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Energy Security in Mexico: An Evaluation in the Light of St. Petersburg

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Introduction

Energy security was a priority issue on the G8 agenda at last year's summit in St Petersburg (July 2006). The leaders of the major industrialised nations issued a joint statement declaring that transparent, efficient, competitive markets were the best way to achieve global energy security. To this end, they agreed to draw up an Action Plan that would provide a strategy to confront the global challenge of energy security based on the principle of "reducing barriers to energy investment and trade, [so that] companies from energy producing and consuming countries can invest in and acquire upstream and downstream assets internationally". A number of guidelines for analysing energy security were derived from this principle:

- increasing the transparency, predictability and stability of global energy markets;
- improving the investment climate in the energy sector;
- enhancing energy efficiency and energy saving;
- diversifying the energy mix;
- ensuring the physical security of critical energy infrastructure;
- reducing energy poverty;
- addressing climate change and sustainable development.

To understand how the facts square up to these energy security guidelines in the case of Mexico, we have to adopt a differentiated reading of the sector concerned, in so far as Mexico has only recently begun introducing the criterion of energy security to evaluate its policies, strategies and energy integration processes and incorporating these security criteria into an assessment of national interests.

1) We began considering the Mexican situation by diagnosing its main energy problems and prevailing attitudes in Mexico to global energy problems and their implications;

2) we analysed the principal objectives of national energy policy and some of the key strategies to achieve these;

3) we considered the forecasts for private investment in the energy sector;

4) we assessed energy demand, energy savings and energy efficiency;

5) we looked at predictions on the diversification of the Mexican energy sector over the next 20 years;

6) we describe how critical infrastructure is being addressed through the Security and Prosperity Partnership of North America (SPPNA);

7) we reviewed the key components of the National Climate Change Strategy;

8) and finally, we evaluated Mexico's commitment to transparency in the regulatory and legal framework for its energy sector.

1 National Challenges and Global Energy Security

The pivotal problems of the Mexican energy sector are associated with the decline in oil reserves and production, the financial standing of PEMEX and growing dependence on imported fuels.

Proven hydrocarbon reserves have been decreasing in recent years down to a level equal to 9.3 years of production for petroleum and 9.7 years for natural gas.[1] Although the government and others persist in denying officially that Mexico has reached the zenith of its oil career, the shrinking of the principal deposit, Cantarell, demonstrates the opposite. Various articles by specialists within the oil industry itself have commented on the fall in production from the rate of 2,132,000 barrels a day (b/d) in 2004 to what may well be just 339,000 (b/d) in 2017. For some time PEMEX has been pursuing a strategic plan to offset this loss of production by launching new projects, as the decline in mature fields has been stronger than expected and new production has not been achieving forecast levels. The estimated loss sustained annually by Cantarell (about 120,000 b/d) cannot be compensated by current efforts.

In conjunction with this, revenue from oil has been employed to cover current expenditure rather than invest in the oil industry, and this situation has provoked budgetary inertia that has not been matched by an integral fiscal reform to bolster national finances. An integral fiscal reform would entail levying the major national and international capital that benefits from a privileged tax regime, and this has the potential to provoke political conflicts.

Another problem relates to the high consumption of natural gas across all sectors of the economy, but especially in the power sector. Although the production of natural gas increased at the rate of 4.7% a year to reach 5,356 million cubic feet per day (cf/d) in 2006, this has not been enough to cope with the rise in domestic demand, which has been growing at an

[1] PEMEX, Annual Statistics, several years.

annual rate of 5.9%. This has led to an increase in imports from 109 million cubic feet in 1997 to 877 in 2006, a rise of 704%.

Another sign of distortion in the production model of Mexico's oil industry relates to derivatives (refined products and petrochemicals). Production is still performed outside national territory, with the consequent impact on domestic jobs and imports of these products. It is estimated, for example, that in 2015 imports of petrol will hit 415 thousand b/d, or 42% of domestic consumption, worth 13,228 million dollars a year. In terms of investment and jobs, this is like shifting the equivalent of two additional refineries to the United States.

This lack of investment in the oil industry and its distorted productive spectrum compel PEMEX to export basic petrochemical inputs such as naphtha and then import secondary petrochemicals[2] and derivatives. If this continues, imports of petrochemicals will account for 50% of domestic consumption by 2015, equivalent in value to 190,000 million pesos.[3]

Contrary to the general trend for national companies in producer countries to expand and play a greater role in the international arena, PEMEX has been subjected to deliberate fiscal efforts to strip it down. Whereas the public treasury has received over 2,200 billion pesos from its exports in the last six years, more than at any other time in the country's history, investment in PEMEX has only been 600 billion pesos (27% of this revenue). 85% of this expenditure was committed within the Pidiregas (Productive Long-Term Infrastructure Projects) framework, plunging PEMEX into absurd and disproportionate debt. The other indication that the company is being deliberately stripped down is that the state-owned agency was obliged under the previous government to maintain an annual primary surplus of over 100,000 million pesos, even though PEMEX was incurring debt to meet its own requirements, not only for investment, but even for maintenance.

The fiscal model, the productive decline of the company and the plundering of its resources during Vicente Fox's administration have led the government of Felipe Calderón to identify a range of monetary resources which they hope to recoup from the workers by means of pension funds and privatising all the physical assets they still control (roads), sparking social discontent in the light of the lack of jobs and productive alternatives in the country. This is being heftily stamped upon by the military forces, triggering a serious backsliding on human rights throughout the country.

The global energy security challenge

Apart from domestic factors, there are fundamental and geopolitical factors in the international context, such as: 1) political instability in the Middle East; 2) volatility of production in Nigeria; 3) rising demand from China and India; 4) low surplus production capacity in OPEC countries, with only a small potential margin to be expected in Saudi Arabia, Kuwait and the United Arab Emirates; 5) uncertainty about production in non-OPEC countries, given that most of them have passed their peak outputs so that production is likely to decrease in the future; 6) the need for investment funds; 7) the problem of energy security in the United States, which benefited from the Mexican government earmarking higher levels of its own oil production for export to there. All of this is significant at national level, not only in defining what action needs to be taken, but also because of the direct impact on the global price of oil, which is the basis for determining national finances and budgets.

2 General Aims and Strategies for Energy Policy

The historical course Mexico pursued in seeking to make oil a cornerstone of the national project has changed, and the aims and strategies of energy policy are now similar to those of any country in the world seeking to secure an adequate supply of energy based on international quality standards and competitive prices. Other aims are

[2] In Mexico petrochemical products have historically been classified and reclassified artificially as either basic or secondary. Secondary products can be produced by private initiative while basic products are ringfenced for national industry. Essentially, all the products that other countries refer to as petrochemicals have been classified in Mexico as secondary petrochemicals, as there were plans in the last decade to privatise the petrochemical industry as a whole, and calling the output secondary petrochemicals made the privatisation more palatable in political terms. In fact, basic petrochemicals are natural hydrocarbons, not petrochemicals. These basics consist of gaseous hydrocarbons (ethane, methane, butane, pentane, hexane and hectane) found in natural gas and of naphthas or natural gasolines. All these basic products are used as inputs in refineries and the petrochemical industry.

[3] Speech by the Under-Secretary for Hydrocarbons, Mario Gabriel Budebo, at the opening of the consultation forum on the National Development Plan on 20 April 2007, http://www.sener.gob.mx/ webSener/portal/index.jsp?id=209

more operational in character, given the international commitments that Mexico has undertaken in the context of free trade agreements, and these define some of the energy alternatives that need to be developed in forthcoming years, i.e.:

- design the legal framework as an instrument for developing the energy sector, granting legal security and certainty to the economic agents concerned and ensuring the energy sovereignty and authority of the state;
- encourage the participation of Mexican companies in energy infrastructure projects;
- promote the use of renewable energy sources, energy efficiency and energy savings;
- make safe, reliable, peaceful use of nuclear power in compliance with the highest international standards;[4]
- broaden and strengthen international energy cooperation and contribute to shaping the global energy markets.[5]

Some action strategies concern the operation of Mexico's two biggest energy agencies, PEMEX (oil and natural gas) and CFE (power). These are:

- ministerial guidance and supervision for the operations of these sector agencies, monitoring the planning of prospecting, production and processing in the field of hydrocarbons and the generation of power and nuclear power, with respect for environment legislation;
- regulate and promote the development and use of alternative renewable energy sources, creating appropriate incentives in conjunction with the Ministry of Finance;
- define a platform for the production of oil and gas by PEMEX based on proven reserves, with priority attached to national energy security.[6]

Of these, a particular role will be played by designing sector policies that are compliant with environmental laws and granting priority to national energy security – a major turn-around after the previous government attached priority to helping the United States achieve energy security by exporting as much crude as possible.

3 Prospects for Investment in the Sector

When Mexico joined GATT in 1985 it pledged to open up its markets and establish clear, transparent rules and regimes that would create a climate of certainty for the foreign trade activities of Mexican companies and establish a basis for dispute settlement. Mexico has even had recourse to this mechanism by submitting a proposal on how its functions: the period during which a country may refrain from meeting its commitments or obligations while awaiting resolution is an incentive for trying to impose or uphold measures in defiance of the World Trade Organisation (WTO).

In all its international agreements, Mexico has demonstrated its willingness to accept international arbitration along the lines drawn up by the WTO. It has also proposed that even if a country has not formally committed to complying with new WTO obligations for services, it is nevertheless bound by them. In this respect it is in sympathy with the call by developed nations for a broader WTO system.

This policy is being continued by the current administration. President Calderón has endorsed the country's commitments to the WTO on enhancing the competitiveness of Mexican companies and products. He has drawn attention to the efforts the Mexican government has undertaken to establish legal certainty and clear rules, boosting the competitiveness of the country's production system. This attitude has not been confined to statements and has infused the regulation of the energy sector.[7]

4 Energy Demand, Efficiency and Conservation

National energy consumption presents a different picture depending whether we consider the sector as a whole, where domestic households account for a large proportion, or the power

[4] SENER, Programa Sectorial de Energía 2001-2006 (PSE), México, Subsecretaría de Planeación Energética y Desarrollo Tecnológico, 2006. pp. 2-3. It should be noted that the Energy Sector Programme for 2007, in which the new Calderón administration will define this government's national strategy, has not yet been published.

[5] ibid, p.3

[6] 60th Legislature of Union Congress, Proposal to reform Article 33 of the Federal Public Administration Act (Ley Orgánica de la Administración Pública Federal) with regard to the Department of Energy, Mexico, Senado de la República, 21 December 2006.

[7] The Comisión Reguladora de Energía (energy regulator, 1993) was set up specifically to regulate the gas and power industries in a transparent, impartial and efficient manner in order to stimulate productive investment.

sector, where the highest growth rates are coming from national industry. Among the fuels consumed, petroleum products and natural gas play a major part.

Daily energy consumption by end users amounts to a little over 2 million barrels of oil for the country as a whole. If we break this down by sector, energy consumption rose from 2001 to 2005 by 3.2% for households, 1.8% in the trade sector, 2.6% in the service sector, 2.0% in agriculture and 2.2% in industry. In 2006 65% of consumption was accounted for by oil products, 11% by natural gas, and 15% by electricity, the latter drawing on various primary sources, such as water, steam, geothermal, natural gas, thermal carbon and fuels such as diesel and combustoleo. The remaining 9% is accounted for by wood, bagasse, coke and coal. The greatest consumer is transport at 43%, followed by industry with 29%, housing, trade, lighting for public buildings and the pumping of drinking and non-drinking water with 19%. Non-energy-related use is primarily for petrochemicals (7%) and agriculture (the remaining 3%). We can see from this that the oil industry and the transport sector are major factors in national energy demand.

If we consider the consumption of electricity in the period 1994-2004, industry was the biggest client, purchasing 59% of overall power output. The greatest momentum came from medium-sized industry with an average growth rate of 5.4% in the period under examination (2001-2005). In a regional breakdown, the North-East revealed the fastest growth (5.2%). In terms of generating GDP, the structure of power consumption has shifted over the years towards service-related sectors (including financial services), trade and tourism.[8]

This energy demand stands against gross domestic supply equivalent to 3.5 million barrels of oil, of which about 2 million are exported, with the equivalent of 580,000 barrels imported, essentially in the form of petrol.

Mexico's efforts to achieve greater energy efficiency have sparked the sustained institutional and programmatic development of various bodies, such as the National Commission for Energy Saving (CONAE), the Trust Fund devoted to saving electricity (FIDE), the Integrated Systematic Savings Programme (ASI) for households and others, which have taken the lead in formulating and applying programmes for various sections of society.

CONAE is responsible for schemes such as daylight saving (which entails putting the clocks forward one hour to save energy in summer), reducing energy consumption in public buildings and, ever since its creation in 1989, the promotion of savings and efficiency in the consumption of natural gas by means, for example, of setting standards for energy efficiency, training and support for human resources in associated projects, disseminating best practice, developing a market for goods and services related to energy saving and efficiency, liaising with sources of project finance and strengthening channels of information. The Commission has engaged in other activities, too, relating to standards, energy efficiency programmes and schemes for promoting renewable energies as a substitute for natural gas.[9]

The trust fund FIDE is a privately operated, mixed ownership entity whose purpose is to target energy efficiency measures at users in the industrial, commercial, service, households and municipal sectors. FIDE has an efficient support system for small and medium-sized businesses, which generate more than 70% of the country's jobs and half its GDP, apart from consuming 20% of the country's electricity. Following from this, FIDE is considering two major nationwide programmes of assistance: the first involves funding to invest in highly efficient equipment from a pre-established list, and the second includes granting a credit line so that these users can embark on an integrated scheme to reduce their power consumption and enhance its efficiency. There is also another programme aimed at saving electricity in shops and services. In 2006 11,110 GWh were saved in this way.

All these energy-saving programmes together resulted by late 2005 in a 19,650 GWh fall in consumption, or a little over 4,900 MW in deferred capacity, at both government and consumer sector level. The targets for 2014 are savings of 40,900 GWh and 9,970 MW. Crucially, this has been achieved without detriment to the quality or quantity of the services requiring energy.[10] As the table above shows, the most effective programmes for saving energy and reducing de-

[8] SENER, Prospectiva del Sector Eléctrico 2005-2014, México, Secretaría de Energía , 2006, pp. 39-47

[9] SERER, Prospectiva del Mercado de Gas Natural 2006 – 2015, Dirección General de Planeación Energética, México, 2006, p. 125.

[10] SENER, Informe de Labores 2005. Comisión Nacional para el Ahorro de Energía (CONAE), México, 2006, pp. 7 and 8.

Targets for Current Energy Savings Programmes (%)

Year	Application of standards (NOM)		Daylight saving		Installations		Agro-fisheries		FIDE incentives		House-holds		Lighting for public build-ings
	*	**	*	**	*	**	*	**	*	**	*	**	*
2005	72.6	51.8	6.7	5	5.8	5.7	5.7	5.3	7	11.2	2	5.2	1
2014	81.5	65	3.8	15	3.7	3.9	3.5	4	5.2	8.7	1.3	3.5	7.4

Source: Comisión Nacional para el Ahorro de Energía * Energy GWh ** Reduction in demand MW

mand are the application of official Mexican standards (NOM) and the FIDE incentives, although daylight saving in summer will prove a bigger factor in 2014.

5 Energy Diversification

Analysis of the energy sector as a whole and it possible trajectory over the next 20 years suggests that Mexico is shifting from a position of energy independence to one of dependence on primary energy, although petroleum will continue to be the most important energy source for the next 25 years and the prime object of strategic efforts.[11] Integration with North America is developing around natural gas in the form of LNG, which is why this fuel plays such a big role in cross-border trade. As technology diversifies, it will acquire growing momentum: nuclear and coal-based power, like renewables, will only play a complementary, if not marginal role in the overall future scenario for power generation.

Petroleum

Significant effort continues to be devoted to prospecting and drilling for oil. In line with the PEMEX business plan for exploration and production (PEP), the crucial objective is to maximise the economic value of reserves and resources of crude oil and natural gas in the long term. The following aims remain fundamental to this:
1. continue prospecting to assess petroleum potential and incorporate reserves throughout the country; 2. step up prospecting for offshore light crude; 3. develop fields in heavy crude provinces; 4. reactivate prospecting in mature fields; 5. develop exploration and production in Chicontepec[12]; 6. develop the processing and handling of heavy crudes; 7. step up exploration and production for natural gas; 8. activate exploration and production in deep waters.[13]

The oil policy of the present government will focus on speeding up the exploitation of current deposits and an active search for new onshore and above all offshore reserves. If everything necessary were done to upgrade probable and possible reserves to the status of proven reserves, this would result in a total proven reserve of over 33,000 million barrels which, at a rate of output of 3,333,000 barrels a day would mean almost 25 years of energy autonomy. This, however, would entail the need for massive investment and intense prospecting and development over the next 8 to 10 years.

[11] This section is based on work presented to the 9th Annual Congress of the Energy Economy Association (AMEE), México. CFE Technology Museum, 15-16 November 2006.

[12] Background to Paleocanal de Chicontepec:Location: north of Veracruz and east of Puebla; Date of discovery: 1926; Exploitation began: February 1952; Surface area: 3,875 sq.km. The goal of PEMEX in Chicontepec is to exploit reserve 2P by drilling 17,603 wells at a strategic investment value of 439,000 million pesos. Due to the geology, this project is regarded as a high-risk technological challenge with concomitant investment risk, so that returns are impossible to forecast.

[13] PROGRAMME FOR DEVELOPMENTAL DRILLING (2007-2009)

PROJECT	NUMBER OF WELLS	NEW PLATFORMS IN THE GULF OF MEXICO
Ku Maloob Zaap	65	8
Cantarell	35	3
Lankahuasa	4	1
Offshore Light Crude	24	3
Others at depths of less than 500m	625	16
Burgos	791	-
Chicontepec	2,780	-
Complex Bermúdez, Samaria, others	24	-
Jujo Tecominoacán	10	-
Total	4,358	31
Source: PEP Portfolio 2007-2009		

These projects are located along the coastline of Veracruz and Tabasco and waters within the Gulf of Mexico. Burgos is in the North-East of Mexico in the State of Tamaulipas.

As for power-sector demand for the fuels produced by PEMEX in the form of combustoleo and diesel, prospects seem to be only short-term, as CFE plans do not include any conventional new stations to be fired by combustoleo, while diesel only features in small quantities. As part of its energy planning, PEMEX will cease to produce combustoleo, seeking instead to install petrol-producing technologies. Refinery residue will be used by PEMEX for cogeneration purposes.

Natural Gas and Liquefied Natural Gas (LNG)

Demand for natural gas will trigger an increase in output and imports of this fuel, given the gap which currently exists between production and demand.

The coming six years are expected to witness a rise in the demand for natural gas of 2,200 million cubic feet a day, to be met by an increase in national production. By 2012 demand is expected to reach 7,900 million cf/d, due to the additional needs of CFE following the conversion of power stations to natural gas. Production this year is forecast to be 6,100 million cf/d, and the shortfall of 1,800 million cubic feet will have to be met by net imports. The forecasts point out that LNG regasification terminals and increased pipeline capacity will contribute significantly to national energy security. The strategy is for PEMEX to continue importing gas by pipeline while parallel to this exporting significant volumes of gas via Reynosa (north-east Mexico) to the US market. Over the next two years Mexico will receive 1,500 million cf/d LNG, half of which will be destined for domestic consumption and the rest for the US market. Nearly all the gas entering via the regasification facilities along Mexico's northern border, about half the total, will be destined for the US market. For the time being there are five projects already or soon to be under construction on national soil and another five projects that are rated as potential.

Despite the importance of natural gas, the Department of Energy has not sidestepped the objective of energy diversification, which is why the Power Sector Construction and Investment Programme (POISE 2006–2017) proposes restricting its use to no more than 50% of power capacity, in order to stimulate a diversity of energy sources.

Renewable energies

The Department of Energy promotes the use of renewable energies and has joined the World Bank in drawing up a programme to this end. This will stimulate the use of renewable energy sources, i.e. hydroelectric, biomass, wind and solar. While the latter three will remain marginal in the next 15 years, wind energy will be at least relatively significant. Its potential has been estimated at over 700 MW, of which 2.12 MW have already been installed, with another 83.3 MW under construction.

Nuclear power

Promotion of this source began with the capacity boosting (+ 20%) in units 1 and 2 of the nuclear power station Laguna Verde. Among various project proposals now up for consideration, CFE has completed a study on building a new power station that would come on stream commercially from 2015. A nuclear programme is also being assessed that envisages an extra unit to begin operation in 2015 but with the potential to expand to 30 GW by 2030. The overall magnitude of this programme has not been announced in the light of public opinion.

Coal

Mexico's entire coal output is used by CFE, so that if any new coal-fired power stations are built, these will have to be fuelled from imports. CFE is therefore contemplating co-investment projects with coal companies to ensure reserves. There is every indication that coal-fired stations will be built, starting with one in Petacalco.

Biofuels: ethanol

There has been a top-level executive decision to turn Mexico into an ethanol producer, based on maize and sugar cane, from 1 January 2008. Adopted by a parliamentary majority in the Cámara de Diputados, the Bioenergy Promotion and Development Act of 2007 proposes a range of strategies to stimulate the production, marketing and use of biofuels. It also reflects the government's will to encourage the production of this fuel in order to help prevent and/or contain atmospheric pollution, create a market for emissions trading and facilitate the Clean Development Mechanism.[14] Nevertheless 2007 has not

[14] Agriculture and Livestock Committee of the 60th Legislature of the Cámara de Diputados, Draft Decree to expedite the Bioenergy Promotion and Development Act, November 2006. Cf. SENER-GTZ, "Factibilidad del etanol y del biodisel derivados de biomasa como combustibles para el transporte en México", (Projects ME_T1007-ATN/DO-9375-ME and PN 04.2148.7-001.00), November 2006.

yet seen the birth of any concrete policies or actions.

The natural destination for this fuel is the vehicle manufacturing sector, where changes can be expected such as new engine designs in the wake of advances in biofuels in the United States and other effects of the agreements now being drawn up with the car industry. This will be influenced by the level of integration in this sector across North America, which will inevitably also have an impact on Mexico.

Conclusions

According to CFE planning, the scenario for expanding gross capacity in the public utility also reflects changes in the composition of the sources of power generation, the biggest being: coal-fired (15.7%), nuclear (12%) and combined cycle (with the lion's share of 41.6%). Conventional thermal power stations will find their share reduced to 1.4%, and one category of technology has been left undefined in the forecast as a margin for future energy diversification.[15]

These substantial changes in the power sector will make their impact in the period to 2026, in line with CFE's internal planning. There will be a greater role for natural gas in the form of LNG, coal and nuclear power, with a marginal role for renewables.

Trade negotiations will feature in energy security in connection with long-term contracts for the supply of LNG to the Manzanillo terminal, contracts for the supply of coal to Petacalco, and agreements with PEMEX for the supply and use of combustoleo and for the supply of LNG to some independent producers (IPP).

Critical infrastructure is another key factor in energy security. The power sector builds infrastructure for fuel management with the aim of enhancing supply security. To this end, CFE has undertaken the following measures: ensure gas supply to installations, diversify sources and reduce the impact of price volatility.

6 Maintaining Critical Infrastructure

Visible advances have been made in maintaining and upgrading energy infrastructure on the part of the principal players in the sector, but where infrastructure of crucial future significance for energy integration with the countries of North America has not yet developed it has been proposed by the Security and Prosperity Partnership of North America (SPPNA).

The SPPNA was created on 23 March 2005 following an agreement by the Presidents of Canada, the United States of America and Mexico. It is now engaged in a process of "deep integration". Through the SPPNA format and via working parties involving various Mexican Ministers and their Canadian and American counterparts, along with representatives of private companies in the three countries, a number of codes have been drawn up under the heading "regulatory cooperation", and these are then implemented within national frameworks in the form of public policies flanked by "security measures".

In February 2007 the Partnership created the North American Competitiveness Council, consisting of leading members of business associations and private companies in the three countries, who formulated the following recommendations for the energy sector which, given the composition of the Council, stand every chance of being carried out.

- Cross-border energy distribution: a) strengthen trilateral cooperation on cross-border energy distribution issues, and b) enable Mexican corporations (including CFE) to engage in long-term contracts for the purchase of electricity;
- With the supply of petroleum ensured for the US economy, the NACC recommends: a) liberalising the trade, storage and distribution of refined products. This recommendation also addresses the construction, ownership and operation of pipelines. The retail-level ramifications would be a leap forward in bringing market pressure and discipline to PEMEX distribution operations; b) spin-off non-associated gas activities by PEMEX and set up a separate state entity called Gasmex. This initiative is consistent with the longer-term objective of liberalising the Mexican hydrocarbon sector.[16]

The SPPNA also advocates security and prosperity superhighways to provide major infrastructure links known as NAFTA corridors. Intermodal transport which combines land, air and maritime traffic is key to the United States. These corridors

[15] CFE, Programa de Obras e Inversiones del Sector Eléctrico 2005-2014, México, Gerencia de Programación de Sistemas Eléctricos, pp. 3-39, 3-40

[16] Cf. North American Competitiveness Council, "Enhancing Competitiveness in Canada, Mexico, and the United States. Private-Sector Priorities for the Security and Prosperity Partnership of North America (SPP)", February, 2007.

from Canada down to Mexico would have six-lane passenger highways, four lanes for trucks, 6 railway tracks and space for the underground distribution of gas, oil and electricity.[17]

7 Climate Change and Sustainable Development

Mexico contributes 3% of the greenhouse gases that are causing global climate change and ranks twelfth among the top emitting nations. However, as a developing country it has not undertaken any pledges to reduce emissions. The country has, nevertheless, instigated various measures designed to cut emissions and is moving towards agreed international commitments to contain this pollution. The measures include:

- an environment education campaign which includes planting 250 million trees as part of the Pro-árbol Programme and increasing the surface area of protected landscapes to 3 million hectares;
- a Greenhouse Gas Programme, involving 45 companies in various sectors and also public agencies such as PEMEX, which together account for 89 million tonnes of CO2 equivalent or 32% of all industrial emissions of greenhouse gases, by means of which Mexico hopes to convince these companies to reduce their emissions;
- CFE hopes that projects relating to renewable energies and the upgrading of transmission lines to reduce technical losses will be implemented through the Clean Development Mechanism so that its mitigation efforts can be traded. This is seen as an option to enhance the economic and financial viability of these projects.

More fine-tuned proposals for national strategies to combat climate change are found in the National Climate Change Strategy[18], which was completed in time for the G8 summit in Germany in June 2007, which Mexico attended as one of the G8+O5. This document proposes measures such as:

- Generation and energy use: apart from mitigating greenhouse gas emissions this also means achieving a cleaner energy matrix;
- Energy efficiency: in particular standard-setting, CONAE programmes and savings and efficiency programmes by FIDE;
- PEMEX cogeneration programmes, centralised power supply to oil platforms, improved refinery performance, and reduction of volatile methane emissions;
- Power generation and distribution by CFE and Luz y Fuerza del Centro (LFC): improved management of power transmission and distribution; thermal efficiency of thermal power stations fired by combustoleo, their conversion to natural gas and upgrading of thermal stations along the Pacific, and modernisation of the national refining system;
- Industrial sector: use of cogeneration in national industry;
- Renewable energy sources: power generation from renewables, introduction of sustainably produced biofuels;
- Transport: replacing the old vehicle fleet and encouraging the use of rail.

To sum up, the Climate Change Strategy seeks to encourage projects under the Clean Development Mechanism (CDM), to enhance energy efficiency at PEMEX, to promote renewable energies including bioethanol as an admixture to petrol and the installation of four cogeneration units in the refineries at Madero Minatitlán, Salamanca and Tula.[19] Of all these proposed measures, the greatest reductions in CO_2 equivalent per year are expected from the industrial sector, the CONAE programmes, conversion to natural gas and the upgrading of thermal power stations.

This strategy leaves some open questions, for example about quantitative evaluation, in particular calculating the overall reduction in emissions by 2014, which is given as up to 106 million tonnes of CO_2 equivalent. This means that Mexico would still be emitting 585 million tonnes in 2014, just 32 millions more than in 2002. This does not sound very realistic, especially compared with international values. Nor does the document indicate where the financial resources for these mitigation measures are to come from, and the references to CDM do not give adequate consideration to the fact that any resources acquired in this manner will be miniscule by comparison with national needs.

[17] Vojel, Richard, Monthly Review, vol. 57, no. 9.

[18] Comisión Intersecretarial de Cambio Climático, Estrategia Nacional de Cambio Climático, México , SAGARPA, SEDESOL, SEMARNAT, SER, SCT, SE, SENER, 2007

[19] Pérez-Jácome Dionisio, 10 años de regulación energética en México, Comisión Reguladora de Energía: logros y desafíos. México 2003.

While there is a will to participate in the international climate change regime, especially on the part of the Mexican scientific community, the problem of global warming has not been accorded the status of an energy security issue, nor of a national priority, much as in the United States. Although there have been pledges to reduce greenhouse gas emissions, the quest for cheap oil and the use of coal in the future power generation mix could limit the achievements of strategies to combat planetary warming.

8 Transparency in the Legal and Regulatory Framework

The Mexican energy sector is engaging in a series of mechanisms aimed at transparency in public activities. One of the most recent is the coordinated initiative by state entities and agencies launched on 12 February 2007 that is designed to enhance good governance in the energy sector and ensure accountability and transparency in the use of public resources. SENER, PEMEX and CFE are injecting new life into their auditing and control processes. The energy sector will review finances, budgets and performance and intends to evaluate compliance with standards, the efficient use of public resources and adherence to the goals and targets defined when drawing up public policies.

The audit committees[20] will follow three lines of joint action: first, broaden the scope and impact of auditing in the sector with a focus on prevention; second, review administrative regulation and internal processes, especially in the field of public works, procurement and contracting, with the aim of ensuring improved contractual conditions in the sector. They will also be verifying purchasing processes, returns and project implementation and reinforcing auditing functions, given that PEMEX and CFE alone account for 48% of all government contracting in Mexciso; third, strengthen the functionality and enhance the vigilance of internal auditing bodies.

Transparency and accountability mechanisms are also being pursued by other players, such as the energy regulator CRE, which has instigated a series of measures. The most salient of these relate to collective analysis and decision-making, recording of decisions and documents by the public registry, Web access to CRE resolutions and licences, public consultation, access to the information request system, and appeals handling.

Less visible but equally significant are the mechanisms imposed by US regulations and laws under the Sarbanes-Oxley Act. PEMEX is working hard, on the basis of the controls established by the latter, to improve its accounting and information systems and review the processes set in motion to monitor compliance with internal and external auditing and supervisory procedures and standards.

Mexico must also adapt to the requirements of the US Securities Exchange Commission[21] in valuing its hydrocarbon reserves.

This transparency culture[22] is being developed in all Mexican government entities. However, this in itself will not suffice to clear away old power structures and the dominant role that the leader of the executive was able to play with regard to the other organs of the state.

9 General Conclusions

The energy policy guidelines described in the St Petersburg Declaration are *de facto* part and parcel of the aims and strategies of Mexican energy policy, but they do not in themselves constitute a response to the challenges contained. Government policy has continued to express its desire to sign up to these guidelines, but there has not yet been any official statement on the subject. There are, however, two areas where convergence with Mexican interests can be identified: a) in international law and b) in the need for multilateral cooperation agreements. These are both areas in which Mexico has a proven active record.

Although one of the objectives of Mexican energy policy is international cooperation and a more dynamic role in global energy markets, there are probably two major constraints that would deter Mexico from supporting the international community fully:

1) Mexico is part of the "deep integration" process with North America, where the energy mar-

[20] Speech by Public Administration Secretary Germán Martínez Cázares as part of the "One Hundred Actions for One Hundred Days of Government" programme at the Salon Adolfo López Mateos in the Official Residence at Los Pinos, 13 February 2007.

[21] The Securities and Exchange Commission (SEC) is a regulatory agency responsible for administrating US law to protect investors. This legislation aims to ensure fair markets and provide accurate information to investors. The principal laws on securities were adopted in the 1930s after the stock exchange crash in 1929 and the weak functioning of the market in the early thirties.

[22] This is the mission of the Ministry of Public Administration.

ket plays a key role. This process is led by the United States and it responds in many respects to the national and energy security needs of that country, where Mexico and Canada participate as reliable market suppliers. Hence, Mexico's priorities lie with its northern neighbour and less with the international community. In this context, the St Petersburg Declaration could be seen as a potential rival to the SPPNA and the energy strategy of President Bush (2001-2005).

2) Mexico's geological situation has endowed it with mature oil fields that have now entered decline. The major investments that are being envisaged will serve to alleviate this fall in production. This situation has led to a shift in national policy away from its focus on the energy security of the United States towards energy security for Mexico. As a result, it would seem difficult for Mexico at present to contribute to a global solution, not only because almost all its oil exports (85%) are destined for the US market, but because it is heading for a production structure which will depend on the outside world for its energy supply.

This is already having an impact on the policy of dialogue with consumers. Whereas in 2005 President Vicente Fox undertook to deliver 230,000 b/d of oil for a refinery project in Central America, in April 2007 the current President Felipe Calderón announced changes in supply, reducing exports to these countries to 80,000 b/d, which is 60% less than pledged by his predecessor.[23] This jeopardises the joint project to build a refinery there.

Another field where there is a weak overlap of interests relates to energy diversification and climate change in the Mexican strategies. On other points, Mexico's interests tally precisely with the St Petersburg Declaration, given the international commitments which Mexico has undertaken in the framework of globalisation by accepting the rules, standards and institutions of the WTO and free trade agreements with various other countries.

Although Mexico has signed up to the terms for "free, efficient and transparent markets", there is a contradiction here that acts as a constraint and extends beyond the particular situation of Mexico: energy security in any country calls for a strong state and the rule of law in a framework of international cooperation. The challenge is to reconcile the criteria of security, state activity and the market in order to reach international consensus in the interests of global causes.

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[23] González Arrecis, Francisco, "México confirma menos petróleo para refinería", Prensa Libre.com, www.pensalibre.com/pl167954.html [11 April 2007].

GLOSSARY OF MEXICAN INSTITUTIONS

ASÍ	Ahorro Sistemático Integral *energy-saving programme for households by CONAE*
CONAE	Comisión Nacional para el Ahorro de Energía *National Commission for Energy Saving*
CFE	Comisión Federal de Electricidad *state-owned power utility supplying most of Mexico*
CRE	Comisión Reguladora de Energía *Mexico's energy regulator*
FIDE	Fideicomiso para el Ahorro de Energía Eléctrica *Trust Fund for Electric Energy Saving*
LFC	Luz y Fuerza del Centro *state-owned power utility supplying the area around Mexico City*
POISE	Programa de Obras e Inversiones del Sector Eléctrico *Power Sector Construction and Investment Programme*
PEMEX	Petróleos Mexicanos *state-owned oil and gas company*
PIDIREGAS	Proyectos de Impacto Diferido en el Registro del Gasto *long-term infrastructure projects with public assumption of debt and deferred impact on costs*
b/d	barrels per day
cf/d	cubic feet per day

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