of mineral extraction. The more China builds its renewables powerhouse, the more it enhances its energy security and acts to curb the shocking levels of particulate pollution caused by its burning of fossil fuels.

The 2015 data reinforce this favourable trend. We can use the capacity additions made in the year 2015 as indicating where the leading edge in the system is moving. In 2015 China added generating capacity of 72 GW from non-thermal sources (34 GW from wind, 14 GW from solar, 17 GW from hydro plus 6 GW from nuclear) compared with 74.5 GW from thermal sources Thus China is close to the tipping point where non-thermal capacity added exceeds thermal capacity added.9 China is adding more than 1 billion watts (1 GW) of clean new power capacity every week. This shows clearly the direction in which the system is headed, as well as the rate of change.

As for the total system of electric power generation, it has changed from being dependent in 2008 on thermal sources for 81 per cent of its generating capacity, falling to 73 per cent in 2015 – a reduction of 8 per cent in just seven years, or more than 10 per cent change in a decade. At this rate China will be down to sourcing less than 50 per cent of its total electric power from thermal sources by the 2030s – by which time it would be described accurately as more of a green electric power system than a black. It would be the first in the world amongst major industrial powers to be so described.

Let us ponder that for a moment – China’s electric power system generating more power from renewable sources (WWS plus a bit of nuclear) than from coal and thermal sources (counting oil, gas and coal) – a transformation that is well under way, with the leading edge of the energy system already more green than black (where new capacity added from WWS sources is outranking thermal capacity added). As the capacity added becomes more green than black, the total system changes; it can be anticipated to be more

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9. All data are taken from my 2016 posting to Asia Pacific Journal: Japan Focus, at: http://apjjf.org/2016/17/Mathews.html.
green than black by the 2030s, that is, well before mid-century. This is in itself an unprecedented rate of industrial change. We have been told by energy scholars such as Smil that energy systems take decades to change. The modern fossil fuel system, for example, took close to 100 years to oust the former system with its organic sources, and current shifts in fossil fuels themselves, for example, from oil to natural gas, are likewise projected to take decades. Yet here are renewables in China reaching a tipping point within just a couple of decades. This is the power of manufacturing and logistics dynamics demonstrated in all their grandeur.

Most observers immediately extrapolate from this shift away from fossil fuels to carbon emissions, arguing that China's carbon emissions could peak in less than a decade after that point – still within the 2030s. (In fact they are likely to peak much earlier – perhaps as early as 2020.) But it is not reduction in carbon emissions that I am suggesting drives this change, so much as the dramatic improvements offered in energy security and in terms of reducing particulate pollution.

WHAT ARE THE OPTIONS AVAILABLE FOR CHINA?

When the world's largest industrial revolution is considered from China's perspective, what exactly are the options available? So far, China has been placing most emphasis on the black energy strategy, that is to say focusing on building a huge fossil-fuelled power system that would become (and has become) the largest in the world. But the country has clearly run into the environmental limits of such a strategy. No other country on the planet suffers from such bad pollution – of air, of water, of soil – as China. And the Chinese leadership knows better than anyone else what might be the political limits of tolerance in China for the filthy air that people are required to breathe. So an alternative is needed. What are the options?

One option that might be considered attractive to some is that of carbon capture and storage and 'clean coal' technology for power generation. But this is an unlikely scenario. Firstly such technology addresses the carbon pollution (carbon emissions and their impact on climate) but not so much the particulate pollution, which is the real problem from the Chinese perspective. Secondly these solutions would involve China in importing advanced technology (e.g., for scrubbing emissions from thermal power plants) from countries like Germany and Japan. The third and most powerful reason that this pathway might not be supported is

that this option would not capture for China the learning curve advantages that would flow from manufacturing its own energy devices. Neither would it square with China’s goal of indigenizing its own technological innovation.

For similar reasons it is unlikely that China would wish to follow the pathway of nuclear power – even if this option is widely promoted by informed observers in Europe and the US such as James Hansen.\textsuperscript{11} It is true that China is building more nuclear reactors today than any other country – but it is likely that this is more a business decision than a domestic environmental strategic decision. Hao Tan and I have provided data that demonstrate that China has been building more wind power capacity than nuclear capacity, and actually generating more electrical energy from wind than from nuclear sources – a trend that is very likely to continue.\textsuperscript{12} In China’s case the reason for this preference is no doubt inked to the fact that wind power and solar power technologies can be indigenized and expanded rapidly in China whereas nuclear technology is much more recalcitrant and harder to transfer. That China is devoting considerable resources to the nuclear option (and to newer generations of reactors) is evidence of an openness to keeping several energy options open – not of having made a choice for or against any specific technology.

Another option for China is to reduce its resource and energy dependence by opting for zero growth. Although this is a popular perspective amongst Western environment groups, who argue that on a finite planet there cannot be exponential growth forever, it is obviously not viable for China, which depends on economic growth to lift its population up to middle-income status. Of course all countries as they advance in terms of per capita income and industrial strength will eventually have to phase out extensive growth – but China has not reached that point yet.

It seems clear that the best option for China is green growth, or what the Chinese themselves call (somewhat awkwardly) ‘ecological civilization’. This refers to an increasingly intensive model of economic growth, achieved by a switch to resource regeneration rather than endless resource throughput (i.e., a switch from a linear to a circular economy) and a switch to renewables rather than fossil fuels, making for a smaller footprint arising from China’s industrial activities.\textsuperscript{13} It is this model that I am referring to as ecomodernization or the global green shift.

\textsuperscript{11} See the statement by James Hansen and other nuclear physicists on nuclear power being the only path forward on climate change (and for China) in \textit{The Guardian}, 3 December 2015, at: http://www.theguardian.com/environment/2015/dec/03/nuclear-power-paves-the-only-viable-path-forward-on-climate-change.

\textsuperscript{12} See Mathews and Tan 2015.

\textsuperscript{13} There is now substantial scholarly research on China’s prospects for a clean energy transition. For an exposition utilizing the SWITCH model as applied to China, see He et al. (2016).
How China stumbled upon this particular option as its preferred way forward is an interesting question in itself. It is surely partly a result of an intense pragmatism – a willingness to judge strategies in terms of their results rather than their ideological underpinnings. And green growth certainly delivers – in terms of the immediate goal of clearing the skies, as well as in the medium-term goal of enhancing energy security and resource security. It also delivers in terms of building export platforms for the future, in anticipation of the likely emergence of renewables as the dominant energy industries of the twenty-first century. Apart from this pragmatic outlook, perhaps what also contributed to China’s pursuit of a green option as alternative to the black fossil fuelled option previously followed was a desire to avoid the kind of terrorist entanglements that were clearly evident in the US as it suffered the Twin Towers catastrophe of 11 September 2001. It was only two or three years after these events in New York that decisions were made in China that launched a serious build-up of (manufactured) renewables as alternative sources of energy security, taking China away from dependence on oil imports from the Middle East. This is unlikely to have been coincidental.14

Are bankruptcies and overcapacity in China’s renewables manufacturing industries a sign of weakness?

China has utilized industrial strategy to good effect in fashioning new industries based on renewable energies and resource recirculation. But critics point to bankruptcies and overcapacity. It is true that there have been bankruptcies in China’s solar PV industry, as well as widespread overcapacity. This is sometimes interpreted as meaning that China has made a bad choice in promoting this industry. But these developments should be viewed as symptoms of healthy industrial dynamics. Consider the analogous situation in the US automobile industry in the 1920s, where hundreds of companies

14. Much more could be said on these points. It is true that China’s involvement as oil importer from both Iraq and Iran has increased since 2001 – but that can be attributed to China as a latecomer to the global oil markets pursuing a strategy of taking on any sources of supply as they become available. In similar manner China has also raised its level of imports from countries such as Ecuador and South Sudan – with all their civil war and geopolitical complications. As the years go by and the energy security implications of China’s choice of renewables as desirable option become clear, no doubt the Chinese leadership is confirmed in the wisdom of its choice.
came into existence supplying component parts or final vehicles in the Detroit area, which were then were weeded down to the Big Three and a few other independents (all of whom had stopped manufacturing by the 1950s). The US industry was consolidated through mergers, acquisitions, bankruptcies and exits from the industry – making for greater efficiencies, cost reductions and development of industry-wide standards. The same process is found in other manufacturing industries – and can be anticipated as unfolding in the renewable energy industry in China.

Bankruptcy laws operate like the capitalist equivalent of the biodiversity created by natural selection in the biological world. By having the legal option of bankruptcy, companies are able to rescue themselves from creditors and allow the established patterns of production to be changed and adapted to new conditions. China is following the rest of the industrial world in discovering the benefits of bankruptcy law in facilitating industrial adaptation, and so the appearance of cases of bankruptcy in an emerging industry like solar PV or wind power should be viewed not as a sign of weakness but on the contrary as an indication of strength, of healthy industrial dynamics. Bankruptcies and firm exits allow for the release of resources that would otherwise be tied up in unproductive arrangements, allowing new firms with new strategies to emerge. Just as biodiversity is the key to adaptive survival in the biological world, so bankruptcy allows for adaptation in the business world to allow firms to meet changing conditions. The biggest shift that is under way now is the green shift, with its accommodation between economics and ecology – and healthy industrial dynamics promise to enable firms in China to adapt to meet the challenges involved.15

**The pollution constraint**

China has telescoped development processes that took centuries to accomplish in other parts of the world into just three decades. So it is not surprising that China is now experiencing some of the worst pollution crises

15. By contrast the high level of curtailment in the Chinese renewables sector is a sign of weakness and one which needs to be addressed by policy as a matter of urgency. Curtailment refers to electric power that is generated but is not fed into the grid, either because of poor connections or because the grid cannot accommodate the fluctuating sources of power. Whatever the cause, this is an issue that needs to be addressed by grid modernization and upgrading – an issue that Chinese State Grid Corporation is focused on. Curtailment represents a waste of energy production that the country can ill afford.
on the planet. One Chinese journalist who is hitting back and promoting a popular movement to combat the worst effects of the pollution is Chai Jing, with her video sensation ‘Under the Dome’. After a few brief days enjoying huge popularity in China the YouTube video was taken down – but it is still of course available outside China.\(^\text{16}\) Chai Jing emphasizes the point that China’s smog is the result of a concatenation of pollution problems coming on top of each other – pollution from coal burning in heavy industry, pollution from dirty road vehicles, pollution from gasoline vaporization which adds further polycyclic aromatic hydrocarbons (all carcinogenic) to the toxic mix, as well as other sources. The clear message of the talk she gives is that China has the means available to tackle the pollution problems, but in practice at local level officials lack the political will to enforce the legal sanctions. A key episode in the film is the story of the petrol station owner who blocks an impromptu inspection of fuel dispensing equipment (which is clearly operating without a fumes trap) by telling the Environment Ministry inspectors that they ‘have the responsibility but not the authority’. Chai Jing is calling for citizens in China to uphold that authority. She is in effect calling for a social movement that could emulate the effect just over half a century ago of Rachel Carson’s *Silent Spring* in the then heavily polluted USA.\(^\text{17}\)

Pollution problems are of course a major factor in driving China’s government towards renewables – everyone, including senior officials, has to live ‘under the dome’ that is modern China. And China is demonstrating that a major industrial country can build a 1-trillion watt renewable energy system based on WWS sources within no more than a decade, swinging its power generation system away from dependence on fossil fuels with all their polluting and geopolitical threats and hazards towards reliance instead on manufactured energy generating sources. And as it swings away from the linear economy (with dependence on virgin raw materials extracted from the earth as well as dumping of wastes in the earth) to a circular economy, so its dependence on raw materials to drive this huge manufacturing system needed to produce energy devices will diminish. More and more of the materials required will be ‘mined’ from the circulation of materials in circular flows within its own economy. All of these dramatic changes are occurring in China, as the world’s largest industrial power, within the space of a couple of decades. This breeds

\(^\text{16}\) See Chai Jing’s talk on YouTube, at: https://www.youtube.com/watch?v=T6X2uwlQGQM.

\(^\text{17}\) See Carson (1962).
confidence that the era of the Anthropocene will be able to witness an earth-friendly energy and resources flow system, initiated first in China and then spreading around the world through competitive emulation.

**INDIA’S RENEWABLES STRATEGY**

From a slow start, India is now determined to become a world leader in green energy and green development. It is doing so not just because of concerns over climate change, but for reasons to do with energy and resource security and the building of an energy platform that will supply both domestic markets and export business as well.\(^\text{18}\) India is using a full panoply of industrial strategies to achieve these ambitious goals, from market promotion measures including tax breaks and feed-in tariffs to industrial promotion such as local content requirements being attached to foreign direct investments – albeit attracting some opposition at the WTO, particularly from the USA.\(^\text{19}\)

The most ambitious programme is the National Solar Mission, which in July 2015 was upgraded with a new goal of seeing 100 GW of solar power installed in India by the earlier date of 2019 – where 40 GW would be rooftop solar and 60 GW would be medium- and large-scale grid-connected solar power projects. These are extremely ambitious targets, upgraded from the original target of 20 GW by 2021–22 that had been announced in 2008 and amended in 2010. Indeed it puts India at par with China in terms of specific solar PV targets, where China had a well-known target for solar PV of 100 GW by 2020 and actually raised this to 160 GW by 2020 as part of the 13th FYP.

With the election of the Narendra Modi government in 2014, the stage was set for further detailed promotion of renewables and greening of the Indian economy generally. Modi himself has reiterated the point that his government’s central goal will be to ensure 24/7 power for all Indians – and since coal is subject to supply and price fluctuations, the best way of delivering on such a promise is through promotion of renewables. The fresh targets announced are backed by administrative and financial commitments. The July 2014 budget of the Modi government had a provision for a doubling of the tax on coal, which would raise an extra $1.1 billion to fund clean energy projects. Green energy

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18. For discussion of India’s greening strategies, see for example Mattoo and Subramanian (2012) or Johnson (2015).

19. See the Dispute at the WTO involving US objections to India’s National Solar Mission with its local content requirements, at https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds456_e.htm (WTO 2016).
companies were at the same time offered a ten-year tax holiday in order to get themselves firmly established.\textsuperscript{20}

There has been an important follow-up to the NSM in the form of direct support to farmers who are installing solar powered irrigation pumps, as announced in January 2016 by the Energy Minister Piyush Goyal. The plan envisages funding of US$11 billion over 3–4 years to roll out 30 million solar pumps, which would lead to substantial savings in subsidies and thereby pay for itself.\textsuperscript{21} Here we see the benefits of a decentralized energy system as opposed to the centralized, high-density power system favoured by the authors of the \textit{Ecomodernist Manifesto}.

The next move is doubtless for the Indian government to announce a National Wind Mission (NWM) to replicate the success to date of the National Solar Mission (NSM), with an anticipated target of adding an extra 60 GW of wind power by 2022. This goal, too, can be expected to be backed by comprehensive promotion policies encompassing tax breaks, facilitation in securing land and local permits, as well as promotion of the wind power manufacturing value chain in India (at present largely dominated by Suzlon). The essence of these renewables Mission programs (NSM and NWM) is that they are designed to provide investment certainty and real incentives for developers based on a clear understanding of what manufacturers and wind/solar farm developers need. The projects represent a substantial initiative on the part of the Ministry of New and Renewable Energy, itself a major institutional innovation, designed to create fiscal and monetary space for RE development separated from the influence of fossil fuels.\textsuperscript{22}

India has learned from China the power of local content requirements (LCRs) as a tool for domestic industry development. The provisions covering LCRs in the NSM were designed to avoid WTO entanglements, in particular having a state-owned entity being the purchaser of the solar energy generated and thereby being nominally in compliance with the WTO Government

\textsuperscript{20} See Johnson (2015) for further details.
\textsuperscript{22} Current levels of Renewable Energy (RE) capacity in India were (at March 2015): wind power capacity 23.4 GW; solar PV capacity 3.7 GW and total RE capacity 35.8 GW. The ambitious NSM and (probable) NWM targets would have to see an extra 10 GW of solar and 10 GW of wind capacity being added each year between now and 2020. This in itself can be viewed as a major industrialization effort.
China, India – Green Growth Strategies

Procurement Agreement. Even the name of the Indian programme, namely the NSM Procurement Program, emphasized this aspect and signalled India’s strategy if required to defend the programme in Geneva. Nevertheless the United States objected to the LCR provisions on grounds that they create trade barriers to exports of US renewable energy products and technology (which is, after all, their goal). In fact the US lodged two successive objections in a case where the WTO declared in February 2016 that India’s NSM violated WTO rules and would have to be disbanded. India is of course appealing the decision, which on the face of it would prevent any country from utilizing tools like local content requirements to facilitate the building of a renewables devices industry in its own country – a measure that runs directly counter to the commitments made by countries to decarbonize their energy systems at the Paris climate conference of December 2015. However the Indian government is clearly determined to see the issue through and continue its strong support for building renewables industries, and is unlikely to allow this hiccup at the WTO to curb its aspirations.

23. For commentary see Clean Technica, at: http://cleantechnica.com/2016/03/15/indias-dcr-woes/. My own comments can be found at Mathews (2016b) and in Chapter 8.