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Energy-related issues from the trade and development perspective

Note by the UNCTAD secretariat*

Executive summary

In the course of 2008, oil prices increased rapidly, reaching the unprecedented level of \$147 per barrel in July 2008. Subsequently the prices crashed to \$33 per barrel in December 2008. These sharp fluctuations in oil prices have been generated mainly by demand and supply imbalances, with the subsequent slump linked closely to the ongoing global financial and economic crisis. Such high-energy price volatility has led to much introspection over the impact on economic growth and sustainable development in developing countries. This report examines the issues facing developing countries and the international community in ensuring, through national and international measures, that energy is (a) accessible to households and industries; (b) affordable for all, especially the poor; (c) sustainably produced and consumed; and (d) available for promoting development locally and globally. Addressing these challenges should open up new opportunities, including trading and investment prospects, for developing countries in enhancing the contribution of energy to development now and in the future. UNCTAD could help to support global, regional and national efforts in this area, including efforts to strengthen cooperation on energy, trade and development issues.

* This document was submitted on the above-mentioned date as a result of processing delays.

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Introduction

1. The Johannesburg Plan of Implementation, adopted at the 2002 World Summit on Sustainable Development, called upon the international community to work together to improve access to reliable and affordable energy to facilitate the achievement of national and internationally agreed development objectives. Yet around 1.6 billion people, mainly in South Asia and sub-Saharan Africa, lack access to electricity, and 2.4 billion people lack access to modern fuels for cooking and heating.¹ In view of the imperative to mitigate climate change, a drastic “decarbonization” of energy generation and use by households and industries is also required. These challenges have been intensified by the high volatility in energy market trends, further complicated by the impact of the ongoing global economic crisis. Against this background and pursuant to the Accra Accord of UNCTAD XII (paragraph 98), this report discusses the key features and implications of the emerging global energy economy on the trade and development prospects of developing countries.²

I. Market trends, investment and competition

A. Energy demand, supply and prices

2. In the five years leading up to 2008, in particular in 2003 and 2004, global energy demand increased at an average annual growth of 2.2 per cent per year, as compared with 1.2 per cent during the preceding five-year period. According to the International Energy Agency (IEA) and the Organization of the Petroleum Exporting Countries (OPEC), oil demand is projected to reach around 120 million barrels per day (mbpd) in 2030, with the transportation sector being the main user. Developed countries account for the major share of global demand. However, demand increased faster in developing countries, particularly in Asia (especially China). A small group of oil-producing countries in the Middle East also contributed to this increase, partly because of the expansion of their refining, petrochemical and metals industries.

3. Key factors influencing future energy demand include income growth, prices, energy intensity (energy use in relation to national income), environmental considerations, technological developments and government policies. Although energy demand may initially be price-inelastic, price rises eventually induce demand-reducing technological change, particularly if the rises are perceived as permanent.

4. Fossil fuels (oil, gas and coal) supply the bulk of global energy requirements (see table 1). Oil is the most important fuel and this will remain so through 2030, although the relative importance of gas, coal and non-fossil fuels should increase. Both OPEC and IEA predict a predominant role for fossil fuels for the next two decades (see table 2). Renewable energy use is growing at about 9 per cent annually and is forecast to account for 29 per cent of power generation and 7 per cent of transport fuel by 2030.³ Biofuels could play an important role in the future energy mix. The extent of biofuels use will be influenced by the impact on land availability and food prices, on oil prices staying above about \$50 per barrel (pb) and on countries’ regulatory requirements regarding inclusion of biofuels in their fuel mix.

¹ UN–Energy (2005). The Energy Challenges for Achieving the Millennium Development Goals.

² The report draws upon UNCTAD (forthcoming). Trade and Development Perspectives of the Emerging Global Energy Economy.

³ IEA (2008). Deploying renewables – principles for effective policies.

Table 1. World primary energy supply – share of various energy sources
(%, 2006)

Crude oil	34.4
Coal	26.0
Gas	20.5
Combustible renewables and waste	10.1
Nuclear	6.2
Hydro	2.2
Geothermal, solar, etc.	0.6
Total (mtoe ^a)	11741

^a Million tons of oil equivalence.

Source: IEA (2008). Key World Energy Statistics.

Table 2. OPEC and IEA projections of world energy demand in 2030
(per cent share)

Years	OPEC		IEA	
	2005	2030	2005	2030
Oil	39	36	35	32
Gas	23	27	21	22
Coal	28	27	25	28
Hydro/nuclear/renewables	19	9	19	18

Sources: IEA and OPEC background papers for the eleventh International Energy Forum, Rome, 20–22 April 2008.

5. Table 3 shows the world oil production in 2007 and the distribution between non-OPEC and OPEC producers. Non-OPEC countries produced about 50 mbpd, while OPEC countries produced about 35.5 mbpd. When demand increased, production levels and investment remained flat – non-OPEC producers operate at close to full capacity, while OPEC spare production capacity had fallen from 5.61 mbpd in 2001 (about 7 per cent of global production) to 2.05 mbpd in 2003, and has not increased since. In June 2008, OPEC's effective spare capacity (excluding capacity in some member countries where production could probably not be increased rapidly) was down to less than 2 mbpd, virtually all in Saudi Arabia,⁴ amounting to about 2 per cent of global annual demand. Such insufficient spare capacity, together with declines in oil inventories, led to disproportionate weight being attached to any possibility of supply disruption and precautionary stockpiling, further raising prices. Other key price-raising factors included insufficient refinery capacity, its mismatch with crude oil supply and dollar depreciation.

6. Oil prices, which were around \$12 pb in the late 1990s, rose steeply from 2002, reaching \$25 pb in 2003, hitting the \$100 pb mark in January 2008 and a peak of \$147.27 on 11 July. Notable price increases had also occurred for agricultural commodities. The prices then crashed, falling below a five-year low of \$33 pb on 19 December 2008 and just over \$40 in January 2009. Natural gas prices in most consuming countries broadly followed similar trends, because of oil-linked price clauses in gas contracts (although some de-linking has now taken place). The price hikes brought about significant revenue for energy companies and energy producers, as well as increased incentives for investment in exploration, development of harder-to-reach oilfields, construction of new pipelines, refineries and storage capacity, energy efficiency and renewable energy (RE) research and use. The sharp energy price decline, together with the global financial and economic crisis,

⁴ IEA, *Oil Market Report*, various issues.

has now chilled such incentives. This will in turn lead to higher long-term prices and reduced energy availability and sustainability, unless appropriate measures are taken to improve the supply of energy.

Table 3. World oil production, 2007 (mbpd)

North America	14.23
Europe	4.95
Former Soviet Union	12.77
China	3.73
Other Asia	2.68
Latin America	4.32
Africa	2.51
Other non-OPEC crude	2.39
Processing grains and biofuels	2.50
Total non-OPEC	50.08
Saudi Arabia	8.48
Islamic Republic of Iran	3.98
Iraq	2.09
United Arab Emirates	2.52
Kuwait	2.16
Nigeria	2.13
Venezuela, Bolivarian Republic of	2.39
Other OPEC crude and natural gas liquids	11.74
Total OPEC	35.48

Source: IEA (2008). Oil Market Report, 10 October.

7. The sharp oil price rises were caused primarily by demand–supply imbalances and low short- to medium-term price elasticity of oil demand and supply. The price decline may mainly be ascribed to (a) the sharp downturn in oil demand, especially in Organization for Economic Cooperation and Development (OECD) countries (largely due to global economic crisis); (b) growing oil inventories in the United States; (c) production increases in Saudi Arabia; and (d) revised market expectations arising from the price fall. Short-term energy price trends are uncertain, but it is possible that a long-term floor for oil prices will be set by production costs for alternatives to conventional oil. These range from \$50 pb (cost of producing biofuels and heavy crude) to \$70 pb (possible cost of extraction from Canadian tar sands, including environmental damage mitigation).

8. The impact of speculation, especially excessive speculation, on oil prices has been a controversial matter. Some studies have suggested that there is no clear evidence of the impact of speculation on oil prices.⁵ A staff report of the United States' Commodity Futures Trading Commission (CFTC), after analysing 2007 and 2008 data on commodity swap dealers and index traders, did not find strong evidence concerning the impact of speculation. Nevertheless, one of the commissioners dissented, considering such conclusions to be based upon limited and unreliable data and calling for enhanced data-gathering and regulatory powers regarding futures markets.⁶ UNCTAD and other studies have noted that speculation does not drive commodity prices, but is rather a factor that may, in the short-term, accelerate and amplify price movements driven by fundamental supply and demand factors.⁷ In view of the controversy, the impact of speculation merits further

⁵ IEA (2008). *Medium Term Oil Market Report*. July.

⁶ CFTC staff report of September 2008.

⁷ UNCTAD (2008). *Trade and Development Report 2008*. box 2.1. UNCTAD (forthcoming, 2009).

examination to help regulators assess whether strengthened supervision of futures markets could ensure that prices better reflect demand/supply fundamentals.

9. It is uncertain whether significantly more oil and gas will be available by 2030 to meet the expected demand, in view of the following factors:

- (a) Likely eventual resumption of demand growth in consumption;
- (b) Shrinking conventional oil and gas reserves and increasing costs of accessing them;
- (c) Doubts whether OPEC members will raise production substantially if it results in lower prices, thus lowering the net present value of future oil exports;
- (d) Low levels of investment in exploration and extraction in non-OECD countries;
- (e) Increased costs of constructing oil and gas facilities for storage and refining;
- (f) Credit problems;
- (g) Long gestation periods for the investments recently made in new capacity;
- (h) Risks that oil prices will stay below production costs of unconventional fossil energy sources (oil sands, heavy oils, oil shales) and of biofuels, constraining their availability; and
- (i) Exogenous factors (e.g. politics and weather).

10. In summary, imbalances between demand and supply have been the primary reason for volatility in energy prices. Other factors – such as excessive speculation, geopolitical instability and environmental conservation concerns – can also affect energy prices. Energy price volatility may continue in the future as, notwithstanding the temporary slump in demand arising from the global economic crisis, demand is expected to continue to increase, while energy supply might not expand in tandem. Oil is and should continue to be the most important energy source, but it is also a major source of greenhouse gas (GHG) emissions (overall consumption of fossil fuels accounts for some 80 per cent of global CO₂ emissions).⁸ Given the non-renewable nature of fossil fuels, there are growing pressures and needs to diversify the energy mix, to invest in alternative sources of income (for energy producers) and to develop and expand alternative clean energy sources to mitigate climate change.

B. Investing into energy

11. A key aspect of ensuring availability of and accessibility to energy in the future is to invest in energy production and infrastructure, including into energy efficiency and RE. According to IEA, an estimated cumulative investment of \$22 trillion–\$26 trillion between now and 2030 will be needed in the energy industry, with at least half in developing countries, particularly in the power sector, to satisfy growing energy demand and meet the costs of converting capacity to conform with increasingly stringent climate change standards (see figure below). Energy-producing countries would need to meet this challenge by developing business, investment and fiscal regimes which attract domestic and foreign investment and technology transfer. The opportunity could be used to boost the

The Global Economic Crisis: Systemic Failures And Multilateral Remedies (UNCTAD/GDS/2009/1): chapter III: Managing The Financialization Of Commodity Futures Trading.

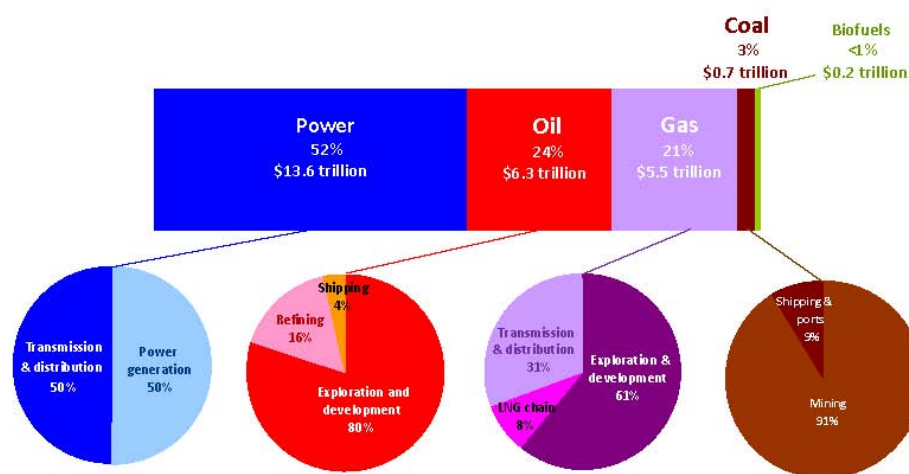
⁸ Stern N (2007). *The economics of climate change*. Cambridge University Press, 2007.

development of the domestic energy industry and energy-related auxiliary services, including by promoting local content, cooperation among firms and public-private partnerships (PPPs).

12. A crucial role on investing in energy would be played by foreign investors with the

Energy investment in the Reference Scenario, 2007-2030

World Energy Outlook 2008



Cumulative investment in energy-supply infrastructure of \$26.3 trillion is needed, but the credit squeeze could delay spending – especially in the power sector

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requisite financial and technological capacities and global transportation, refining, marketing and distribution knowledge and infrastructure. Nine of the top 20 transnational corporation (TNCs) are active in the extractive industries or in the power sector. However, given the “sensitivity” of extractive industries, most developing countries rich in oil and gas restrict the entry or operations of foreign investors in extraction, and there is a trend towards renationalization or renegotiation of investment contracts. Least developed countries (LDCs) with oil and gas deposits that do not have “national champions” or whose deposits are difficult to access, generally impose less restriction. There are usually relatively less restrictions in the power sector (particularly generation) because of its high capital-intensity. However it is still “sensitive” even in some developed countries where some proposed mergers involving foreign participation have been blocked by Governments.⁹

13. A TNC’s investment in a country depends upon such factors as its foreign direct investment (FDI) regime, economic conditions, infrastructure, business facilitation

⁹ UNCTAD, *World Investment Report 2007 and 2008*.

measures, competition and sectoral regulation policies and perceived risks.¹⁰ In many developing countries, efforts to attract FDI are hampered by an inadequate legal framework, unclear entry conditions and tender rules, the absence of cost-reflecting tariffs and frequent policy interference.¹¹ The relatively high number of investment disputes in the energy industry, especially in electricity, is a further illustration of the potential problems involved. Significantly, by the end of 2007, 79 investment disputes – or more than 29 per cent of all known treaty-based disputes – related to energy, with the largest number in electricity (44), followed by oil production projects (16), gas supply and distribution (12) and hydrocarbon concessions (7), with some disputes involving both oil and gas production.¹² Accordingly, foreign investment into the energy sector in many countries may remain significantly below what is needed. A key challenge for energy-producing developing countries would thus be to enhance the quantity and quality of TNCs' energy investments by creating and maintaining an enabling framework that balances host countries' rights to regulate foreign investment towards development goals with TNCs' interest in profitable, transparent and stable investment conditions.

14. In this regard, a key issue would be the distribution of rents obtained from energy production. While transfers to government budgets from State-owned exporting companies or joint ventures exceed 60 per cent of fuel export earnings in some major oil-exporting countries, the equivalent share is much smaller in several sub-Saharan African countries, with foreign investors obtaining a higher share, partly because of fiscal incentives.¹³ Some countries have revised fiscal and ownership regulations in the oil sectors.

15. State-owned national oil companies (NOCs) and international oil companies (IOCs) face the challenge of responding to the investment requirements for maintaining existing oil fields and developing new ones. NOCs in particular also face the challenge of keeping up with the technological developments and using state-of-the-art technologies to gain maximum advantage from their oil reserves. NOCs of some developing countries often have substantial finance and know-how, and this is significantly enhanced by their control over global proven oil reserves (around 78 per cent of global oil reserves are in OPEC countries under NOCs control). For example, Sonatrach, the Algerian NOC, made six of the eight Algerian oil discoveries in 2005 and planned to invest \$8.6 billion–\$9 billion in exploration and production (E&P) during 2006–2010, constituting over 70 per cent of Algerian E&P investment.¹⁴ As NOCs may face difficulties extracting oil from complex sources, they sometimes cooperate with IOCs under E&P or production-sharing agreements, service contracts, buy-back deals and other forms of collaboration. Such agreements often provide for technology transfer and staff training (given acute skills shortages and the need to apply advanced technologies). Large NOCs of developing countries and countries with transition economies play an increasingly important role at the international level, sometimes investing overseas, especially in the South–South context.

16. So far, the involvement of local enterprises in the energy industry's auxiliary services is still low and few linkages exist to ensure spillover into the national economy. Thus, promoting local content in the energy sector could be another key element for its closer integration into the economy, as a stepping stone towards wider industrial development. Critical to the success of local content development would be the application of long-term strategies and pragmatic measures, including use of PPPs, regulation of

¹⁰ UNCTAD, *World Investment Report 1998*: 91.

¹¹ Sader F (2000). *Attracting Foreign Direct Investment Into Infrastructure – Why is it so difficult?* FIAS Occasional Papers No. 12, Washington, D.C, 2000.

¹² UNCTAD database on Investor–State disputes (www.unctad.org/ia).

¹³ UNCTAD (2008). The changing face of commodities in the twenty-first century (TD/428).

¹⁴ *Oil and Gas Journal* (2006). 6 March 6: 28.

environmental sustainability of production and adequate financing. The elaboration of national (and regional) energy policies can also help.

17. In summary, investment – in huge amounts – is required to expand production of energy from fossil fuel and other energy sources, and improve energy-related infrastructure, in order to meet growing demand and increase access to electricity, particularly in LDCs. Investment is also required in technologies to enhance energy efficiency and reduce carbon emissions. It would therefore be important to carefully calibrate the development interests of host countries with those of TNCs and to promote cooperation between local and foreign stakeholders.

C. Competition in the energy markets

18. Traditionally, the energy sector was publicly owned and did not operate commercially. More recently, the role of private operators has greatly increased and substantial competition has been introduced in the generation, transport and distribution of energy.¹⁵ The driving forces of liberalization in energy markets in OECD countries were technological developments and efficiency-inducing effects of private management and competition. Developing countries privatized to inject badly-needed capital investment into the energy sector and to ensure universal access to energy. In practice, liberalization has been incomplete and the energy sector in different countries exhibits a variety of market structures and degrees of competition.

19. Different countries have had mixed fortunes in this regard. For several years following liberalization in the 1980s and 1990s, prices for industrial consumers fell in most OECD countries and those Latin American countries that had fully opened their electricity industries to competition. Prices paid by residential consumers did not similarly decline, however, but they later increased as primary energy prices rose. Natural gas supply liberalization in OECD countries showed similar results (natural gas infrastructure outside non-OECD Europe and Eurasia is less developed). In Africa and Asia, most electricity industries continue to perform poorly financially and operationally. From the United Kingdom's experience, it appears that competition flourishes better with a slight overcapacity, which is certainly not present in most developing countries.

20. Deregulated wholesale electricity markets have often been vulnerable to unpredictable volatility and high price "spikes" – which may partly result from some firms' ability to manipulate wholesale prices in concentrated markets. There is enduring pressure to address the distributive effects of liberalization and for most developing countries, energy poverty remains at unacceptably high levels. However, overly strict regulation of retail prices of electricity and gas may be discouraging entry into retail supply, while the design of electricity markets and the separation of different segments of electricity and gas supply chains may have reduced investment incentives for generation and transmission companies. Passive consumer reactions to price movements may be failing to deter abuses of market power. Such problems are not easily tackled by industry regulators or competition authorities. There is thus a trend towards reintegrating previously unbundled elements in energy supply chains.

21. Developing countries therefore need to consider whether and how their energy sectors could be reorganized and made more competitive. Also, devising an appropriate sectoral regulatory regime should help ensure optimal energy pricing, service, universal

¹⁵ UNCTAD (2007). Competition in energy markets (TD/B/COM.2/CLP/60).

access and interconnection between monopoly and competitive elements within energy supply chains.

22. In sum, liberalization and competition in energy markets have not led, in many developing countries, to increased affordable access, efficiency gains, or enhanced incentives for investment. There is thus a need to redesign and apply tailor-made competition and sectoral regulation policies to achieve better synergy and calibration among the goals of (a) stimulating competition; (b) encouraging investment (local and foreign) to increase supply; and (c) promoting efficiency, consumer welfare and universal access.

II. Trade and structural change

A. Energy trade patterns and their implications

23. Energy accounts for 13 per cent of total international trade, 11 per cent of which is composed of oil. Natural gas and coal constitute 14 and 4 per cent respectively of international energy trade. Trade in oil is expected to double and in natural gas to triple by 2030. The relative importance of energy products in countries' trade balances and their shares in total world energy trade may be seen from tables 4 and 5 respectively.¹⁶ Developing countries as a group are net energy exporters, with substantial variations among countries, while developed countries are the main importers, with the United States alone accounting for almost one fifth of imports. Some Asian countries – particularly China, the Republic of Korea and India – are also major energy importers.

24. The impact of higher energy prices varies with net energy-exporting countries usually benefiting from improved terms of trade and windfall revenues.. Thus, between 2004 and 2006, average income gains from changes in the terms of trade were 7.3 per cent for oil-exporting countries.¹⁷ However, these countries faced challenges in absorbing or recycling their earnings and addressing their weakened export competitiveness in other sectors arising from exchange rate appreciation, which hampered economic diversification into non-energy related sectors. Conversely, developing country net importers, especially LDCs, experienced deteriorating balance-of-payments positions, increased expenditure on subsidies for oil products for social purposes (many of which had to be abandoned), budget shortfalls and consequent reductions in development spending. The oil import bill in developing countries (excluding OPEC countries) exceeded 3.5 per cent of their gross domestic product in 2004–2005, roughly twice the ratio in the main OECD countries.¹⁸ Also, energy price hikes increased inflation and entailed substantial losses for households, particularly for the poor, for example by increasing kerosene and liquefied petroleum gas prices, for farmers (by raising fertilizer prices) and industry. The fall in energy prices has caused shortfalls in energy export revenues with consequent reduction of fiscal revenue of net energy exporters, while bringing relief to the external payments of net energy importers.

¹⁶ Energy exporters are not necessarily producers, but can include countries active in refining or trans-shipment.

¹⁷ See UNCTAD (2008). TD/428.

¹⁸ *Ibid.*

Table 4
The importance of energy products in countries' merchandise trade, 2007 (%)

Share in the respective country or territory's total merchandise trade			
Exports		Imports	
Algeria	98.1	Saint Helena	72.8
Congo	97.3	Pitcairn	72.2
Venezuela (Bolivarian Rep. of)	96.4	Gibraltar	69.8
Kuwait	95.8	Netherlands Antilles	61.5
Nigeria	95.0	British Virgin Islands	60.6
Oman	94.7	Bahrain	56.2
Iraq	93.7	Guam	49.9
Chad	93.3	Cameroon	40.1
Brunei Darussalam	93.0	Fiji	35.8
Saudi Arabia	92.0	Trinidad and Tobago	35.0
Yemen	91.5	Montserrat	32.4
Libyan Arab Jamahiriya	89.2	Democratic People's Rep. of Korea	32.1
Qatar	88.9	Côte d'Ivoire	31.9
Azerbaijan	84.6	Timor-Leste	31.8
Equatorial Guinea	84.6	Northern Mariana Islands	30.2
Angola	83.5	India	29.9
Netherlands Antilles	80.8	Seychelles	29.0
Gabon	80.8	Mauritania	28.9
Bahrain	78.1	Japan	28.8
Cameroon	76.7	Djibouti	28.4

Sources: UNCTAD secretariat calculations based on IMF IFS CD-ROM *Commodity Prices* Energy Index 2000=100, for energy; UN COMTRADE and UNCTAD estimates.

Notes: 2007 trade values by product are estimated from 2006 values multiplied by the price change for energy products in 2007.

IMF-IFS weights for energy price index are: coal=47.8 per cent, natural gas=4.5 per cent, and petroleum=39.9 per cent.

Shares of Algeria, Azerbaijan, Nigeria, Oman, and Trinidad and Tobago based on 2006 data.

Table 5
Main energy exporters and importers, 2007 (%)

Share in total world energy trade			
Exports		Imports	
Russian Federation	11.0	United States	19.5
Saudi Arabia	10.9	Japan	9.1
Norway	4.8	Germany	6.3
Canada	4.5	China	5.0
United Arab Emirates	4.2	Republic of Korea	4.9
Venezuela (Bolivarian Republic of)	3.3	France	4.4
Kuwait	3.1	India	3.5
Iran (Islamic Republic of)	3.1	Netherlands	3.3
Netherlands	2.9	United Kingdom	3.1
Algeria	2.8	Italy	3.0
United Kingdom	2.5	Spain	2.9
Nigeria	2.3	Belgium	2.7
Mexico	2.2	Singapore	2.5
Singapore	2.1	China, Taiwan Province of	2.1
United States	2.0	Canada	1.8
Qatar	1.8	Thailand	1.4
Angola	1.7	Indonesia	1.1
Australia	1.7	Austria	1.0
Belgium	1.6	Australia	1.0
Germany	1.6	Brazil	1.0

Sources: UNCTAD secretariat calculations based on IMF IFS CD-ROM *Commodity Prices* Energy Index 2000=100, for energy; UN COMTRADE and UNCTAD estimates.

Notes: 2007 trade values by product are estimated from 2006 values multiplied by the price change for energy products in 2007.

IMF-IFS weights for energy price index are: coal=47.8 per cent, natural gas=4.5 per cent, and petroleum=39.9 per cent.

Shares of Algeria and Nigeria based on 2006 data.

25. To reduce uncertainty and maximize gains in terms of revenue or expenditure, at least in the short-term, both net energy-exporting and importing countries could consider a number of measures. Exporters could implement potential remedial measures to address the Dutch Disease (appreciation of real exchange rates that weaken the competitiveness of the country's exports) and reduce excess liquidity in the economy. These countries could also consider retaining some of the income accruing when prices are higher in funds for release to the economy when prices are lower, thus ensuring a smooth income stream. Such funds could also constitute a source of investment for future generations. Bold steps could also be taken to channel energy-derived revenues into investments in infrastructure (at national and regional levels) and human capital, social programmes to address poverty issues, as well as diversification of their economies as future source of wealth creation. This would enhance economy-wide productive potential, competitiveness and sustainability. South-South cooperation initiatives could also be undertaken, for example, in strengthening production and trade in agriculture and food.

26. One approach to mitigating price risk exposure by both energy importers and exporters is the prudent use of market-based risk management tools. One country

(Mauritius) reduced the impact of rising oil prices on its balance of trade by hedging oil imports through structured finance instruments and derivatives such as forwards, futures, swaps and options. However, use of such instruments may be hampered by inexperience and regulatory constraints.

27. In summary, trade in energy is substantial, will increase in the future and is important in the trade balances of both net exporters and net importers. Energy price fluctuations can have major consequences for national economies, trade competitiveness and the welfare of households. Governments could accordingly consider and introduce measures to reduce uncertainty, minimize losses and maximize gains in terms of revenue or expenditure, including long-term investment for future generations. Agreements could also be concluded among developing countries to address their energy and development needs.

B. Energy and climate change implications

28. Rising concerns over climate change impact, coupled with high energy costs, raise pressures to enhance energy efficiency and promote cleaner energy and related technologies. More investment will be required for this purpose. This will be particularly important in sectors that, together, account for approximately 85 per cent of industrial energy use and constitute major sources of GHG emissions and other pollution.¹⁹ Indeed, industry represents over a third of both global primary energy use and energy-related carbon dioxide emissions. In many developing countries, industry consumes over half of energy supply. These sectors have expanded in developing countries because of industrialization and infrastructural needs, as well as outsourcing by developed countries.

29. Promoting “clean” and energy-efficient industries and infrastructure could enhance developing countries’ locational attractiveness, save on energy expenditure and import bills, enhance competitiveness and adaptation to export market requirements, provide health and environmental benefits and promote a less carbon-intensive development path. The energy efficiency of industrial facilities could be improved by 20–30 per cent, particularly in some energy-intensive sectors, if they were to use the best available technology.²⁰ The McKinsey Institute has estimated that a \$170 billion annual investment up to 2020 in simple energy efficiency measures by households and industries using current technologies would cut projected global energy demand in half²¹ – most such investment would be quickly amortized even at a carbon price of about \$50 per ton of CO₂.

30. Regarding power infrastructure, although the deployment of wind or solar power can involve difficulties or costs in storing large amounts of electricity and connecting to electricity grids, RE is well suited for localized use, and saves on transmission losses. RE deployment in rural areas could considerably enhance access to affordable and secure energy supplies and hence improve agricultural and industrial production, economic growth and poverty alleviation. Other promising areas for energy and carbon dioxide savings include agriculture (organic agriculture), urban transport and construction. National energy policies can be put in place by developing countries to provide a framework for developing such climate-friendly energy-related structural changes.

¹⁹ Including iron and steel; non-ferrous metals; chemicals and fertilizers; petroleum refining; and minerals, including cement, lime, glass and ceramics, and pulp and paper

²⁰ IEA (2007). *Tracking Industrial Energy Efficiency and CO₂ Emissions*; and UNIDO (2008). *Policies for promoting industrial energy efficiency in developing countries and transition economies*.

²¹ *The McKinsey Quarterly* (2008). *How the world should invest in energy efficiency*. July.

31. Energy-efficient and RE technologies can be promoted through a range of economic and regulatory instruments and voluntary measures.²² China, which aims at reducing its energy intensity by 20 percent during 2005–2010, has established investment review measures that discourage energy-intensive projects. India aims at increasing energy efficiency by 20 per cent by 2016–17 and has revised its building codes for large new buildings to reduce energy consumption by 20–40 per cent. Brazil has adopted the United States efficiency standards for light vehicles and European Union (EU) standards for motorcycles and heavy vehicles. The main cement companies in Brazil, Mexico and Thailand participate in the Cement Sustainability Initiative of the World Business Council for Sustainable Development, which studies energy efficiency gains leading to reductions in GHG emissions. As countries adopt, develop and implement energy-efficient measures and RE technologies, this should open up opportunities for fruitful trade and technology exchanges among countries. In this regard, developing countries may be particularly proficient in elaborating technological solutions adapted to other developing countries, providing an opportunity for South–South exchanges.

32. In the energy–climate change nexus, different concerns have emerged. One, as highlighted by the Stern Review, is that, if some countries move faster than others in implementing energy-efficiency and GHG-reduction policies, energy- and carbon-intensive industries may relocate to countries where such policies have not been implemented, which would obtain economic benefits at the expense of other countries, while nullifying global targets for controlling GHG emissions. However, while there is some evidence of relocation of a few of these industries to some developing countries, exports of most energy-intensive industries in OECD countries which have been subjected to carbon taxes have increased, because of off-setting subsidies and exemptions received.²³ Another concern revolves around suggestions that unilateral border measures (such as carbon taxes or requirements that importers purchase carbon credits) be levied upon energy- and carbon-intensive imports from countries not applying carbon-constraining policies.

33. In short, promoting clean and energy-efficient industries and infrastructure would be advantageous for developing countries at the national level and could open up trading and investment opportunities globally, including at the South–South level. To this end, a range of economic and regulatory instruments, as well as voluntary measures, can be applied. However, it should be ensured that unjustified barriers to trade are not adopted.

C. Fuel costs, transportation and production patterns

34. Fuel oil dominates the energy mix used in transportation. Thus, volatile and rising international oil prices can impact on transport costs and global transportation strategies and, in turn, on trade patterns and production plant locations. Both oil prices and transport costs may be retreating downwards in light of the current global financial crisis and economic downturn. However, this should not divert attention from the long-term implications of rising oil prices on transport and trade.

35. Developing countries – especially the most vulnerable among them, such as landlocked or island developing countries and LDCs – are particularly affected by high transport costs. These costs often surpass customs duties as effective barriers to international trade. For example, freight costs on *ad valorem* basis for a landlocked country

²² Including emission taxes, tradable emission permits, performance standards, fiscal or financial support, labeling schemes and benchmarking on best practice international standards.

²³ World Bank (2007). International Trade and Climate Change: Economic, Legal, and Institutional Perspectives.

such as Uganda amounted to about 24 per cent of the value of its imports in 2004 (i.e. seven times the freight costs on *ad valorem* basis at the global level).²⁴ Disproportionate transport costs give rise to a vicious circle by reducing trade volumes and, hence, investment in trade-supporting infrastructure and services which, in turn, further increases transport costs and undermines trade growth.

36. The impact of energy costs on transportation can be gleaned from the maritime transport sector. Maritime transport is the backbone of global trade and at the core of global transport strategies, with over 80 per cent of world merchandise trade by volume²⁵ being carried by sea. As maritime transport relies predominantly on oil for fuel, increased oil prices immediately inflate the cost of running a ship and result in industry adopting a range of cost-cutting strategies. However, freight rates and ship bunker fuel prices do not always move in tandem or to the same extent. Freight rates have often risen far less, as their level is also determined by many factors other than fuel costs.

37. The long-term implications of rising oil prices for transportation costs and trade are yet to be fully understood; however, sustained higher oil prices would likely affect relative prices and export competitiveness. A change in relative trading costs is likely to affect existing comparative advantages and could lead to major changes in global transportation strategies and production plant locations, and realignment in trade patterns. The opening of the first factory of Swedish manufacturer IKEA in the United States in May 2008 can be cited as an example.²⁶ Lower-value manufactured goods (e.g. clothing and textiles) and bulky goods such as steel could be affected more than higher-value manufactured goods (such as computer chips), the production of which involves significant capital or start-up costs. Vertical specialization could also be adversely affected as higher transport costs drive up both final delivery prices and the costs of inputs sourced from distant locations.

38. The extent to which such relocation of production facilities may be due to concerns about transport costs, rather than other factors, remains unclear. Reports about offshore production locations losing their competitive edge because of rising transport costs are questionable in view of the increasing importance of new low-cost offshore locations such as Viet Nam and Bangladesh in the apparel and textiles manufacturing sector. In the first half of 2008, rising energy prices did not translate into lower demand for logistics services,²⁷ nor did they automatically result in equivalent rises in transport costs. Moreover, distance is not necessarily decisive in this context – economies of scale from deploying more fuel-efficient larger ships on longer trade routes contribute to achieving greater fuel savings and reduced CO₂ emissions.²⁸ At the same time, it is likely that physical proximity to final markets could become a more important competitive advantage.

39. Other relevant factors that affect transport costs include, inter alia:

- (a) The potential for substitution of oil by more affordable alternative energy sources;
- (b) The share of transport costs in overall production and distribution costs;
- (c) Whether shifting production closer to the market is cost-efficient, outweighing potential rises in production costs and disruption from relocating production plants and related business partnerships; and, importantly

²⁴ UNCTAD, *Review of Maritime Transport 2006*.

²⁵ UNCTAD, *Review of Maritime Transport 2008*.

²⁶ Rohter L (2008). Shipping costs start to crimp globalization. *International Herald Tribune*. 2 August.

²⁷ *Transport Intelligence* (2008). Soaring fuel prices have yet to dent demand for freight transport. TI Briefing, 28 May.

²⁸ UNCTAD, *Maritime transport and the climate change challenge* (TD/B/C.I/MEM.1/2).

(d) The type of goods traded/transported (e.g. bulk or manufactured), their value, weight and handling requirements.

40. In summary, rising oil prices affect (a) transport costs; (b) trade and competitiveness, especially for landlocked and island developing countries and LDCs; and (c) global transportation strategies, production plant locations and trade patterns. However, the magnitude and long-term implications of such trends will depend on whether, when and how far and continuously oil prices rise and remain high, notwithstanding the current economic downturn.

III. International cooperation and UNCTAD's contribution

41. The need for secure energy supplies to meet growing demand calls for greater investment into enhancing supply and trade in energy. In parallel, climate change, the continuing depletion of fossil fuels and other environmental concerns make recourse of energy efficiency and greater use of alternative energy sources essential. Whether such needs will be met with maximum sustainability and minimum cost, disruption to energy supplies, economic hardship to all stakeholders (particularly the poorest) or damage to development prospects will strongly depend upon the levels and predictability of energy prices and investment, as well as the policy and regulatory framework. Prices and investment will depend in turn upon the evolution of energy demand, supply and security, as well as environmental considerations, technological change and incentives to promote energy conservation, efficiency and development and use of RE. National measures by developing countries in this area need to be supported by an integrated range of international measures to turn these challenges into opportunities.

A. Addressing price fluctuations

42. A key measure to reduce the sharpness of oil price fluctuations could be to increase transparency and predictability. This would enhance market responsiveness and the reliability of price signals for deciding whether and where to allocate resources for energy supply and efficiency, as well as RE research and deployment. Accordingly, it could be examined whether or how to promote joint consideration by all stakeholders of the implications of available data on oil reserves, production, consumption, public and private inventories and the relationship between "long" (buy) and "short" (sell) positions in futures markets. If necessary, further efforts might be made to collect and collate more complete and timely data. Dissemination and explanation of such data and of risk management measures could be undertaken to developing countries, particularly LDCs, could be undertaken

43. To cope with balance-of-payment problems arising from energy price rises, Governments may use concessional compensatory financial mechanisms, which are operated by the Bretton Woods institutions, the African Development Bank and the EU when energy bills rise above a predetermined level. Such financing, however, is often too small to meet the needs, disbursed late or subject to conditionalities. Possible actions to mitigate the impact of adverse price trends upon energy producers or consumers, particularly in LDCs, include strengthening compensatory financing schemes and establishing viable safety nets for households and small producers.²⁹

²⁹ See TD/428.

44. Oil exporters could also help. The Petrocaribe scheme of the Bolivarian Republic of Venezuela, for instance, supplies oil, extended payment facilities (over 25 years at 1 per cent interest), logistical and technical help, and a fund for social and economic programmes to most neighbouring Caribbean net oil-importing countries. Furthermore, in June 2008, King Abdullah bin Abdul Aziz Al Saud of Saudi Arabia called on the Saudi Fund for Development to allocate \$500 million in loans for poor countries' energy needs, and requested the World Bank to organize a meeting of donors and development institutions to formulate an "Energy for the Poor" initiative. He also urged the OPEC Fund to take measures to alleviate the impact of energy price rises on the poor.

B. Financing and technical assistance

45. In 2005–06, disbursements for energy generation and supply represented only 3.8 per cent of total official development assistance (ODA) disbursements by OECD countries to developing countries, and only 1.2 per cent and 1.3 per cent respectively of total ODA to Africa and LDCs.³⁰ The low priority of energy-related infrastructure in ODA raises difficulties for developing countries' energy plans and development strategies.³¹ A substantial increase in energy-related aid to developing countries, particularly LDCs, is needed. As the capital-intensity and sunk costs of building power-generation plants or electricity distribution require long period financing periods, donors could also extend financing of energy projects to cover costs from start to finish.

46. The international community should promote an enabling environment for the development and utilization of financing mechanisms for new energy technology and infrastructure. This might include assistance to developing countries, particularly LDCs, for de-carbonization projects, climate change adaptation investment and associated transfer of energy-saving technologies, including by allocating auctioning revenues from emissions trading. Germany has indicated it will provide one third of the income obtained from auctioning of emission allowances under the European Emission Trading Scheme to support the transfer and effective use of carbon-efficient technologies to developing countries. The African Biofuels and Renewable Energy Fund supports the development of biofuels and RE industries in African countries. The Group of Eight (G-8) Finance Ministers, at their Osaka meeting in June 2008, expressed support for the establishment of multilateral climate investment funds to support the efforts of developing countries in this area. The outcome of post-Kyoto negotiations on carbon dioxide emission reductions would be relevant.

47. Strengthened technical assistance and information on relevant best practices will be important. It could help developing countries to develop energy policies and to better integrate such policies into their economic, environmental and trade policies, tailor strategies on energy use in different areas, create public awareness, transfer appropriate technologies, and establish a domestic market in energy efficiency services and products.

48. A special issue that deserves attention is the impact upon a country of sudden graduation from LDC status, owing to a surge in petroleum export revenue raising gross national income over the maximum income threshold for LDC status. This has happened to Equatorial Guinea.

³⁰ UNCTAD secretariat calculations based on OECD Creditor Reporting System.

³¹ UNCTAD. *The Least Developed Countries Report 2006*.

C. Dialogue and partnerships

49. Consumer–consumer and consumer–producer dialogues or partnerships have been suggested or established. A proposal by Mauritius, made to the African Union on 11 July 2008, was that an organization of non-oil producing countries be created, as well as an international oil fund for Africa and the LDCs. Another proposal by India was for a coalition of “buyers” of oil to negotiate supply and price with “sellers” of oil, like OPEC. The International Energy Forum, hosted by Saudi Arabia, brought together energy ministers and business leaders from energy-producing and consuming countries, and promoted important initiatives such as the Joint Oil Data Initiative.

50. Strengthening of regional cooperation could help improve the efficiency, security and profitability of the regional energy sector, through compensatory financing, price risk management, investment in infrastructure, refining, bulk procurement, sharing of storage and distribution facilities or strategies for RE development. Several such initiatives have been launched, for instance, to develop Africa’s energy sector, including the Africa Energy Commission, the West African Gas Pipeline and the Kenya–Uganda Pipeline. Strategic energy corridors and partnerships between producing and consuming countries are being developed, particularly in natural gas, including (a) the Baku–Tbilissi–Ceyhan pipeline; (b) the North European Gasoline pipeline between Germany and the Russian Federation; and (c) the Nabucco project for oil and gas running through Central Asia and the Russian Federation. Energy policies could also be developed within the framework of regional integration groupings.

51. New partnership and cooperative models between developing countries could be evolved, building up from ongoing cooperation. One example is the Petrocaribe scheme of the Bolivarian Republic of Venezuela. Thus opportunities may arise for greater cooperation between:

(a) Oil exporters with well-established NOCs (such as OPEC countries) and those without NOCs or small NOCs (such as oil-exporting LDCs);

(b) Oil exporters and dynamically growing developing countries constituting major markets for energy, needing security of supply and offering financial and technical expertise in backwards and forwards oil industry linkages; and

(c) NOCs (which already collaborate, for example, to develop clean oil technology).

D. The Multilateral Trading System

52. WTO rules affect issues related to trade in energy.³² Given its strategic importance, however, energy has been considered a special case. First, the Energy Charter Treaty (annex G) states that most trade in nuclear energy is not covered by WTO but by other agreements. Second, when negotiating the General Agreement on Tariffs and Trade (and later WTO), several key energy exporters were not yet contracting parties or members and, even today, key energy exporters still remain outside WTO (e.g. Azerbaijan, Iraq, the Islamic Republic of Iran, the Russian Federation and Sudan). Third, prior trade rounds failed to reach agreements on key issues regarding energy trade (e.g. dual pricing practices and attendant subsidies, reverse dumping, export restrictions, export taxes and issues related to natural resource product displacement by substitutes).

³² Pauwelyn J (2001). Trade in Energy: WTO Rules Applying under the Energy Charter Treaty. ECT Secretariat, Brussels, December.

53. There are also ambiguities about the classification of energy trade in WTO terminology (e.g. whether electricity is a good or the provision of a service) with attendant lack of clarity about the application of the respective rules. Moreover, with respect to energy-related services, significant liberalization commitments are yet to be undertaken. The vast majority of the global energy services industry is not covered by specific commitments under the General Agreement on Trade in Services (GATS) and only few members undertook – sparse – commitments in various energy-related services.³³

54. Against the backdrop of increasing energy demand and competition, interest in strengthening multilateral rules governing this sector has grown. Energy is a prominent issue in (a) the working groups established for the accession of energy-resource-endowed countries; (b) the Committee for Trade and Environment, which looks at issues related to the liberalization of environmental goods; (c) the Council for Trade and Services Special Session, which looks at the liberalization of energy-related service; and (d) the Committee for Specific Commitments, where members discuss classification-related issues. The Director-General of WTO noted that the conclusion of the Doha round would impact upon the energy sector – through the negotiations on energy services, environmental goods and services – potentially impacting upon energy efficiency, trade facilitation and agriculture (biofuels), as well as proposals made regarding export taxes and subsidies for energy products.³⁴ In 2006, the EU Trade Commissioner suggested a new WTO round that would address the energy sector.

55. Energy is characterized by numerous peculiarities, which impact on how energy is traded, and the specific policy issues that arise. Thus, any strengthening of international trade rules in the energy area would need to take into account these characteristics, while aiming at (a) enhancing energy access, especially for developing countries; (b) strengthening of developing countries' competitiveness in energy production and services; and (c) increasing international flows of energy-related technology. Stronger multilateral (or regional) trade rules in this area should also facilitate access by developing countries to less carbon-intensive goods, technologies and environmental services, and open up export opportunities for them in this area. Some issues with respect to energy trade that may arise include (a) differentiated export tariffs, which have given rise to most favoured nation-related questions; (b) which energy taxes are eligible for border tax adjustments; (c) subsidies, which have given rise to the challenge of designing a subsidy regime according to which financial support would not be considered "actionable"; (d) dual pricing practices; (e) technical regulations and standards; (f) local content requirements in the petrochemical industry; (g) issues relating to the transit of energy products; and (h) how to distinguish between trade in energy goods and services.

56. At the regional level, free trade agreements rarely contain provisions specific to the energy sector. Those that do so tend to contain reservations, such as with respect to investments in the energy sector. The North American Free Trade Agreement, for example, contains an energy chapter (applying to measures relating to energy and basic petrochemical goods, covering measures relating to investment and to cross-border trade in services associated with such goods).

E. Issues requiring urgent attention and UNCTAD's contribution

57. The United Nations system collaborates under the UN-Energy inter-agency mechanism to enhance access to energy in a sustainable manner to achieve internationally

³³ www.wto.org.

³⁴ Speech by Mr. Pascal Lamy to the Twentieth World Energy Congress, 15 November 2007.

agreed development goals, including the Millennium Development Goals. UNCTAD, as a member of UN-Energy, contributes to promoting energy for development via international trade and trade-related measures. It could strengthen its contribution by monitoring and assessing trends in the energy economy, identifying emerging issues and proposing policies at the national, regional and multilateral levels for strengthening energy trade and development.

58. UNCTAD organizes an annual Africa Oil and Gas Trade and Finance Conference, which brings together major players from the private and public sector, facilitating multi-stakeholder dialogue on topical issues in the African energy sector and strengthening consensus on how to develop this sector. Building on this experience, UNCTAD could act as a forum for dialogue and sharing of experiences on energy, trade and development, bringing together various stakeholders. This forum could assess and identify best practices and promote consensus on practical policies and measures to enhance energy supply, predictability, diversification, sustainability and affordability, as well as interlinkages relating to trade, technology, investment, commodities, climate change, transport and structural change. It could examine energy-related trade measures and efficiency standards, and support discussions on how these could be addressed. It could study the implications of national trade measures as well as regional and WTO rules and negotiations that affect energy.

59. UNCTAD could continue to assist developing countries, especially LDCs, in elaborating energy policies, tailored to their specific circumstances, that contribute to meeting the multi-dimensional developmental aspects of energy's contribution to development.

60. In the transportation area, further work is required to:

- (a) Compile and analyse data on fuel consumption and GHG emissions by mode of transport, to facilitate decisions on different options;
- (b) Assess the implications of sustained rising oil prices on ocean freight costs and trade, as well as on modal and inter-country trade competitiveness;
- (c) Explore the potential for the transportation sector to mitigate both oil dependency and related external costs resulting from GHG emissions and climate change;
- (d) Identify mechanisms to effectively integrate energy security and climate change considerations into transportation and logistics policies, land use, planning and design, as well as infrastructure investments and development;
- (e) Follow relevant international developments; and
- (f) Strengthen international collaboration on these issues.

61. In the commodities field, UNCTAD could continue to (a) promote exchange of experiences, policy dialogue and consensus-building among Governments on forward-looking commodity supply and demand strategies and scenarios, and related policy measures and business practices; (b) provide technical assistance on maximizing gains from oil and gas exploitation; and (c) support the building of South-South partnerships in energy, along the lines of the Africa Oil and Gas Trade and Finance Conference.

62. UNCTAD could further disseminate its extensive training manuals on the use of modern commodity risk management and finance tools, and the implementation of proper control systems to prevent abuse and losses. It could advise Governments on budget risk management in coping with sharply fluctuating oil prices.

63. In the competition policy and sectoral regulation field, UNCTAD could continue to provide a forum to address the development dimensions of introducing competition in

energy markets, monitor features of energy markets raising competition concerns and address supply and affordability concerns, particularly for poor consumers.

64. In regard to WTO rules, UNCTAD will continue to assist developing countries in WTO negotiations regarding energy trade, and environmental goods and services. It can enhance assistance to countries in WTO accession on energy issues.

65. UNCTAD could also continue to support Governments in greater use of new technologies, including RE, by (a) building awareness of scientific and technological developments; (b) identifying and disseminating information on best technologies and best practices in the development, assessment, transfer, adaptation and diffusion of energy technologies and promotion of energy-efficient industry and agriculture; and (c) promoting appropriate industrial and trade policies and instruments to favour such a switch.
