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Title: Energy management in 21st century: an inquiry into the mounting corporate hegemony over basic human necessities and the role of civil society as a countervailing force.

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Abstracts: *In 21st century, as energy and food supplies are increasingly becoming dependent on each other, any strategy to manage these two basic human needs should be formulated collectively –not in isolation.*

The ‘green revolution’ of 1950s paved the way for ascertaining corporate control on food and water. Through the enactment and subsequent ratification of Kyoto Protocol, the corporate hegemony on air and energy has been established firmly.

During last hundred and fifty odd years, a symbiotic relationship between the state and large corporations was developed. The transnational corporations are trying to break away from such dependence on state and emerge as the dominant force to control and manage the global market.

This study tries to explain the consequences of this changing relation between the ‘state’ and ‘corporations’ on the food and energy needs of the citizens. It also analyses various issues pertaining to the energy supplies during the next few decades of the 21st century.

The paper concludes that in future, the civil society organizations (CSOs) will play an important role in steering the course of society especially in the allocation and distribution of basic human necessities like food and energy.

Introduction

As energy and food supplies are increasingly becoming dependent on each other, any strategy to manage these two basic human needs should be formulated collectively –not in isolation. In a span of fifty odd years, during the second half of the 20th century, two important events namely the ‘green revolution’ of 1950s and the formation of United Nations Framework Convention for Climate Change (UNFCCC) and subsequent signing of Kyoto Protocol in 1990s have made profound impact on the production and distribution of basic human necessities like food and energy. This period has also observed a dramatic change in the relationship between the ‘nation states’ and the transnational corporations (TNCs) engaged in the food and energy sectors. Both the nation states and the private corporations wanted to retain their control on the basic necessities of their citizens/consumers - namely food and energy.

Prior to the ‘green revolution’, the ‘nation states’ had failed to establish its control on the diversified food habits of its citizens. Large varieties of grains with diverse cultivation process which were suitable to a particular local condition, made it difficult for a ‘nation state’ to formulate a ‘national agricultural polity’ incorporating all such diversities. Based on their experience and local knowledge, a farmer decided on his own the type of seed and the cultivation process that was most suitable for him. In the supply of traditional forms of energy (fire wood, energy generated by human and animals etc) also, the ‘state’ had little say and to establish control on the modern forms of energy, the ‘state’ needed capital intensive complex technology for the generation and distribution of the same. Thus, a device/process was looked upon through which production and distribution of food and energy could be controlled through the combined tool of technology (to be provided by the private corporations) and subsidies (to be given by the ‘state’). Consequently, the firms with strong interest in petroleum sector had developed the ‘green revolution’ package during 1950s¹. It was nothing but a new cultivation process comprising of high yielding varieties of seeds; chemical fertilizer; pesticides and controlled irrigation facilities, implemented worldwide, through the active support of the states. Within a span of few years, farmers found themselves completely dependent on

¹ See Brown, 1970

the state and transnational corporations for seed, fertilizer, water and pesticide. As water was a critical input in the 'green revolution' package, a huge water industry has been developed to meet its increasing demand.

The climate change debate and the recent trends in energy supplies

Like water, 'air' was another 'common' resource that was available 'free' from the beginning of the human civilization. It has also been turned into an 'economic good' through the enactment of Kyoto Protocol in 1997². A systematic market mechanism to buy and sell 'emission' was incorporated³ in the Kyoto Protocol itself.⁴ In 1999, the emission trading market was \$50 billion which is likely to reach \$13 trillion by 2050.⁵

The Kyoto Protocol has also created enough business opportunities to the logging and seed industries. The 'common property resources' (CPRs) across the globe are being systematically destroyed and grabbed for short term commercial benefits. For example, the Kyoto Protocol has provided incentives to destroy old forests to enable to plant new trees and earn money as a reward for 'purifying polluted air'. It is estimated that nearly 20 to 25% of the world carbon dioxide comes from the destruction of tropical forest.⁶ Monsanto- the US based transnational corporation has claimed that massive amount of CO₂ would remain stored in the soil if farmers reduce or stop traditional farming practice and instead use its herbicide and genetically modified crops. Monsanto expects to earn huge profit with genetically modified plants and trees that take up or store carbon more effectively.⁷ In near future, to earn emission credit under CDM

² It came into force in February 2005

³ Say 'emission trading', 'joint implementation' (JI) and 'clean development mechanism' (CDM).

⁴ However, there exists a lack of consensus among scientist on the cause of global warming. Critics of the Kyoto Protocol which calls for cut in carbon di-oxide, claims that the theory underlying the pact lacks scientific basis. For details see. Radyuhin. V, challenging the basis of Kyoto Protocol, The Hindu, July 10, 2008

⁵ Dey 2007

⁶ For details see 'Carbon market encourages chopping trees', The Hindu Business Line, 15.8.2007

⁷ Corporate Europe Observatory, (CEO) April'2001

project, genetically engineered forest may come up in different parts of Southern countries; evicting local people from their ancestral land.

Resurgence of renewable energy

The debate on climate change, during 1990s, has made a profound impact on the future energy mix of all the major economies across the globe. Apprehending the extreme consequences of global warming, environmentalist and civil society organizations (CSOs), world over, have demanded for more environmentally benign energy supplies. This 'demand pull factor' has increased the importance of renewable energy sources. It has also been observed that since 2002 the share of renewable energy sources in the energy mix of the major economies have been increasing.

A resurgence of renewable energy is being observed across the globe. The World Bank has claimed that the current share of renewable energy and energy efficiency projects in the World Bank Group's energy portfolio has risen to 37% in 2007 as compared to just 14% in 1994.⁸ In 2008, nearly 12,000 megawatts of wind power capacity, 9,740 megawatts of cumulative solar photovoltaic systems and at least 6000 megawatts of geothermal energy projects had been installed and in January 2009, the International Renewable Energy Agency (IREA) -a multinational agency focused solely on spreading clean energy across the globe, was launched.⁹

Restructuring of coal, oil & gas and nuclear industries

The energy industry is passing through a major transformation. In recent past, major changes are being observed particularly in coal, oil & gas and nuclear sectors. These changes are redefining the role of major stake holders of the industry.

⁸ 'Germany in push to set G8 emission target', The Financial Times, April 13, 2007

⁹ <http://www.worldwatch.org/node/5997?emc=el&m=194497&l=7&v=a274235068> dt 30.1.2009

Coal: The European Union (EU) is seriously aiming towards a low CO₂ fossil fuel future through the development of clean coal technologies so that after 2020 “near zero emission” power generation can be systematically used in the EU and in the world. Coal is traditionally the key fossil fuel in power generation and by far the most carbon-intensive one. Carbon-di-oxide emitted from coal fired power generation represents 76% of emission from power generation and around 30% of total global emission of carbon di-oxide. But it can also contribute to the security of energy supply. It is estimated that compared to the reserves for oil and gas which are expected to last for another forty and sixty years respectively, at current rate of production, hard coal and lignite would last for another 200 and 130 years respectively. Improved technology with a capacity to reduce coal’s harmful environmental effects would change the total energy equation of the globe and the owner of that new generation clean coal technologies will dominate the global energy market in future. Keeping this in mind, EU has envisaged an integrated technological solution combining efficiency improvement of the conversion cycle with the mechanism of ‘carbon-di-oxide capture and storage (CCS). This ‘Sustainable Coal Technologies’ will enable European firms to become the ‘global leaders in this energy form’.¹⁰

Oil & gas: The developing countries are likely to be the major loser. As the share of hydrocarbon in the total energy mix is expected to decline in the medium and long term, the oil producing developing countries, most of which depend heavily on the revenue earned from the export/royalty of crude, will suffer most. There is a very high possibility of major organizational restructuring in the integrated international oil companies. These might get divided into smaller entities on the basis of functional activities. Mid sized specialized service firms like Slumberger, Halliburton et al, having expertise in specific functional areas might dominate the oil industry. In that changed situation, to retain their

¹⁰ Commission of the European Communities (CEC), Commission Communication on sustainable power generation from fossil fuels: aiming for near zero emissions from Coal after 2020. Brussels, 10.1.2007

control, the present oil majors might focus on distribution and marketing function only as in this area they are at a comparative advantage over the state owned firms.

The current trend shows that the major energy utilities engaged in oil and gas might diversify to new and renewable forms of energy in the medium and long term. Few of them have already ventured into solar (say BP Solar) and bio-fuels (Chevron et al). Probably oil majors will prefer to focus more on bio-fuel than on other renewable energy forms during their transformation from a 'carbon to carbohydrate' fuel base though for years, the bio-diesel market had been dominated by relatively small companies and firm co-operatives. For example, Chevron –the second largest US oil company, has invested in one of the first large-scale bio-diesel plants in the USA. Chevron's bio-diesel production facility will be able to produce annually up to 100 million gallons of fuel from soybeans and other resources¹¹. Royal Dutch Shell is one of the leading distributors of first-generation bio-fuels and is focusing on developing a second generation made from waste plant matter.¹² Reliance Industries –one of the largest Indian conglomerates having major interest in petroleum and petrochemicals have entered into a formal agreement with the government of Andhra Pradesh (one of the coastal states of India) for Jatropha (one type of bio-energy plants) plantation. The company has selected 200 acres of land for Jatropha(one type of energy plant) plantation for high quality fuel.¹³

Nuclear: It has been reported that in unlike in North America and most of Western Europe, where growth of nuclear power have leveled out for many years, the 'greatest growth in nuclear generation' in near future is expected in China, Japan, South Korea and India¹⁴. In 2005, the year when the Kyoto Protocol came into force, an attempt was made to popularize nuclear energy as a major energy source by conferring the Nobel Peace prize jointly to El Baradei –the Chief of International Atomic Energy Agency (IAEA)

¹¹ FT.Com, Oil majors cultivate an interest in bio-fuel industry, August 23, 2006, <http://www.ft.com/cms/s/d97a5a...>

¹² See Annual Report, 2006, Royal Dutch Shell

¹³ Jatropha-India's Bio-fuel Options, New America Media, July 28, 2008; http://news.newamericamedia.org/news/view_article.html?article_id=768c6540d33837f41 visited on July 29, 2008

¹⁴ World Nuclear Association, 2007, Asia's Nuclear Energy Growth, February, <http://www.world-nuclear.org>

and IAEA¹⁵, for promoting peaceful use of atomic power. But till date, the nuclear industry has failed to re-establish its credibility that was battered in 1986 due to Chernobyl disaster.

Energy industry at the cross road

The global energy industry is at the cross road now. The last five decades of the previous century starting from the mid 1950s, when the 'green revolution' was arranged, to the late 1990s when the Kyoto Protocol on climate change was signed, was very crucial in shaping the relationship between the 'nation states' and major corporations dealing in human necessities like food, water and energy. The symbiotic relationship that existed during the early stage of green revolution phase had deteriorated slowly in the later decades when the corporations gained enough economic and political authority to ignore and marginalize the nation states. In the present century, when the multilateral bodies like WTO regulates the global business environment, the transnational corporations are trying to break away from their dependence on state and emerge as the dominant force to control and manage the global market. This tendency to break away from the protective shadow of the state is likely to continue despite recent turmoil in the global economy due to a cyclical downturn which was overdue. During transition process from a regulated nation centric economy to a deregulated corporate centric multinational economy, similar hiccups, may be with less devastating effect, are likely to be observed in future also specially in the early stage of this transition when over enthusiasm and unbounded greed of a section of business leaders would lead to strategic and operational blunders.

Plan of this study

This study has been divided into two sections. Section A explains the consequences of this changing relation between the 'state' and 'corporations' on the food and energy needs of the citizens. Section B analyses various issues pertaining to the energy supplies

¹⁵ Dey, 2006a

during the next few decades of the 21st century. This analysis has been made in the context of (i) the paradigm shifts observed in recent years in the generation/ production process;(ii) the increasingly important role the civil society organizations (CSOs) are expected to play as a countervailing force against the oligopolistic power of the global corporations and (iii) the changing role and relative importance of major stake holders in shaping the energy supplies

Section A

The last five decades of the previous century had witnessed a gradual but systematic dilution in the symbiotic relationship between the states and major corporations engaged in the business of food and energy. In this section, an attempt has been made to explain the consequences of this changing relationship on the basic needs of the citizens. This is being explored by addressing the following questions.

- 1. Will the dependence of agriculture on petroleum sector continue or could there be a change in the relationship?*
- 2. Would the states be able to sustain this alliance in the long run especially when the economic and political powers of the states are on decline?*
- 3. It would be naïve to believe that the political establishments are not aware of the negative consequences of nuclear power. Then why have the emerging economies like India, China, Brazil, et al have aligned themselves with the nuclear establishment without fully exploiting other alternative energy sources?*
- 4. Is there any 'supply push factor' along with the already identified 'demand pull factor', behind this resurgence of renewable energy?*

A.1.0 Green revolution, the nation state and petroleum industry: the beginning of subjugation of agriculture before the joint control of the state and large corporations

Ancient Roman law declared that some things were ‘common’ by their very nature. Primarily these were air, sky, wildlife, and navigable waters. Government did not own these and therefore could not privatize them, even if legislators wanted. Much like trustees of an estate, governments had a legal obligation to maintain these assets for the benefit of the public at large.¹⁶

1st green revolution: Since mid fifties of the last century, in the name of green revolution and electricity generation, the nation states first started to invade these ‘common’ properties. By erecting huge dams, water of the free flowing rivers like Tennessee, Nile, Beas, Damodar, Ganges and Narmadas were used first to generate electricity and then for commercial irrigation. When large scale canal irrigation projects failed to generate enough revenues, ‘small scale irrigation’ was made popular. Underground water was used indiscriminately for proper dissolution of chemical fertilizer which was necessary for the cultivation of high yielding varieties (HYV) of seeds.¹⁷ As a consequence, ground water in many parts of the world, especially in Asia, got polluted and arsenic prone. Water became a scarce ‘economic commodity’ and a water market was thus created.

¹⁶ World Watch Institute, 2008

¹⁷ See Brown (1970)

The firms with strong interest in petroleum sector had developed the ‘green revolution’ package¹⁸. It was nothing but a new cultivation process comprising of high yielding varieties of seeds; chemical fertilizer; pesticides and controlled irrigation facilities, implemented worldwide, through the active support of the states. Thus independent farmers became completely dependent, for their agricultural inputs, on the state and transnational corporations for critical inputs like seeds, fertilizer and pesticide. Initially, the farmers had to rely on the state for subsidies on fertilizer and diesel/electricity. Subsequently, their dependence on the state became total when they had to rely on the state for ‘support price’ to cover the rising input costs.

At that inflated price, only the state agencies could ‘buy’ the harvests to bail out the peasants. In India, the grains thus purchased by the government agencies were then distributed through public distribution system at a subsidized price. The developed countries like USA followed a slightly different model. The huge agricultural subsidy received by the farmers enabled them to sell their products at a much lower price. While lower food price helped to control domestic inflation, the government also used the surplus food to retain their political supremacy over the food starved least developed /developing countries. The ‘oil for food’ program in Iraq is a case in point.

A.1.1.Liberalization of state control

In a span of few decades the ‘green revolution’ had spread to different grain producing countries of the world. The centuries old cultivation practices based on traditional irrigation systems using rain water had been replaced by modern cultivation process.¹⁹ Since then water has become an ‘economic good’ and a new market for water was

¹⁸ See Brown, 1970

¹⁹ This modern cultivation consumes around 80-90% of the fresh water the human civilization consumes every year. Depending on the level of industrialization, 5-10% is consumed by the industry and only 4-5% of total fresh water is used for the human and animal consumptions.

created. The state control on water used for cultivation started with the launch of large scale irrigation projects (government controlled canal water supplied by erecting large dams) in the sixties. When these were found not that efficient to serve the water requirements of new miracle ‘seeds’, the governments turned to tube wells. The finance ministers of most of the Asian countries offered various incentives to encourage small-scale irrigation financed largely by individual farmers. For example, in India, electricity was offered almost free for running agricultural pump sets and in Pakistan the government had lifted all import restrictions on low-lift pumps for use in the wheat fields of eastern Pakistan.²⁰

Presently, the global water market is estimated at around \$316 billion and is growing very fast. Asia’s water market is the fastest growing market in the world and the present size of the Asian market is estimated around \$120 billion in a year. As in the case of other industries, water industry is also dominated by few major firms. Veolia Environment (world’s largest); Black and Veatch, Siemens Water Technologies (a unit of Siemens AG Germany-the electrical equipment company), GE Water & Process Technologies (a unit of General Electric)²¹ are few such firms.. Major soft drink firms like Pepsi and Coca-Cola also have ventured into bottled water business.

In addition to the ‘real’ water market, the concept of ‘virtual water trade’²² is also gaining importance. It has been suggested by a section of academicians that the World Trade Organization (WTO) should set up a virtual water-trading council to help ‘manage both real and virtual water resources for the world’s booming population’.²³

²⁰ see Brown, 1970

²¹ International Herald Tribune, Asia holds promise of big profits for water industry, July 1, 2008, <http://www.ihb.com/bin/printfriendly.php?id=14125066>

²² Virtual water is water used in the production of food and electricity. For example, to produce one kg of wheat, say 1000 liters of water is required, giving it a virtual water content of 1000 liters. Thus if India exports one kg of wheat to Japan, then there is virtual flow of 1000 liters of water from India to Japan.

²³ Virtual water trading could benefit developing countries, February 13, 2007. <http://www.unisa.edu.au/news/2007/130207>

The process of liberalization of the state control on food has been formalized through the enactment (1995) of the Agreement on Agriculture (AoA) under WTO, which primarily aims at reducing the subsidies given to the agricultural sector by the respective states. As a result of this, many states have lost their self sufficiency in food and have been compelled to import food grains at an exorbitant price from the grain traders in the international market. According to Food and Agriculture Organization (FAO), in 2005, out of 216 countries in the world, 207 had to import wheat and 170 had to import rice from international markets.²⁴

A.1.2. Bio-technology, genetically modified seed and second green revolution:

2nd green revolution: The second green revolution is mainly driven by the biotech and seed firms. The firms with strong interest in agricultural production are trying to retain control on millions of farmers, by establishing their supremacy on critical inputs like seed. This command on seeds will ensure their control on both food grains and bio energy. Currently the trans-national seed companies control over half of the world's seed market. They have bought many plant breeding programs which were earlier controlled by the governments.

The Global Crop Diversity Trust (GCDT) - a 'private entity with strong corporate funding' is one of the major stake-holders in the newly opened (February 25, 2008) Global Seed Vault (GSV) that has the capacity to store 4.5 million seed samples from around the globe. It is alleged that the GSV would take the unique plant varieties away from farming communities that 'originally created, selected, protected and shared the seeds'.²⁵ It is predicted that in coming years, biotechnology will enable to 'create bio-fuels from non-food crops, crops that yield more per acre, require less fertilizer and are more tolerant of drought and other adverse conditions.... biotechnology will play an

²⁴ See, The Times of India, June 4, 2008, 'Agri business booms amid global food crisis.'

²⁵ Acharya, 2008

essential role in providing the world with cleaner fuel and more affordable food', as commented recently by the President and CEO, Biotechnology Industry Organization²⁶.

Anticipating such changes in near future, industry majors like Dow Chemicals has already initiated few strategic moves. For example, on August 30, 2007, Dow Agro - Sciences, a wholly owned subsidiary of The Dow Chemical Company²⁷, announced that it had further strengthened its global corn seeds platform with the acquisition of Netherlands-based Duo Maize. The deal followed two other acquisitions in the corn seeds arena, involving Brazil's Agromen Tecnologia, and Austrian company Maize Technologies International (MTI). "The expanding seed platform that we are building will enable us to leverage superior Dow Agro Sciences input and output traits in key crops around the world," said Jerome Peribere, Dow Agro Sciences president and chief executive officer.²⁸

The first green revolution had made agriculture dependent on petroleum and chemical firms for inputs like fertilizer and pesticides. In future petroleum and chemical companies might depend on bio-energy sources produced by genetically modified seeds. The Global Seed Vault has created the base for the 'second green revolution' which will not only ensure the hegemony of global seeds and bio-tech firms on food and energy (bio-fuel) but will also ensure supply of feedstock to petrochemical firms.²⁹

A.1.2.1. Food retailing: strengthening the corporate hegemony on the food business

²⁶ Cleantech Blog ,Biofuel Innovators with Alternatives to Oil, may 14, 2008, <http://www.cleantechblog.com/2008/05/bio-fuel-innovators-with-alternatives-to.html>.

²⁷ In 2006-07, Dow had annual sales of \$49 billion and employed 43,000 people worldwide. The Company offers a broad range of products and services to customers in more than 175 countries. See *ibid*.

²⁸ http://news.dow.com/dow_news/corporate/2007/20070830a.htm

²⁹ On June 20, 2006, BP and DuPont jointly launched bio-butanol. "DuPont firmly believes that biology will help us reduce global reliance on fossil fuels," commented DuPont Chairman and Chief Executive Officer Charles O. Holliday, Jr, while speaking at that occasion. For details, see <http://www.bp.com/genericarticle.do?categoryId=2012968&contentId=7018942>

To strengthen the corporate hegemony on the food business, in addition to retaining control on critical inputs like seed, fertilizer et al, a complex model of organized retailing has been developed by linking millions of small and medium (SMEs) producers with the major retailers through global supply chain, developed and managed with the application of sophisticated technology. An UNCTAD (2005)³⁰ study has revealed that global supply-chains played a key role in the adjustment to new environment and safety regulations. The SMEs have to abide by the requirements set by global retailers or risk being phased out as input providers. The study also showed that in addition to mandatory food safety requirements, large private retailers had introduced stringent product and process standards that required technical competencies, technical support packages and new management methods, symbolizing a move to high-precision agriculture.³¹

Global consolidation of agro business and its major consequences: Over the past twenty years, fresh produce and food service industries have headed towards global consolidation. In 1980, the United Nations Centre on Transnational Corporations published an analysis on the world's 180 most important food and beverage companies, identifying significant levels of market concentration in segments such as dairy, meat, tropical fruits, grain, and tropical beverages. The ETC Group, based in Canada, tried to replicate this study and found that within two decades barely a third of the original 180 companies existed, and that “nearly all of the others have been absorbed into the surviving third”. In USA, by 1997, supermarkets and bigger ‘super-centers’ owned by companies like Wal-Mart and Kroger controlled 92 per cent of fresh-produce retailing³².

The two major consequences of this global consolidation of food business were: (i) rapid erosion of income of the farmers -particularly the small and marginal farmers; (ii) loss of biodiversity.

³⁰ UNCTAD, 2005

³¹ Dey, 2007

³² Oxfam 2004

Un-remunerative price to farmers: Liberalization of agriculture from the state control had made thousands of small farmers exposed to ruthless exploitation of few major corporate buyers. Supermarkets pushed price and payment risks onto farmers and growers, controlled the packaging and delivery requirements, squeezed producers' margins, and focused on technical, not ethical standards. The extreme imbalance in negotiating power between a handful of supermarkets and numerous farmers mean that most of the gains from trade were captured at the top.

A study by Oxfam (2004) showed that when the African farmers as a whole got only 9% of the total price³³ of an exported apple, the overseas retailers in UK cornered 42% of it and the rest went to other stakeholders³⁴. Another study indicated that in 1950s, farmers in Europe and North America received between 45% and 60% of the money that consumers had spent on food. But after fifty years, the farmers on an average received only 26% of the retail price. The retailer mostly captured the rest. For example, the UK retail major Tesco in 2001 earned a profit of 1 billion, which was more than half of the income of all the UK farmers³⁵.

Loss of bio-diversity: The consolidation of retail business in the hands of few large firms is destroying the bio-diversity also. Halwell (2002) had observed that the global food chain (the 'global vending machine') made production of diversified local food obsolete. It encouraged chemical intensive monoculture and global homogenization of food aiming at 'culinary imperialism'. This model of food distribution challenges the food security of a region by destroying the local self-efficiency and making it highly dependent on imports. Local communities can suffer if farmers replace staple crops for local consumption with exports crops. For example as recently as 1965, Britain was largely self-sufficient in dessert apples (apples for direct consumption, not canning or baking). There are over 2,000 varieties – that ripened and were harvested throughout the year.

³³Share of different stakeholders in the final price of apples exported from South Africa to UK supermarkets: Farm Labor (5%); Farm Income (4%); Supermarket (42%); Importer's commission and duty (7%); UK handling (7%); Shipping (12%); Transport and customs (6%); Farm inputs and packaging (17%)

³⁴ Oxfam 2004

³⁵ Kjell-2003

British orchards are now dominated by two or three “commercially desirable” varieties with a relatively narrow harvest season, crippling the potential to regain self-sufficiency.³⁶

A.2.0 State and major energy utilities: the symbiotic relationship

After preliminary success in establishing their control on food supplies, the large corporations have directed their focus on energy. Conventional energy sources namely coal, petroleum, natural gas and large hydro have dominated the world economy during the last century. Technology was one of the strategic tools through which energy utilities maintained their dominance over the production and distribution of different energy sources. Major oil companies could control world petroleum market over a fairly long period mainly due to their technical edge over others. However, constant support from their ‘home’ state was also essential to maintain their dominance. Though coal was found abundantly throughout the world, most of the countries shifted to oil, after the Second World War. By then, the technique of coal production became known to almost all the countries but the technique of oil exploration and refining remained unknown to most of them. Since 1950s, thanks to Marshall Plan³⁷, the ‘US oil majors’ who established their dominance in the global petroleum market, played the crucial role in this shift from coal to oil, especially in Europe³⁸. Subsequently, India, with a huge coal reserve capable to meet her energy demands for few hundred years, had also systematically switched over to petroleum.³⁹

A.2.1. Breaking down of the alliance between the state and major corporations: the possible consequences on energy market

³⁶ Halwell, 2002

³⁷ Tanzer, 1974

³⁸ Europe is planning to reverse the trend by regaining their dominance on coal through ‘sustainable coal technology’

³⁹ Dey, 1999

In 21st century, which is likely to be dominated by knowledge based industries (unlike the resource based industries of the last century), corporations will not require the backing of the state to the extent it needed during the previous decades⁴⁰. In future, the nation states will be increasingly subjected to the regulations of multilateral and regional bodies like WTO, European Union et al. The transnational corporations will play a dominant role in formulating rules and regulations of those bodies.⁴¹ In such an environment, the nation states are likely to lose their sovereign power and a less powerful state will not be left with enough funds to subsidize large energy projects, the way it used to subsidize earlier. Tax-incentives, cross subsidies, military support to ensure supply of raw materials like crude etc will be discouraged. But subsidies (may be at a much lower amount) for new and renewable energy sources might continue for few more years. The process has been started already. The US House of Representatives has passed legislation in January 2007, seeking a cut of US\$14 bn in oil and gas subsidies in next ten years. The legislation proposed to pass on the said amount to the companies engaged in the development of renewable energy and technology.⁴²

Anticipating dwindling support from the states in future, the energy utilities have started to look for an alternative strategy to retain their control on energy supplies. They have realized that the century old symbiotic relationship that existed between the state and energy utilities is unlikely to be continued for a long period in future. In this new century, the transnational corporations engaged in energy and food business, are putting pressure on the 'nation states' to loosen latter's control on both 'food' and 'energy' supplies.

Debates and discussions have been initiated in different forums like UN CSD15⁴³ on the need for liberalization of energy markets from the control of the state by bringing it under the purview of the General Agreement on Trade in Services (GATS). The developing countries have been 'requested to offer' market access (may be to gain access to

⁴⁰ The present crisis is a temporary phenomenon and should not be considered as an indication of resurgence of state power as witnessed during last century.

⁴¹ Dey 2006b

⁴² Chakraborty and Govind, 2008

⁴³ United Nations Commission on Sustainable Development(UNCSD 15 was held in 2007)

agricultural markets of the developed countries) in energy services under GATS.⁴⁴ On February 28, 2006, a group of countries (USA, EU and Saudi Arabia) have submitted a 'collective request' (as per the new plurilateral negotiation process under GATS) to a group of developing countries to 'offer' specific commitments to liberalize their energy sector.⁴⁵ And it emerged during CSD 15 that business and industry representatives had also emphasized the importance of trade-related aspects of intellectual property rights (TRIPS) for achieving energy efficiency. TRIPS would ensure the protection of patent rights of the proprietors of the clean and green technology required to combat 'global warming' and climate change.⁴⁶

Under GATS, 12 categories of services were identified and within these broad categories, there were numerous sub categories. Energy appeared only once amongst these subcategories as 'service incidental to energy distribution' under 'other business services' category of 'business services'. It was later revealed that the 'services incidental to energy distribution' actually included 'core distribution and transmission'.⁴⁷ This change in strategy got reflected in the current pattern of World Bank led power sector reforms that harped on the importance of partitioning or unbundling the integrated power sector into separate generation, transmission and distribution entities.

Keeping in line with this, the government of India has promulgated a new Electricity Act in June 2003. As per the provisions of this Act, the generation has been totally deregulated, transmission partly regulated and distribution fully regulated. It was claimed that, deregulation of generation would bring in many small private generators to

⁴⁴ The 'request-offer' mechanism as followed in the negotiation process under GATS puts tremendous pressure on the resource poor countries ('Target groups') to offer liberal terms to attract investment from the 'Demandeurs'. This is almost identical to the internet based 'reverse bidding' system followed by the global retail chains while negotiating with their numerous small suppliers.

⁴⁵ Menotti V, June 2006, The Other Oil War: Halliburton's Agenda at the WTO, International forum on globalization.

⁴⁶ Dey, 2008

⁴⁷ See 'Turning off the lights: GATS and the threat of community electricity in Sri Lanka', www.itdg.org

industry⁴⁸. This also explains the recent trend in developing small size ‘next generation’ nuclear reactors suitable for the developing countries. In addition to financial constraints, the need for integration into smaller grids of the emerging developing economies, are the major driving forces behind this shift towards smaller nuclear reactors.⁴⁹

A.3.0 Nuclear energy: the ultimate ‘power’

Transnational energy utilities have always preferred mega exploration projects; large refineries and power plants with modern technology. For producing electricity, micro or mini turbines with decentralized power production facilities have been consciously discarded paving way to mega thermal/hydro/nuclear complex with centralized control on production and distribution. Since the 1950s, the size of reactor units has grown from 60 MW to more than 1300 MW, with corresponding economies of scale in operation.⁵⁰ Total control on the entire value chain right from the procurement of raw materials to final distribution and marketing of the product/services were maintained through establishing forward and backward linkages.

The nation states realized that as in food and water, ‘energy’ was another human necessity through which control of the state on its citizens could be asserted by entering into a collaborative arrangement with large energy utilities.⁵¹ Usually in such arrangements, the state provides with the financial assistance –subsidies, tax rebate etc

⁴⁸ Dey, 2006a

⁴⁹ Frogatt, 2006

⁵⁰ See Frogatt, 2005

⁵¹ The state’s collaboration with large corporate houses for retaining its control on food and energy has led to a global distortion in the food grain production. In the interest of the energy – fertilizer lobby, more importance was put on the cultivation of energy intensive food grains like wheat. It is reported that in US, wheat is most energy-intensive crop both in terms of cultivation process and transportation requirement.. Wheat is consumed globally in countries spread around an area of 8.2million sq km and it is cultivated in an area around 218.8 million hectares. Wheat price exhibits the maximum co-relation co-efficient with the crude oil price when the later is compared with corn and soy-bean. See Shunmugam. V, The Untold Story of Wheat, The Economic Times, November 9, 2007

and the corporate supplies the required technology. In a study done by the World Bank in 1992, it was estimated that around US\$230 billion was provided towards annual global fossil fuel consumption subsidy. In a subsequent study in 1997, the World Bank estimated the annual fossil subsidy in the OECD members and to 20 largest countries outside the OECD at US\$10 billion and US\$ 48 billion respectively. And in 1999, the International Energy Agency (IEA) had estimated the total value of energy subsidies, in eight of the largest developing countries; at around US\$95 billion⁵². For decades, a win-win relationship existed between the states and mega corporations. This symbiotic relationship was more prominent in conventional energy sources like petroleum and nuclear power.

The 'state' plays an important role in every stage of energy generation including disposal of the wastes. Major electrical utilities would have loved to put higher stakes on nuclear energy as sophisticated nuclear technology ensures total control on large scale generation of energy. And without state's support the private corporations will not be able to bear the huge financial risk associated with mega nuclear projects. But the budgetary support of the states towards nuclear energy program, in the developed countries, is dwindling due to strong resistance from CSOs against nuclear energy. As observed earlier, now the epicenter of the nuclear energy has shifted to the developing south.

The hunger for 'absolute political power' that will enable to retain state's control on the basic energy needs of its citizens is pushing the ambitious states like India, China, Brazil and South Korea towards mega nuclear power projects.⁵³ This could be one of the reasons why these states still want to construct new nuclear power plants knowing fully well about the safety risks and high environmental and economic cost⁵⁴ associated with nuclear power.

⁵² As mentioned in Chakraborty and Govind (2008)

⁵³ For detail discussion see, Dey, Dipankar, Nuclear Energy - Most Suitable Energy Source for Retaining State's Hegemony on Citizens' Basic Needs: A Case Study on India (July 26, 2008). Available at SSRN: <http://ssrn.com/abstract=1178902>

⁵⁴ The cost becomes prohibitive if we include the cost of managing the nuclear waste. See FORTUNE, America's Nuclear Revival, August 6, 2007, p 63-64

A.4.0 Resurgence of renewable energy: the supply push factor

Technology: the driving force: Renewable energy is generated in small units. The nature of the existing technology demands such small production facilities. As total control on these forms of energy, generated in hundreds of scattered small units, could not be fully guaranteed, the states and the large energy utilities were not interested in these forms of energy. During the last century, renewable energy sources simply did not fit into their model of energy management.

In 21st century, deprived of the financial support of the state, it is most likely that the energy utilities will try to implement their control through the application of superior technology in critical areas of energy management. Accordingly, they will put less importance on production/ generation, producing only those types of energy which requires application of high-end technology. Instead, transmission and distribution will receive higher priority. According to this strategy, production/ generation of different forms of energy (mainly new and renewable sources), with all the associated problems, would be left to the small producers.

Rapid progress in technology is bringing in revolutionary changes in the generation and distribution of renewable energy. The Global Energy Network Initiative (GENI) had put its focus on linking renewable energy resources around the world using international electricity transmission. The research showed that the premier global strategy would be the interconnection of electric power networks between regions and continents into a global energy grid, with an emphasis on tapping abundant renewable energy resources to form a 'world wide web' of electricity.⁵⁵ It has also been reported that researchers at the Columbia University had developed the framework for a "Smart Electric Grid," a lean and efficient electrical delivery system that could meet the future energy and security demands of the nation. It was claimed that these new technologies would smartly control the complex system associated with the continent's vast electrical power grid, which

⁵⁵ 'Linking Renewable Energy Resources Around the World', <http://www.geni.org/>

interconnect 200 million houses, blocks, communities, industries, towns, and regional generation, transmission, distribution and storage systems.⁵⁶

Parallel to the development of the ‘smart grid’ another initiative to develop ‘micro-grids’ are also attracting attention of the policy makers. It is a major ‘paradigm shift in electricity generation, delivery and control’ as it will ‘move electricity supply away’ from the highly centralized universal service quality model ‘towards a dispersed system with heterogeneous qualities of service’. It is also claimed that ‘micro-grids’ will result in, among others, more electricity generation close to end-users and increased local integration of renewable energy sources.⁵⁷

Breakthrough in renewable energy technology especially in solar energy is also playing a crucial role in making the renewable energy sector more viable in recent past. New technology can support a solar power plant up to 10 MW size and the cost of solar panel is likely to come down drastically due to economies of scale.⁵⁸

During last two decades, smaller firms engaged in production of renewable energy has taken advantage of the space being created due to initial reluctance by major energy utilities in the production of renewable energy⁵⁹. By establishing efficient energy highways through ‘smart grid’ and ‘micro-grid’, which are capable of taking the responsibilities of transmission and distribution of the electricity generated by the numerous small producers, the leading energy utilities have successfully created an enabling environment for managing the renewable energy supplies.

In addition to the ‘demand pull factor, these ‘supply push factors’ are also highly responsible for the recent resurgence of renewable energy.

⁵⁶ http://www.eurekalert.org/pub_releases/2003-09/teia-seg092203.php, visited on 24,5,2007

⁵⁷ Marnay and Firestone, 2007

⁵⁸ See The Guardian, Solar energy revolution brings green power closer, Dec 29, 2007

⁵⁹ It has been proved that “bp: beyond Petroleum’ campaign in 2000 by the oil giant BP Amoco was an eye wash only. For detail, see Sharon Beder, ‘bp: Beyond Petroleum ?’, <http://www.uow.edu.au/arts/sts/sbeder/bp.html>, visited 1.5.2007

Section B

This section analyses various issues pertaining to the energy supplies during the next few decades of the 21st century. This analysis has been made in the context of (i) the paradigm shifts observed in recent years in the generation/ production process;(ii) the increasingly important role the civil society organizations (CSOs) are expected to play as a countervailing force against the oligopolistic power of the global corporations and (iii) the changing role and relative importance of major stake holders in shaping the energy supplies.

B 1.0 Small is gainful- a paradigm shift towards small and microenterprises

Political thinkers like M.K Gandhi had strong faith in the creativity of the poor masses. Gandhi did not believe that the capital and energy intensive highly sophisticated western mass production system would in any way help the poor of the developing countries. Instead, he talked about an alternative village based production system where poor masses would produce their products in millions of such small production units using very simple technology. To endorse and extend Gandhi's logic, Schumacher (1973) talked about Buddhist economics ('Right Livelihood').He also wrote about an 'intermediate technology' - a technology with a human face and popularized the idea that 'small is beautiful'. Interestingly, almost after four decades of the publication of Schumacher's seminal work, a book titled 'The fortune at the bottom of the pyramid – eradicating poverty through profits' by management guru C.K Prahalad (2005)⁶⁰ has turned the attention of policy makers, world wide, to the small and micro enterprises (sme)⁶¹.

⁶⁰ Published by Pearson Education

⁶¹ Here 'sme' stands for small and micro enterprise and SME represents Small and Medium Enterprise. Please note the distinction between these two.

The focus of this new thinking is different. To Gandhi and Schumacher, 'production by the masses' using labor intensive, simple technology was the philosophy of life. But to the new thinkers like Prof Prahalad, it is a new business strategy to earn profit using the market mechanism as defined by the western economists.

Global supply chains have created new opportunities for labor-intensive exports from low-cost locations which resulted in a dramatic growth in the number of producers, increasing competition among the world's factories and farms for a place at the bottom of the chain. At the top end, however, few leading retailers and brands have consolidated their market share thereby creating an oligopolistic market structure. Telecommunication technology, economic liberalization and easy mobility of capital across boarder have strengthened this process of consolidation of power in a global scale⁶². As the global marketplace continued to develop, small and medium enterprises (SMEs) provided an effective tool for economic growth through participation in global supply chains, claimed a note prepared on global facilitation partnership for transportation and trade by the World Bank Group.⁶³

SMEs drive economic development by creating a valuable source of employment. In most parts of the world, SMEs are defined as organizations with up to 250 or 500 employees. In most case, companies start as proprietorships, become small business units and then grow to medium size units or SME's. It is estimated that 99.7% of all enterprises in the world are SMEs and rest 0.30%, are Large. They account for directly and indirectly around 80% of the employment and nearly 80% of all value addition within the economy.⁶⁴ European Commission has defined SMEs as independent enterprises that have fewer than 250 employees, and an annual turnover not exceeding Euro40/£25 million or a balance-sheet total not exceeding Euro27/£17 million.⁶⁵ 23 million SMEs of EU as a whole represent about 99 percent of all EU enterprises and 57

⁶² Oxfam 2004

⁶³ <http://www.smecentreofindia.com/about.htm> visited 8.10.2007

⁶⁴ India -Watch (i-Watch) http://www.wakeupcall.org/sme/definition_sme.php visited on 8.10.2007

⁶⁵ ibid

percent of the EU's total economic added value.⁶⁶ In OECD countries, SMEs account for 60-70 percent of employment. In developing countries, this number is often much higher. In Ecuador, for example, 99 percent of all private companies have no more than 50 employees.⁶⁷

Since early fifties, SMEs have been playing vital role as a growth engine of the Indian economy.⁶⁸ At the beginning of the Xth Five Year Plan (2002-03), the segment provided gainful employment, through 10.5 million units, to 24.9 million people in the rural and urban areas of the country. Over the next four years (end 2005-06), the manufacturing units have grown to 12.3 million units providing employment to 29.5 million persons.

Shift from SME to sme

In the emerging economies of India and People's Republic of Korea (South Korea), the recent trend indicates that the contribution of small and micro enterprises (sme) in the economy are growing at a faster rate compared to the SMEs. To recognize the growing importance of micro enterprises in India, the government has recently enacting the Micro, Small and Medium Enterprises Development Act, 2006 which seeks to facilitate promotion and development of these enterprises.⁶⁹ Subsequently, the President under a notification dated 9th May 2007 has created a new ministry namely 'Ministry of Micro, Small and Medium Enterprises'. It was formed by merging the 'Ministry of Agro and Rural Industries' and 'Ministry of Small Scale Industries'.⁷⁰

In South Korea, the growth of micro-enterprises was more evident. Since the 1990s, the number of micro-enterprises (5-9 employees) in the manufacturing sector has been rapidly increasing, while small and medium companies (50-299 employees) have been displaying a continual decline. In 1990, micro - enterprises in the manufacturing sector numbered 21,652 (31.4% of total business). By 2004, this number had jumped to 56,976

⁶⁶ <http://www.ens-newswire.com/ens/oct2007-10-03-04.asp> visited on 6.10.2007

⁶⁷ GFP 2005

⁶⁸ <http://www.smecentreofindia.com/about.htm> visited 8.10.2007

⁶⁹ See <http://ssi.nic.in/>

⁷⁰ See <http://msme.gov.in>

(50.7% of total business). In comparison, the number of small and medium business in the manufacturing sector has significantly decreased from 8,820 in 1990 (12.8% of total business) to 8,034 (7.2%) in 2004. The number of large companies in the sector has also dropped from 1,193 in 1990 (1.7%) to 695 in 2004 (0.6%). The percentage of manufacturing employees and value-added production accounted for by micro-enterprises has increased from 4.9% and 2.3% respectively in 1990, to 12.9% and 5.0% in 2004.⁷¹

The reason Korea was experiencing such a replacement of small and medium manufacturing business by micro-economics was the ‘quick to build and quick to fall’ type start-ups that swept the country following the restructuring measures taken by large companies. The employment growth rate, according to company size, between 1990-1999 shows that the number of employees in micro-enterprises has grown significantly, implying a migration of labor from large companies and SMEs which provided higher wages to micro-enterprises which offered lower wages. Despite job creation in micro-enterprises, the average income level of these companies decreased from 56.6% of large company levels in 2000 to 48.4% in 2004.⁷² This also indicates the declining bargaining power of smes vis-à-vis large firms

Unlike the Korean manufacturing industry, Japan displayed no sign of growth in micro – enterprises. In fact, the number of micro – enterprises (4- 9 employees) in Japan has been continually decreasing between 1990 and 2003.⁷³

In the Gandhi Schumacher model, ‘smes’ were portrayed as a challenge (an alternative) to the large scale mass production system of the western capitalism. Now these smes are considered as part of the global production/supply system.

The identified ‘opportunity at the bottom of the pyramid’ is attracting huge fund (both national and international) to the undeveloped regions for the development of

⁷¹ Cho, Deok-hui, 2006

⁷² ibid

⁷³ Cho, Deok-hui, 2006

infrastructure – both physical and human. Capital is also mobilized at the grass root level by organizing self help groups (SHG) and encouraging the practice of thrift among them⁷⁴. A network of such SHGs have been formed in many developing countries like Bangladesh and India to mobilize and manage ‘micro-credits’ and ‘micro-enterprises’.⁷⁵ The concept of micro-credit that was introduced in USA and Bangladesh⁷⁶ by the Ford Foundation has been popularized in many developing countries⁷⁷ to finance millions of smes. And to meet the growing energy needs of these micro enterprises, a decentralized energy production and retailing model is emerging.

In this global business environment, ‘smes’ are increasingly loosing their independence and are being turned into an insignificant component at the bottom of the global supply chains of trans national manufacturers and retailers. It has been reported that some leading durable and non-durable product manufacturers have started to ‘append SHGs as channel partners’ to promote their brands in rural markets of Tamil Nadu (India)⁷⁸. A new terminology ‘glocal’ has been popularized to endorse this new strategic thinking.

The small producers survive at the mercy of the big retailers as all traditional local outlets get wiped away by the global retailers. It has been observed that over the past twenty years, fresh produce and food service industries have headed towards global consolidation. Like food, energy is the other human necessity, which is indirectly (via numerous small producers) being put under the total control of global energy retailers of tomorrow. The ground is being prepared for this at the advanced laboratories of the developed west through massive investments in R &D activities for developing new and innovative technologies. And simultaneously regulations like TRIPS, GATS et al are

⁷⁴ Generally a SHG consists of 10 to 20 persons. It is a voluntary structure. The concept was initially promoted with a mission to make people in the rural areas economically independent. Women are mainly encouraged to form SHGs with an aim to make them socially, economically and politically a powerful force.

⁷⁵ In 2005-06, there were around 0.16 million SHGs (with over 2.75 million members) were operating in the State of Tamil Nadu, India. These SHGs had generated around \$100 million revenues. For details see Marketing Mastermind, April 2008, Icfai University press, India.

⁷⁶ Grameen Bank- was founded in 1976 with the seed money provided by the Ford Foundation

⁷⁷ Roelofs J, 2003, Foundations and Public Policy- The Mask of Pluralism, State University of New York Press

⁷⁸ Ramanathan and Rajamohan 2008,

enacted at the multilateral bodies like WTO to safe guard the interest of large trans national firms- the representatives of monopoly capital.

B 2.0 Rising importance of the Civil Society Organizations (CSOs)

In contemporary political literature, Civil Society has been defined in various ways. It is a polysemic (one term, many meanings) concept, which could be molded into almost any shape. Antonio Gramsci- an Italian socialist, in his theory of ‘hegemony’, argued that any political system, such as democratic capitalism, is maintained in two ways. The political realm or the ‘state’ exercises its control through force and laws. The private realm or ‘civil society’ complements the state by maintaining the system by producing consent without resorting to force.⁷⁹ However, a more apolitical definition of Civil Society is used here. It is defined as an intermediary entity, standing between the private sphere and the state. It excludes individual and family life, in-ward looking group activities like recreation; spirituality et al, profit making business enterprises, political activities aiming to take control of the ‘state’. A civil society involves its citizens to act ‘collectively in a public sphere to express their interest, passions and ideas, exchange information, achieve mutual goals, make demands on the state and hold state officials accountable.’⁸⁰

Transnational corporations (TNCs) are the main driving force behind globalization. Due to global consolidation of capital, these TNCs are becoming extremely powerful. Yearly revenue of many such industry leaders like Wal-Mart, Exxon-Mobil et al exceed the Gross Domestic Product (GDP) of many developing and emerging countries like Indonesia, Iran etc. In the past, many of these TNCs were responsible for creating currency crisis leading to instability in the economies of the developing countries. They were/are also responsible for over exploitation of natural resources; cross boarder transfer of pollution and hazardous wastes. For obvious reasons, which are both political and

⁷⁹ Roelofs, 2003

⁸⁰ See, Meidinger E (2001), ISEAL and Global Civil Society, draft 1.2 (18th October, 2001), <http://law.buffalo.edu/homepage/eemeid/scholarship/ISEAL.pdf>

economic, smaller economies find it difficult to control these powerful TNCs. And multilateral bodies like The World Bank, IMF and WTO have also failed to regulate these large corporations. Instead, multilateral regulatory bodies often got influenced by global ‘Foundations’ created by the large corporations. In USA, such ‘Foundations’ had owned assets of about \$450 billion in the year 2000.⁸¹

In the absence of any effective intervention by the states and multilateral regulatory bodies, the global network of Civil Society Organizations (CSOs) of concerned citizens are taking the responsibility to hold the corporate leaders accountable for their misdeeds. During the last decade, the number of NGOs exhibiting concerns with global issues had quadrupled and in ten years, between 1993 and 2003, the mention of NGOs in the *Wall Street Journal* and the *Financial Times*, had increased by over twenty folds which indicates the growing influence of CSOs in shaping business policies.⁸² It may also be mentioned that a global alliance –The International Social and Environmental Accreditation and Labeling Alliance (ISEAL) was formed in 1999 by six loosely related NGOs. It was formed with the purpose of establishing standards and publicly recognizable labels for products from socially and environmentally responsible operations. Many such alliances have been formed across the globe to address various socio economic issues those shape the business and technology policies.

Historically, the political parties have flourished within the framework of the ‘nation states’. As the sovereign powers of the states are on the decline, political parties are also losing their relevance. Moreover, national level political parties when not in power, face many constraints in voicing their protest against aggressive global capital. This may also be true for many CSOs operating in a global scale. The political vacuum created during this ‘transition phase’ is increasingly filled by the CSOs.

⁸¹ For detailed discussion, see Roelofs, 2003

⁸² For detailed analysis on this, see Yaziji, 2004

The active participation of CSOs in influencing major decision-making process in most of the countries in Europe is a case in point⁸³. Formation of a multilateral body like European Union has already eroded the sovereign power of the member states. The national political parties have also lost their past glory and power. Instead hundreds of CSOs have filled that political space in Europe. The same trend is also exhibited in USA. As of 1998, there were 1.6 million non-profit organizations in the United States of America. Of these, 1.23 million are considered ‘independent sector organizations’, consisting of religious organizations (0.35 million); charitable organizations (0.73 million) and ‘social welfare organizations’ (0.14 million). The ‘other types’ included social clubs, cooperatives and fraternal organizations. In 1997, the independent sector had about 11 million paid employees.⁸⁴

It is expected that the voluntary and ‘not for profit’ characters of the CSOs will play an increasingly larger role in steering the course of society especially in the allocation and distribution of basic human necessities like food and energy. They are likely to determine the outlook and future course of the energy utilities of the 21st century. They achieve a high level of social influence by exercising cultural leadership.⁸⁵ In addition to cultural leadership, these organizations (also referred as non governmental organizations –NGOs) exhibit four other distinct strengths namely legitimacy, awareness of social forces, distinct networks, and specialized technical expertise.⁸⁶

B.3.0 The role and relative importance of major stake holders in shaping the energy supplies during the next few decades of the 21st century

As the relative importance of the major stakeholders namely the ‘consumers’, the ‘nation states’ and the ‘energy utilities’, are getting redefined, the energy sector is passing through a massive transition phase. In this analysis, the changing importance of the

⁸³ But CSO activities are limited in France (a member of EU). Moreover, French nationals are very conscious about their heritage and national identity. These factors might have helped the nuclear lobby to retain their strong presence in France compared to other European states.

⁸⁴ Roelofs, 2003

⁸⁵ ibid

⁸⁶ Yaziji, 2004

stakeholders, during the past and next five decades of the previous and current centuries, in deciding the relative weights of various forms of energy (traditional, clean coal, oil and gas, large hydro, thermal, nuclear and renewable⁸⁷) in the total energy mix have been discussed.

B.3.1 The emerging energy mix and the shifting status of the major stake-holders

Parameters: The changing importance of the stakeholders has been measured using different parameters.

- (a) For consumers (C), ‘access to energy supplies’ is one such parameter where it is assumed that decentralized generation using local resources and simple technology will make energy more easily accessible to the consumers at a reasonable price. ‘Ability to influence energy supplies’ is the second parameter where it is assumed that consumers can exercise more influence on an energy form which could be generated with a low grade, simple technology. For example, the consumers will be able to express their opinion more effectively in deciding the location of a community bio-gas plant than in deciding on the location of a mega nuclear plant. And ‘sufferings due to adverse impact on environment while generating a particular form of energy’, is the third parameter considered here.
- (b) For the ‘nation states’ (S), parameters like ‘capability to regulate supplies’; and ‘amount of subsidies (direct or indirect) given to the energy utilities’, have been considered as the yard sticks for measuring the importance of the ‘state’.

⁸⁷ Renewable energy is of two distinct types. (a) Bio-fuels: (b) electricity generated from naturally available sources like sun rays, wind, ocean current, river water etc. To produce bio-fuel the basic inputs (say corns, energy plants like jatropha etc) are to be cultivated first and then converted into a suitable energy form,

- (c) Finally for judging the position of the ‘energy utilities’ (U), two parameters namely the ‘complexity of the technology’ they use to generate and distribute energy and ‘the amount of capital investments’ required in such projects, have been considered here.

Notations: The period between 1950 and 1999 which represents the last half of the 20th century is being denoted by a suffix 20 (say I_{20} , C_{20} etc) and the period between 2000 and 2050 – the first half of the 21st century is being denoted by a suffix 21 (say I_{21} , C_{21} etc). ‘I’, denotes the ‘importance’ of a particular form of energy in the total energy mix; and H, M, L denote their level of importance as high, medium and low respectively. For detailed analysis, please refer to tables 1a, 1b and 1c in Annexure I

Assumptions: Based on the discussions done in previous sections, the following assumptions have been made to develop an analytical frame work to understand the issue in question.

- (i) Consumers will ‘gain’ if improved technology leads to ‘near zero emission’ from thermal plants. Both the consumers and utilities will push for clean thermal power.
- (ii) Increased share of renewable in the energy mix will improve the condition of the consumers and the thrust for the generation of more renewable energy will come from the consumers as well as the energy utilities.
- (iii) The rising demand of electricity generated from the renewable energy sources will encourage the electrical utilities to put more importance in its transmission and distribution through the development of a ‘world wide web of electricity’ – the global grid and ‘smart grid.’

- (iv) While the 'state' will slowly relegate to a watchdog, consumers through different civil society organizations (CSOs) will play a more dominant role in deciding the future energy mix.
- (v) The share of nuclear energy will remain low (L) mainly due to strong resistance against it by the CSOs in the developed countries. The nuclear lobby will continue with their search for the strong autocratic states in the emerging economies of Asia and Africa who will agree to share a part of the financial risks/burdens associated with such mega projects.
- (vi) Assuming that the 'clean coal' will replace the 'dirty coal'; the consumers are expected to gain on environmental impacts but that gain will be neutralized due to loss on 'easy accesses'. With improved clean coal technology, greater control will be exercised on supplies by the energy utilities. For clean coal, the initiative will primarily come from the large utilities.
- (vii) During the next few decades, it is expected that clean coal, thermal (with near zero-emission) and renewable energy sources will enjoy higher importance in the total energy mix.

Findings: Table 1a (ref to Annexure1) tries to capture the '*shifting importance/position of the major stake holders namely consumers (c), states (s) and energy utilities (u) vis-a vis different energy forms between 1950-1999 and 2000-2050.*' It reveals that

- (i) 'Consumers' (C) will 'gain' more importance in their status vis-a vis 'thermal' (with near zero emission) and renewable energy sectors. With reference to other forms of energy consumers' position will remain unchanged.
- (ii) During the same period, the 'nation states'(S) -which also includes state run enterprises, like state electricity boards, national oil companies etc, will loose their position in oil and gas; large hydro, thermal with near zero emission and

nuclear energy sectors. Vis-a Vis other forms of energy, the state's position will remain unchanged.

- (iii) In this period, the 'energy utilities' (U) engaged in clean coal; thermal with near zero emission and renewable energy sectors, will be gaining in importance. Oil and gas utilities might face marginal deterioration in their position in the short run but in the medium and long term they will consolidate their position with the help of advance refining technology and by substituting crude oil with new and renewable energy sources like bio-fuel. Energy utilities dealing in other forms of energy will keep their importance unchanged.

The Tables 1b & 1c (Ref Annexure I) indicate that in the 1st half of 21st century, renewable sources will gain importance. And the gain in renewable is expected to be substantial (+2). But in this period, traditional energy sources (fire wood etc), oil and gas, large hydropower and nuclear energy are expected to loose their importance. 'Clean coal' and 'zero emission thermal power' are likely to gain more importance, though marginally, in the future energy mix. As expected, the Table 1b also indicates that in future, the importance of primary energy sources in the energy mix will decline and the secondary form of energy (electrical) will gain its importance.

B.3.2 'Energy retailing'-the emerging model

Renewable: Table 1c (Ref Annexure I) clearly indicates that in the next few decades renewable energy sources will gain maximum importance in the energy mix and as discussed in the previous section, the gain in renewable is expected to be substantial due to both demand pull and supply push factors.

Renewable energy is of two distinct types. (a) Bio-fuels and (b) electricity generated directly using naturally available sources like sun rays, wind, ocean current, river water etc. However, to produce bio-fuel the basic inputs (say corns, energy plants like jatropha etc) are to be cultivated first and then converted into a suitable energy form,

The existing international oil companies are likely to diversify into bio-fuel mainly for four reasons. First it is more environment friendly; second it is a renewable source; third dependence on the states (most of which are in the developing south) which usually enjoy the ownership right on their natural resources like crude and natural gas, will be minimized, fourth it will not require major restructuring in the upstream activities.

Bio-fuels can be sold through the same retail pump outlets which sell petrol and diesel. Millions of small farmers will be provided with seeds and other critical inputs to produce the raw material. Local refiners with technical assistance from major refiners will produce the 1st generation bio-fuel which will be entirely bought by the major refineries for further processing and distribution.

In other forms of renewable energy (say tidal current, small hydro, wind, solar et al), which primarily generate electricity; it will be the SMEs which will be the forerunner of this revolutionary change by generating electricity in millions of such small and medium units.

The world is familiar with the retailing of the primary energy sources like coal and petroleum products. Distribution of electricity to the residential/commercial buildings by any electrical utility is also a familiar example of electricity retailing. The basic difference in the emerging model of energy retailing (both primary and secondary) is that in the previous model, the energy that was distributed was mainly sourced from one or two major suppliers. In many cases, a single integrated firm managed the entire chain say from exploration of crude oil to marketing of the refined products. Similarly, in many electrical utilities, generation, transmission and distribution were integrated. But the

emerging model consists of numerous producers/generators who will be supplying energy to one or few major distributors/retailers that control the industry by virtue of their technical and marketing superiority.

An analysis of this emerging energy format reveals a number of similarities with the organized retail format as followed by Wal-Mart and other major retailers across the globe. It is said that the retail and brand companies have positioned themselves as powerful gatekeepers between the world's consumers and producers. Their global supply chains stretched from the supermarket shelves in the world's major shopping centers to the fruit and vegetable farms of Latin American and Africa and the garment factories of South Asia and China⁸⁸. Integration of retail chains with global supply chains resulted into a new business model for major retailers like Wal-Mart, which in 2005; procured products from over sixty-five thousand suppliers spread across the globe and sold products worth \$312 billion dollars through its 6,600 odd retail outlets located in different countries.⁸⁹ In this model, there exist numerous small suppliers who compete amongst themselves to get a space in the retail outlets of the major retailers. By developing quality standards, the major retailer ensures quality of the product it procures. A global supply chain, developed with the help of highly sophisticated tracking technology, act as the backbone of the complex transportation and procurement system. And a chain of retail outlets looks after the distribution issue.

The emerging energy industry will also follow the same structure. As in the food retailing, the numbers of electricity/bio-fuel generating units in the renewable energy sector are likely to be many and small in size. Through the application of 'smart grid' or 'global grid' large utilities will ensure total control on electricity transmission.⁹⁰ This resembles that of global supply chain of the organized retailers. In case of bio-fuel, steady supply of high quality fuel will be ensured through the application/collaboration of

⁸⁸ Oxfam 2004, *Trading Away our Rights: Women working in global supply chains*, Oxfam International, U.K.

⁸⁹ Dey, 2007

⁹⁰ Ref discussion in the previous section: A.4.0 Resurgence of renewable energy: the supply push factor

technology. And dedicated networks of electrical lines of major electrical utilities for the final distribution of ‘quality electricity’ resemble the chain of retail outlets of the organized retailers.

Conclusion

The energy industry in general and the new and renewable sector in particular, is at a take-off stage now. A paradigm shift in the production and distribution is eminent. Introduction of very advanced technology will ensure maximum efficiency in the system. The new technology will also enable the energy utilities to retain control on millions of small energy generators across the globe.

This emerging model is almost identical to the model followed by the business leaders of the personal computer and agro seed industries. A few firms like Intel, Microsoft, Apple, Monsanto et al have been successful in retaining control on their respective industries through their monopolistic control on critical components like ‘chips’, ‘operating system’ and hybrid/genetically modified ‘seeds’. In similar lines, as a first step, the energy majors are preparing to establish their control on the critical technology required for transmission and distribution. Subsequently, their control will be extended to numerous small generators through the invention/innovation of new production technology.

The other alternative could be a radical departure from this conventional model. Instead, the new and renewable forms of energy might take the ‘intermediate technology path’.⁹¹ It is a self-help technology in which every body has an access and is not reserved for those who are affluent and powerful. This democratic and people’s technology, implemented through millions of local micro-grids, might dominate the energy sector in the 21st century. As an alternative to a ‘global/smart grid’, ‘micro grid’ at the town or

⁹¹ Schumacher 1973

village level, as implemented in parts of Viet-Nam, Nepal, Sri Lanka, China, Brazil and India would act as the interface between the local producers and consumers of the new and renewable forms of energy.

Joseph Schumpeter, had identified the great threat to capitalism as ‘... capitalism creates a critical frame of mind which, after having destroyed the moral authority of so many other institutions, in the end turns against its own; the bourgeois finds to his amazement that the rationalist attitude does not stop at the credentials of kings and popes but goes on to attack private property and the whole scheme of bourgeois values.’⁹² It may be expected that, a global network of ‘rationalist’ civil society organizations (CSOs) which are not nudged into line with grants and assistance from ‘Foundations’ managed by mega corporations with high stakes in energy management, will bring in huge changes, through sustained campaign, in the consumption and production/distribution of energy.

In 21st century, the CSOs are likely to act as a countervailing force against the monopolistic power of the transnational corporations and will largely influence the food and energy supplies to the citizens in a sustainable way. The food and energy industry is at the cross road now.

⁹² Roelofs 2003

Annexure I

Table1a. Shifting importance/position of the major stake holders namely consumers (c), states (s) and energy utilities (u) vis-a vis different energy forms between 1950-1999 and 2000-2050.

Stake holders & parameters	Tradition al energy	Coal and clean coal	Oil and Gas	Large Hydro	Thermal/ with near zero emission	Nuclear	Renewable energy
Consumer (C)	C ₂₀ C ₂₁	C ₂₀ C ₂₁	C ₂₀ C ₂₁	C ₂₀ C ₂₁	C ₂₀ C ₂₁	C ₂₀ C ₂₁	C ₂₀ C ₂₁
Access to supplies	H H	M L	M L	L L	M M	L L	L H
Ability to influence energy supply	M M	M M	L L	L L	L L	L L	M M-
# Impact on environment	L L	L M	L M	L L	L M	L L	H H
Over all	M M	M M	L L	L L	L M	L L	M H-
State (S)	S ₂₀ S ₂₁	S ₂₀ S ₂₁	S ₂₀ S ₂₁	S ₂₀ S ₂₁	S ₂₀ S ₂₁	S ₂₀ S ₂₁	S ₂₀ S ₂₁
Capability to regulate	L L	L L	H M	H H-	H- M-	H H-	M- L
Amount of subsidy extended	L L	L L	H M	H M	M L	H M	L L
Over all	L L	L L	H M	H M	M L	H M	L L
Energy Utilities (U)	U ₂₀ U ₂₁	U ₂₀ U ₂₁	U ₂₀ U ₂₁	U ₂₀ U ₂₁	U ₂₀ U ₂₁	U ₂₀ U ₂₁	U ₂₀ U ₂₁
Complexity of technology	L L	M H	H H	M M	M H	H H	L M
Amount of Capital investment	L L	M H	H H	M M	M H	H H	L M
Over all	L L	M H	H H	M M	M H	H H	L M

High 'adverse' impact will attract low grade (L) and vise -versa

Table1b: Changing importance of different forms of energy in the energy mix and the shifting position of the major stake holders (namely consumers, states and energy utilities) vis-a vis different energy forms between 1950-1999 and 2000-2050.

Energy Forms	Importance in the energy-mix		Position of the major stake-holders (ref to Table 1a)					
	I ₂₀	I ₂₁	C ₂₀	C ₂₁	S ₂₀	S ₂₁	U ₂₀	U ₂₁
I. Primary	M+	L	-	-	-	-	-	-
a. Traditional	M	L	M	M	L	L	L	L
b. Coal-clean Coal	M	M+	M	M	L	L	M	H
c. Oil & Gas	H	M	L	L	H	M	H	H-
II. Secondary	L+	H	-	-	-	-	-	-
a. Large Hydro	L+	L	L	L	H	M	M	M
b. Thermal – near zero-emission	M	M+	L	M	M	L	M	H
c. Nuclear	L+	L	L	L	H	M	H	H
d. Renewable	L	H	M	H-	L	L	L	M

The above table clearly indicates the changing position/importance of the major stakeholders with respect to different forms of energy. And the table 1c below summarizes the projected changes by assigning values to H, M and L as 3, 2 and 1 respectively.

Table 1c. Projected changes between 1950-1999 and 2000-2050

Energy Forms	Importance in the energy-mix	Consumers(C)	The States (S)	Energy Utilities (U)
Primary	-1.5	0	-1	+1
a. Traditional	-1	0	0	0
b. Coal-clean Coal	+0.5	0	0	+1
c. Oil & Gas	-1	0	-1	0
Secondary	+1.5	+1.5	-3	+2
d. Large Hydro	-0.5	0	-1	0
e. Thermal- near zero-emission	+0.5	+1	-1	+1
f. Nuclear	-0.5	0	-1	0
g. Renewable	+2	0.5	0	+1
Net Impact	0	+1.5	-4	+3

*The values of the columns have been ‘added’ to make the analysis simpler

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