

# India's Integrated Energy Policy: A Source of Economic Nirvana or Environmental Disaster?

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## *Editors' Summary*

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India's rapidly growing economy naturally demands increasing energy needs from the industrial scale down to the personal. Mindful of potential negative impacts of economic development, India is making efforts to encourage growth while preserving and protecting the environment and human rights. India's Integrated Energy Policy sets out the roadmap for how the country plans to achieve the balance among development, environmental protection, citizens' rights, energy security, and a host of other priorities and concerns. Though ambitious and broad in scope, the Policy may prove inadequate in mitigating environmental impacts of development, and thus inadequate in balancing India's needs, particularly in the realm of climate change.

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India's economic ambition to alleviate poverty and provide a better quality of life for innumerable Indians is justified and understandable. To achieve these goals, the Indian government must ensure that energy supply is adequate. Further, to avoid undermining the benefits of economic prosperity and the rights of Indians, India's energy policy must also address security matters and mitigate environmental concerns, such as climate change. Although the Indian government appears cognizant of these complex challenges, its current energy policy does not balance these competing goals in the long-term interest of Indians.

This Article evaluates India's efforts to balance its economic and environmental interests by assessing the Integrated Energy Policy (IEP), a blueprint of energy and environmental policy adopted by the government of India. Part I sets out the multiplicity of energy and climate change challenges that emerge from India's economic growth. Part II examines India's energy policies and their scope as articulated in the IEP. Part III analyzes positive developments based on the IEP. Part IV identifies gaps in India's approach to its energy and environmental policies.

Before proceeding with the Article, it must be noted that recent errors regarding climate data have led the Indian government to establish its own panel on climate change, in line with its earlier pursuit of an independent climate change assessment.<sup>1</sup> Nevertheless, the government has expressed its continuing commitment to climate change research and action.<sup>2</sup> Thus, it is unlikely that the government will deviate from its commitment to innovative energy policy.

## I. India's Energy: Caught Between the Economy and the Environment

India is on the path to steady economic growth. Between 2003 and 2009, India's gross domestic product (GDP) grew

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1. The Indian government established the Indian Network of Climate Change Assessment for this purpose in late 2009. See Indian Ministry of Environment and Forests, India Network of Climate Change Assessment, <http://moef.nic.in/modules/others/?f=event> (last visited May 28, 2010). See also MINISTRY OF ENV'T & FORESTS, GOV'T OF INDIA, CLIMATE CHANGE AND INDIA: TOWARDS PREPARATION OF A COMPREHENSIVE CLIMATE CHANGE ASSESSMENT (2009), available at [http://moef.nic.in/downloads/others/Final\\_Book.pdf](http://moef.nic.in/downloads/others/Final_Book.pdf). India and China had also earlier indicated their intent to establish a separate committee to address climate change. See *India, China to Cooperate Over Himalayan Glaciers*, Jairam, DECCAN HERALD, Aug. 3, 2009, <http://www.deccanherald.com/content/17542/india-china-cooperate-over-himalayan.html>. These efforts have gained momentum more recently. See *India Abandons IPCC, Sets Up Own Panel*, INT'L BUS. TIMES, Feb. 5, 2010, <http://www.ibtimes.com/articles/20100205/india-ipcc-un-climate-change-global-warming.htm>; see also Dean Nelson, *India Forms New Climate Change Body*, TELEGRAPH.CO.UK, Feb. 4, 2010, <http://www.telegraph.co.uk/earth/environment/climate-change/7157590/India-forms-new-climate-change-body.html>.
  2. *India Backs IPCC Climate Chief Pachauri*, BBC NEWS, Feb. 5, 2010, [http://news.bbc.co.uk/2/hi/south\\_asia/8501401.stm](http://news.bbc.co.uk/2/hi/south_asia/8501401.stm); see also *Indian Prime Minister Backs IPCC Boss*, GUARDIAN.CO.UK, Feb. 5, 2010, <http://www.guardian.co.uk/environment/2010/feb/05/indian-prime-minister-ipcc-pachauri>.

by approximately 8%.<sup>3</sup> Foreign direct investment (FDI)<sup>4</sup> and general trends indicate that India's economic rise remains promising.<sup>5</sup> Consequently, India faces steep increases in energy demand for commercial and personal use.

Commercially, energy is required in multiple sectors, such as manufacturing, services, and transportation.<sup>6</sup> Personal energy consumption is increasing, particularly in urban areas where there is a high concentration of India's middle class. Although rural energy consumption is relatively low,<sup>7</sup> efforts to achieve higher efficiency in transporting agricultural products to markets may lead to increased energy consumption in rural India as well by increasing dependency on fuel for vehicles and for storage facilities. India has a diverse but traditional energy portfolio to meet its energy demands. A major portion of India's energy demand is satisfied by coal, oil, and natural gas. In 2006, India used 53% coal, 31% oil, and 8% natural gas to meet its energy demands. By 2008, India had become one of the world's top five oil-consuming states. Although India is diversifying into other sources, such as hydroelectric, nuclear, and renewable energy, it is unlikely that dependence on coal or oil will diminish in the near future, as indicated, for instance, by the administration's negotiations with oil-rich nations, such as Russia and Sudan.<sup>8</sup>

3. See World Bank, GDP Growth (Annual %), [http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?cid=GPS\\_30](http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?cid=GPS_30). The growth rate is an average of four years, with lowest growth rate in 2008.

4. According to a recent study, India is now one of the top destinations for foreign direct investments. See Premila Nazareth Satyanand & Pramila Raghavendran, *Inward FDI in India and Its Policy Context* (Vale Columbia Ctr. on Sustainable Int'l Inv., Columbia FDI Profiles, 2010), available at [http://www.vcc.columbia.edu/files/vale/documents/India\\_IFDI\\_2010\\_-\\_FINAL.pdf](http://www.vcc.columbia.edu/files/vale/documents/India_IFDI_2010_-_FINAL.pdf).

5. See Mukesh Jagota, *India Expects Strong Economic Growth This Fiscal Year*, WALL ST. J., Jan. 11, 2010, available at <http://online.wsj.com/article/SB126292793623121229.html> (limited content without subscription). See also James Lamont, *India Forecasts Growth of Up to 8.75%*, Feb. 25, 2010, FIN. TIMES, available at <http://www.ft.com/cms/s/0/c47ffb70-21ed-11dF-98dd-00144feab49a.html> (content requires subscription).

6. For instance, high growth is expected in the transportation sector. See Joyce Dargay et al., *Vehicle Ownership and Income Growth, Worldwide: 1960-2030*, ENERGY J., Oct. 2007, at 19 fig. 9, 21 fig.10. An earlier version of the article is available at [http://www.econ.nyu.edu/dept/courses/gately/DGS\\_Vehicle%20Ownership\\_2007.pdf](http://www.econ.nyu.edu/dept/courses/gately/DGS_Vehicle%20Ownership_2007.pdf). The government has linked the transport sector directly to economic growth. See THANGARAJ COMM., MINISTRY OF ROAD TRANSP. & HIGHWAYS, NATIONAL ROAD TRANSPORT POLICY 1, available at [http://morth.nic.in/writereaddata/sublinkimages/Road\\_Transport\\_Policy27333191.pdf](http://morth.nic.in/writereaddata/sublinkimages/Road_Transport_Policy27333191.pdf).

The government has launched an extensive highway construction project to promote growth in the transportation sector. The National Highways of India Authority, constituted under the National Highways Act of India, launched the Golden Quadrilateral project to connect the four major metropolitan cities of the country via a single highway system. This Authority has also undertaken several projects that are slated to connect key parts of India by 2017. For information about National Highways Authority of India and its projects, see National Highways Authority of India, Golden Quadrilateral, <http://www.nhai.org/goldenquadrilateral.asp> (last visited May 28, 2010).

7. As of 2007, nearly 412 million Indians had no access to electricity. See International Energy Agency, *World Energy Outlook 2007: Fact Sheet—India*, available at [http://www.iea.org/papers/2007/fs\\_india.pdf](http://www.iea.org/papers/2007/fs_india.pdf).

8. See *infra* note 51.

There are several downsides to the government's projected energy diversification. Increased dependency on imported sources threatens India's energy security, especially because India must compete with China for negotiating suitable agreements. Continued reliance on traditional energy, such as coal, can entrench India in a carbon-based economy, with adverse environmental consequences, such as climate change and acid rain. Even some alternative energy sources that the Indian government is seriously considering, such as nuclear energy, present environmental and human rights concerns arising from siting of plants and waste disposal. India's energy choices will thus exacerbate the country's environmental problems.

To achieve economic growth without inordinately compromising its environment, public health, and security, the Indian government must adopt a strategic and balanced energy policy. Although India has an energy policy in place, the question is whether this policy can achieve a fine balance of competing interests.

## II. India's Energy Policy: An Effort to Bridge Economic and Environmental Concerns

The IEP adopted by the Indian government in 2006 is India's comprehensive energy road map. Prepared by the Planning Commission of India, the IEP identifies multiple energy challenges that the administration must address, including meeting energy demands, securing supply, mitigating climate change, and promoting renewable and alternative energy.<sup>9</sup> The IEP sets forth several policy choices that the government can pursue to address these challenges. These choices primarily comprise four strategies: energy diversification and efficiency; catalyzing investment in energy diversification and energy by a combination of market competitiveness, regulatory intervention, energy pricing changes, and effective subsidies; strengthening diplomacy; and demanding accountability for environmental externalities.<sup>10</sup> Each of these is considered briefly below.

### A. Energy Diversification, Efficiency, and Alternatives

To meet growing energy demand, the IEP emphasizes coal use, which it indicates may provide most of India's energy needs even beyond 2030.<sup>11</sup> The Policy also recommends increased use of traditional and alternative sources, such as oil, liquid natural gas, nuclear, and renewable energy.<sup>12</sup> The

9. See PLANNING COMM'N, GOV'T OF INDIA, INTEGRATED ENERGY POLICY: REPORT OF THE EXPERT COMMITTEE (2006), available at [http://planningcommission.gov.in/reports/genrep/rep\\_intengy.pdf](http://planningcommission.gov.in/reports/genrep/rep_intengy.pdf).

10. *Id.* at xiii-xiv.

11. *Id.* at xiii.

12. *Id.* at xxiii.

Policy in particular focuses on increasing nuclear and hydro-power energy production by 2050.<sup>13</sup>

In addition to deepening traditional energy production, the Policy suggests increased emphasis on renewable energy and on increasing energy efficiency. The IEP focuses on a range of renewable sources, including fuel wood, biogas, gasified wood, solar, thermal, biodiesel, and ethanol.<sup>14</sup>

To spur investment in renewable energy, the IEP suggests that the government provide time-bound subsidies, such as Tradable Tax Rebate Certificates that would become payable proportionate to the amount of certified alternative energy generated by a certificate owner.<sup>15</sup> The Policy also calls for expanding the authority of the Indian Renewable Energy Development Agency Ltd. to finance renewable energy projects in collaboration with other financial institutions.<sup>16</sup>

Recognizing energy efficiency as an important strategy, the IEP recommends the adoption of policies to minimize energy intensity. The Policy suggests that the Bureau of Energy Efficiency (BEE), established under the Energy Conservation of Act,<sup>17</sup> should focus on enhancing efficiency in sectors such as mining, electricity, industrial production, mass transport, construction, and home utilities.<sup>18</sup> The IEP also proposes additional measures, such as energy-efficiency labeling, public transport development, production of fuel-efficient vehicles, and increased research and development (R&D) in technological innovation by funding educational institutions.<sup>19</sup>

The IEP notes the general and urgent need for increased investment in R&D and recommends the establishment of a National Energy Fund to finance commercially viable technologies for enhancing efficiency, gasification, carbon sequestration, and other renewable energies.<sup>20</sup> It also suggests that the Ministry of Power, Coal, and Non-Conventional Energy Sources ought to increase its allocations for all energy research and reduce the anomaly in the amount spent on atomic energy research in comparison with other energy research.<sup>21</sup>

## B. Regulatory Intervention, Increasing Market Competitiveness, and Pricing

To achieve its energy diversification and efficiency goals, the Policy recommends liberalization of certain energy sectors. For example, under the Policy the government would denationalize coal by opening it to market-based production contracts, liberalize international coal trade, and relinquish its current monopoly over coal by disinvesting from the government-owned Coal India Limited.<sup>22</sup>

13. *Id.* at xxii.

14. *Id.* at xxvi.

15. *Id.* at xxiii.

16. *Id.*

17. *Id.* at 81-83.

18. *Id.*

19. *Id.* at 83-84.

20. *Id.*

21. *Id.* at 104.

22. *Id.* at 116-17.

The Policy presents regulatory solutions to increase investment in energy production. These include passing federal legislation allowing all states and citizens to invest in Central Government energy projects, even though they are located in a specific resource state.<sup>23</sup> Such a measure would presumably also alleviate any equity concerns of states.

The IEP proposes that the government adopt a series of measures to increase investment in energy production, supply, and access by changing pricing methods. These measures include the following: (1) separating grid transmission and electricity-pricing<sup>24</sup>; (2) regulating prices and providing bankable agreements to ensure adequate returns to gas producers supplying to the fertilizer, petrochemical, transport, and power sectors and stimulate expansion of gas production<sup>25</sup>; (3) removing government pricing control over automotive fuels, liquefied petroleum gas (LPG), natural gas for domestic use, and kerosene<sup>26</sup>; and (4) reducing tariffs and increasing power-purchasing parity, both in the interest of the economy and consumers, by reforming the pricing control of state electricity boards.<sup>27</sup>

Additionally, the Policy emphasizes the establishment of distribution audit programs to minimize loss<sup>28</sup> and the liberalization of the power sector as a means of increasing competitiveness and reducing costs by shifting to a pricing system that would not be based on a cost-plus approach.<sup>29</sup> It suggests divesting regulatory responsibility from Ministries controlling government-owned corporations or Public Sector Units (PSUs) in the energy sector to ensure both independent regulation and promotion of market competitiveness and fair pricing.<sup>30</sup>

The IEP, however, does not recommend complete deregulation in preference for market-based pricing. Indeed, the Policy suggests that the government intervene to provide targeted subsidies to consumers without access to electricity.<sup>31</sup> It commends programs, such as the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), which provides financial assistance to Indians living below the poverty line for receiving connection to electricity grids.<sup>32</sup>

## C. Energy Security

The IEP identifies two sets of security challenges: (1) supply, technical, and market risks; and (2) geopolitical risks. The IEP suggests that the government can alleviate the first set of

23. *Id.* at xv.

24. *Id.*

25. *Id.* at xv.

26. *Id.*

27. *Id.* at xvii-xviii.

28. These include an Accelerated Power Development and Reform Programme (APDRP), Geographical Information System (GIS) mapping, and Management Information Systems. *Id.* at 110.

29. *Id.* at 14, 113. Under the cost-plus pricing system, the corresponding government agency sets prices based on the operational costs, plus a set percentage of post-tax returns on costs. Dipanker Dey, *Initiatives to Improve Energy Efficiency of the Indian Economy: A Review of Past Experiences and Future Challenges*, available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1028510](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1028510).

30. *See supra* note 9, at xxviii, 71-72.

31. *Id.* at 29.

32. *Id.*

risks by increasing production and importation, diversifying its energy portfolio, and increasing its petroleum reserves.<sup>33</sup> To address geopolitical risks, the Policy recommends that the government strengthen diplomatic ties with major oil-producing countries.<sup>34</sup>

#### D. Climate Change and Environmental Accountability

The IEP suggests that the government should reduce carbon dioxide emissions through the Clean Development Mechanism (CDM) established under the Kyoto Protocol. The Policy also recommends increasing sectorwide energy efficiency, promotion of mass transportation, development of renewable energy, expeditious nuclear energy development, and clean coal technology development as key measures to mitigate climate change.<sup>35</sup> This policy goal dovetails with some of the broad objectives set out in the National Action Plan on Climate Change.<sup>36</sup>

The Policy notes that the government can address other environmental externalities due to increased energy use by improving environmentally suitable alternative fuels and land use planning using tax subsidies.<sup>37</sup> It also recommends the use of an innovative tax system by the government to penalize environmentally unsustainable use of energy, such as fuel for private transportation.<sup>38</sup>

In sum, the Integrated Energy Policy provides a comprehensive set of energy policy recommendations for the government to achieve economic growth and to address adverse environmental impacts and security concerns. However, as discussed below, the IEP falls short of ensuring optimal environmental protection.

### IV. The Upside of the Integrated Energy Policy

The government has, thus far, been partially successful in achieving some of the IEP goals. The government is making substantial efforts to increase the alternative and renewable energy supply. The government has launched over 2000 renewable energy projects under the CDM mechanism.<sup>39</sup> The Central Electricity Regulation Commission (CERC) has passed regulations to promote growth in the renewable sec-

tor, such as regulation on certificates for generation of renewable energy,<sup>40</sup> regulation designating the National Load Despatch Centre as the implementing agency,<sup>41</sup> and regulation on renewable energy tariff-determination.<sup>42</sup>

The government has also adopted detailed policies to promote renewable energy. For example, the National Policy on Biofuels adopted by the Ministry of New and Renewable Energy furthers the IEP recommendation to substitute traditional fuels with biofuels.<sup>43</sup> Biofuels are especially critical for achieving energy sufficiency in the transportation sector.<sup>44</sup> The government has established specialized centers on technology development to promote solar and wind energy projects.<sup>45</sup> The government has also been advised by the National Biofuel Coordination Committee and the Biofuel Steering Committee to achieve at least a 20% ethanol blend in petroleum and diesel by 2017.<sup>46</sup> Toward this end, the government has proposed a Union government tax exemption goal and a uniform 4% state tax on biofuels.<sup>47</sup>

The Indian administration has also passed laws to promote renewable energy. The National Electricity Policy of 2005 and the Tariff Policy of 2006 promote renewable energy investment by pricing it competitively with conventional energy.<sup>48</sup> The Electricity Act of 2003 requires state electricity boards to facilitate supply and distribution of renewable energy, along with traditional electricity.<sup>49</sup>

33. *Id.* at 56, 66-67.

34. *Id.* at 127.

35. *Id.* at xxix.

36. See PRIME MINISTER'S COUNCIL ON CLIMATE CHANGE, GOV'T OF INDIA, NATIONAL CLIMATE ACTION PLAN [2008], available at <http://pmindia.nic.in/Pg01-52.pdf>. The National Climate Action Plan (the Plan), which also emphasizes the linkage between economic growth, energy, and climate change, seeks to achieve reduction of greenhouse gas emissions by shifting to alternative energy. Additionally, the Plan establishes eight national missions, including solar energy, energy efficiency, and "green India" to achieve climate mitigation and adaptation goals.

37. PLANNING COMM'N, *supra* note 9, at 15-16.

38. *Id.* at 78, 132.

39. See CDM India, Welcome to CDM: Current Updates, <http://www.cdmindia.com> (last visited May 28, 2010); CDM India, List of Project Names and Locations, <http://cdmindia.nic.in/cdmindia/projectList.jsp?n=y&off=1> (last visited May 28, 2010) (listing all the CDM projects approved by the CDM authority).

40. See Central Electricity Regulatory Commission, Notification No. L-1/12/2010-CERC (Jan. 14, 2010), available at [http://cercind.gov.in/Regulations/CERC\\_Regulation\\_on\\_Renewable\\_Energy\\_Certificates\\_REC.pdf](http://cercind.gov.in/Regulations/CERC_Regulation_on_Renewable_Energy_Certificates_REC.pdf). This regulation seeks to further the goals set out in the National Action Plan for Climate Change, to steadily increase the renewable energy production over the next decade. See Central Electricity Regulatory Commission, Statement of Objects and Reasons (for L-1/12/2010-CERC) (2010), available at [http://cercind.gov.in/Regulations/Statement-of-Reasons\\_SOR\\_for-CERC\\_REC\\_regulations\\_2010.pdf](http://cercind.gov.in/Regulations/Statement-of-Reasons_SOR_for-CERC_REC_regulations_2010.pdf).

41. See Central Electricity Regulatory Commission, Designation of an Agency as a Central Agency, Petition No. 18/2010 (Suo-motu) (Jan. 29, 2010), available at [http://cercind.gov.in/Regulations/Signed\\_order\\_in\\_Petition\\_No\\_18-2010.pdf](http://cercind.gov.in/Regulations/Signed_order_in_Petition_No_18-2010.pdf).

42. Central Electricity Regulatory Commission, In re Cent. Elec. Regulatory Comm'n (Terms and Conditions for Tariff Determination From Renewable Energy Sources) (First Amendment) Regulations, No. L-7/186(201)2009-CERC (Feb. 25, 2010), available at [http://cercind.gov.in/Regulations/ORDER\\_DATED\\_RE\\_amend\\_25-02-2010.pdf](http://cercind.gov.in/Regulations/ORDER_DATED_RE_amend_25-02-2010.pdf).

43. See Joseph B. Gonzalves, U.N. Conf. on Trade & Dev. [UNCTAD], *An Assessment of the Biofuels Industry in India* 5-7, U.N. Doc. UNCTAD/DITC/TED/2006/6 (Oct. 18, 2006), available at [http://www.unctad.org/en/docs/ditcted20066\\_en.pdf](http://www.unctad.org/en/docs/ditcted20066_en.pdf). A detailed overview of the government's biofuel policy is available at <http://mnes.nic.in/policy/biofuel-policy.pdf>.

44. See Deepa Badrinarayana, *Transporting India Into a New Climate: The Implications for Energy Law and Policy*, 40 CUMB. L. REV. 119 (2010).

45. See MINISTRY OF NEW & RENEWABLE ENERGY, ANNUAL REPORT 2008-2009 (2009), available at <http://mnre.gov.in/annualreport/2008-09EN/index.htm>.

46. See iGovernment, *India Approves Biofuels Policy*, Sept. 12, 2008, <http://igovernment.in/site/India-approves-biofuel-policy>; see also Outlook India, *Cabinet Approves Biofuel Policy*, Sept. 11, 2008, <http://news.outlookindia.com/item.aspx?10153>.

47. *India Approves Biofuels Policy*, *supra* note 46.

48. See National Electricity Policy, No. 23/40/2004, GAZ. INDIA, Feb. 12, 2005, available at [http://www.powermin.nic.in/indian\\_electricity\\_scenario/national\\_electricity\\_policy.htm](http://www.powermin.nic.in/indian_electricity_scenario/national_electricity_policy.htm); Tariff Policy, No. 23/2/2005, GAZ. INDIA, Jan. 6, 2006, available at <http://www.karmayog.org/redirect/strred.asp?docId=2176>.

49. The Electricity Act, No. 36 of 2003, at §86(1)(e), available at [http://aptel.gov.in/pdf/The%20Electricity%20Act\\_2003.pdf](http://aptel.gov.in/pdf/The%20Electricity%20Act_2003.pdf).

Nuclear energy development has received a boost from the U.S.-India Civilian Nuclear Energy Agreement.<sup>50</sup> Since the signing of the agreement, India has entered into arrangements with France and Russia, for instance, and the Department of Atomic Energy is presently formulating the structure for establishing a domestic nuclear energy system.<sup>51</sup>

Energy efficiency measures have also gained traction within the BEE, established under the Energy Conservation Act of 2001.<sup>52</sup> The BEE has introduced labeling requirements and building codes in an effort to reduce the energy intensity of GDP growth.<sup>53</sup> For instance, the Energy Conservation Building Code is aimed at maximizing energy utilization in commercial buildings by using Leadership in Energy and Environmental Design (LEED) certification standards and customizing buildings based on location temperatures.<sup>54</sup>

The government is also developing a scheme for energy efficiency trading as part of its National Action Plan on Climate Change. Under the present proposed scheme of Perform, Achieve, Trade (PAT), specific industries would be required to commit to energy-intensity reductions, and the government will give trading certificates to entities successful in meeting their goals.<sup>55</sup> Penalties for noncompliance are mentioned under the proposed plan, but not mandated.

Policies to address environmental protection and climate change issues linked to energy policies have also been addressed. For example, the Finance Minister has proposed a coal tax to fund the National Clean Technology Fund, which may also be useful to address problems, such as acid

rain, in the long run.<sup>56</sup> To alleviate food security concerns<sup>57</sup> associated with biofuels, the government emphasizes nonedible oils cultivated on degraded agricultural land.<sup>58</sup>

Additionally, some state governments are reportedly establishing geographic information system (GIS) mapping and improving rural electrification.<sup>59</sup> Further, the CERC has passed the Power Market Regulations of 2010<sup>60</sup> to establish a comprehensive market for the power sector.<sup>61</sup> The CERC has also published draft rules on interstate transmission.<sup>62</sup> Thus, the government has taken several steps toward achieving the goals and recommendations set out in the IEP. However, it may be too early to conclude that the government can achieve the fine balance among economic growth, environmental protection, and security concerns by following the IEP recommendations.

## V. The IEP: The Downside

Despite the progress made by the government of India, there are several shortcomings in achieving the IEP recommendations. For instance, power-sector reforms have been delayed because of complex and insurmountable regulatory power-sharing by the central-state governments,<sup>63</sup> and a general public suspicion against privatizing the energy sector.<sup>64</sup> The government has also been unable to iron out details regarding distribution franchising, grid capacities, and power-trading.<sup>65</sup> The Prime Minister of India has not only expressed concerns that India's energy portfolio has grown insufficiently to meet its economic ambitions, but has also indicated the need for a formal process to assess and evaluate policy measures undertaken in furtherance of the IEP.<sup>66</sup>

50. See Henry J. Hyde, United States-India Peaceful Atomic Energy Cooperation Act of 2006, H.R. 5682, 109th Cong. (2006); see also Joseph G. Silver, *The Global Partnership: The Final Blow to the Nuclear Nonproliferation Regime?*, 21 N.Y. INT'L L. REV. 69, 91 (2008).

51. *France, India Fire Up Military Cooperation, Nuclear Ties*, ABC NEWS (Austl.), Jan. 26, 2008, <http://www.abc.net.au/news/stories/2008/01/26/2147099.htm>; Vladimir Isachenkov, *Russia, India Cement Nuclear Ties*, WASH. POST, Jan. 25, 2007, <http://www.washingtonpost.com/wp-dyn/content/article/2007/01/25/AR2007012500182.html>; see generally DEP'T OF ATOMIC ENERGY, GOV'T OF INDIA, PUBL'N NO. 10, A STRATEGY FOR GROWTH OF ELECTRICAL ENERGY IN INDIA, available at <http://www.dae.gov.in/publ/doc10/index.htm> (click "Meeting Demand Project." on left side of web page); DEP'T OF ATOMIC ENERGY, GOV'T OF INDIA, LONG TERM VISION OF THE DEPARTMENT OF ATOMIC ENERGY 4, available at <http://www.dae.gov.in/publ/vision.pdf>.

52. See the BEE home page, <http://www.bee-india.nic.in> (last visited May 28, 2010). The BEE is comprised of ministers of Central and State energy-related agencies. The BEE is working with key industries, including cement, aluminum, and paper and pulp, to establish voluntary energy-efficient practices. It is also drafting standards for energy-labeling, building codes, and certification programs, among other initiatives. See Bureau of Energy Efficiency, Engagement of Retainer Consultant for National Energy Conservation Awards 2008, at 7, §§1.1, 1.2, 2.3, and 4.3.

53. See MINISTRY OF ENV'T & FORESTS, MINISTRY OF POWER, & GOV'T OF INDIA, INDIA: ADDRESSING ENERGY SECURITY AND CLIMATE CHANGE 5-6 (2007), available at [http://envfor.nic.in/divisions/ccd/Addressing\\_CC\\_09-10-07.pdf](http://envfor.nic.in/divisions/ccd/Addressing_CC_09-10-07.pdf).

54. See MEREDYDD EVANS ET AL., U.S. DEP'T OF ENERGY, COUNTRY REPORT ON BUILDING ENERGY CODES IN INDIA (2009), available at [http://www.energy-codes.gov/implementation/pdfs/CountryReport\\_India.pdf](http://www.energy-codes.gov/implementation/pdfs/CountryReport_India.pdf).

55. See Government of India, National Mission on Enhanced Energy Efficiency, <http://www.emt-india.net/NAPCC/NMEEE-forPublicComments.pdf> (last visited May 28, 2010); see also National Action Plan on Climate Change Main Page, <http://www.emt-india.net/NAPCC/main.htm> (last visited May 28, 2010).

56. See United Press International, *India Proposes Coal Tax for Clean Energy*, Mar. 1, 2010, [http://www.upi.com/Science\\_News/Resource-Wars/2010/03/01/India-proposes-coal-tax-for-clean-energy/UPI-89761267464322](http://www.upi.com/Science_News/Resource-Wars/2010/03/01/India-proposes-coal-tax-for-clean-energy/UPI-89761267464322); see also James Murray, *Updated: India Proposes Coal Tax to Pay for Clean Energy Push*, BUSINESSGREEN.COM, Mar. 3, 2010, <http://www.businessgreen.com/business-green/news/2258824/india-proposes-coal-tax-pay>.

57. See R.T. Gahukar, *Food Security: The Challenges of Climate Change and Bioenergy*, 96 CURRENT SCI. 26 (2009), available at <http://www.ias.ac.in/currsci/jan102009/26.pdf>; see also Vijayalakshmi Viswanathan, *Biofuels and Food Security*, HINDU BUS. LINE, Sept. 12, 2007, available at <http://www.thehindu-businessline.com/2007/09/12/stories/2007091250060900.htm>.

58. See MINISTRY OF NEW & RENEWABLE ENERGY, GOV'T OF INDIA, NATIONAL BIOFUEL POLICY (2009), available at <http://www.mnre.gov.in/policy/biofuel-policy.pdf>.

59. Geospatial Resource Portal, *Power Sector Reforms Take Center Stage*, Jan. 20, 2010, [http://www.gisdevelopment.net/news/viewn.asp?id=GIS:N\\_awnnyctsb](http://www.gisdevelopment.net/news/viewn.asp?id=GIS:N_awnnyctsb).

60. See Central Electricity Regulatory Commission, Notification No. L-1/13/2010-CERC (Jan. 20, 2010), available at [http://cercind.gov.in/Regulations/PowerMarketRegulation\\_20Jan2010.pdf](http://cercind.gov.in/Regulations/PowerMarketRegulation_20Jan2010.pdf).

61. See Central Electricity Regulatory Commission, Statement of Object and Reasons for Power Market Regulations (No. L-1/13/2010-CERC), at 11 (2010), available at [http://cercind.gov.in/Regulations/SOR\\_Power\\_market\\_reg\\_28Jan10.pdf](http://cercind.gov.in/Regulations/SOR_Power_market_reg_28Jan10.pdf).

62. See Central Electricity Regulatory Commission, Draft Regulation on Sharing of Inter-State Transmission Charges and Losses, [http://cercind.gov.in/regulation/Transmission\\_Charges\\_and\\_Losses.html](http://cercind.gov.in/regulation/Transmission_Charges_and_Losses.html) (last visited Mar. 8, 2010).

63. Devangshu Datta, *Power Sector Reform: India's Biggest Problem*, REDIFF.BUSINESS.COM, June 1, 2009, <http://business.rediff.com/column/2009/jun/01/guest-power-reform-indias-problem.htm>.

64. See *supra* note 59.

65. See *supra* note 63.

66. The government of India, however, aims to undertake an assessment of the IEP shortly. See generally iGovernment, *India to Assess Inte-*

More fundamentally, the IEP recommendations do not provide sufficient safeguards against threats to the environment. The Policy's emphasis on coal as a major fuel source in the near future exacerbates climate change threats, as does its recommendation to increase importation of fossil fuels. Climate change threats are especially challenging because of the absence of adequate international and national regulatory safeguards for victims globally, many of whom are predicted to be Indians.<sup>67</sup>

The Indian government's climate change-related initiatives lack adaptation strategies.<sup>68</sup> By focusing on efforts to reduce emissions without compromising its economic growth, the government has failed to assess potential climate-related adaptation problems that could affect millions of its citizens, many of whom may not benefit from its targeted economic policies.<sup>69</sup>

The government of India has also failed to adopt a comprehensive nuclear energy policy, without which substantial harm may be caused to Indians and their environment.<sup>70</sup> Although nuclear energy is an attractive alternative to mitigate climate change, it presents threats to natural resources. Nuclear plants must be located in areas close to water for cooling purposes; water reintroduced after being used for cooling will likely threaten aquatic species. Safe sites to dispose of nuclear wastes will have to be identified.<sup>71</sup> The experience of other nations with nuclear energy shows that this source may present unique and, perhaps, insurmountable challenges that may defy regulation.<sup>72</sup> Such challenges are

especially problematic for India, where awareness of environmental problems, such as climate change, is low.<sup>73</sup>

Similarly, other options, such as biofuels, threaten both the environment and agricultural production. The government's goal to increase domestic production of ethanol using sugar cane and *Jatropha* presents unique problems, including high costs and use of fertilizers.<sup>74</sup>

While the IEP recommends carbon capture and storage, the regulatory framework for appropriate implementation is challenging. Reinjecting carbon into subsurface land will increase land pressure and transport safety concerns, especially since, unlike in the United States or Norway, there are no used oil fields that can serve that function.<sup>75</sup> The government may not be able to pursue these goals without endangering public safety. While environmental impact assessments (EIAs) could provide safeguards, it is unlikely that they will, because the government has streamlined the EIA process so much in the interest of expediency that the efficacy of the process may be compromised.<sup>76</sup>

Thus, India's energy goals appear to lean toward promoting economic growth while paying lip service to potential environmental concerns. These concerns are especially worrisome, because many Indians may not only be unaware of the grave implications of their energy future, but many may also be unaware of problems associated with climate change. To the extent that the IEP does not provide guidance on this front, it fails to balance economic growth and environmental protection.

## VI. Conclusion

India is in the midst of a unique experiment: to achieve economic growth and sustained energy supply in an environmentally sound manner. The IEP provides a series of recommendations that should theoretically achieve all three goals. Indeed, the government has made substantial progress in framing policy and regulatory goals at multiple levels, from energy efficiency to new sources of clean energy. Nevertheless, these policies will not alleviate climate con-

*grated Energy Policy Impact*, Sept. 1, 2009, <http://igovernment.in/site/India-to-assess-Integrated-Energy-Policy-impact>.

67. For an overview of potential impacts from climate change, see INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [IPCC], *Summary for Policymakers, in CLIMATE CHANGE 2007: IMPACTS, ADAPTATION, AND VULNERABILITY: CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 7-22 (2007)*, available at <http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf>. See also Andrew C. Revkin, *Poor Nations to Bear the Brunt as World Warms*, N.Y. TIMES, Apr. 1, 2007, at A1; Jayant Sathaye et al., *Climate Change, Sustainable Development, and India: Global and National Concerns*, 90 CURRENT SCI. 314, 314-25 (2006).
68. Absent from India's recent overview of climate change initiatives is any mention of adaptation. See Ministry of Environment & Forests, India: Taking on Climate Change—24 Initiatives Related to Climate Change (Jan. 6, 2010) (pamphlet), available at [http://moef.nic.in/downloads/public-information/24\\_Recent\\_Initiatives\\_CC.pdf](http://moef.nic.in/downloads/public-information/24_Recent_Initiatives_CC.pdf).
69. See generally Deepa Badrinarayana, *The Emerging Constitutional Challenge of Climate Change: India in Perspective*, 19 FORDHAM ENVTL. L. REV. 1 (2009).
70. The atomic energy ministry is, however, examining possible options for disposing nuclear waste, which is currently stored on site. See World Nuclear Organization, Nuclear Power in India, <http://www.world-nuclear.org/info/inf53.html> (last visited May 20, 2010); see also Kanwar Raj et al., *Radioactive Waste Management Practices in India*, 236 NUCLEAR ENGINEERING & DESIGN 914 (2006).
71. For a visual overview of the linkages between nuclear energy generation and its human and environmental impacts, see Jaimie Cavanaugh et al., Univ. of Mich., Environmental Impacts of Nuclear Proliferation: Remediation of Waste, [http://sitemaker.umich.edu/sec003group5/remediation\\_of\\_waste](http://sitemaker.umich.edu/sec003group5/remediation_of_waste) (last visited May 29, 2010).
72. For instance, Canada continues to struggle with its nuclear waste disposal. See DAVID RICHARD BOYD, UNIV. OF VICT., CANADA V. OECD: AN ENVIRONMENTAL COMPARISON 21 (2001), available at <http://www.environmentalindicators.com/htdocs/PDF/CanadavsOECD.pdf>. In the United States, contamination of water near nuclear sites has been a recurring concern. See Larry Bivins & Greg Wright, *Report: Nuclear Sites Put Drinking Water Sources at Risk*, USA TODAY, Mar. 29 2004, available at [http://www.usatoday.com/news/washington/2004-03-29-nuclear-gns\\_x.htm](http://www.usatoday.com/news/washington/2004-03-29-nuclear-gns_x.htm); see also *Radioactive Waste*

*Reaches Water*, Nov. 24, 1997, PHYSICSWORLD.COM, <http://physicsworld.com/cws/article/news/3364>.

73. According to one Gallup poll, only 35% of Indians were aware of the threats of climate change and only 29% considered it a personal threat. Anita Pugliese & Julie Ray, Gallup, Top Emitting Countries Differ on Climate Change Threat (Dec. 7, 2009) (poll), available at <http://www.gallup.com/poll/124595/Top-Emitting-Countries-Differ-Climate-Change-Threat.aspx#2>.
74. See GLOBAL AGRIC. INFO. NETWORK, U.S. DEPT OF AGRIC., GAIN REPORT No. IN9080, INDIA BIOFUELS ANNUAL REPORT (2009), available at <http://www.thebioenergysite.com/articles/369/india-biofuels-annual-report-2009>.
75. See Rudra V. Kapila et al., Investigating the Prospects for Carbon Capture and Storage Technology in India (Univ. of Surrey, 2009), available at [http://www.geos.ed.ac.uk/scs/India\\_CCS\\_Report-Oct2009.pdf](http://www.geos.ed.ac.uk/scs/India_CCS_Report-Oct2009.pdf). See generally *Carbon Capture and Storage*, POSTNOTE (Parliamentary Office of Sci. & Tech., London, U.K.), No. 238, Mar. 2005, available at <http://www.parliament.uk/documents/upload/POSTpn238.pdf>.
76. See GOV'T OF INDIA, REPORT ON REFORMING INVESTMENT APPROVAL AND IMPLEMENTATION PROCEDURES: PART I: INVESTMENT APPROVAL PROCEDURES—GOVERNMENT AND PUBLIC SECTOR PROJECTS (2002), available at <http://dipp.nic.in/implrepo/implrepo1.pdf>; see also Ritu Paliwal, *EIA Practice in India and Its Evaluation Using SWOT Analysis*, 26 ENVTL. IMPACT ASSESSMENT REV. 492 (2006).

cerns and will elevate other environment concerns to the detriment of Indians.

At present, the Indian government should not only focus on meeting energy demands to satisfy its economic growth, but must also reevaluate its broad development goals. While the government is right in promoting economic growth in the interest of poor Indians, its efforts will be futile if—in

the process of achieving economic prosperity—it irreparably harms the interests of Indians. At present, both traditional energy sources and some alternative energy sources, such as nuclear energy, present environmental threats that can harm Indians. Thus, without effective policies to mitigate the environmental impacts, India's economic ambitions may be in vain.