

Canadian NATO  
Parliamentary Association



Association parlementaire  
canadienne de l'OTAN

**Report of the Canadian Parliamentary Delegation  
respecting its participation at the joint visit of the Sub-  
Committees on Transatlantic Economic Relations (ESCTER)  
and Energy and Environmental Security (STCEES)**

**Canadian NATO Parliamentary Association (NATO PA)**

**Texas, United-States  
June 24 to 28, 2013**

# Report

## I. Introduction

A delegation of 20 parliamentarians from 12 NATO member states and Sweden, an associate member, visited Austin and the Permian Basin around Midland, Texas from 24 to 28 June 2013. The main focus of the visit was to explore the boom in unconventional oil and gas production in the United States as a whole and in Texas in particular. The boom is not only radically altering the energy outlook of the United States, it also promises to recast its strategic outlook – a development with myriad implications for transatlantic economic and possibly security relations. The delegation of the NATO Parliamentary Assembly's (PA) Sub-committees on Trans-atlantic Economic Relations and on Energy and Environmental Security was jointly led by Leon Benoit (Canada) and Philippe Vitel (France).

Over the course of the visit, the delegation met with a diverse set of actors holding very different views on the unconventional energy boom, the opportunities it creates for the US economy, and its potential costs, particularly to the environment. The visit provided an opportunity for the parliamentarians to go beyond “the big picture”, take a first-hand look at the technological changes making this boom possible, and connect with people affected by events on the ground. The findings of the visit have been incorporated in the 2013 Economics and Security Committee report on the Economic and Strategic Implications of the Unconventional Oil and Gas Revolution [150 ESC 13 E].

While in Texas, the delegation also engaged in dialogue with one another and with subject-matter experts on topics of particular interest to both Sub-committees. Among the topics discussed were other matters of energy and environmental security, including the role of renewable energy in Texas, the pressures of water stress in the US south-west, and military energy initiatives; US defence and security policy; the state of transatlantic relations; the future of military airpower; as well as the way technological innovation has spurred economic growth in Austin.

## II. THE UNCONVENTIONAL OIL AND GAS REVOLUTION

On the first day, the delegation received briefings at the Lyndon B. Johnson School of Public Affairs at the University of Texas at Austin (UT-Austin) that set the stage for the remainder of the visit. **Professor Varun Rai**, Assistant Professor of Public Affairs at the UT-Austin, and Dr. Fred Beach, Fellow at the Center for International Energy and Environmental Policy (Jackson School of Geosciences) and the Webber Energy Group (Department of Mechanical Engineering) at the UT-Austin, presented the delegation with a general overview of where the United States stood in terms of energy security and energy efficiency. This led to a discussion on the geo-strategic implications of the unconventional energy boom and how it might transform both the US economy and the way US-Americans look at the rest of the world.

Professor Rai started by pointing out that there is a certain irony in the emphasis on energy security in the United States: Compared to many of its large allies, the United

States is much less dependent on energy from the outside world. While France, Germany, Italy, Japan, and Spain receive more than half of their energy from outside sources, the United States had only a net import of energy of 22 % in 2010. According to the US Energy Information Administration (EIA), this number is set to fall to 13 % in 2035. However, Dr. Beach argued that the EIA numbers are far too conservative as they overestimate consumption trends; according to him, already today, this number stands at 12.9 %. He conceded that it is still unclear whether the United States will become a net exporter of energy in the future, but under certain scenarios this is certainly possible.

Professor Rai told the delegation that it is odd that shale gas has gained so much media and policy attention when the bigger story in the United States is the boom in shale oil production. Since the 1970s, US oil production had been in decline, bottoming out in 2005/2006. Today, however, the country is already the third-largest producer of oil, and he suggested that in about five years it might, in fact, overtake Saudi Arabia as the largest producer in the world.

The two energy experts laid out the unconventional oil and gas revolution in greater detail, both from the technology and economic side. Their main message was that this revolution is just starting to take off. One important prospect they addressed was the opening of liquefied natural gas (LNG) export terminals on the Gulf of Mexico. At this point, natural gas prices are very low in the United States (between USD 3.79 and USD 4.42 per thousand cubic feet in May 2013), but high in other parts of the world (over USD 10 in Europe and USD 14 in Asia per thousand cubic feet), creating large export opportunities. While many regulatory obstacles remain, they were confident that these terminals will be approved. This will take five to ten years and cost a lot of money, but energy companies believe that there is money to be made by exporting LNG. Indeed, the EIA estimates that in 2035, US net exports of natural gas could amount to 5 %.

Turning to trends in energy efficiency, which they called the “fifth fuel”, they cited examples of where energy efficiency efforts have worked in the United States. In Austin, the construction of a 500 MW power plant had been avoided through energy efficiency measure. Another good example is California, where policy initiatives that began in the 1970s have driven vast energy efficiency improvements. Also, the Federal Weather Assistance Program which funds low income home improvements has yielded very good results, they said. However, a large energy efficiency puzzle remains: energy efficiency measures are very cheap and even generate money soon after investments are made, but investment levels remain low. It could, to a degree, be explained by market failures and behavioural issues. Solutions are beginning to emerge, they said, for example in the form of large-scale information systems, which are most useful in large organisations, feedback mechanisms for customers and producers, such as smart meters, as well as changing social norms. They also argued that President Barack Obama’s fuel efficiency standards for cars will have an impact on US energy efficiency.

**Hoxie Smith**, Director of the Petroleum Professional Development Center of Midland College, gave the delegation an impression of what role Midland College and his Center in particular played in the oil and gas boom in the Permian Basin along with a broad overview of the global and US energy picture and of the revolution in oil and gas extraction in the United States as a whole and in the Permian Basin in particular.

While the world will rely less on fossil fuel and more on renewable and nuclear energy in the long run, for the time being oil and natural gas constitute a very big share of the global energy mix, Smith told the delegates. That is why the renaissance of US oil and gas production is a very significant trend.

In the United States, individual landowners hold the mineral rights below their land – which contrasts starkly to European states. Due to these individual rights, US landowners have very strong incentives to extract these resources. In Australia, China, and South America, the public and governments also have a great interest in developing unconventional fields. However, public perception and government views regarding the development of unconventional oil and gas resources is decidedly mixed in Europe, mostly due to environmental concerns. Lastly, Russia and the Gulf countries have little interest in unconventional oil and gas because of the abundance of traditional oil and gas reserves in these parts of the world.

The main reason for the current unconventional boom is technological change, namely horizontal drilling and hydro-fracturing techniques. These new techniques have given previously abandoned oil fields a new lease on life. For example, in the Permian Basin, the Sprayberry field was formerly known as the ‘largest uneconomical oil field in the world’; now, it might be set to become the second biggest oil-producing field in the world.

Smith challenged arguments made by opponents of the new techniques that they pose a threat to groundwater. Hydraulic fracturing has been done for six decades, and he noted that there has been no documented contamination of potable groundwater in the region arising from the fracturing process, which occurs thousands of feet below groundwater aquifers. In addition, well bores were lined with two layers of cement and two metal casings to increase protection against accidental release of contaminants into shallower rock formations. Also, while the fracturing fluid indeed contains some harsh chemicals, most chemicals injected into rock formations were comparable to common cleaning products like soap. Many US companies disclosed the chemicals used on the internet to increase transparency ([fracfocus.org](http://fracfocus.org)). He also challenged the argument that the boom was purely speculative. Smith assured delegates that what is transpiring in the region’s vast oil fields is premised on the promise of a very significant increase in oil production. Smith also addressed concerns that the new techniques will overwhelm already water stressed region, due to the large amounts of water required for hydraulic fracturing. Companies, he said, are increasingly using brackish water instead of fresh water to fracture the rocks. He also went on to say that it is very unlikely that hydraulic fracturing could bring on dangerous earthquakes. Tremors and minor earthquakes are certainly possible and have indeed taken place, but these represent no danger to infrastructure. He underlined that energy companies have an interest in running their unconventional operations as safely as possible, as they do not want to be sued for damages. Smith argued that a lot of misinformation on these techniques exists in the public realm and that many opponents are partially driven by fear of the new.

The Permian Basin, which covers about 250 miles by 300 miles, was the region in the United States where most wells were being drilled at this point in time: The wells being drilled in the Permian Basin accounted for 27 % of new wells in the whole country. Texas as a whole held 24.3 % of US oil reserves and 29.5 % of US natural gas reserves. Its history as an oil producing region started in 1921. Today, there are over 1,300 oil

reservoirs and 30 plays identified. Currently, about 500 oil rigs are active. Smith outlined in great detail where oil and gas resources in the Permian Basin are found and explained the geology that made the Basin such a rich reservoir as well as the technologies that were needed to extract its resources.

At Midland College, the delegation also heard from **Willie Taylor**, chief executive officer of the Permian Basin Workforce Development Board. Both he and Smith discussed the challenge of meeting the booming economy's soaring labour requirements and the very special role that Community Colleges play in this process. Schools like Midland are working hand in glove with the local employers to ensure that the skill sets the school is imparting are relevant to the requirements of business, Smith said. This has worked particularly well in the oil and gas sector, as many oil companies eliminated training sections after the last oil price collapse. Now these firms work with the school to develop specialised training programmes for their employees.

The total population of the Permian Basin is around 420,000 people. In Midland, 29 % of the workforce is employed directly in the mining, logging, and construction sector, but naturally huge swathes of its roughly 120,000 inhabitants are indirectly profiting from the boom in oil and gas extraction. Midland has been through a number of booms in the past, but this one is without precedent, Taylor said. From a workforce development perspective, it is uncontrollable, he admitted. The region had not been prepared for the boom. Before its onset, no new apartment building had been built in two decades, leading to a massive housing shortfall that is still not fully resolved.

The Permian Basin Workforce Development Board has drawn up a list of target occupations which they send to high schools and colleges in the region, in order to stimulate targeted workforce development. Looking at job listings in the region of Midland and Odessa (a neighbouring town of about 100,000 inhabitants), Taylor said that truck drivers, managers of retail sales workers, and maintenance and repair workers top the list. In these jobs, people can earn premium wages. Despite the high wages, however, it is still difficult to attract people to Midland, due to its remoteness, its unattractive flat landscape, and its somewhat harsh hot climate, frequently plagued by sand storms. While employers can draw on workers from other regions within the United States, bringing in labour from other countries is very hard, in contrast to Canada for example where many foreign workers are employed in the oil and gas sector in boom regions such as Alberta.

The delegation met with other faculty and administrators at Midland College including its President **Stephen Thomas**, who explained in general terms the role of Community Colleges in America's educational system and the special role his institution plays in the economy of the Midland region. He stressed the critical contribution the school makes in training workers for the local economy and noted that this role has become all the more important as some companies no longer conduct basic training. The school has grown from an institution with 600 students to one that now has 7,000 students. The school also conducts non-credit training programmes that are very focused on skills development.

Hoxie Smith discussed the specific relationship between the oil and gas industry and Midland College and the work conducted by his Petroleum Development Program. That programme is designed to provide very specific training to prepare a work force suited to the needs of the local energy business. It trains petroleum economists, accountants, truck

drivers, managers, software developers, water managers, geo scientists and engineers all of whom are essential to the business. New hydro-fracturing techniques are also taught as well as a range of environmental management courses. Efforts are made to bring the best minds in the business to meet with these students. The programme also works with the energy industry to develop firm specific non-credit seminars that help local companies meet training requirements for their workers

The delegation also had an opportunity to visit a Chevron Training Facility in the Permian Basin. The facility is used to train newly hired workers slated to work out in the field. The training division has 27 field offices and employs state of the art computer training modules to ensure that the workers are fully up to speed on procedures and methods. The delegation was given a detailed tour of the training facility including a mock oil well which illustrated how these pumping systems work. The delegation also met with senior executives of Cadre Proppants Company in Brady, Texas. Companies like Cadre produce the sand mixes that are injected into hydraulically fractured rocks. The proppants literally prop open the rock which facilitates the release of trapped oil and gas. This is a critical element of the contemporary oil and gas business and companies like Cadre are experiencing a surge in demand for their products which are an essential element to the fracturing process.

The delegation also visited the Permian Basin Petroleum Museum in Midland. The Director of that museum, **Kathy Shannon**, provided an overview of the history of the oil industry in the region and the role that wildcat speculators played in developing the oil fields around Midland in the 1920's. Those wildcatters took enormous risks to drill oil wells, and many of them became extraordinarily rich if and when they struck oil. She also noted that the region's economy is utterly tied to the fate of the oil industry; when oil prices fall, the region's economy invariably plummets. This was the case during the Great Depression, by which time, Texas had become the leading producer of oil and gas in the United States. The Second World War triggered a surge in energy prices and the region recovered quickly from the malaise of the 1930s. The region's fortunes only grew during the 1950's as rapid US economic growth, an automobile-driven transportation revolution and national prosperity led to a surge in demand for oil.

Since the University of Texas owns the rights to an important share of leasable oil fields, it has enjoyed a funding bonanza that has helped underwrite major improvements to the Texas University system. This system, in turn, has become an agent of economic development in a range of other fields. In the early years, much of the gas that was produced in the drilling process was flared off rather than captured and sold. This changed over time, and now Texas has the infrastructure to capture and commercialise gas produced in the drilling process. The OPEC (Organisation of the Petroleum Exporting Countries) cartel helped drive up global oil prices in the 1970's and this obviously raised revenues in the region.

**Steven H. Pruett**, President and CEO of Elevation Resources LLC provided an investor's view of doing business in the Permian Basin. His company is an independent oil and natural gas company headquartered in Midland, Texas, whose mission is to develop oil and natural gas resources in the Permian Basin in an economical, sustainable and scalable manner. He first noted that some of the fields drilled in the 1930's are still producing oil and that fracturing technology has given these fields a new lease on life. He

also noted that fracturing techniques are not, in themselves, new and were used as early as 1947. The drilling techniques, however, have improved dramatically. This is the third time technological change has caused a large increase in production in the Permian Basin region.

To drill a vertical well can cost \$2 million while a horizontal drill can cost as much as \$10 million. All this drilling activity requires enormous amounts of support infrastructure including pipelines, storage facilities, transportation equipment etc. and there has been a boom in support industries in West Texas. Wages in the Permian Basin region have soared, with the average engineer salary now approaching \$300,000 and truck drivers making over \$100,000 a year. With a wage structure like this, it is very difficult to imagine the region successfully diversifying its industrial base. Simply put, the cost structure is already too high for non-energy related firms to want to operate in the Permian basin region. As a result, it will likely remain vulnerable to the kind of boom and bust cycles that have long been a feature of the local economy.

The situation in West Texas is very different from other parts of the world with the potential to develop unconventional oil and gas. The economic and regulatory environment in the basin encourages risk taking and rapid development of the industry. This is not the case in many other parts of the world. There is also a concentration of skilled workers and experienced managers that make these fields highly competitive. The business environments in Mexico or Argentina, by comparison, are far less dynamic and the state in both countries is far more interventionist and burdensome. These kinds of problems as well as matters related to population density, vegetation and water conditions are hindering the development of unconventional oil and gas industries elsewhere.

Higher prices and new drilling techniques are the primary drivers of rising production. The business is convinced that on-shore crude production will continue to rise. The Bakken field in North Dakota is producing an enormous amount of oil and this is driven by horizontal drilling technologies which have made that oil accessible. The challenge there lies in moving that oil to market. Bakkenoil is currently shipped by rail, and new pipelines would be needed to drive down costs. The US government has not yet approved the Keystone XL pipeline which will move crude oil from Alberta to Texas refineries. Although this pipeline would invariably enhance US energy security, it would actually compete with West Texas oil. Moving oil by pipeline is far safer and generally cheaper than moving it by rail.

The United States government forbids US oil producers to export crude oil although roughly 145,000 barrels were exported to Canada last year. The government does allow the export of refined products. Texas and Louisiana host the bulk of US refining infrastructure and it is likely that LNG refining will become part of the mix. Currently gas prices are so low that activity in the gas industry is slowing. Higher prices, possibly precipitated by the development of LNG export facilities, would likely encourage far more gas field development.

Mr Pruett said that the industry has every incentive to protect the region's scarce water resources, and he noted that there has been no case of a hydraulic fracturing operation hitting an aquifer in the region. One well known case in the northern United States was due to the failure of a well board that was not properly cemented. Regulations have since

grown more stringent. Mr Pruett said that such incidents today are highly unlikely. He did say that very old well boards could pose problems and this must be managed.

### **III. ENERGY AND ENVIRONMENTAL SECURITY IN TEXAS AND THE UNITED STATES**

**B. J. Stanbery**, President of the Texas Renewable Energy Industries Association (TREIA) discussed the outlook for renewable energy in Texas. He noted that Texas has been a leader in photovoltaic technology development and that enormous efforts have been made to develop the state's solar potential. TREIA works with solar, wind, biomass, geo-thermal and hydrokinetic firms in Texas, supports their development and helps them contribute to the state's energy output. It lobbies the state on behalf of these firms and works closely with regulators and public utilities officials. Texas has a self-contained electricity grid, while the other two US grids are regulated by the Federal government. TREIA needs to focus on the Texas legislature and the regulatory authorities in that state for matters related to the Texas grid, although it also deals with the US Congress, the Environmental Protection Agency and The Federal Electricity Reliability Council.

Legislation requiring that a fraction of total energy capacity be generated through renewables has been very helpful to the industry. Texas policy on renewable energy is based on a market-based approach, especially price signals and removal of administrative barriers. This approach awards performance and develops efficient markets its proponents argue. West Texas has become a critical generator of wind power, but efforts are still needed to develop the grid and build more transmissions lines. TREIA estimates this will cost \$6.85 billion. Customers in Texas have the capacity to choose their source of power.

The delegation had an opportunity to visit one of the largest solar farms in the state of Texas in Weberville. That facility is plugged into the electrical grid and the delegation learned about the pricing and regulatory mechanisms that help keep the operation profitable and contributing to the region's energy use profile in a manner that minimizes its environmental footprint. The cost of solar energy is constantly falling as technology improves and over the long-run it will be cost competitive with other fuels used in electricity generation.

**Kevin Gresham**, Vice-President, External Affairs, E.ON Climate & Renewables North America, argued that state policy makers in Texas have shown a great deal of foresight in helping to get renewables into the state's energy mix. E.ON is a leading operator of wind farms in the United States, and Texas is the country's largest generator of wind energy. Indeed, Texas is a very windy state and West Texas and the Gulf coast have different wind patterns which reduce the risk of intermittency. This allows the system to balance wind generated loads more efficiently. E.ON estimates that Texas can support a great deal more wind energy if sufficient investments are made to the grid. The wind sector is currently employing 26,000 people many of whom live in rural areas.

**Peter L. Pfeiffer**, Principal, Barley & Pfeiffer Architects discussed the many ways that homes and buildings can be built or modernised in such a way that energy consumption is dramatically reduced. He noted that at the level of public policy, it is essential to incentivize the construction of "green" buildings that use less energy and water than traditional homes. When this is done at scale, it can reduce both the demand for new energy



generation facilities and the environmental footprint left by homeowners. The insight that Mr Pfeiffer shared is that it can be far more effective to focus energy conservation efforts on the home rather than on energy production facilities. Simple design changes can bolster efficiency, improve health, lower energy use and reduce the environmental footprint of entire communities. Limiting the size of houses, ensuring that they are well-insulated and oriented properly to the sun, using natural vegetation for shading, growing garden plants that do not require too much water, and employing efficient lighting and appliances can do far more than solar panels to increase energy efficiencies. These solutions are often not expensive.

**Danny D. Reible**, of Environmental Health Engineering, and Director, Centre for Research in Water Resources at UT-Austin spoke on the relationship between energy and economic development on the one hand and water stress on the other. He noted that water is fundamentally under-priced as its scarcity is rarely reflected in the price consumer actually pay to use it. This is a fundamental factor in the current water crisis in west Texas. 58% of the water demand in Texas is generated in the agriculture sector which collectively constitutes about 0.6% of the economy. This is not economically sustainable. The stress on water reserves is now being aggravated by the rise of hydraulic fracturing. The Eagle Ford Formation has become a ground zero in the battle over water in Texas. In short, water is being drawn out of the aquifer at rates that are unsustainable and this is now exacerbated by continued severe draught in Texas.

The solution to this complex problem will necessarily be multifaceted. In agriculture, Texas may need to begin to switch out of crops that require a great deal of water. It is also important to develop a range of conservation measures, particularly as the population increases. Water treatment facilities are needed. Treatment to remove salt from saline ground water sources offers another potential means of addressing the shortage.

**John King** from RideScout, discussed the US military's efforts to become more energy efficient. President Obama has mandated that by 2025, 25% of the Department of Defense's energy come from renewable sources. Mr King noted that this has become a matter of some concern in the Department of Defense although it is secondary to ensuring the safety and operational effectiveness of US troops. Still there is ample room for improvement. If the Department of Defense were a country, it would rank 58th in the world in terms of energy use and 34th in terms of water use. 18% of US casualties in recent wars have been linked to efforts to provide fuel and water resupply to those engaged in forward operations. Energy and water supply puts U.S. forces in harm's way and so the matter has both direct and indirect security as well as budgetary and environmental implications.

There are a number of projects designed to make military installations more energy efficient even those operating in theatre. The key though is that these efforts should not in any way impede operations. The navy is conducting a lot of work in biofuels while the air force is pushing for lighter aircraft to lower fuel requirements.

#### **IV. MEETING WITH ENVIRONMENTAL GROUPS AND OPPONENTS OF THE PEROLEUM SECTOR**

The Delegation had an opportunity to meet with several opponents of the hydraulic fracturing. Dewayne Quertermous, the Chair of the Sierra Club's "Beyond Natural Gas" effort described the work of the Sierra Club. He noted that one goal of the organisation is to move the national economy away from fossil fuels. He suggested that while natural gas burns cleaner than coal, it is not in itself a clean technology. He noted that methane, which is a by-product of natural gas production, has a powerful impact on global warming. A recent study by the National Oceanic and Atmospheric Administration (NOAA) and the University of Colorado, Boulder, estimates that natural-gas producers in an area known as the Denver-Julesburg Basin are losing about 4% of their gas to the atmosphere. Given that methane is 25 times more efficient than carbon dioxide at trapping heat in the atmosphere, releases on that scale could effectively offset the environmental edge that natural gas is said to enjoy over other fossil fuels. Mr Quertermous suggested that LNG, therefore, has myriad climate effects and that the fracturing technology employed to bring up gas is affecting water quality - something that representatives of the industry strenuously deny. He noted that the average fracked well uses 3-5 million gallons of water and indicated that much of this water is removed from the hydrological cycles or becomes a source of pollution.

Mr Quertermous told the delegation that current estimates of gas reserves in the United States are significantly overstated and that they do not factor in rapid depletion rates. Projections, he argued, tend to be made on the "sweet spot" of the plates, not on the entire plate and this biases estimates upward. He said that rather than focus political and economic resources on developing unconventional oil and gas fields, funding should be targeted on developing and commercializing renewable energy sources.

**Deborah Rogers**, Executive Director, of the Energy Policy Forum offered an economic critique of the promise of unconventional oil and gas. She argued that much of the hype about the industry is actually a cover for what she termed a land grab. Rogers said that those dealing in land leases in oil and gas producing regions have a vested interest in overstating reserves, as this endows those leases with a greater value. Because gas today is very cheap, much economic attention is focused on the lease market. She argued that unconventional gas and oil production are not likely to be highly profitable over the long-term and that externality costs are not being included in the final price. Among these costs, she listed road damage, which she said are costing more to the state of Texas than the revenues it generates from the industry. This, she argued, has also been true in Arkansas and Pennsylvania. She also noted that in parts of the country, oil is being shipped by train, which is three times more expensive than using pipelines. She openly wondered why more new pipelines were not under construction and suggested that this, in itself, could reflect a lack of confidence in the long-run prospects for the business. She also noted that well production tends to be very high initially but that it rapidly tails off and this, in turn, has required the industry to drill constantly for new wells. She suggested that production in the Baaken region peaked in June 2010 and this could reflect a broader pattern in the industry. Again, this is an argument that industry representatives rejected.

Another critique of the industry was offered by **Sharon Wilson**, an Organizer with EARTHWORKS' Oil and Gas Accountability Project. She first suggested that the amount of water the unconventional oil and gas industry is using has been understated. She suggested that claims that water is being recycled are misleading as some of the water is pumped too far below the surface and becomes unrecoverable. Her primary focus, however, was on the alleged health consequences of the industry and particularly the chemicals that the industry is allegedly releasing into local environments. She suggested that exposure to chemicals used by the industry has led to persistent skin problems, fatigue and other illnesses.

Ms Wilson also discussed some of the social cost linked to the booming oil and gas industry in Texas. A massive and sudden influx of workers into oil and gas regions is overloading social services, housing supplies and schools. There have been large spikes in drug arrests and sexually transmitted diseases in rural communities and this is a pattern that has been found in other communities across the country where unconventional oil and gas drilling is underway. Finally the manner in which litigation over some of these issues is conducted was also discussed. The industry tends to settle lawsuits with “gag orders” that prevent public disclosure of the issues at hand in the case. This tends to limit public discussion about the environmental consequences of the industry and it denies access to information to those communities that are contemplating offers from the industry to allow drilling. According to Ms Wilson and Earthworks, this has gravely complicated efforts to collect data about the impact of the industry on public health and the environment.

## **V. US DEFENCE AND SECURITY POLICY**

The visit of the Lyndon B. Johnson School of Public Affairs gave the delegation an opportunity to discuss current US defence and security policies, including a conversation on how to strengthen transatlantic ties with Ambassador Robert Hutchings, the Dean of the School whose diplomatic past include positions such as Chairman of the U.S. National Intelligence Council and Director for European Affairs with the National Security Council.

**Professor Eugene Gholz**, Associate Professor at the School, spoke to the delegates about defence procurement in times of limited budgets. Already in early 2010, at a time when Professor Gholz was working for the Pentagon, did the then US Secretary of Defense, Robert Gates, begin worrying about future budget cuts. Secretary Gates thus started two initiatives designed to help ease into these cuts, namely the “Efficiency Initiative” and the “Better Buying Power” initiative. Under these initiatives, the Department of Defense (DOD) could spend money saved in one area on other more pressing defence items. However, in 2011, gentle cuts of about USD 50 billion were made in future projected spending. Since then, however, a grand bargain on the US budget has failed to materialize, and sequestration hit in 2013, a budgetary instrument that Professor Gholz likened “to cut meat with an axe”. Sequestration more or less doubles the cuts already in place.

Professor Gholz dispelled the notion, often put forth by politicians, that the defence budget protected jobs. He argued that “defence spending is an extremely inefficient way to prop up employment”. The DOD itself does not like this argument, he said, in part because it insults their professional pride: “The military is not in the business of promoting jobs, but

defending national security". Also, defence products are very capital - and technology-intensive, limiting the effect of defence dollars on jobs compared to many other government spending. Instead, he maintained that small, targeted investments in parts of a defence system's supply chain made sense in order to protect the kinds of jobs where it would be very expensive and very time-consuming to retrain workers in the future. It makes no sense to continue a full programme only because one wants to protect one crucial part of it, he argued, calling this approach "a billion dollar solution to a million dollar problem". He cited the repeated desire on the part of Congress to continue producing Bradley Fighting Vehicles, even though they are not needed. The DOD preferred targeted investments to "right-size" factories and update manufacturing techniques, maintaining the skills that would be needed to build new platforms, such as fighting vehicles, if the need for them arises in the future.

To show examples of how complex supply chains of defence platforms are today, he laid out a number of concrete cases. Often, thousands of facilities were involved, with foreign facilities often making up more than 10 % of supply chains. A key theme for protecting the vital defence jobs was that companies that were mainly focused on defence contracts needed to be encouraged to increase their commercial activities. If this was not possible, then these companies, often small and medium enterprises, should qualify for small and targeted investments by the government.

Another crucial problem with cutting defence spending by cutting programmes was that, because supply chains between systems are so interconnected today, costs for other programmes would go up exponentially, which meant that the DOD would not save as much money as might be hoped for. This required in-depth analysis, and sequestration was not a tool that would lead to such analysis.

Defence procurement is rather globalised, Professor Gholz pointed out. For one, the defence markets in Canada and the United States are already integrated substantially. However, contractors in Mexico and Europe also provided many services to US programmes. Even Asian contractors received parts of the pie, albeit mostly through commercial products. On top of this, often US facilities were owned by foreigners.

Professor Gholz concluded that defence spending can and will come down, but these cuts needed to be made carefully, not through blunt instruments such as sequestration.

**Professor Jeremi Suri**, Mack Brown Distinguished Chair for Leadership in Global Affairs at the Lyndon B. Johnson School, talked to the delegates about the foreign policy dilemmas created by today's diffuse threats and an environment of scarce resources.

Professor Suri's research focuses on the question of how Americans are thinking about security and foreign policy over time and how past thinking influences their thinking today. Regarding defence spending levels, US public perception traditionally has been very much influenced by public debt as a percentage of GDP, i.e. when public debt was low there seemed to be more money to invest into security and defence budgets. While he did not think that this is the best way to think about spending money on security and defence matters, these perceptions that often drive US budgets. He feared that in the future there will be fewer resources available for these matters, and in particular the budgets for the State Department and foreign aid will be cut more, compared to military budgets – even

though such cuts will be short sighted, he believed. 'Short sight-ism' is not unique to the US public foreign policy mind set, but it is unfortunately very prevalent, Suri said.

On top of these resource concerns, the fact is that threats have been becoming more diffuse since the days of the Cold War. No single threat, like the Soviet Union of old, remains. Ironically, the United States is safer today than at any other time in the country's history, Suri argued, but the wider range of smaller threats makes it more difficult to assess where scarce resources need to be spent. China, the Korean Peninsula, Iran, Syria, cyber security, and terrorism are all issues that need to be addressed through foreign policy, but how do these threats compare to each other and which security issue commands more resources to be spent, he asked. The answers have not been answered clearly. Therefore, Professor Suri argued that the US foreign policy establishment and the public needed a thorough discussion on a) what the goals and priorities of US foreign policy should be, b) how many resources should be spent on these goals and priorities, and c) how progress should be measured. The United States has not undertaken these discussions in over 50 years. These are not partisan issues, he added. The key struggle is to find a new way of thinking about these questions, and in this regard, the input of allies could be vital, Professor Suri told the lawmakers.

The delegates also engaged Professor Suri on a wide range of topics, including the US "pivot" to the Asia Pacific region, the revolution in oil and gas markets, the right balance of soft and hard power, and burden-sharing in the Alliance. In these discussions, Professor Suri argued that the relationship between China and the United States was not one of pure containment and that the pivot was building on existing multilateral relationships. Answering a question of whether the world needed a greater number of well qualified analysts, Professor Suri replied there is no lack of good political analysts who can answer the strategic questions of today, but he believed that politicians do not always listen to them. He cited President Dwight D. Eisenhower as an excellent example of a President who listened to and debated with policy advisers. He furthermore called for more and better training of personnel who get jobs in US government institutions because today's challenges were indeed very complex.

## **VI. THE FUTURE OF MILITARY AIRPOWER**

In Austin, the Sub-Committees held a roundtable on the future of military airpower with three aerospace defence companies – Boeing, Lockheed-Martin, and Sikorsky Innovations – in part to produce input for a 2013 Special Report by the Science and Technology Committee on "The Future of Combat Aircraft: Towards a 6th Generation?"

**Richard S. McCrary**, Director of International Business Development at Boeing Military Aircraft, presented his view on how airpower has been transformed since the end of the Cold War and how NATO and industry have interacted since then. After the collapse of the Soviet Union, member states wanted to earn a "peace dividend", but at the same time, NATO took on a broader role and was more involved in peacekeeping missions. This, over time, led to innovative approaches in sharing operating assets, for example with regard to NATO AWACS and C-17s as well as the air policing mission Baltic Quick Reaction Alert. Today, challenging turbulences imposed by the global economic situation and US concerns about unfair burden-sharing in the Alliance exist, McCrary said.

These background factors affected the aerospace defence industry severely, Mr McCrary argued, most notably in the production of fighter planes which dropped very sharply after 1990. At that time, seven to nine production houses could produce fighter aircraft in the United States, today there are only two. In the current environment, development cycles are too long, too costly, and out of step with threat developments, Mr McCrary told the delegates. In today's world, he told the delegates, the "half-life" of technology is getting shorter: The time it takes to effectively counter new aerospace systems is being shortened considerably, which could destabilize the global strategic environment.

The military and the industry face similar challenges, Mr McCrary said. He argued that high-technology systems created the impression with governments that fewer aircraft and sorties as well as less training are needed, but quantity has a quality of its own, he argued. Indeed, too few aircraft are being built and bought today. He called for better threat analysis to get the right funding for military aircraft. The Cold War years were easy in this regard because of the single focus on the Warsaw Pact. Furthermore, he said that commonality of future systems is important, but this does not necessarily guarantee interoperability. Lastly, Alliance needs must be balanced against national needs, he said.

**Steve Williams**, Regional President, Continental Europe in Lockheed Martin's Corporate International Business Development unit, started out by saying that NATO member states needed to be prepared for strategic surprises at all times, citing the Improvised Explosive Device (IED) threat as a military surprise which caught the Alliance unprepared. In the air domain, he argued that Allies might be in for similar surprises, for example because of the advances in air defence systems. Already, he argued, the Alliance could not run an operation in Syria that would be similar to the one over Libya. He maintained that three attributes are essential for future aircraft: They needed to be cheap, survivable, and different from what is out there today.

Mr Williams further argued that Allied states were much better off when they stood together. The F-35 programme was an expression of this desire. Whereas the F-16 was developed by the United States alone and only subsequently spread across the Alliance, with the F-35 the thought was to start developing an aircraft together from the outset. These multi-national approaches needed to be reinforced, Williams posited. However, for the immediate future, he saw a number of challenges to a robust defence and security stance. The discussions over burden sharing needed to be resolved for NATO to move forward, and the United States armed forces, due to the large military budget cuts, needed to avoid turning into a "hollowed-out force".

**Chris VanBuiten**, Vice-President of Sikorsky Innovations, presented his view of what the future of airpower would hold and which role rotorcraft would play. Mr VanBuiten challenged the notion that the future of airpower would still be represented by fighter aircraft, the symbol of the airpower throughout the Cold War. Recent conflicts have proven that destroying air defences and taking airports was more representative of the type of airpower that was emerging, and that rotorcraft were ideal for these tasks. Rotorcraft have proven their mettle in the asymmetric conflicts of today as well as in the civilian world, Mr VanBuiten argued. Helicopters serve in the roles of troop transport, urban operations, medical evacuation, search and rescue, as well as disaster relief. And they would remain invaluable in the future as well.

In terms of future technologies, Sikorsky Innovations and the rotorcraft industry as a whole are working to make helicopters even more independent of infrastructure. Mr VanBuiten argued that potential conflict zones often do not have proper runway for fixed wing aircraft to land, making helicopters indispensable. However, he also cited the F-35 Vertical Take-Off and Landing (VTOL) variant as a very interesting aircraft for such missions. Future air systems will also be more flexible than they are today, VanBuiten said, pointing to the joint multi-role Blackhawk as an example which served 22 different missions across all three US military services. System of systems approaches would become more important too. Citing the Russian Doll as an inspiration, cargo aircraft could carry helicopters into conflict zones that would in turn carry small Unmanned Aerial Vehicles (UAV) on board. Mobility would also play a greater role, as the lack of infrastructure or the threat of IEDs would force equipment and troops to be lifted from one zone to another in often very large theaters. Helicopters would become faster, with Boeing and Sikorsky Innovations collaborating on a replacement helicopter for the Blackhawk and Apache that would be twice as fast. They would furthermore be able to fly closer to the ground. Indeed, whereas fighter aircraft, even stealthy ones, will become increasingly vulnerable to air defences, such helicopters could evade them more easily and deliver more firepower. Rotors are in development that could shift shape in order to switch between different profiles, maximizing for fuel efficiency, low noise levels, velocity etc., thus making them more adaptable. However, taking the current economic and fiscal environment as a starting point, rotorcraft will become more affordable in his view. By being connected throughout the system, costs could be held down as mechanics will know when exactly it is wise to replace parts. UAVs will play a greater and greater role, VanBuiten said, as they could be launched as scouts from helicopters for example. Future helicopters will also become more fuel efficient, and Sikorsky Innovations is already conducting test with electric helicopter motors.

In the discussions between the industry experts and the delegates, a multitude of topics were discussed, including progress on the F-35 programme and how mistakes made in this process can be avoided in the future. Williams and VanBuiten both agreed that more international co-operation on defence projects is viable. VanBuiten pointed out that in the lean budget times ahead, defence companies can keep their workforce sharp by increasing commercial revenue and forging forward with technology demonstrators independent of governments' current requirements. He also spoke about the right balance between stealth and velocity in future fighter jets. McCrary argued that during the Cold War, it was learnt that it was less and less practical to develop even faster jets. He went on to posit that the level of stealth that fighter jets will possess down the line will also settle at an equilibrium point where increasing the level of stealth further will not be practical, due to rising costs and higher maintenance requirements for example. McCrary and VanBuiten agreed with some delegates that argued that the High North will pose large challenges in the future, as the ice is melting in the Arctic. This creates special requirements for fixed and rotary aircraft, and the industry is working to meet them.

## **VII. AUSTIN: ECONOMIC GROWTH THROUGH TECHNOLOGICAL INNOVATION**

The delegation met with several academics and members of the Austin policy community to discuss the important role the university plays in the economy of Austin and in the state

as a whole. Indeed, Austin has become one of the most important innovation centres in the United States, and this is partly due to the location of a globally consequential research university in the heart of that city. But it also reflects important public and private efforts to capitalize on the university's location, the research it generates, and the kind of people who have been drawn to Austin for this reason.

**Juan Sanchez**, the University's Vice-President for research noted that the University of Texas has 50,000 students of which 12,000 are graduate students working on their Masters and Doctoral degrees. Faculty and students are recruited globally. The university's annual budget is \$2.2 billion. There are currently 4,800 funded research projects underway at the university and these are spread out over 150 research units. Research funding totalled \$620 million in 2012. The University of Texas at Austin holds over 800 patents based on this research. The university sees its mission to educate, to generate knowledge and to disseminate that knowledge.

There is also a growing interest in the commercialisation of this knowledge and this has led to innovative partnerships with the private sector. A large share of the research is in the areas of engineering as well as the physical and biological sciences. Most of the funding is for engineering, computer studies and bio-medical research but the university is also very well known for the research it conducts in the petroleum and geology sectors. Over the last six years, the university has doubled the amount of research funding from the private sector, although the Federal Government remains the most important funder of University research. There is concern at the University of Texas, as at other major American research universities, that major reductions in federal support for basic research could slow or even halt myriad projects that the private sector will never pick up. The private sector tends rather to support applied and not basic research.

UT-Austin ranks among the top 15 in the United States in generating revenues from the technology licenses it issues based on its patents. The University has the world's sixth fastest computer and this is a critical tool for some of the advanced researched underway at the school. It has made important advances in small particle accelerators and the school has actually started a company to sell these accelerators commercially. The university received \$20 million in royalties in 2012 and a number of faculty members are positioned to supplement their salaries by producing research with the potential for commercialisation.

**Lauren McKinney** from Governor Rick Perry's Small Business Office noted that the Texas economy is globally integrated and that the state benefits enormously from open trading systems. It has benefitted from the North American Free Trade Agreement (NAFTA) and its business community would welcome a transatlantic free trade area. Support for open trade in Texas is widespread and the state is well situated to prosper in a liberal trading order. It is supremely well situated as it borders the heartland of the United States, Mexico and the shore of the Gulf of Mexico. Economic regulation in the state is very trade friendly; taxes and the regulatory burden are low and the cost of living in the state is highly competitive. 18 % of the state's output is traded as compared 9.8 % for the United States as a whole. The state's population is growing rapidly and it is young. Austin is the centre of the state's high technology industry and the state has nearly 4,500 high technology companies accounting for 14 % of total employment. Moreover many



companies are relocating to Texas from other states in the country. It is not surprising that Austin was the last major city to fall into the recent recession and was the first one out of it.

**Ben Ramirez III**, the Economic Development Manager at the Austin Economic Growth and Redevelopment Services Office noted that 40 % of the city's population holds a four-year Bachelor's of Arts degree and that many of the young people in the city have come from other parts of the country. The city has supported a range of projects to advance work force training. It collaborates closely with the private sector to ensure that the skills they need align with the skills of the inhabitants of the city. The city is very focused on attracting diversity, talent and ensuring a high quality of life to keep talented people in the city. The University of Texas has played a central role in all of these areas. Its high technology incubators across various sectors have helped fashion a very holistic approach to meeting these needs. The city works with eight local universities on these projects. The City Council founded a Telecom Emerging Technology Council, and the city works to facilitate networking and marketing. The city also has a small business development program to help entrepreneurs start-up firms. The city provided land in the centre of Austin for the construction of a smart grid research community to help design energy systems for the future. Some companies that have committed to invest in the region receive tax reimbursements if they manage to create a certain number of jobs.

**John Butler**, the Director of the IC<sup>2</sup> Institute at the UT-Austin discussed the role of the IC<sup>2</sup> Institute in Austin's transformation into a veritable city of science and innovation. The basic intuition was to put science and technology at the very centre of the city's development planning. Other cases including MIT Boston and Stanford in Silicon Valley were studied and this helped shape the direction the University and the planning community followed. The Austin Technology Incubator program has been an unmitigated success while forging a number of links between the university and the private sector in the Austin area. One result of this close collaboration among the university, the city, private commercial actors and the financial community is that it has helped reduce and manage risk for would be entrepreneurs. This has helped advance the commercialisation of basic research. This effort has even led the University to create a Masters Degree in Science and Technology Commercialisation, which endows graduates with a deeper understanding about how to move science out of the laboratory and into the process of wealth creation. The University has begun to work with Russia, the Republic of Korea, Poland and Mexico on similar projects. "Angel" investor networks have sprung up throughout Texas and these help bring critically needed finance to technology start-up companies that cannot generate financial capital through traditional banking networks. This is a critical element of the incubation process. Such efforts have helped make Austin the third ranked city in the United States for high technology firms after Silicon Valley, which is linked to Stanford, and Route 128 around Boston which is linked to MIT.

Respectfully submitted,

Mrs. Cheryl Gallant, M.P., Chair  
Canadian NATO Parliamentary Association  
(NATO PA)



## Travel Costs

<b>ASSOCIATION</b>	Canadian NATO Parliamentary Association (NATO PA)
<b>ACTIVITY</b>	Joint Sub-Committee on Transatlantic Economic Relations (ESCTER) and Sub-Committee on Energy and Environmental Security (STCEES) Visit
<b>DESTINATION</b>	Texas, USA
<b>DATES</b>	June 24 to 28, 2013
<b>DELEGATION</b>	
<b>SENATE</b>	
<b>HOUSE OF COMMONS</b>	Mr. Leon Benoit, M.P.
<b>STAFF</b>	
<b>TRANSPORTATION</b>	<b>\$2,587.37</b>
<b>ACCOMMODATION</b>	<b>\$1,400.95</b>
<b>HOSPITALITY</b>	<b>\$0.00</b>
<b>PER DIEMS</b>	<b>\$490.14</b>
<b>OFFICIAL GIFTS</b>	<b>\$0.00</b>
<b>MISCELLANEOUS / REGISTRATION FEES</b>	<b>\$305.43</b>
<b>TOTAL</b>	<b>\$4,783.89</b>