



**WG3. Climate Change and the Environment**  
**30 August - 1 September, 2012. Panama City, Panama**

## **The Extractive Industries Today: Climate Change and the Environment. *Energy Fuels and Materials Focus***

**Michelle Michot Foss, Ph.D.<sup>1</sup>**

*In this discussion paper I touch on three aspects of extractive industries operations that are of concern to policy makers.*

1. *Extractive industries policy issues such as fiscal regimes and health, safety, environment (HSE) oversight*
  - a. *How to achieve good governance, transparency, open markets, light handed approaches*
2. *Impacts of extractive industries on the environment and climate change*
  - b. *The "clean energy", "green jobs" debates*
3. *Best practices in capacity building*
  - c. *How to improve poorly equipped government institutions and bodies)*
  - d. *Case studies Putting forward the idea that one of the core principles of modern democracies must be the recognition and defence of the fundamental rights of minorities in group decisions implies the Rule of Law guaranteeing the right of any man (even if he is the only one) to oppose a majority decision. As a result, both democracy and the Rule of Law acknowledge local structures at a micro level represented by individual citizens.*

### **Extractive Industries Policy Issues**

For the first theme on policy issues, my emphasis is on fiscal regimes and HSE oversight for the major commodities industries. The global commodity cycle has pressured both net producing and net consuming countries. For the former, high commodity prices generate windfalls but also high costs for raw material inputs and human resource skills, contributing to inflation in some locations, squeezing profit margins for producers, and creating other impacts that can erode benefits. For net consuming countries substantially higher prices for fuel and non-fuel minerals impacts customers and consumers, creates a drag on economic performance, and contributes to budget and trade deficits which in turn dilute resources that could otherwise be deployed for human advancement.

As the commodity "super cycle" unfolded in the early 2000s, challenges quickly arose to the process of economic liberalization that had been the hallmark of the previous 20 years. More than 100 countries subsidize, or administer prices for, energy and other materials. Political transitions away from these policies already are fraught with difficulty; extraordinary price peaks made political will even more fragile. Governments of producing and exporting countries have become ever more dependent upon economic rents from natural resource extraction (even though "this time was supposed to be different"). The commodity super cycle and robust economic rents discouraged economic diversification by producing/exporting countries or, equally troubling, spurred government investment in sectors and activities that have no clear net benefit for longer term growth and development. In response to political upheaval across North Africa and the Middle East and instability in other countries and regions, governments have pushed political patronage to new heights in efforts to pacify populations. Many of

---

<sup>1</sup> Chief Energy Economist and Head of CEE (University of Texas – Bureau of Economic Geology's Center for Energy Economics). Contact the author at [energyecon@beg.utexas.edu](mailto:energyecon@beg.utexas.edu), or access the CEE web site at [www.beg.utexas.edu/energyecon](http://www.beg.utexas.edu/energyecon).

these patronage programs serve to preserve administered pricing regimes. Subsidized energy fuels and services are popular for political classes, if quite ineffective in reducing energy poverty because of resulting disincentives to invest in new capacity. Two substantial areas of underdevelopment – electric power generation and system capacity and refining – also are two examples of pervasive tendencies to price below market cost.

**Fiscal Regimes for Extractive Industries**

Fiscal regimes encompass the combination of legal rules and policies for access to and development of resources; ownership of assets; payment of taxes, royalties, and other fiscal obligations faced by both foreign and domestic investors; establish procedures for dispute resolution and arbitration; and address other key elements that establish competitive upstream investment frameworks. Successful fiscal regimes largely balance the respective interests of host governments and investors. They also allocate responsibilities of the parties (including sovereign national oil companies or NOCs), guide distribution of revenue from resource production, and often incorporate specific national mission goals and objectives such as development of expertise and industrial competence. Notably, and increasingly, HSE is considered a cross-cutting goal for both resource owning host governments and extractive industry investors. Investors that cannot demonstrate HSE excellence are less competitive in securing key opportunities. Governments that cannot build and maintain institutional capacity for effective HSE oversight will not attract world-class investors.

**The Fiscal Regime Balancing Act**



Source: CEE-UT

A key function embedded in administration of fiscal regimes is revenue management. Huge attention has been paid to extractive industry transparency (EIT), but almost always with the wrong focus. A large number of organizations and bodies have coalesced around EIT, often with dubious purposes, motives, and outcomes. These range from multilateral institutions to nongovernmental organizations (NGOs), including environmental and civil society groups. It has been easy for the many, varied agents to target investors, especially publicly traded companies. However, almost always the source of the problem lies within the host country itself, and often below national government jurisdictions. Thus, EIT programs that target multinational companies but exclude sovereign companies, elected and appointed government officials, indigenous and traditional leaders, labor and professional unions, courts (judicial coercion and capture being a prime culprit in revenue mismanagement), and so on are largely ineffective. Clearly, this is a difficult and challenging realm. The constraints are largely cultural, deeply ingrained in societies, viewpoints, perceptions, and underlying structures such as legal systems. Yet, lack of transparency

probably has done more to undermine project success, expose investors and governments to undue risk, and shortchange citizens than any other aspect of extractive industry development.<sup>2</sup>

Large resource projects benefit from government competence in HSE. Investors are worse off if government regulators do not have:

- Technical capability, which means having qualified staffs and equipment;
- Experience, presenting obvious difficulties for new government bodies;
- Good understanding of the industry and technology. While many criticize interactions between HSE authorities and regulated industries, in fact, little can be accomplished if personnel and organizations do not interact in appropriate settings, share information and jointly develop best practices and new technologies for safety assurance, ensure continuous education and development of personnel, and so on.

HSE is important but perilous terrain. Issues such as human and indigenous rights; concepts such as consultation and free, prior, and informed consent (FPIC); and the vast array of international organizations, institutions, NGOs, and consultancies in this milieu can create more harm than help in resolving problems.

In sum, the “institutional infrastructure” is essential for fiscal regimes to function as they are (hopefully) designed to do with regard to balancing interests.

The concepts and examples below are drawn from the oil and gas domain but can apply to other fuel and non-fuel mineral resources as well.

- They can help, or undermine, good governance.
- Some fiscal regimes lend themselves to high implementation cost and erosion of transparency unless governments have strong institutional capacity.
- Generally speaking, royalty/tax concessions offer the most light-handed approach and afford the least amount of host government (resource owner) control. Investors compete for licenses, engage in E&P work programs, deliver royalty payments to host governments as the first obligation on production volumes, and pay corporate and possibly other taxes on operating income. Strong and effective oversight for revenue management and HSE can be instilled within the royalty/tax framework, which also provides the least amount of distortion when it comes to project economics and commerciality. Investors tend to like royalty/tax regimes most because they provide the clearest property rights for resource extraction and monetization. Companies operating in these regimes are able to “book” reserves of oil and gas and/or other minerals according to the rules of the financial regulators in their home countries (for instance, the Securities and Exchange Commission, SEC, in the U.S. and comparable agencies in other countries<sup>3</sup>). The U.S. (federal), Canada (provincial governments), North Sea countries (national), and Australia (federal) all utilize royalty/tax regimes. Countries that use royalty/tax regimes for oil and gas also tend to use them broadly across sovereign mineral estates.
- Production sharing arrangements, in which governments and investors negotiate splits of profits after capital expenditures are amortized, provide a means of paying investors “in kind” for their assumption of risk. As such, investors are able to book reserves associated with production sharing contracts (PSCs). PSCs give the resource owning governments more control but are much more opaque

---

<sup>2</sup> There are the obvious networks for transparency facilitation, such as Extractive Industry Transparency Initiative (EITI, <http://eiti.org/>), Revenue Watch (<http://www.revenuewatch.org/index.php>) and new efforts such as Natural Resource Charter (<http://naturalresourcecharter.org/>). All of these efforts, and many others, have decidedly mixed results. Grass roots efforts like Africa Mining Vision, <http://www.africaminingvision.org/>, may achieve better success. In some instances, transparency is being incorporated into policy and legislation in home countries of investing multinational companies but in ways that are unconstructive and don't address the array of complexities described above. The Dodd-Frank transparency requirements for U.S. based companies subject to securities oversight are one such example.

<sup>3</sup> See the International Organization of Securities Commisisions, <http://www.iosco.org/>, for information on government bodies and other organizations.

frameworks, require substantial administration and associated cost, and can lead to significant disputes on allowable costs and allocation of profits that can undermine the host government-investor relationship. It can be quite difficult for resource owning governments to administer PSCs in an effective way. A large number of countries utilize PSC regimes; outside of the locations and regions mentioned above, it is the most common type of framework.

- Governments may require risk service contracts, in which the investor is essentially a contractor but with some component of risk (and so some ability to book reserves). Typically, production and other performance targets are set and the contractor/investor is paid a fee (fee per barrel of oil, for instance). Even more stringent are pure service contracts, rarely used because of the burden of sovereign control and lack of risk component for investors. Publicly traded international oil and mining companies have great difficulty accepting pure service contracts.

### ***India as an Example***

As the ParlAmericas assembly gathers, India is affording a spectacular case study in the implications of underinvestment in electric power generation and delivery. The large scale blackouts that occurred 30 July-1 August 2012 have many causes but prominent among them are the high degree of technical as well as non-technical (theft and other sources) losses and associated system unreliability, and the lack of generation fuels. India's grid, but especially local distribution networks (LDCs), is plagued by lack of capital improvements, a consequence of the cumbersome, inefficient state utilities that own and operate the LDCs and heavily subsidized prices for delivered electricity. Subsidies both reduce revenue available for reinvestment and create additional cost burdens for the state utilities and governments.

With respect to generation fuels, India relies heavily on coal to fuel power generation. Coal India is one of the most problem-prone industrial entities in that country. Chronic shortages of coal production are a paradox given India's reasonable coal resource endowment. But the inefficiencies of state control and/or oversight also extend to India's natural gas resource base. India has made major investments in liquefied natural gas (LNG) receiving terminals.<sup>4</sup> These investments are important, yet Indian energy customers and consumers, as well as the national economy, clearly could benefit from increased production of the country's own natural gas resources. Cleaner-burning natural gas produced in India could help to increase generation fuel supply and diversity.

India has yet to build a truly attractive fiscal regime for upstream, or exploration and production (E&P), of hydrocarbons (crude oil, natural gas, and natural gas liquids or NGLs). Shortcomings range from fiscal regime administration and management to the role of India's sovereign companies to basic inadequacies in HSE assurance. For many years, India's national governments have been concerned about energy security as a consequence of India's reliance on imported crude oil and, now, natural gas (see charts below). India pays for its LNG imports on an oil indexed basis, using an approach that is typical for the industry but yields a natural gas cost that can be \$10 per million Btu<sup>5</sup> (MMBtu) or more, and perhaps as high as \$14-20 depending upon oil prices and other factors such as supply source and shipping distance. By comparison, the U.S. natural gas price stands at less than \$3 per MMBtu. India's expensive fuel imports bill, resulting trade and fiscal deficits, and recent economic slowdown triggered a recent warning from Standard & Poor's on the country's sovereign credit rating.<sup>6</sup>

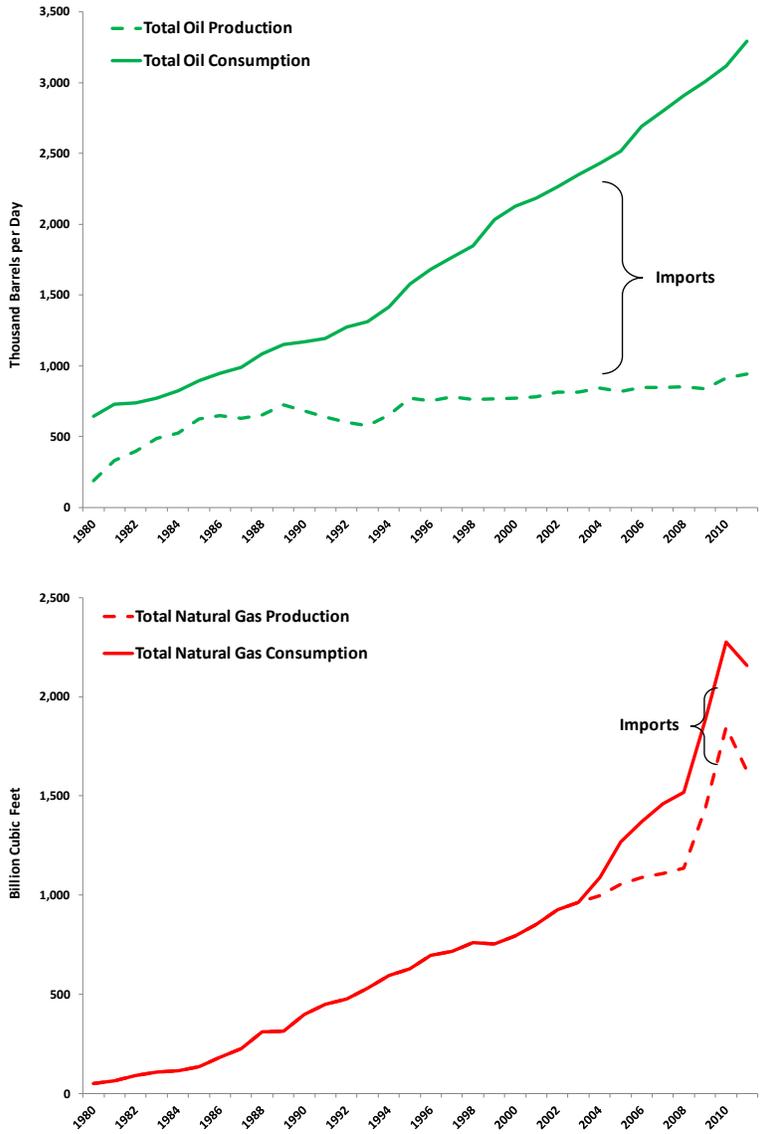
---

<sup>4</sup> Natural gas pipelines to carry imported natural gas to India from Iran and/or Pakistan, possibly including Turkmenistan and Afghanistan (the "TAP" concept), have been proposed and discussed but present myriad challenges.

<sup>5</sup> A Btu or British thermal unit is a typical measure of energy content of fuels. One Btu is equal to 0.252 kilocalories (kcal) or about one kilojoule (kJ). One billion cubic feet or BCF of natural gas is equal to about one trillion Btus (TBtu), about 0.028 billion cubic meters (BCM) of gas, about 0.021 million tonnes of LNG (MMT), and about 0.19 million barrels of oil equivalent (MMBOE).

<sup>6</sup> See "S&P: India Risks Losing Investment Grade Rating", *The Hindu Times*, June 11, 2012 which also references S&P's April 2012 downgrade from stable to negative, <http://www.thehindu.com/business/Economy/article3515855.ece>.

### India's Total Oil (top) and Natural Gas (bottom) Production and Consumption

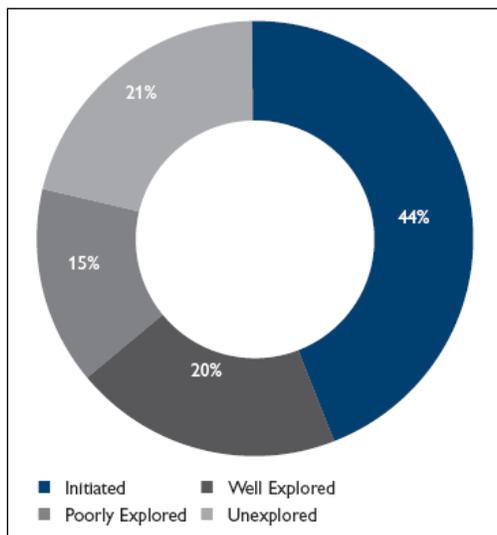


Source: U.S. Energy Information Administration, [www.eia.doe.gov](http://www.eia.doe.gov).

Since the late 1990s-early 2000s the Indian government has experimented with a variety of programs to open and encourage investment in its upstream sector. Success has been limited, although discoveries that have been made indicate some potential. India's main national oil company, ONGC (Oil and Natural Gas Corporation of India) has vigorously pursued outbound, or foreign, direct investment to try to improve its oil and natural gas reserves base. Not all of ONGC's efforts appear to be prudent. An early 1990s upstream reform incorporated a requirement that India's NOCs be given 25-40 percent interests in exploration blocks, a typical requirement of governments but one that can easily discourage investment. This rule was later eliminated. The New Exploration License Policy (NELP) created in 2000 for the first time allows 100 percent equity ownership by foreign entities in Indian oil and gas fields. The NELP approach has yielded somewhat better results although foreign investors still typically participate via joint ventures with India's public sector companies. Active debate continues on whether India's resource endowment is too mature and immaterial (in terms of potential volumes of resource recovered through production) to be attractive when stacked up against other, much larger opportunities for investors. Yet a 2007 review of India's oil and gas sector demonstrated the relative lack of exploration intensity in the

country, as shown below. An alternative, more sensitive, explanation for the country's relative lack of progress is competency among its public sector companies. It can be particularly difficult for NOCs to acquire advanced technologies and skills, and to build sophisticated commercial strategies and management structures. Their national mission roles and obligations can be extensive, and many NOCs lack budgetary and decision making independence.<sup>7</sup>

### Status of Oil and Gas Exploration in India as of 2007



Source: IBEF.<sup>8</sup>

Subsidized prices for refined products also contribute to India's energy sector ills. In 2002 the government attempted to phase out domestic refined product price subsidies by replacing the Administered Price Mechanism (APM) with a new Market Determined Price Mechanism (MDPM) which is notionally benchmarked to international oil prices. However, domestic prices of oil products such as diesel, LPG, and kerosene remain heavily subsidized. In India, the cost of the subsidies is shared by the upstream and downstream (refining, chemicals, marketing, and distribution) NOCs and the government, with the NOCs bearing most of the burden.<sup>9</sup> Predominantly upstream NOCs like ONGC subsidize refiners' losses by providing discounts on crude oil sales. Since 2004, it is estimated that ONGC provided about US\$20 billion in price subsidies through discounted sales of oil.<sup>10</sup> The domestic refined product price subsidies situation in India explains the continued domination of the refining sector by state-owned companies. The private companies that do operate in India have an overt export focus in order to avoid suffering significant financial losses in the domestic market.<sup>11</sup>

### Impacts of Extractive Industries on the Environment and Climate Change

It is popular for governments to pursue "clean" or "green" investments to diversify away from, or invest economic rents from, extractive industries. Whether it is Middle East oil producers pursuing mega-solar projects or the assortment of biofuels initiatives that have emerged around the world (usually with deep consequences for the integrity of both NOC balance sheets and income statements, since many NOCs

<sup>7</sup> All upstream and downstream analysis based on a CEE case study on ONGC and India's hydrocarbons sector for the World Bank as part of research on NOC value creation. See <http://www.beg.utexas.edu/energyecon/nocs/> and <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTOGMC/0,,contentMDK:21991336~pagePK:148956~piPK:216618~theSitePK:336930,00.html>.

<sup>8</sup> India Brand Equity Foundation "Oil and Gas: October 2007," presentation available at [www.ibef.org](http://www.ibef.org).

<sup>9</sup> "Government Response to Oil Price Volatility," by Masami Kojima, Extractive Industries for Development Series #10, July 2009, The World Bank Group available at [www.worldbank.org](http://www.worldbank.org).

<sup>10</sup> "India Rejects Goldman Sachs Criticism on ONGC Subsidy," by Rakteen Katakey available at [http://preview.bloomberg.com/apps/news?pid=newsarchive\\_en10&sid=a1S11DPF8uC8](http://preview.bloomberg.com/apps/news?pid=newsarchive_en10&sid=a1S11DPF8uC8).

<sup>11</sup> See Energy Information Administration, India Country Analysis Brief, available at <http://www.eia.doe.gov/emeu/cabs/India/pdf.pdf>.

must absorb the cost of biofuels ventures and associated subsidies in their refinery operations), the pursuit of green investment is well underway.

Several cautions should be noted.

- The concept of “green jobs” is generally poorly defined and burdened by measurement problems. The benefit-cost calculus associated with green jobs promotion is not clear and, in many instances, appears to be negative.<sup>12</sup>
- Environmental impacts associated with alternative energy schemes are largely unknown. It is not clear that net energy balances are favorable, given the requirements to balance intermittent energy sources such as wind and solar and provide backup energy sources. Alternative energy schemes ultimately will rest on battery designs that will necessarily utilize rare and exotic materials and minerals (and thus large extractive industry operations and global supply chains) to achieve energy storage and release performance criteria. Governments and backers of alternative energy systems are largely uneducated, uninformed, and ill-prepared to deal with environmental and societal impacts of these systems. Little to no research has been done on environmental and societal consequences of alternative energy initiatives. The global debate on whether biofuels provide net benefits, including impacts on food sources and prices, greenhouse gas (GHG) emissions, water use for agriculture, and impacts on oceans and coastal dead zones from increased agricultural runoff is an example of the kind of unintended consequences that need careful consideration.

Alternative energy systems may be no panacea for conventional energy fuels and the associated mining and drilling operations required to harvest them.

### Best Practices in Capacity Building

How can poorly equipped government institutions and bodies be better prepared with the assortment of challenges presented in this paper? No easy answers exist for this dilemma. Resource rich countries, even small ones, need to be diligent about devoting portions of their resource wealth as well as assistance from international development partners to prepare people and organizations for the demands placed on them.

#### Ghana Case Study

The country of Ghana affords a useful case study on how complex capacity building needs could be addressed in order to prepare for large scale, offshore oil and gas operations and activity associated with Ghana’s Jubilee blocks and future activity. The case study provides both positive and negative results and outcomes for lessons learned. The following table summarizes key points.

Key Issue	Positive Action/Outcome	Negative Action/Outcome
Coordination among international development partners (DPs) and Government of Ghana (GoG) needed to be achieved in order to obtain alignment on core principles and priorities.	Use oil and gas sector needs assessment to engage key stakeholders, especially in the Western Region where operations are based; define priority actions and plans; establish timetable for execution.	DPs did not follow through with all recommendations in needs assessment.
Strategy for managing expectations within GoG and among key stakeholder groups.	Fostered capacity building at a local NGO partner that had experience in hands-on demonstration projects, media consultation, and transparency. Several public	NGO continues to struggle to find continuing support for initiatives.

<sup>12</sup> See Copenhagen Consensus, 2011, *Defining, Measuring, and Predicting Green Jobs*, prepared by CEE, <http://www.copenhagenconsensus.com/Default.aspx?ID=1542#7056>.

<b>Key Issue</b>	<b>Positive Action/Outcome</b>	<b>Negative Action/Outcome</b>
	education and information initiatives achieved.	
Devise targeted education plan to build first stage national capacity in skilled technical crafts in order to grow an indigenous workforce.	Local vocational technical institutes identified, some already engaged constructively with operating companies and regional government.	Continued lack of basic, fiscal budget cohesion in Ghana's education sector to provide foundational support.
Develop technical assistance (TA) for strategic GoG bodies to gain competence for management of natural gas production handling and commercialization, so that optimal Jubilee development could proceed. Included technical, regulatory, revenue, and safety considerations. Included appointed ministry and regulatory officials, NOC personnel, and elected parliamentarians.	Problem dimensions well defined and understood through targeted meetings and workshops with involvement of NGO partner.	GoG failed to resolve internal conflicts; natural gas handling remains an unresolved constraint for Ghana's oil and gas sector.
Identify opportunities for higher education improvements in order to build white collar, professional, indigenous workforce for Ghana's oil and gas industry.	Institutions identified, some with programs already underway, and facilitated matching between equipment donation and faculty recipients.	Additional international higher education linkages for core petroleum education not finalized.

The examples above should provide ample illustration of a workable approach – a thorough needs assessment survey – as well as the kinds of capacity building activities that can be developed. The fundamental lesson from the Ghana case is the importance of a host government's own resolve to foster internal improvements and transparency. "All politics is local." If the lead government bodies cannot develop and maintain conviction of purpose, then constructive endeavors will fail or not reach their potential. The extractive industries can be powerful forces for good as conduits for human development, extending from energy and materials; to technology research and development and creation of intellectual property; to new sources of revenue and economic benefits through both direct and indirect impacts. The themes of policy, extractive industries interactions with environment and climate change, and capacity building needs are highly linked and require careful thought and planning.