

The Bitumen Cliff

Lessons and Challenges of Bitumen
Mega-Developments for Canada's
Economy in an Age of Climate Change

Tony Clarke, Diana Gibson, Brendan Haley, and Jim Stanford





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Summary

THE ENORMOUS BITUMEN developments taking place in northern Alberta today are collectively considered to be the largest industrial project on the planet. These projects will have dramatic impacts on the economy and the environment; they are also affecting the nature of the Canadian federation, and the structure of society itself. While the booming bitumen extraction and export industry supports important jobs and incomes, it is having a range of complex effects on other economic and social variables – both direct and indirect, intended and unintended. The full range of these effects has not been adequately analyzed or debated by Canadians.

To help understand the broader economic consequences of the bitumen boom, this report applies the staples theory of resource extraction and export (as developed by Harold Innis and other Canadian writers). Viewed through a historical lens, the bitumen industry both reflects and reinforces Canada's traditional role as a supplier of raw materials (fish, fur, wheat, timber, minerals, etc.) to more developed and powerful industrial centres (e.g. France, Britain, the U.S., and today China) in the global economy. A risk of any staples development strategy is what Innis called the "staples trap." Staples-based economies must make enormous fixed-cost investments in production and transportation infrastructure, generally undertaken by large, often foreign-owned companies. To pay off these overhead costs and reward investors, staples industries face an enormous motivation to produce and export their staple faster.

This strategy is expensive, and potentially self-defeating: rapid export can drive down unit prices (a perverse trend already evident in the case of Canadian bitumen, with the costly “Canadian discount”), and revenues can also be threatened by technological or consumer changes which reduce demand for the staple in question (a longer-term threat which is also clearly relevant to the case of bitumen). As staples are exported in raw form to more industrialized trading partners, Canada is left to buy back processed, value-added products and service at a much higher cost. The combined outcome is a self-reinforcing staples trap, whereby the faster Canada exports its latest staple, the less diversified and capable the economy becomes — and hence all the more dependent on finding more staples to export. These economic, environmental, and geopolitical risks of staples-based development strategies must be weighed against the shorter-run economic gains that accompany major resource expansions.

This staples analysis helps us to understand the bitumen boom and its accompanying effects, both positive and negative, along several dimensions:

- In one of his first international statements, Canada’s Prime Minister declared Canada to be the “world’s next energy superpower,” with the bitumen industry as the centerpiece of this strategy. Surging commodity prices and unique trade rules (in particular NAFTA’s unprecedented “energy sharing” provisions) have reinforced the renewed dominance of staples exports in shaping Canada’s economic trajectory, and cemented Canada’s emerging structural role as North American energy storehouse. The result has been a largely unplanned and unregulated boom in the extraction and export of raw bitumen. All the classic features of a “staples economy” have become increasingly visible as this trend gathers momentum: including heavy investment in production and transportation infrastructure, growing reliance on foreign capital, disproportionate political influence of staples-producing corporations, and growing regional inequality.
- The growing bitumen industry has had dramatic effects on the international value of the Canadian dollar, and consequently on other tradable industries in Canada. Historically high global commodity prices have produced extraordinary profits for the petroleum industry and related companies. The consequent surge in the market value of Canadian petroleum and mining companies has attracted a corresponding surge of foreign investment: both portfolio flows and foreign direct investment (including a spate of resource-sec-

tor takeovers which has driven inward foreign direct investment to its largest share of Canada's economy in decades). These effects, reinforced by self-fulfilling expectations among currency traders (who believe that the loonie is now a "petro-currency"), contributed to a decade-long surge in the exchange rate, culminating in the substantial overvaluation of the Canadian dollar (which, at par with the U.S. dollar, is almost 25 percent higher than its fair value according to purchasing power comparisons). This has negatively impacted Canada's other export-oriented industries: both non-resource commodities (especially manufactures), but also tourism and tradable services (such as business services and transportation). Defenders of status quo policies have reacted with vitriol to the mere suggestion that the oil-fueled surge in the currency could possibly impose any downside whatsoever on other industries or other regions. But this vitriol cannot hide the overwhelming economic evidence that high oil prices and surging oil production are key factors behind the appreciation of the Canadian dollar, and that the high dollar in turn has been a key reason for the contraction of all other major tradeable industries in Canada (including, but not limited to, manufacturing).

- Because of the decline in all non-resource tradeable industries, the impact of the bitumen boom on the structural make-up of Canada's economy has been two-fold. First, Canada's exports have become increasingly concentrated in unprocessed or barely-processed resource products. This reversed the progress that Canada made during the latter part of the 20th century (by the end of which, close to 60 percent of all merchandise exports consisted of value-added products, rather than resources). Today, in contrast, resources once again account for the large majority of all exports. Secondly, there has been a marked shift of employment and production into non-tradeable industries (since the overvalued exchange has made Canadian-made tradeable products, including tradeable services, punitively expensive); this disengagement from tradeable sectors has been very damaging for Canadian productivity and incomes.
- While the bitumen boom reveals classic features of the "staples trap," Canada's current reversion to staples-producer encounters an additional, troubling dimension — as a result of climate change. It is well-known that the greenhouse gas emissions from the bitumen industry are immense: bitumen production is far more carbon-intensive

than conventional oil production, and the industry's impacts on forests and water resources exacerbate the net impact of the industry on carbon concentrations. The growth in greenhouse gas emissions from the bitumen industry is swamping efforts at conservation in other parts of Canada's economy; indeed, the petroleum industry accounts for over 100 percent of the net growth in Canada's total greenhouse gas emissions. Perversely, the growing importance of the bitumen industry locks Canada into an increasingly carbon-dependent development path, at the very moment in time when other countries are shifting aggressively toward more sustainable, low-carbon strategies. By investing so heavily in an industry that is ultimately constrained by climate change, Canada limits its capacity to adapt to climate realities, and undermines our ability to foster new, sustainable industries. In essence, the "staples trap" has now also become a "carbon trap," locking Canada into a carbon-intensive economic structure for which the costs and risks of future climate adaptation will be all the more difficult.

- Canada's return to a staples economy reveals classic political consequences, too. The concentrated political influence of this latest staples industry, anxious to recoup (as quickly as possible) its enormous investments in bitumen export, shifts the nature of politics in Canada as a whole. The growing political influence of the petroleum sector, both provincially and federally, constitutes a kind of "petro-state" in Canada, wherein the petroleum industry exercises disproportionate influence over all public policy. Through a mix of legislative, regulatory, taxation, lobbying, and related initiatives (including the demonization and intimidation of contrary voices), both the federal and Alberta governments have acted to protect the bitumen industry and expand its reach, thereby locking in a staples-based future all the more firmly.

In the context of this structural analysis of staples development and its economic and political consequences, Part Two of *Bitumen Cliff* goes on to evaluate more specific economic impacts of the bitumen boom, both positive and negative:

- *Employment Impacts:* Although 16,500 mostly well-paying direct jobs were created in the petroleum industry (mostly in bitumen-related developments) in the decade ending in 2011, this amounts to less

than 1 percent of all the new jobs generated by the Canadian economy during this period. Meanwhile, some 520,000 manufacturing jobs alone were lost in Canada in the same time frame. Being such a uniquely capital-intensive industry, petroleum extraction demonstrates among the weakest job-creation effects of any sector in the economy as a whole. Jobs lost in other tradeable industries vastly outweigh jobs created in the bitumen sector.

- *Income Distribution:* While the bitumen industry provides a number of well-compensated jobs, total labour income constitutes a uniquely low proportion of the industry's total revenues. Indeed, the dramatic expansion of petroleum production (with its uniquely low share of labour compensation) has been an important cause of the overall shift in national income away from labour income and towards capital income. In the three oil-producing provinces, corporate profits account for a much higher portion of GDP than in the rest of Canada. And even in Alberta, high nominal wages are offset by soaring prices for housing and other essentials; incredibly, real wage growth in Alberta has been among the weakest of any province.
- *International Trade:* Canada's petroleum exports have steadily increased over the past decade, but non-petroleum exports (including manufactured goods, tourism, and tradable services) have declined at a much faster rate. The decline in non-petroleum exports has been 8.5 times greater (measured as a share of GDP) than the increase in petroleum exports. As a result, Canada's overall export performance has deteriorated dramatically, and we now experience a large and chronic current account deficit. Among the contributing factors behind this imbalance are the continuing net outflow of profit and dividends on foreign investments in the petroleum industry, and the reliance on imports for the vast majority of machinery and equipment purchased for bitumen investment projects.
- *Manufacturing Crisis:* Although all non-resource export industries have been impacted by the side-effects of the bitumen boom, the manufacturing sector has borne the brunt of the damage. By 2011, employment in manufacturing had dropped to barely 10 percent of total employment in Canada, by far the lowest in postwar history, and lower now than other OECD economies. Across all manufac-

tured goods, Canada moved from a balanced trade position at the turn of the century to an enormous \$90 billion trade deficit by 2012.

- *Foreign Direct Investment:* Foreign direct investment can have positive benefits if it enhances the host country's technical and productive capacities. It is difficult to see this outcome in the case of surging foreign investment in the bitumen sector, however. Inflows of foreign finance have reinforced the link between Canada's currency and the price of oil, with resulting negative impacts on other sectors. Long-run payments of interest, dividends, and profits back to foreign-based owners further weaken Canada's already-deteriorating current account balance. More generally, the growing degree of foreign ownership and control in the petroleum industry clearly undermines Canadian control over our energy industry, and reduces our national capacity to manage its social and environmental costs.

(See also Appendix 1 for an annotated bibliography of recent research on the economic effects of bitumen developments)

The bitumen-driven restructuring the Canadian economy, focused so tightly on the extraction and export of a single non-renewable resource, has created many economic, environmental, and geopolitical risks for our country. One thing that is obvious from Canadian economic history is that staples-driven booms can end as quickly and dramatically as they begin. Indeed, the current staples boom could eventually lose momentum as a result of similar forces to those that ended previous waves of staples production: such as the ultimate exhaustion of the resource, or a significant lowering of oil prices. More likely, however, the greater danger to the bitumen industry will come from something that was not a concern to previous staples waves: the erosion of markets for carbon-polluting fossil fuels like bitumen as a result of global measures to address climate change. If the world really wants to prevent dangerous climate outcomes, then countries have little choice but to reduce fossil fuel production and consumption quickly, and work toward a transition to renewable energy sources by mid-century at the latest.

To avoid falling off the "bitumen cliff," the report concludes that two tracks of policy should be pursued simultaneously. First, powerful efforts must be made to more tightly regulate the bitumen industry, with the goal of slowing the pace of extraction, enhancing its net benefits to Canadians (including by significantly boosting Canadian content in the upstream and downstream supply chains), and attaining a better balance between sectors and regions in the national economy. This track would help to enhance the

benefits of the industry, minimize its costs, and limit the extent to which our whole national economy depends on the extraction and export of a resource which will inevitably fall out of use. At the same time, however, a second track must work energetically to re-orient Canada's economy around more balanced, innovative and low-carbon industries, thus catching an economic upside from coming necessary investments in sustainable products and services. Appendix 2 provides some illustrative discussion of the policy initiatives that will be required to stimulate and support both of these tracks.

Introduction

THE NEGATIVE ENVIRONMENTAL impacts of the enormous bitumen extraction and processing developments occurring in northern Alberta have been well established. The upstream extraction and production of a barrel of oil from bitumen sands¹ produces substantially more greenhouse gas emissions than conventional oil production.² The clear-cutting of boreal forest in the region, which serves as an important natural carbon sink, and the substantial water takings from and pollution of rivers in one of the world's most important freshwater systems are also well documented. For these and related reasons, the environmental consequences of these developments have been strongly criticized, both nationally and globally.

However, comparatively less public attention has been paid to analyzing and assessing the impacts of bitumen development on the broader Canadian economy.³ This is surprising, given the scale of this activity (collectively, the bitumen developments in northern Alberta likely constitute the largest single industrial development project on the planet), and the varied and multi-dimensional nature of their impacts on the regional and national economies. According to the Canadian Energy Research Institute, \$2.1 trillion of capital investment will occur over the next 25 years for the extraction, production, and delivery of bitumen and products from this region.⁴ Yet, the multiple impacts of an industrial development of this magnitude on the Canadian economy as a whole have not been systematically or critically studied.

Nor have the implications of major shifts in global energy demand been adequately studied or factored into the analysis. The International Energy

Agency's in-depth look at the bitumen sands in 2010 estimated that global demand for bitumen in a low-carbon scenario would be limited to 3.3 million barrels per day, while Alberta has already approved 5.2 million barrels per day of bitumen production, with even more capacity additions announced and under review.⁵ Meanwhile, the Agency's 2012 Energy Outlook predicts that a combination of energy efficiency and tight oil developments could significantly reduce the demand from the U.S. for Canadian oil. The uncertain scenarios introduced by climate change, competition from other fossil fuels, and changing global demand patterns, all introduce significant risks for a bitumen export strategy. This is an appropriate time to ask if increasing Canada's dependence on bitumen export is a wise economic trajectory.

Indeed, the direct and indirect economic consequences of the current unplanned and largely unregulated strategy for developing this resource should spur concern among Canadians, on top of the better-known environmental impacts of bitumen developments.⁶ To be sure, the enormous investments made in northern Alberta have produced significant employment opportunities, not only in the petroleum industry, but in construction, infrastructure, and transportation as well. These opportunities, however, are tinged by the economic and social stresses associated with the unplanned, "gold-rush" nature of this expansion (including rising living costs, housing shortages, and inadequate physical and social infrastructure for those working and living in northern Alberta). Moreover, workers have not been able to capture their fair share of the new incomes generated by the bitumen boom because of Alberta's anti-union labour laws and Ottawa's aggressive expansion of its temporary foreign workers program.

Meanwhile, the bitumen boom has also affected economic performance in other sectors and regions of Canada. A complete economic analysis must consider both the costs and the benefits of this industry in light of the current development strategy. Former Ontario Premier Dalton McGuinty and federal NDP leader Thomas Mulcair, among others, have raised concerns about the unintended and damaging impact of currency appreciation (which, we shall show, is strongly related to rapid bitumen development) on the performance of other important export industries in Canada, and hence on the economic prospects of other parts of the country.

These comments, however, elicited an over-the-top, orchestrated campaign to criticize, even ridicule, the idea that there could be anything other than universal economic benefit from the bitumen boom. This harsh reaction portrayed any concern about the side effects of the bitumen boom as some sort of divisive attack on the Western provinces. Meanwhile, the fed-

eral government, determined to further accelerate the extraction and export of unprocessed bitumen (including through new pipelines to the U.S. and the Pacific coast), has adopted a decidedly McCarthyist strategy to deal with its critics — suggesting, for example, that environmental activists are foreign-financed subversives, and vilifying those raising legitimate economic concerns.

The harsh, polarizing tone of these public debates does not serve Canadians well. Any sensible policy discussion must consider the costs, benefits and potential future implications of a proposed course of action — yet the proponents of the current, largely unregulated model of bitumen development deny there is any risk or downside at all. The bitumen boom in northern Alberta is fundamentally reshaping Canada’s economy, our federation, our environment, and our place in the world, for decades to come. All Canadians need to understand what is happening, and carefully consider the widespread implications, in order to minimize the costs (environmental, economic, and social) and maximize the benefits of this powerful dynamic.

Thus, the goal of this report is to provide a more informative, comprehensive, and constructive understanding of the far-reaching economic effects of this industry. We argue that the current bitumen development model exhibits characteristics similar to the traditional “staples trap” of natural resource developments in Canada. As with previous waves of primary export-oriented resource development, this economic trajectory leaves the national economy sectorally and regionally unbalanced, and unduly dependent on both foreign markets and foreign capital. Moreover, in today’s economy (struggling to grapple with the inevitable reality of carbon constraints), traditional solutions for escaping the “staples trap” (such as fostering more secondary processing and value-added production of the resource in Canada) are, by themselves, no longer sufficient to ensure a transition to a more sustainable and balanced economic structure.

After all, the world has moved from a context in which industrialization was highly resource intensive, to a different economic and environmental context that demands an aggressive transition towards environmentally sustainable products and processes, in order to avoid even more dangerous climate change impacts. In this new context, Canada’s traditional “staples trap” has also become, at the same time, a “carbon trap.” The unthinking acceptance of a profit-driven, unregulated, export-focused bitumen strategy could lock Canada into a development path that will be outmoded as the world economy transitions to a less carbon-intensive model. Escaping this “carbon trap” will require innovative, pro-active strategies and inter-

ventions which will both alter the nature and pace of bitumen development (to minimize its economic and environmental costs, and enhance its broader benefits), and better position Canada's economy (including Alberta) to most effectively transition towards a low-carbon economic future.

Indeed, this is why we have titled this report *The Bitumen Cliff*. Bitumen dependence threatens to put Canada on a dangerous trajectory. When it comes to mega-resource development strategies, boom periods are inevitably followed by bust periods. In the cycle of resource development, what goes up must come down. In this case, however, the downward cycle of the bust period will not only be economic but environmental as well. With the climate clock ticking away for the planet as a whole, the prolonged and expanded development of bitumen development and consumption, with its associated greenhouse gas emissions, will be damaging for both the environment and the economy at the same time. This report explores the potential for Canada to steer away from the "bitumen cliff" and adopt a more sustainable, resilient and innovative economic trajectory.

The aim of this report, therefore, is to analyze and assess the impacts of mega-bitumen developments on Canada's economy and to consider broad strategies for avoiding their hazards. Public debate regarding the nature of bitumen developments should address both the economic and the environmental impacts of this historic transformation in Canada's economic structure. We believe it is wrong to frame these debates as a dichotomy between "economic interests and environmental interests," or as a conflict between petroleum-producing provinces and the rest of Canada. The current unplanned bitumen boom imposes many economic and environmental costs (in Alberta, and elsewhere in Canada) that must be evaluated along with its benefits and opportunities. Ultimately there can be no trade-off between the economy and the environment because the absence of sustainable practices will inevitably impinge on our collective prosperity and well-being.

Similarly, it is equally wrong to frame the discussion as "East versus West." This is a cartoonish stereotype, promoted by vested petroleum interests trying to marginalize any serious consideration of alternative development models for this resource as some kind of throwback to the controversial National Energy Program. All Canadians, including those who live in petroleum-producing provinces, have an interest in ensuring that we manage this public, non-renewable resource in a manner consistent with our best long-term economic, social, and environmental priorities. These projects will have enormous impacts on all Canadians. Indeed, Canadians, and

their governments, have both the right and the responsibility to engage in a full debate over future bitumen development.

Accordingly, this report is divided into two major sections as follows.

Part I considers the structural context for analyzing and understanding bitumen developments, in light of Canada's historical evolution as a supplier of staple resources to export markets, and the economic and political challenges posed by that role. The current trajectory of bitumen extraction and export reveals many similarities with those past waves of staples development. However, there are also important differences, including the aforementioned overlap between the traditional "staples trap" of Canadian development, and the modern challenge of transitioning toward a low-carbon economy.

Part II reviews several of the economic impacts (both positive and negative) of the bitumen boom, which began to reshape Canada's overall economic trajectory about a decade ago. It shows that the current development model has short-changed Canadians (including Albertans). This model facilitates the quick extraction and export of a non-renewable resource, unfairly restricts the incomes flowing to workers and communities, and fails to leverage opportunities associated with deeper supply-chains and other secondary developments associated with the industry.

Finally, our report concludes with a preliminary discussion of policy strategies for addressing the structural challenges posed by the bitumen boom, and thus improving the cost-benefit balance of bitumen development in favour of Canadians and their long-term economic, social, and environmental interests. We provide a preliminary menu of policy alternatives (see Appendix 2) in an effort to stimulate the further enquiry and dialogue necessary to build national support for a more pro-active approach to regulating and shaping the bitumen boom. Thus, our objective is not to outline a detailed, prescriptive agenda of specific policies, so much as to encourage a different way of thinking on the part of policy-makers and Canadians more generally. It would be folly to assume that the choices of private corporations, operating in a largely deregulated market context, will coincide with the long-term public interest.

It is essential for all Canadians to consider ways of actively managing the developments that are occurring in northern Alberta, with an aim to protecting and enhancing the public interest for decades to come. The precise means to achieve this goal will require much more research, debate, and experimentation, but the first step must be to overcome the false polarization of recent public discourse, and recognize that the future course of these enormous developments cannot be left to chance, nor to the self-interested choices of an enormously lucrative private industry.

Part One

Structural Elements of the Bitumen Boom

CANADA'S HISTORIC ROLE as a supplier of raw resources to industrial empires – initially the French, followed by the British and the American – has shaped its economy and institutions. As Canadians, we became known as “hewers of wood and drawers of water” in the global economy. Now, as a result of the bitumen boom, we can add “scrapers of tar” to our collective résumé. To understand the significance of the bitumen boom today, however, it's important to probe the underpinnings of our economic history and the structural context in which this industry now thrives. This is all the more important, since we live in an age of rapidly advancing climate change, which adds new layers of challenge and complexity to the policy environment.

Energy Superpower

In his first speech to an international business audience after becoming prime minister in 2006, Stephen Harper declared that Canada was “the world's next energy superpower.”⁷ Speaking to a blue chip audience in London prior to the G8 summit in July 2006, the Prime Minister declared that “one of

the primary targets for...investors has been our booming energy sector. They have recognized Canada's emergence as a global energy powerhouse – the emerging 'energy superpower' our government intends to build.”⁸

After outlining the leading role that Canada plays in different energy sectors, Prime Minister Harper then zeroed in on the bitumen industry as the cornerstone of Canada's bid to become the next energy superpower. Comparing Alberta's bitumen industry to the building of the Egyptian Pyramids and China's Great Wall, he emphasized that, “even now, Canada is the only non-OPEC country with growing oil deliverability.” For these reasons, he concluded, Canada offers “the most attractive combination of circumstances for energy investment of any place in the world.”⁹

Indeed, the first decade of the 21st century was a period of unprecedented expansion for Canadian bitumen development. Through a combination of strip mining and in-situ production methods, the bitumen extracted and upgraded for transport to U.S. markets grew rapidly on a yearly basis. By 2004, Canada had surpassed Saudi Arabia as the largest foreign supplier of oil to the U.S. At this point, the Americans began to take more notice of the growing oil potential of their northern neighbour. The development of Alberta's oil resource became a strategic priority for those in Washington concerned about U.S. energy security.

The “discovery” of Canadian bitumen resources by Washington triggered a boom in production and sales of oil-based bitumen to the U.S. Early in 2003, the prestigious *Oil and Gas Journal* began to factor bitumen deposits along with conventional oil deposits into their calculations of global oil reserves, thereby promoting Canada to the number two spot on their list of oil producing countries behind Saudi Arabia.¹⁰ This new reporting protocol reflected new extraction technologies that made the resource more economic to recover.

The major oil companies operating in northern Alberta ramped up their production plans for export accordingly. Production from bitumen deposits tripled between 1997 and 2011, reaching 1.6 million barrels per day.¹¹ According to the industry's current plans, daily production will more than triple again to 5 million barrels per day by 2030.¹²

Moreover, to upgrade, refine and deliver all this bitumen to markets in the U.S. requires enormous investments in infrastructure. To transport the bitumen through pipelines to the U.S., the industry needs to invest in the construction of new upgraders close to their production sites. New pipelines such as the KeystoneXL, Northern Gateway, and/or Trans Mountain lines would be needed to move more bitumen to export. And before the bitumen

could be processed into final products, adequate refinery capacity would need to be retrofitted, contracted or constructed.

As a result of all these enormous related investments, the expansion of the bitumen industry is reshaping the entire Canadian economy. At the same time, the industry is playing a disproportionately influential role in Canada's overall economy through many other channels, as well:

- **Commodity Prices and Profits:** Along with other parts of the mining and petroleum sector, bitumen producers benefited from dramatic increases in global commodity prices, which contributed to a dramatic rise in the profitability of energy and mineral companies. The after-tax net profits of the petroleum industry (including bitumen) totaled \$150 billion over the past decade.¹³
- **Corporate Valuations on Stock Markets:** The profit increases for the resource sector of the economy also resulted in a corresponding rapid expansion of market value of Canadian petroleum and mining companies. Energy and mining companies now account for a much larger share of the total value of Canadian equities than a decade ago.
- **Foreign Takeovers:** Soaring corporate valuations in resource sector industries have attracted an inward surge of foreign investment and takeovers. In the last decade, foreign direct investment in the energy and mining sector has expanded by almost \$135 billion,¹⁴ likely the biggest sustained inward surge in FDI in Canadian history. Recent additional takeovers of petroleum companies and petroleum assets by foreign investors (now including Chinese and other Asian firms) have continued this trend.
- **Exchange Rate Appreciation:** Together, the global commodity price boom, the super-profitability of Canadian petroleum and resource companies, and the rapid inflow of foreign investment have generated an historic and dramatic appreciation of the Canadian loonie. In the last decade, the value of the Canadian dollar rose by 60 percent against the U.S. dollar. As we will discuss in detail, this appreciation clearly reflects the direct and indirect effects of the bitumen boom, and has had a negative impact on Canada's ability to export other products (including manufactures, services, and tourism) to the world market.

The petroleum industry has increased its economic and political influence coinciding with the most recent bitumen boom and related political developments. However, in the longer-term context of the historical evolution of Canada's economy, the bitumen expansion in many ways repeats a typical Canadian pattern. The experiences of Canada's resource-based economies have not always been positive, and a reading of their history provides numerous lessons about pitfalls that should be avoided. Given the profound economic, ecological, and social consequences of past resource cycles, Canadians should be wary about ascribing too much faith in this latest incarnation of unbridled resource expansion.

The “Staples Trap”

Canada's economic history has been dominated by successive waves of resource-based development, in which a series of resource products became driving forces in national and regional economic development. The legacies of fish, fur, wheat, forestry, minerals, and other resource waves are well known. Each opened up larger geographies, and altered the economic and political make-up of Canada. Canada traditionally played the role of resource supplier for other more developed major industrial centres or empires, including France, Britain and the U.S. As a country, we played a subsidiary and underdeveloped role.

Canada's famous political economist Harold Innis studied this historic pattern of economic development and spawned a school of thought that helped us understand the strengths and weaknesses of Canada's resource-based economy. Canada traditionally has served as a supplier of raw materials, or “staples,” exported to more developed powers. Innis called these leading powers the “centres” and the resource suppliers the “margins” of the global economy.

In a staples economy organized to supply raw materials to industrial powers, huge investments are required in both fixed capital and technology to extract the resource and build the infrastructure required to deliver it. In developing Canada's role as a global supplier of timber, for example, canals were built to transport these products to market. Similarly, railroads were constructed to move western wheat across the country to seaports.

To develop the required technology and infrastructure, staple economies generally rely on large, centralized companies with the organizational and financial capacities to deal with instabilities and major overhead costs. In

order to pay off their overhead costs and reward investors, the staples economy is geared towards selling more and more of its staple, as quickly as possible. Taken together, these developments set the stage for what has become known as the “staples trap” in resource-based economies.

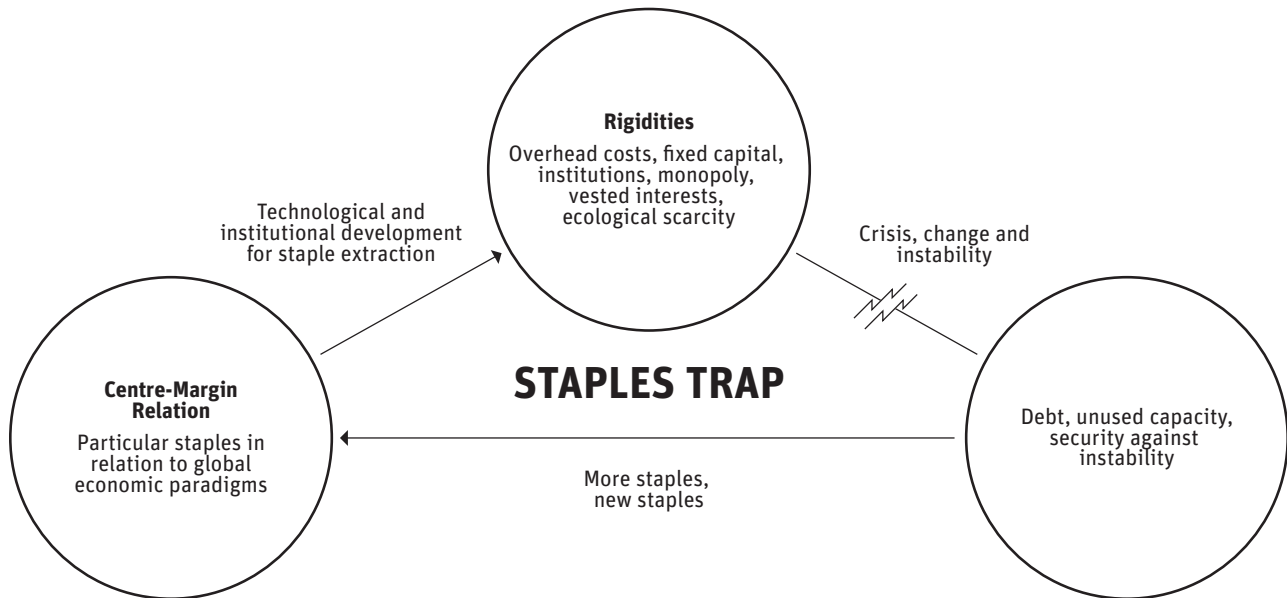
The “staples trap” exhibits several typical characteristics, including the following:

- The adoption and promotion by policy makers and government leaders of the notion that resource extraction and export must be the primary means of economic development;
- The rapid extraction and transportation of unprocessed raw materials to more advanced industrialized economies for value-added transformation into products which are then sold back to resource supply countries at higher cost;
- Heavy upfront investments in infrastructure and technology make staple economies more rigid and inflexible when it comes time to respond to changes in the global economy, especially if (due to changes in technology, taste, or other factors) the staple export falls out of favour with world markets.

Figure 1 illustrates the “staples trap” evident in the history of Canadian resource cycles.¹⁵ The pattern originates from a “centre-margin” relation (illustrated in the bottom-left circle), where Canada (the margin) exports staple products (fur, timber, wheat) to major industrial “centres” (e.g., England, the United States and, increasingly, China). The industrialized centres define the pace and characteristics of global economic development patterns through their major innovations (e.g., railroads, automobiles), social systems, and associated demand for natural resources. The rapid exploitation of natural resources in Canada to meet the perceived demands of industrial centres tends to create political and economic systems that are rigid and inflexible. The need to quickly lay down sprawling and technically complex infrastructures saddles resource-based economies with heavy fixed costs. After rapid extraction depletes the resource in the local environment, there is a need to go even farther in search of resources.

Meanwhile, large-scale resource development has required the creation of large, centralized companies, since only they could grapple with the associated operational challenges, risks, and large overhead costs. Canadian history has also affirmed that resource development creates powerful political interests that advocate for their industry based on the belief that re-

FIGURE 1 Staples Trap



source extraction is the primary means of economic development. All of these factors (fixed costs, ecological scarcity, monopolies, political interests, resource-dependent policy mentalities, and regional specialization) are listed as rigidities in the chart (top circle).

Resource-based development can bring impressive economic expansion (for a while, anyway), making the rigidities seem like strengths. However, economies do not stand still. As the global economy shifts towards new technologies and core resource inputs, the staples are no longer demanded in the same quantity or at the same price. When this occurs, the inflexibility of resource-dependent regions can create new problems of adjustment (bottom-right circle).

Given economic and institutional rigidities, resource-based economies respond to these problems of adjustment by searching for new staples, or extracting even more of the same staple. These resource-dependent economies desperately seek new export markets to rekindle their status as “marginal” staple suppliers (returning back to the bottom-left circle). This pattern compares unfavourably to other economies, which might adapt to economic change through consolidation and the discovery of new technological opportunities.

In recent years, bitumen has become Canada's newest and dominant staple. The unquestioning, unplanned acceptance of a new resource-driven trajectory risks placing Canada within a modern-day staples trap, in which the economy is shaped once again by the extraction and export of a core resource. Given the continuing volatility of resource prices, the uncertain future of unconventional oil, and the likelihood of increasing environmental constraints, Canada's economy may inherit an economic structure that is increasingly vulnerable to the dramatic but predictable economic changes ahead (as the world adapts to a carbon-constrained future).

Indeed, the bitumen expansion of the last decade in many ways exemplifies the main characteristics of the staples trap. First, this industry has become the driving force behind Canadian resource commodity exports. However, most of the bitumen is not refined in Canada (other than basic upgrading required to allow it to flow through a pipeline), but instead is shipped to refineries in the U.S. Ironically, Canada's imports of both crude oil and refined petroleum products have increased substantially over the last decade, even as exports of bitumen expanded. Canada's imports of refined petroleum products grew seven-fold between 2002 and 2011, and our traditional trade surplus in this industry shrank substantially.¹⁶

Finally, just as the world recognizes the need to reduce dependency on carbon-based fuels and has begun the evolution towards a low-carbon economy in the future, Canada is heading the other way. Our economy has become increasingly dependent on carbon-intensive production. In fact, it is estimated that the growth of bitumen production and export will account for over 100 percent of all the growth in national Canadian greenhouse gas emissions between 2005 and 2020.¹⁷

Structural Shifts

The bitumen boom of the past decade has served to entrench and reinforce the traditional staples bias to Canadian economic development. This trend represents the disappointing reversal of earlier progress whereby Canada was gradually escaping its traditional reliance on staples export. Indeed, throughout the second half of the 20th century Canada significantly reduced its resource dependency and developed a more diversified, value-added economy.

The alternative to a staples-based model of development is a more diversified economy, possessing the industrial and innovative capacity to pro-

duce new products and practices, take advantage of new markets, and even influence global development patterns through the innovations it produces. Such an economy would be more resilient in the face of global economic volatility; it would generate more high-wage jobs through value-added, innovation-intensive production; and it would have the capability to more pro-actively direct future economic development towards social well-being and environmental sustainability.

Beginning in the 1960s, Canada's economy began to move forward in qualitative, structural terms, producing a more diversified portfolio of more sophisticated products. During the post-war period, Canada gradually built a diversified and productive industrial base, using active policy tools (such as the Auto Pact, Technology Partnerships Canada, active government procurement strategies, and more) to spawn and nurture higher-value industries.

During this period, the advancement of three manufacturing industries was particularly noteworthy. First, the automotive industry expanded after the successful negotiation of the 1965 U.S.-Canada Auto Pact.¹⁸ Second, Canada developed its own aerospace industry. A third manufacturing success story was telecommunications equipment. The latter benefitted from the federal government's various technology programs and supports. By 1999, Canada was ranked the fourth-largest assembler of motor vehicles in the world. That same year, Canada produced about as much manufactured output as we consumed, laying the basis for an overall balance in our exports and imports of manufactured goods. (Today, in contrast, Canada has become an enormous net importer of manufactured goods: our national trade deficit in manufactures reached \$90 billion by 2012.¹⁹)

Broader economic and social factors played a reinforcing role in the positive structural shift within Canada's economy in the latter period of the last century. For much of the 1980s and 1990s, for example, Canada's currency was undervalued relative to the U.S. dollar,²⁰ thereby making our manufactured products all the more competitive in U.S. and global markets. At the same time, our public health care system served to significantly reduce labour costs for private employers (especially in contrast to U.S. costs which were boosted by that country's inefficient and expensive private health care system). Productivity in Canadian manufacturing grew dramatically, reflecting both the high quality of labour and modern capital equipment. Together, these factors helped to attract additional investment in value-added manufacturing industries. Another dimension of Canada's "maturing" during these decades was the gradual decline in the importance of inward foreign direct investment, whereby the gross stock of inward FDI fell to below

20 percent of Canadian GDP during the early 1990s, and Canada actually became a net exporter of direct investment by 1997.²¹

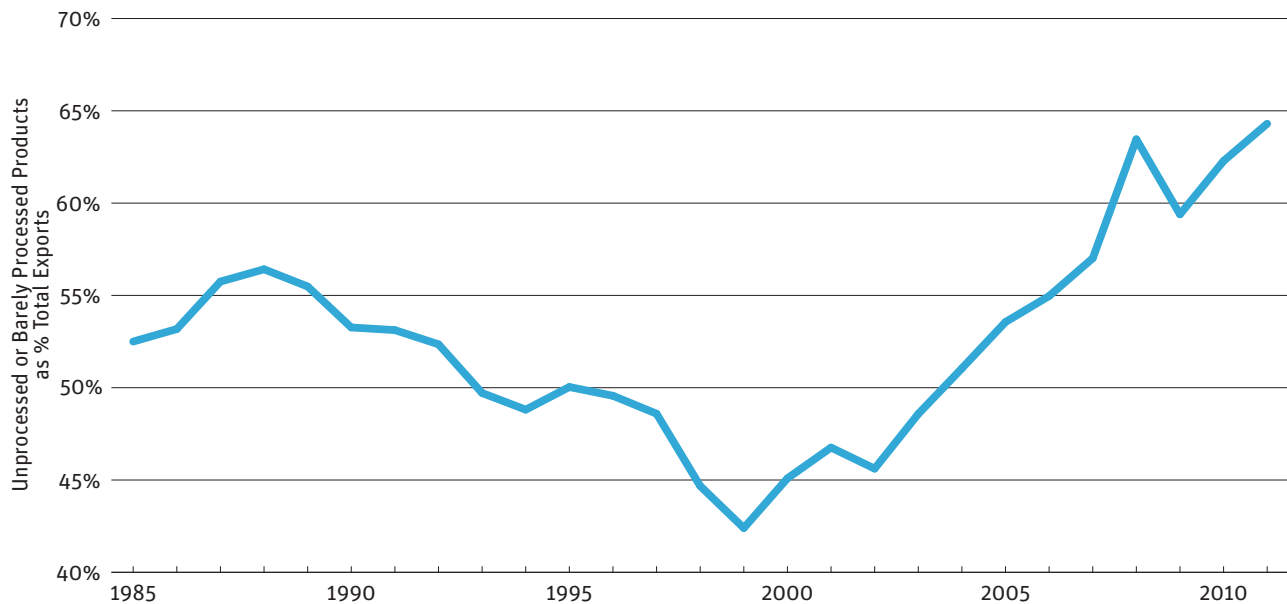
Indeed, right up until the turn of the century, Canada's economy demonstrated growing qualitative strength: a greater diversity of production and exports, a declining reliance on pure resource production, and a greater national capacity to take on more complex and value-adding economic functions. By the mid-1990s, for the first time in Canada's history, unprocessed or barely processed resources accounted for less than half of total Canadian exports. These developments were promising. However, compared to most other industrialized economies, Canada was still relatively more dependent on the extraction and export of raw resources and reliant on foreign investment. Industry ran high-tech trade deficits and made relatively smaller investments in research and development, worker training, and machinery and equipment than other industrial economies.²²

With the turn of the century, however, increasing evidence accumulated of a backward shift in Canada's economic evolution. The proportion of Canadian exports consisting of unprocessed or barely processed resource products rose from barely 40 percent in 1999 to nearly two-thirds by 2011.²³ This reflects both an expansion of resource exports (mostly due to very high prices for these commodities, and only secondarily an expansion in the real quantity of those exports), and a decline in value-added exports. Throughout the last decade, manufactured exports declined as a result of the slowdown in the U.S. market (where most of our products are sold), competition from new global producers (notably China), and the rise in the value of the Canadian dollar (which made Canadian-made goods dramatically more expensive in the eyes of foreign purchasers).

In short, Canada's economy took a sudden U-turn. *Figure 2* illustrates the proportion of Canada's total merchandise exports that consist of unprocessed or barely processed resource products. This composite indicator of Canada's qualitative development steadily declined throughout the last four decades of the 20th century – reflecting a qualitative improvement in the country's economic development and our growing capacity to produce a broader range of products for sale in both domestic and global markets. This indicator reversed course and sharply rose again with the bitumen-led resource boom at the dawn of the 21st century.

During the past decade, strong global commodity prices boosted the profitability and market value of Canadian resource companies, led by the bitumen industry. The growing value of oil and other resource exports, along with foreign appetite for the purchase of Canadian resource companies and

FIGURE 2 Reliance On Raw Resource Exports



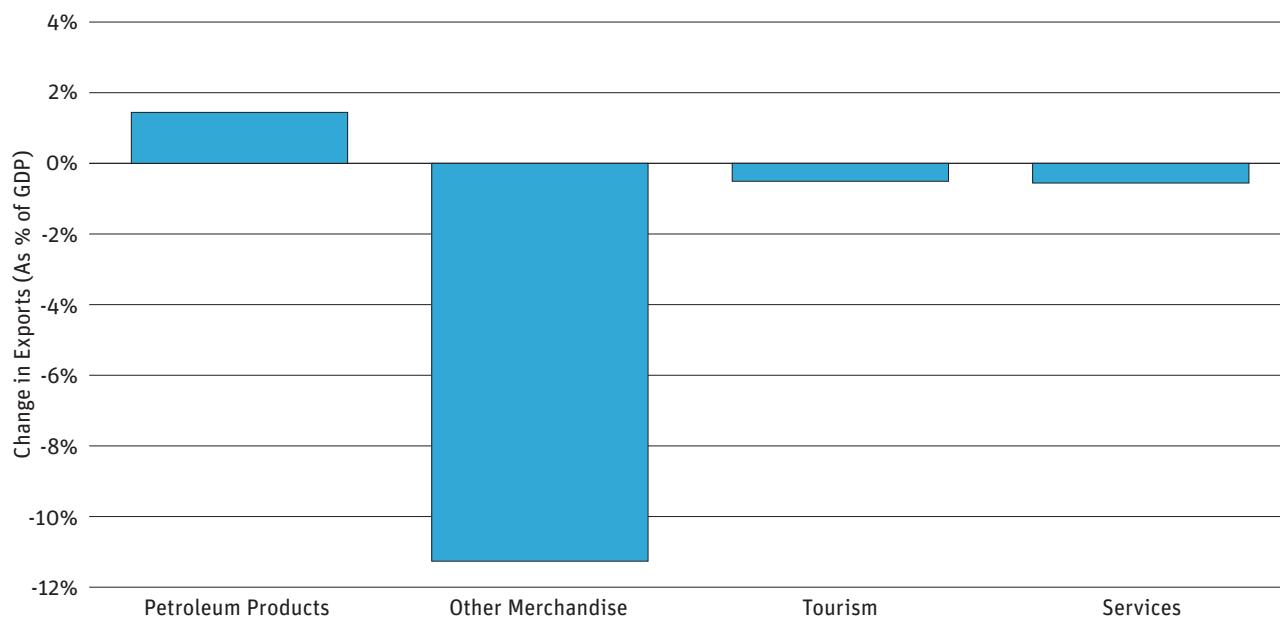
Source Authors' calculations from Statistics Canada CANSIM Table 228-0043

assets, generated a dramatic appreciation in the value of Canada's currency, along with a substantial decline in non-resource, tradable industries.

This decline in non-resource exports is visible across the spectrum of international trade, affecting more than manufacturing. As illustrated in *Figure 3*, Canadian exports of services, and tourism revenues, have both declined significantly as a share of GDP during the years dominated by the bitumen boom. Exports of petroleum grew by just under two full percentage points of Canadian GDP in the last decade. However, the decline in exports (also measured as a share of GDP) of other merchandise was many times greater, supplemented by smaller declines in services and tourism exports. The cumulative result has been a sharp overall decline in Canadian exports, falling by over 10 points of GDP during this period. As a result, Canada's overall trade balance, and hence the country's overall international balance of payments, deteriorated rapidly. Net production and employment shifted to non-tradable industries, which generally demonstrate lower productivity and income levels.

In effect, the resource resurgence led by bitumen this past decade has created a structural imbalance between the resource sector and other sectors of the economy (including manufacturing, services, and tourism). This

FIGURE 3 Change in Exports By Sector, 2001–11



Source Authors' calculations from Industry Canada Strategis database and Statistics Canada CANSIM Table 380-0017.

dynamic is pushing Canada's economy once more toward a staples reliance that undermines our full economic and social development. This time, however, the staples trap features another dimension: namely, the contradiction between petroleum exports and the long-run requirement for Canada's economy to become less carbon-intensive in response to global environmental constraints.

The Carbon Trap

In an age of climate change, Canada's latest staples trap also carries important implications for our ability to economically adapt to pressing environmental constraints, in particular to the need to reduce greenhouse gas emissions. In this regard, this new staples trap is also a "carbon trap." The bitumen industry is premised on exploiting one of the most carbon-intensive resources in the world, at a time when it is recognized that the entire global economy must ultimately and radically reduce greenhouse emissions to avert catastrophic climate chaos. Ultimately, regardless of the stalling and

Canada's Bitumen Industry and Greenhouse Gas Emissions

Some indicators of the greenhouse gas effects of the bitumen industry:

- Currently, around 6.5 % of Canada's total greenhouse gas emissions (approximately 690 million tonnes) come from bitumen production and upgrading operations;
- GHG emissions from bitumen production have increased more than 2 ½ times over the past two decades, from 17 million tonnes in 1990 to 45 million tonnes in 2009;
- By 2020, GHG emissions from bitumen production are expected to double again (from 45 Mt in 2009 to 92 Mt in 2020);
- Between 2005 and 2020, Canada's total GHGs will increase by 54 Mt under current federal and provincial policies while GHG emissions from bitumen production and upgrading will rise by 62 Mt;
- The bitumen industry will thus account for over 100% of Canada's projected increase in total GHG emissions between 2005 and 2020;
- Internationally, Canada was ranked 9th in the world in terms of per capita GHG emissions at 17.7 tonnes per person in 2009;
- If Alberta were a country, it would have the highest rate of GHG emissions per capita in the world, at 69 tonnes per person, more than three times either the U.S. or Canada.

disruption of our current government, Canada needs to join the rest of the world in a global strategy to transition to a low-carbon economy.

Today, however, given rapidly expanding production, the bitumen industry is the fastest growing Canadian emitter of greenhouse gases²⁴ and soon will constitute the country's largest single emitter of GHGs in any sector. As well, strip-mining operations have destroyed large swaths of boreal forest, which serve as a natural carbon sink, and this amplifies the net effect on GHG concentrations. The sidebar provides additional information and comparisons concerning the greenhouse gas emissions of the bitumen industry.²⁵

As noted earlier, Canada's resource-based and export-oriented economy has historically been closely linked to development patterns and priorities within the global economy, especially those of the leading industrialized powers. Hence, our staple booms have coincided with structural shifts in the global economy and developments in technologies that required Canada's raw materials. But, sooner or later, further global shifts inevitably occur through new technological developments and innovation which come

to reduce the global reliance on Canada's raw materials. In such pivotal moments, Canada has traditionally been slow to respond with innovative changes in its own economy. This slowness reflects the heavy investments already made in a particular form of staples production (that was previously in demand), as well as the stunted or underdeveloped nature of the broader domestic business sector (which historically focused more on resource extraction than on innovations supportive of multiple industries).

Economic historians have categorized economic development since the beginning of the Industrial Revolution in five "waves of innovation," in which key technologies had a pervasive impact sufficient to trigger new structures and forms of development.²⁶ These historic waves were based on specific technologies and resources, as follows: *wave 1*: cotton, iron and water power; *wave 2*: steam engineering and railways; *wave 3*: steel engineering and electrification; *wave 4*: oil, automobiles and mass production; *wave 5*: information and communication technologies. For the most part, these waves overlapped, albeit unevenly; the transition from one wave of innovation to another was often accompanied by difficult economic and social adjustments.

The mega-industry being developed to extract raw bitumen for upgrading and export, of course, reflects a late stage of the fourth wave of innovation. Meanwhile, analysts now point toward a sixth wave of innovation that is increasingly emergent: namely, huge innovations and investments in green technologies and renewable energy resources.²⁷

In this regard, the continuing rapid and unplanned development of the bitumen industry generates a "carbon trap" for Canada's economy in the following ways:

- The bitumen industry has already become Canada's fastest growing source of greenhouse gas pollution. Although emissions per barrel have been reduced, the overall growth in production has meant that total emissions are rising rapidly and will continue doing so. Moreover, as carbon emissions from bitumen production continue to grow dramatically, this will swamp efforts to reduce greenhouse gas emissions in other sectors of Canada's economy (such as Ontario's important phase-out of coal-fired electricity generation).²⁸
- Traditional strategies for escaping the staples trap through the development of secondary processing for value-added production also face constraints because of this "carbon trap." Canada could develop new industries to further upgrade and refine bitumen (either

for subsequent export or for our own national use), but this would raise related issues of managing and reducing greenhouse gas emissions from those secondary sectors (on top of the bitumen extraction and upgrading). It would also further increase the overall economic reliance on the bitumen industry, with associated economic and political effects.

- The political power of the petroleum industry over Canadian governments and other institutions increases. Policy leaders increasingly focus on the promotion of bitumen extraction and export as the sole economic development opportunity for Canada, and proponents of alternative views are dismissed as naïve or even dangerous. This “staples mentality” blinds political leaders to the opportunities available to Canada in alternative development strategies, and encourages them to ignore the problem of climate change.
- The rigid pattern of infrastructure commitments that have already been made to facilitate the expansion of the bitumen industry inhibits the development of strategies to encourage green technologies and emissions reduction. As a result, our economy becomes increasingly locked into a carbon-dependent paradigm while other countries in the world (even lower-income emerging economies, like China and Brazil) invest in the transition to a low-carbon future. Canada risks isolating itself from the next wave of industrial innovation.

In many ways, this last dimension or characteristic of the carbon trap is the most worrisome. As noted above, analysts are increasingly convinced that the emergence of green technologies has the potential to trigger a new wave of innovation in the prevailing economic model and structures. Combined with information and communications technologies, new green technologies could contribute to the disruption of the oil-based paradigm by initiating and instituting clean energy systems to power the economies of tomorrow. Globally speaking, annual spending on low carbon goods and services has been growing at a rapid pace. In 2010, it was estimated to be \$339 billion. By 2050, global spending on low carbon goods and services is expected to range between \$3.9 trillion and \$8.3 trillion, depending on which climate policy assumptions prevail.²⁹

As a nation we do not want to be consigned to an economic pigeonhole from which it becomes increasingly difficult to participate in, and benefit from, this inevitable future transition. Moreover, delayed action will also be

costly to Canada's economy. In its final report, the National Roundtable on the Environment and Economy (NRTEE) warned that not only could Canadian exporters be penalized through trade sanctions for not meeting emission standards, but every year of delay in sending strong, economy-wide, policy signals makes it more difficult and expensive for industries to renew equipment and infrastructure to meet the carbon emission standards that will be required. Waiting until 2020 to implement policies aimed at reducing carbon emissions by 65 percent below 2005 levels by 2050, says the NRTEE, would cost the Canadian economy "close to \$87 billion in refurbishments, retrofits and premature retirement of assets."³⁰

Furthermore, as Canada's own history has shown, painful adjustments must be made by staples-based economies during periods of economic restructuring and change. More recently, we have seen a glimpse of this in the natural gas industry. Technological changes allowing for the transport of liquid natural gas and rapid expansion in shale gas production in the United States have caused a dramatic decline in gas prices. What was recently Alberta's main source of resource revenue has fallen off by more than half. Though the conventional gas basin was mature and in decline, the drop off has been much steeper due to game-changing technologies.

So far, the bitumen industry has yet to face a similar "crisis of adjustment," but it is certainly possible that the underlying economics of the bitumen industry could change quickly and dramatically as a result of changing continental market conditions, technological advancements, or policy responses to environmental constraints in North America or elsewhere.³¹ However, instead of preparing for this possibility, Canada continues to pursue a defensive position concerning bitumen, rather than adjusting pro-actively to a global economy demanding renewable energy. In their defensive posture, bitumen interests aim to ensure that the industrial centres of the global economy continue their dependence on fossil fuels — a strategy that seems unlikely to succeed in the long-run (and for very good reasons).

In that case, Canada will be left with a rigid, expensive economic infrastructure oriented toward the extraction and export of a very high-carbon resource that the rest of the world no longer uses.

Petro-State

One key characteristic of the staples economy is the development of concentrated political/economic elites, which promote Canadian resource in-

terests and reinforce Canada's role as resource supplier. In the past, these elites emerged to advocate and protect the interests of staples production at various stages of Canada's economic evolution. In the case of the bitumen industry today, this close cooperation between the petroleum industry and governments (both provincial and federal) is quite consistent with previous cases of staples development.

Provincially, Alberta government policy has reinforced the freedom and profitability of petroleum producers (and the bitumen industry, in particular). Recently, for example, the petroleum industry mobilized powerfully against a modest proposed increase in provincial royalties, forcing the government to abandon those plans. This experience alone attests to the dominant influence on policy and politics of the industry. Various writers such as Andrew Nikiforuk have shown the extent to which the Government of Alberta has become, for all intents and purposes, a "petro-state."³²

In general, the notion of a petro-state has to do with the extent to which the petroleum industry exercises a disproportionate amount of power and influence over public policy, in comparison to and to the detriment of, other sectors of the economy and society. In addition to Alberta, it can now be argued that the petro-state model of governance has become increasingly apparent at the federal government level in Ottawa. While the Chrétien and Martin governments set the stage for the bitumen boom early in the last decade, these petro-state tendencies have flourished under the Harper government since it took office in January 2006.

One of the prime mechanisms for effecting this transformation has been a "revolving door" between federal government and petroleum industry personnel. Senior officials from the prime minister's office (PMO) exchanged positions with high-level personnel in either the oil industry or major lobby firms on Parliament Hill.³³ Prominent lobby firms with major oil companies among their top clients include Earncliffe Strategy Group, Hill & Knowlton, Global Public Affairs and Tactix Government Consulting. These firms represented most of the major players in the bitumen industry including Suncor, Syncrude, Imperial Oil, Shell, Petro Canada, ConocoPhillips (Canada), Chevron (Canada), Synenco, Enbridge and Tech Cominco.

Two industry associations — the Canadian Association of Petroleum Producers (CAPP) and the Canadian Energy Pipeline Association (CEPA) — also deploy considerable influence on policymakers in Ottawa through their lobby machinery. In so doing, CAPP's lobbying initiatives are reinforced by producers in the bitumen sands like Suncor and Imperial Oil while CEPA's lobbying agenda is further strengthened by that of pipeline corporations such

TABLE 1 Number Of Meetings and Communications With MPs, Bureaucrats and Ministers, Including List Of Ministers, From September 1St 2011 To September 1St 2012

Corp. or Assoc.	Total	MPs	Bureaucrats	Ministers	List of Ministers (number of times met)
CAPP	326	136	191	14	Joe Oliver (5-NRCan), Rona Ambrose (4-PWGSC), Peter Kent (3-Env.), Ed Fast (IT), Jason Kenny (Immigr.)
TransCanada	117	38	79	13	Joe Oliver (4-NRCan), John Duncan (3-AANDC), Ed Fast (IT), Peter Kent (Env.), John Baird (FA), Jim Flaherty (Finance), Jason Kenny (Immigr.)
Imperial Oil	59	13	46	5	John Duncan (2-AANDC), Peter Kent, Joe Oliver, Rona Ambrose
CEPA	126	69	57	5	Joe Oliver (3-NRCan), Ed Fast (IT), Peter Kent (Env.)
Suncor	90	30	60	13	Jason Kenny (3-Immigr.), Joe Oliver (2-NRCan), Peter Kent (2-Env.), Dianne Finlay (HRSDC), Keith Ashfield (Fish.), John Baird (FA), Rona Ambrose (PWGSC), Tony Clement (Treasury), John Duncan (AANDC)
Enbridge	73	43	30	3	Joe Oliver (2-NRCan), John Duncan (AANDC)

as TransCanada and Enbridge. *Table 1* shows the high frequency of meetings and communications that these companies and their industry associations had with Canadian Government officials, both cabinet ministers and senior bureaucrats, between September 2011 and September 2012.³⁴ This relatively easy access gives the companies and their lobbyists invaluable opportunities to influence the contents and potential enactment of public policy.

In recent years, the federal and Alberta governments enacted a series of strategic measures to protect and promote the interests of the bitumen industry. These measures include:

- **Federal Subsidies:** Federal tax law provides an Accelerated Capital Cost Allowance (ACCA) that permits bitumen producers to write off costs for new projects and expansions against federal and provincial taxes until all capital costs are paid off. By comparison, conventional petroleum companies are permitted to write-off only 25 percent of capital costs per year. Between 2007 and 2011, the federal government estimates this tax measure alone provided the bitumen industry with a federal subsidy of \$1.5 billion per year.³⁵
- **Low Royalty Rates:** Since the resource is owned by the people of Alberta, the bitumen companies are obliged to pay royalties for the extraction and depletion of this natural capital. Yet Alberta's royalty fee of only 1 percent on the revenues of bitumen ventures until capital costs are recovered (a regime established in 1996) is considered one of the lowest in the world. Moreover, when an independent Royalty Review Panel recommended a modest increase in Alberta's roy-

alty fees in 2007, they were rejected by the Stelmach government. The changes made in 2007 and 2010 were so marginal that Alberta fell even further behind other oil jurisdictions.³⁶ What's more, most of those changes were subsequently revoked.

- **Carbon Emission Exemptions and Delays:** The Harper government has also shielded the bitumen industry from regulations to curb greenhouse gas emissions. By proposing intensity-based targets, the obligation of the petroleum industry is limited to lowering emissions on a per barrel basis. Since the bitumen industry is poised for massive expansion, this means total emissions will increase anyway.
- **Minimal Environmental Monitoring & Regulation:** Federal and provincial expert panels as well as The Royal Society of Canada Expert Panel all concluded that there had been inadequate regulation and monitoring of the water impacts of the bitumen industry by both levels of government. In February 2007, former Alberta deputy minister of the environment, Doug Ratke, publicly issued a scathing report declaring that Alberta's grasp of the cumulative water impacts of the bitumen sands is "unclear, outdated, and incomplete" and that the government had failed "to provide timely advice and direction to industry relative to water use."³⁷ These findings were further amplified by the Report of the Royal Society of Canada Expert Panel of scientists in December, 2010.³⁸ Between 2003 and 2012 as the bitumen extraction process was in its most intense period of expansion, the Alberta government's environmental monitoring, compliance, and enforcement expenditure dropped by 26% while spending on public relations increased by 54%.³⁹
- **Washington Lobby Campaign:** While the Alberta government has waged an ongoing campaign in Washington to promote the bitumen sands industry, the federal government has weighed in with its own U.S. advocacy strategy aimed at both the White House and Congress. Ottawa's pro-bitumen lobbying efforts began with interventions against California's Low Carbon Fuel Standard and also Section 526 of the U.S. Energy Independence and Security Act, both aimed at reducing dependence on carbon intensive fuels. On November 10, 2010, the Heads of Canadian Missions in the U.S. were given special training before lobbying U.S. officials in their respective regions. More re-

cently, this campaign has been geared towards obtaining presidential approval for the Keystone XL pipeline.⁴⁰

- **European Lobby Campaign:** At the same time, the Harper government organized an aggressive lobby campaign in European capitals in an effort to prevent the EU from adopting a Fuel Quality Directive (FQD) that would limit the import of bitumen on grounds that it does not meet environmental standards. Obtained through a Freedom of Information request, a document called “Pan European Oil Sands Advocacy Strategy” reveals briefing notes and letters from Canada’s ambassador to Brussels and senior officials at Natural Resources Canada detailing a series of efforts to ensure bitumen is not assigned a high carbon standard by the new FQD.⁴¹ Media reports also indicated that Canada threatened to pull out of comprehensive trade negotiations with the EU over this issue.
- **Attack Campaign:** In addition, the Harper government began to wage open warfare with civil society groups who question the current unregulated model of bitumen extraction and export. The Minister of Natural Resources launched a series of attacks on environmental and aboriginal groups, making unsubstantiated charges that they were funded by foreign sources. Nothing is said of the millions of dollars spent by the petroleum industry (including foreign oil companies) on ongoing pro-bitumen research, lobbying, and communications, including mass advertising by the Canadian Association of Petroleum Producers and other petroleum industry voices.
- **Stifling Dissent:** The Alberta government has also been actively stifling dissent by defaming scientists and doctors. For example, in 2002 David Swann, medical officer of health in Palliser Health Region, was fired for speaking out on climate change as a public health concern. Scientists Peter Lee and Dr. Kevin Timoney, who published peer-reviewed data on contaminants in the bitumen sands, were accused by a section head at Alberta Environment of lying and fudging the data — an action that resulted in a retraction and an apology from the attorney general’s office.⁴² Moreover, when local physician Dr. John O’Connor raised flags about unusual cancers in Fort Chipewyan, downstream of the bitumen industry, the Alberta government consistently denied that cancer rates were elevated and charges were brought against O’Connor at the Alberta College of Physicians and

Surgeons, which were subsequently dropped.⁴³ Meanwhile, the federal government has also increasingly clamped down on the information from its own scientists. Federal scientists in Canada are no longer able to discuss the basic findings of their work with media outlets without permission from government authorities, compelling the prestigious journal *Nature* to call on Canada to stop muzzling its scientists. Tight bureaucratic control was also exercised over media questions on the federal government's decision to exclude bitumen emissions data from the GHG Inventory report to the United Nations.

- **Regulatory Capture:** Alberta records a clear example of a regulator acting in the interests of the proponent. The Energy and Utilities Board admitted in 2007 to having hired private investigators to spy on landowners' and citizens' groups in a controversial energy transmission line hearing. Senior staff were fired and hearings cancelled after the spying scandal was exposed.⁴⁴ Hearings were subsequently held and the line approved. Other cases of intervention by the Premier's Office in regulatory hearings to expedite timelines on behalf of proponents reveal a pattern of intervention aimed at twisting regulatory processes in favour of the industry.
- **Denial of First Nation Rights:** The Harper government and Alberta government have repeatedly refused to respect the internationally recognized principle of "Free, Prior and Informed Consent" (FPIC) when it comes to First Nations or Indigenous Peoples impacted by oil and gas extraction.⁴⁵ The federal government position has been to engage in "consultation" rather than seek "consent" from First Nations before approving resource extraction on their traditional lands. Moreover, all levels of government have failed to respect or address First Nations concerns with the cumulative health and environmental impacts of the bitumen industry.⁴⁶

These are just some of the mechanisms that have been deployed by government, both provincially and federally, to reinforce and protect the bitumen boom and the companies profiting from it. This coming together of the state with the most powerful and profitable business interests in society is similar to political-economy developments in previous waves of staples-led development in Canada, and reflects a political underdevelopment that parallels our increasingly resource-dependent economic orientation. In so doing, the petro-state works to consolidate and reinforce Can-

NAFTA's 'Proportionality Clause'

NAFTA's infamous "proportional sharing rule," which is spelled out in Articles 315 and 605 of the treaty, compels Canada to export energy to the U.S.

- Under Article 315 it is compulsory for Canada in an emergency to continue its energy exports to the U.S. in the same proportion of its total supply as the average of the previous three years.
- Article 605 reinforces Article 315 by ensuring that petroleum companies continue to export raw bitumen rather than refine it into lighter value-added products before export.
- The same "proportionality rule" does not apply to Mexico, which negotiated an exemption from these constraints.
- NAFTA also provides U.S. oil corporations with additional enforcement mechanisms. Under Chapter 11 of NAFTA, foreign-based corporations have the right to sue the governments of member countries in which they are operating, for alleged violations of NAFTA protections or other actions which undermine profitability of foreign-owned operations.
- Chapter 11 cases are adjudicated by NAFTA tribunals, appointed by the three member governments, in which the rules of NAFTA take precedence over the domestic laws of the country involved. If, for example, Canada were to put quotas on heavy crude exports (whether for energy supply or environmental reasons), the U.S. petroleum industry would have the right to sue the Canadian government for violations of Article 315 and/or 605 of NAFTA.
- The proportionality clause has recently been invoked by U.S. oil purchasers in recent submissions to the National Energy Board regarding allocation of petroleum supplies through the proposed Kinder Morgan pipeline expansion. U.S. buyers objected to requests to allocate first option on the new supply to a B.C. refinery, on the grounds that this would represent interference with traditional export patterns.

Canada's role as a global energy supplier, and our overall staples dependency. Moreover, the basic orientation and mechanisms of the petro-state were, for all intents and purposes, enshrined in the 1994 North American Free Trade Agreement (NAFTA, see sidebar).

In summary, through all of these mechanisms, the federal and provincial governments have firmly aligned the political and regulatory levers of the state behind the interests of bitumen expansion and export, thus reinforcing the political and economic ascendancy of this latest wave of staples development (and tightening the influence of its associated staples and carbon traps over Canada's development). With the election in 2011 of

Bitumen and the Budget

It was supposed to be routine legislation to implement the annual federal budget. But Bill C-38 (legislation to implement the 2012 budget) was a Trojan Horse, built to invade virtually every aspect of Canadian life. It amended 70 different pieces of legislation; the Conservative majority repeatedly suppressed parliamentary debate to force the “omnibus” bill through quickly.

Many of the measures in Bill C-38 are aimed at facilitating a faster, unencumbered development of petroleum projects and associated export facilities (e.g. pipelines and shipping terminals), including:

- Repeals the Kyoto Protocol Implementation Act.
- Repeals the Canadian Environmental Assessment Act and sets retroactive timelines for environmental assessments.
- Gives cabinet power to override the National Energy Board on decisions regarding pipeline approvals, and order alternative environmental assessment processes.
- Changes Navigable Waters Protection Act to permit pipelines and hydro lines to be governed by the National Energy Board.
- Changes Fisheries Act to apply only to major waterways, removes protection of fish habitat.
- Changes Species at Risk Act to remove pipeline permits under the National Energy Board from having to fully comply.
- Amends the Coastal Trade Act to permit more seismic testing off-shore.
- Amends the Parks Canada Agency Act to remove requirement for annual plans, reports and audits.
- Shuts down the National Round Table on the Environment and the Economy.
- Shuts down the First Nations Statistical Institute.
- Changes rules for political advocacy by charities and gives the minister power to suspend privileges for issuing tax receipts.
- Changes the Immigration & Refugee Act to speed up hiring of temporary foreign workers.

a majority Conservative government in Ottawa, the stage was set to accelerate this trend. This soon became evident when the government stacked its “omnibus” budget bill (C-38) with a slate of measures aimed at facilitating the even faster development of bitumen exports (see sidebar).

The characteristic features of Canada's federal and provincial petrostate – tight control over information, vilification of critics, unprecedented foreign lobbying, and general denial of social and environmental problems – are closely linked to Canada's resource-dependent economy and a policy mentality that seeks to reaffirm and reinforce the power and profitability of the petroleum industry. Once policymakers view the rapid exploitation of bitumen as their first priority, it follows that evidence and discussion of associated social, environmental and economic problems should be suppressed, and tight control be sought over the public message to Canadians and outside governments.

Part Two

The Economic Impacts of the Bitumen Boom

THIS PART OF the report will review and evaluate the various and complex economic impacts of the bitumen boom on the Canadian economy as a whole. Our analysis here considers the impacts on employment; on incomes, income distribution and inequality (both personal and regional); on international trade flows and the exchange rate; on innovation and productivity; and on the sectoral composition of the Canadian economy. It is obvious from the data compiled here that the bitumen boom, as currently managed, is having profound impacts, negative as well as positive, on Canadians in all parts of the country. Even in Alberta, the epicenter of the boom, its benefits for working people (as distinct from petroleum corporations) are not unambiguously positive. A more genuine and balanced evaluation of the economic impacts of the bitumen boom must take into account all of its effects: positive and negative, direct and indirect, intended and unintended. (A number of other published studies have recently addressed the economic effects of bitumen projects, reaching a range of conclusions; this other research is critically reviewed in the annotated bibliography contained in Appendix 1.)

Employment Impacts

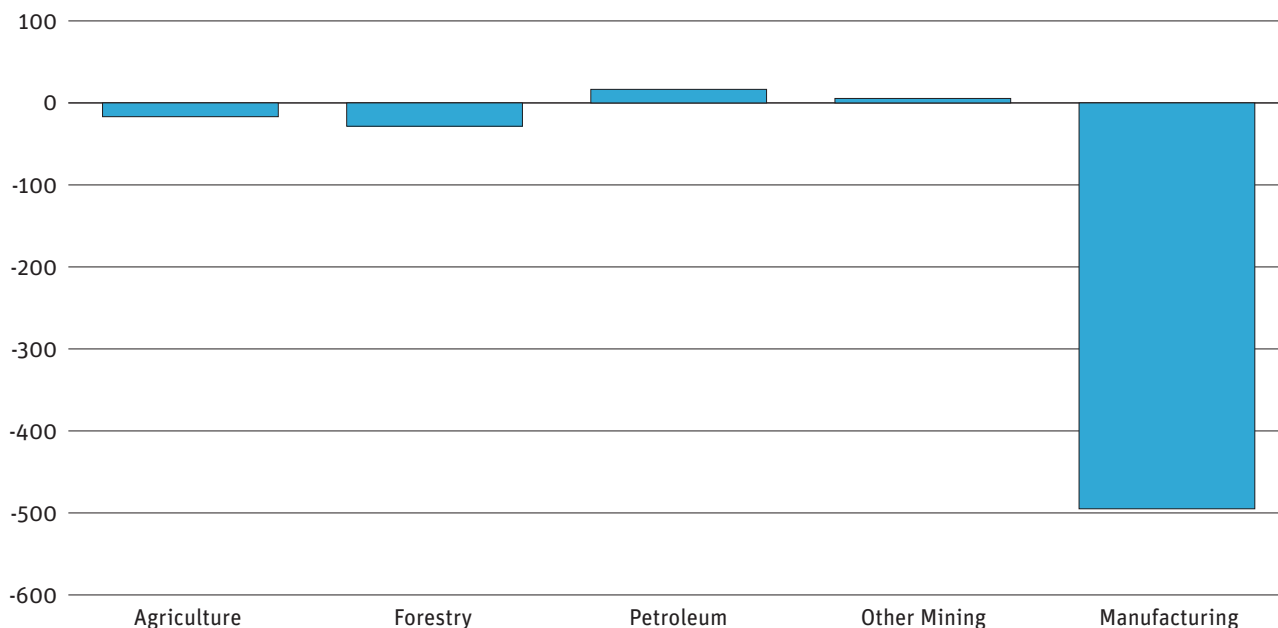
There is no doubt that bitumen developments in northern Alberta have stimulated major new economic activity — including direct jobs in those projects, as well as indirect or spin-off jobs in various related sectors (mainly concentrated in Alberta, but with some impacts elsewhere in Canada, too). However, contrary to the cheerleading from the petroleum lobby, the overall net employment benefits of the bitumen boom have been neither as obvious nor as one-sided as portrayed.

During the decade ending in 2011, the oil and gas industry increased its direct total employment in Canada by some 16,500 positions.⁴⁷ Over 90 percent of those new positions were located in Alberta. Not all of these net new jobs were associated with bitumen production, but since bitumen now accounts for the dominant majority of incremental petroleum output, it is reasonable to assume most net new oil industry jobs are associated with bitumen activity of one form or another.

While these positions are important (and many are well-paid), those direct petroleum jobs accounted for less than 1 percent of all new employment created in the Canadian economy during this period (over 2 million jobs in total). And that small proportion was recorded despite the slowdown in national employment growth that occurred during and after the global financial crisis of 2008.

The employment gains in the petroleum industry pale in comparison to the job losses experienced during the same period in other export-oriented goods-producing industries. *Figure 4* summarizes the change in employment in those crucial sectors, which serve as the economic “base” for diverse regions across Canada.⁴⁸ In addition to the 16,500 jobs produced in the last decade in petroleum, other mining industries added another 5,000 jobs. Therefore, that would seem to be the extent of the direct employment impact of the dramatic expansion in resource extraction and exports that has reshaped Canada’s national economy over the last decade. Other export-oriented goods sectors, on the other hand, have contracted during this period. The decline in manufacturing industries is well-known, but other trade-sensitive sectors have shrunk, as well. Indeed, as will be argued below, the decline of employment and output in those other sectors is not unrelated to the bitumen boom. Agriculture lost nearly 17,000 jobs. The forestry sector lost close to 30,000 positions. And the manufacturing industry, of course, hemorrhaged nearly a half-million positions. For every new job created in the petroleum sector during the past decade, 30 have been lost in manufac-

FIGURE 4 Change in Employment By Sector, 2001–11, Thousands

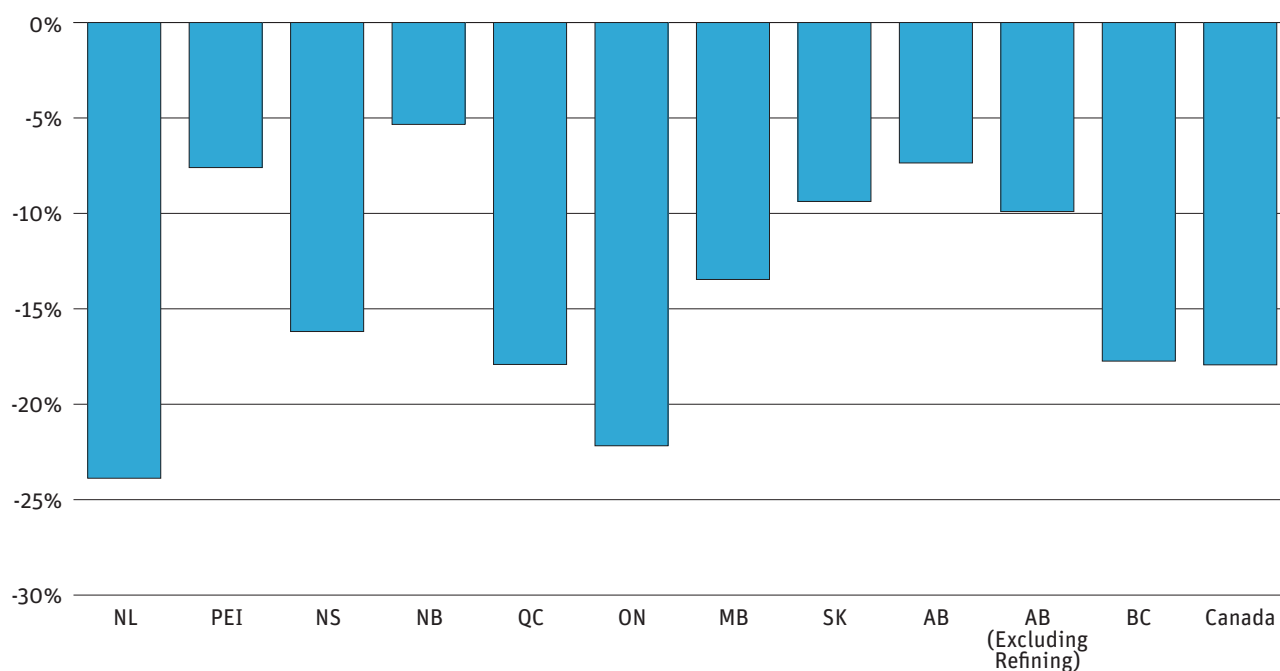


Source Authors' calculations from Statistics Canada CANSIM Table 281-0024.

turing. Across all of the export-oriented goods industries highlighted in *Figure 4*, net employment declined by almost 520,000 jobs in the past decade.

The dramatic retrenchment in manufacturing employment has not been limited to central Canada. In fact, manufacturing employment declined in every single province over the past decade — even in Alberta. *Figure 5* illustrates the proportional decline in manufacturing employment since 2006. Manufacturing employment declined in Alberta by over 10,000 positions during this time, despite a multi-fold expansion in investment and construction in the province. Manufacturing jobs also disappeared from other oil-producing regions: Saskatchewan lost over 2,500 jobs and Newfoundland lost over 3,500 jobs. The decline in Alberta manufacturing employment occurred despite an expansion in petroleum upgrading and refining activity (a source of new employment that is obviously directly related to resource extraction, but which is counted within the manufacturing employment statistics). If the 3,000 new jobs created in refining in Alberta since 2006 are excluded, then the decline in employment in other (non-petroleum) manufacturing activity was even steeper: Alberta lost almost 10 percent of its non-refining manufacturing jobs over the last five years.

FIGURE 5 Manufacturing Job Loss By Province, 2006–11



Source: Authors' calculations from Statistics Canada CANSIM Table 281-0024.

Being located next door to these massive bitumen developments, therefore, is no guarantee that manufacturing and supply operations will be boosted by the related demand for inputs for energy mega-developments. The soaring Canadian dollar (not to mention buoyant labour market conditions) has made Alberta a relatively expensive jurisdiction for manufacturing, and so price-sensitive purchasers go elsewhere for their manufactured inputs. The claim that bitumen investments produce large gains for manufacturing in Canada⁴⁹ is not validated by the data; while there are indeed some positive spillovers, they have been overwhelmed (even within Alberta itself) by the negative side-effects of the bitumen boom.

Why have the direct employment benefits from the bitumen boom been so modest? Petroleum extraction is a uniquely capital-intensive undertaking, which implies that an unusually small number of jobs are created by the expansion of this industry – and those new jobs can be easily overwhelmed by job losses in other, more labour-intensive sectors. *Table 2* summarizes the employment multipliers associated with gross domestic product in several major sectors of Canada's economy. Petroleum production generates

TABLE 2 Employment Multipliers by Sector

Sector	GDP at Basic Prices (Billion Current \$)	Employment	Jobs per \$1 Million GDP
Forestry & logging	4.7	45,592	9.76
Oil and gas	118.1	56,283	0.48
Mining	25.2	58,506	2.32
Utilities	36.8	120,146	3.27
Construction	107.6	827,526	7.69
Manufacturing	173.7	1,673,639	9.64
Wholesale trade	78.2	758,473	9.70
Retail trade	83.5	1,894,251	22.68
Transportation and warehousing	65.9	693,904	10.52
Information & culture	52.0	331,841	6.38
Finance, insurance, real estate	277.4	920,618	3.32
Professional & scientific	73.2	770,613	10.52
Administrative & support	37.6	774,042	20.60
Education	70.1	1,136,770	16.22
Health care & social assistance	100.4	1,527,031	15.21
Arts & entertainment	13.7	241,916	17.71
Accommodation & food services	33.1	1,077,844	32.60
Other services	37.7	509,221	13.50
Public administration	84.9	1,016,654	11.97

Source Authors' calculations from Statistics Canada CANSIM Tables 379-0023 and 381-0024.

the weakest employment effects of any of the sectors listed in *Table 2*; incredibly, each \$1 million in value-added in the sector is associated with less than one-half of a job. In contrast, other sectors of Canada's economy generate many times more employment with each additional increase in economic output. Bitumen projects (especially the new generation of in-situ developments) are especially capital-intensive. Shifting \$1 billion of GDP from manufacturing to petroleum production results in the net elimination of some 9,000 jobs; shifting a similar amount of GDP from health care to petroleum production eliminates close to 15,000 net positions.

To be sure, the direct jobs associated with petroleum production are not the only jobs that depend on the petroleum industry. Other jobs in construction, infrastructure, and various supply functions add to the total employment effect. For example, over the past decade some 50,000 new positions were added in non-residential construction in Alberta's economy, and many

(but not all) of those positions were ultimately dependent on the expansion of petroleum production in that province. However, indirect employment spin-offs are also supported by other “base” industries (e.g., agriculture, forestry, and manufacturing). Hence the decline in direct employment in those other goods-producing sectors (illustrated in *Figure 4*) represents only a portion of the total job loss experienced as a result of those declining sectors. In this context, it is clear that the shift toward petroleum production and away from other industries has had a negative overall impact on Canada’s total employment performance; this structural shift has been a key factor behind the painful decline in Canadian employment rates over the past few years.⁵⁰

Income Distribution

The quantity of jobs in the overall economy has been negatively affected by the structural shift away from more labour-intensive sectors of the economy toward resource extraction; the impact on labour incomes has also been negative. Many jobs in the petroleum industry are well-paid, and while relatively tight labour market conditions in the booming Alberta economy have generated increases in nominal wages and salaries, it is not at all clear that workers in the petroleum industry (and in petroleum-producing provinces) have been capturing a fair share of the wealth they produce in the form of wages, salaries, and benefits. Indeed, labour incomes paid in the petroleum industry are uniquely low as a share of the industry’s total output. Yet business profits in the sector (not surprisingly, in light of high petroleum prices) have been disproportionately high. The skewed distribution of income in this expansive sector has contributed to a noted shift in the composition of national income away from labour income, and toward capital income.

Table 3 illustrates the negative impact of petroleum intensity on labour incomes. It ranks the ten provinces according to the proportion of GDP allocated to labour incomes (averaged over a 5-year period to minimize the effect of year-to-year swings in commodity prices and other temporary factors). The three oil-producing provinces demonstrate the smallest share of the pie going to labour incomes. In Newfoundland’s case, labour takes home barely one-third of the total economic pie. Conversely, corporate profits account for a much higher proportion of GDP in those same provinces, than in the rest of Canada.

TABLE 3 Distribution of Income by Factor (Percent of GDP, Average, 2006–10)

	Labour Income	Corporate Profits
Ontario	55.1%	10.6%
Quebec	53.6%	8.5%
Nova Scotia	53.6%	9.0%
New Brunswick	53.4%	10.0%
P.E.I.	53.2%	9.7%
British Columbia	51.6%	11.2%
Manitoba	49.9%	13.2%
Alberta	47.1%	17.5%
Saskatchewan	38.4%	22.8%
Newfoundland	35.9%	30.3%
CANADA TOTAL	51.8%	12.3%

Note Labour income includes wages, salaries, and supplementary benefits and income. Corporate profits are before-tax and exclude depreciation.

Source Authors' calculations from Statistics Canada CANSIM Table 384-0001.

Due to the disproportionately small share of petroleum GDP received by workers, the expansion in GDP experienced in petroleum-producing provinces has generated a disproportionately small improvement in average wages in those regions. This curious effect is illustrated in *Table 4*, which ranks the ten provinces according to their per capita GDP (measured as a percentage of average per capita GDP in Canada as a whole). The three provinces with above-average per capita GDP are, not surprisingly, the three oil-producing provinces: Alberta, Saskatchewan, and Newfoundland. In the new oil-dominated fiscal federation, these are the only “have” provinces left; every other province (those without oil) falls below the national average. Alberta, the richest province, enjoys per capita GDP more than 40 percent higher than the national average. Median wages in Alberta, in contrast, are less than 15 percent higher than the national average. Median wages in Saskatchewan barely exceed the national average, while wages in Newfoundland are actually 5 percent lower than the national average (despite that province’s now-superior GDP per capita). Ontario and B.C., in contrast, generate higher-than-average labour incomes despite below-average provincial per capita GDP. This demonstrates that a booming petroleum industry provides no guarantee whatsoever of healthy labour incomes. The fact that labour relations laws and labour standards are relatively weak in both Alberta and Saskatchewan⁵¹ helps to explain the failure of petroleum-fueled prosperity to

TABLE 4 Production and Wages by Province, 2010

	GDP Per Capita (% Canada Avg.)	Median Weekly Wage (% Canada Avg.)
Alberta	140.6%	114.9%
Saskatchewan	120.9%	102.6%
Newfoundland	109.5%	94.7%
Ontario	91.9%	104.0%
B.C.	89.1%	103.1%
Manitoba	87.3%	92.1%
Quebec	80.2%	93.0%
New Brunswick	77.7%	88.0%
Nova Scotia	76.4%	87.6%
P.E.I.	69.4%	85.4%

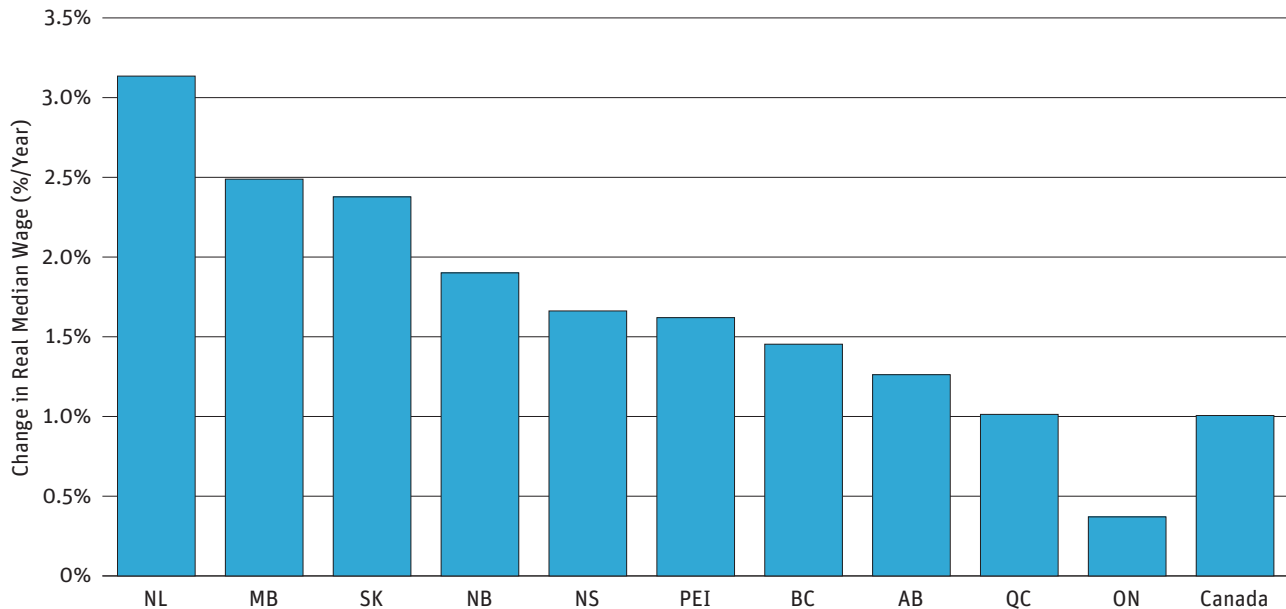
Source Authors' calculations from Statistics Canada CANSIM Tables 51-0001, 282-0072, and 384-0002.

translate proportionately into higher personal incomes in those provinces, in addition to the underlying capital-intensity of petroleum production.

Nominal wages alone, of course, do not fully describe the living conditions of workers; we must also take account of nominal price levels for the products and services which workers buy with their incomes. And while nominal wages in Alberta are, on average, modestly higher than in the rest of Canada, it is well known that consumer prices (fueled by inflation, including within the housing market) are also significantly higher. The net impact for workers in Alberta is not nearly as positive as nominal wage rates alone suggest. *Figure 6* indicates the average annual improvement in real median wages experienced over the last five years in each province. In Alberta's case, shockingly, wage gains have been among the weakest in Canada, ranking eighth among the provinces (outpacing only workers in hard-hit Ontario and Quebec). The value of nominal wage increases paid out in Alberta was mostly offset by the higher costs that Albertans must pay for housing and other essentials.

As mentioned above, the petroleum industry is unique for the extreme capital-intensity of production methods, and the disproportionately small share of generated incomes that are received by the people who actually work in that industry. The failure of this expanding industry to generate proportionate improvements in incomes for employees is also reflected in the growth of income inequality as another side-effect of the petroleum boom.

FIGURE 6 Annual Real Wage Growth, 2006–11



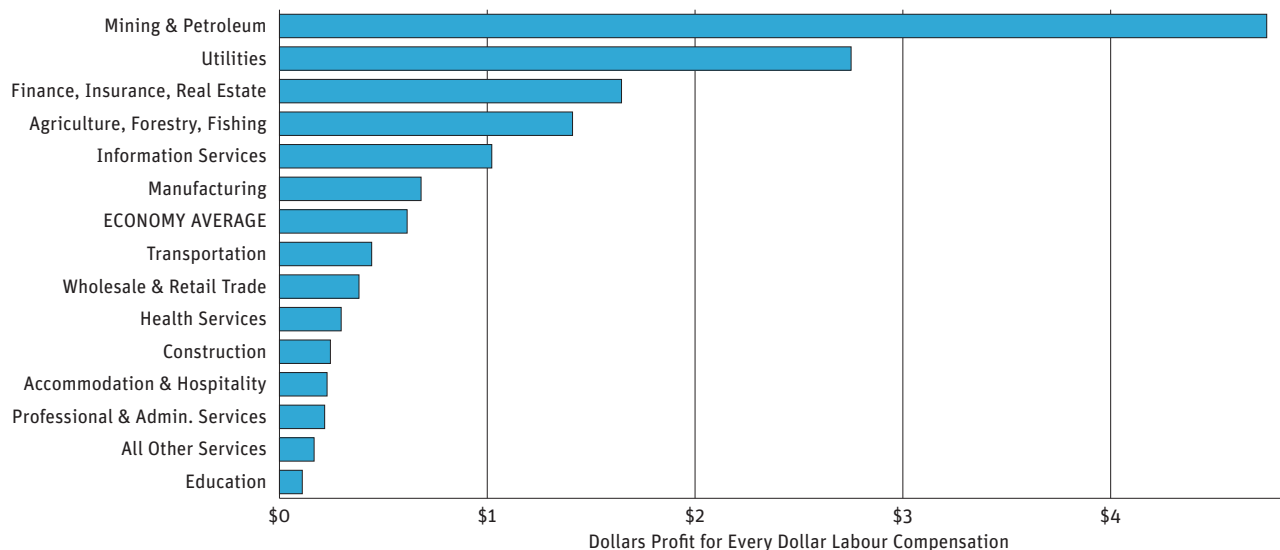
Source: Authors' calculations from Statistics Canada CANSIM Tables 282-0072 and 326-0021.

This inequality can be measured along several dimensions: factor incomes, regional income distribution, and personal income distribution.

Figure 7 illustrates the extreme profitability of the mining and petroleum sectors, on the basis of Statistics Canada input-output statistics. For each dollar paid out in labour income (including wages, salaries, and non-wage benefits), almost five dollars is paid to capital in gross surplus (including depreciation). By contrast, in Canada's economy as a whole, approximately 60 cents is paid out in gross surplus for each dollar of labour income.

Capital income in Canada is distributed far more unequally than labour income. For example, according to the most recent data from the Canada Revenue Agency (2010), tax-filers reporting income over \$100,000 accounted for just over 5 percent of all tax-filers that year, yet they claimed nearly two-thirds of dividend income, three-quarters of taxable capital gains, and over half of all investment and capital income. Those earning over \$250,000 that year (making up just 0.75% of all tax-filers) claimed 41% of dividend income, 52% of capital gains, and almost one-third of all capital income. The significant shift over the past decade in total output and income, therefore, toward the most profit-intensive sector of Canada's economy (in turn generating more capital income for oil industry owners and investors) will certainly

FIGURE 7 Profit Intensity By Sector, 2000–08



Source Authors' calculations from Statistics Canada CANSIM Table 381-0014.

have contributed to the substantial increase in personal income inequality that has been experienced over the same time. For example, consider the share of after-tax income received by the top quintile of the population. That share has been growing in Canada, and in most provinces, in line with the growing inequality of overall income (resulting both from growing inequality of market income and from the erosion of the redistributive effects of Canada's tax-and-transfer system). However, the rise in the income share of top earners over the past decade was more dramatic in Saskatchewan (where their share grew by 2 full percentage points) and Alberta (1.9 percentage points) than in any other Canadian provinces.⁵²

Even in Alberta, the centre of the petroleum boom, and a province where labour market conditions have been buoyant, it is not clear that the benefits of the boom are indeed "trickling down" to all segments of society. At the height of the oil boom in Alberta during the past decade, for example, an Environics poll showed that half of Albertans either felt worse off or about the same despite the new wealth being generated in their economy.⁵³ Moreover, at the height of the boom, a Probe Research opinion poll found that 71 percent of Albertans supported a moratorium on new bitumen approvals until infrastructure and environmental management issues have been addressed.⁵⁴ And First Nations in the area were calling for a moratorium as well.

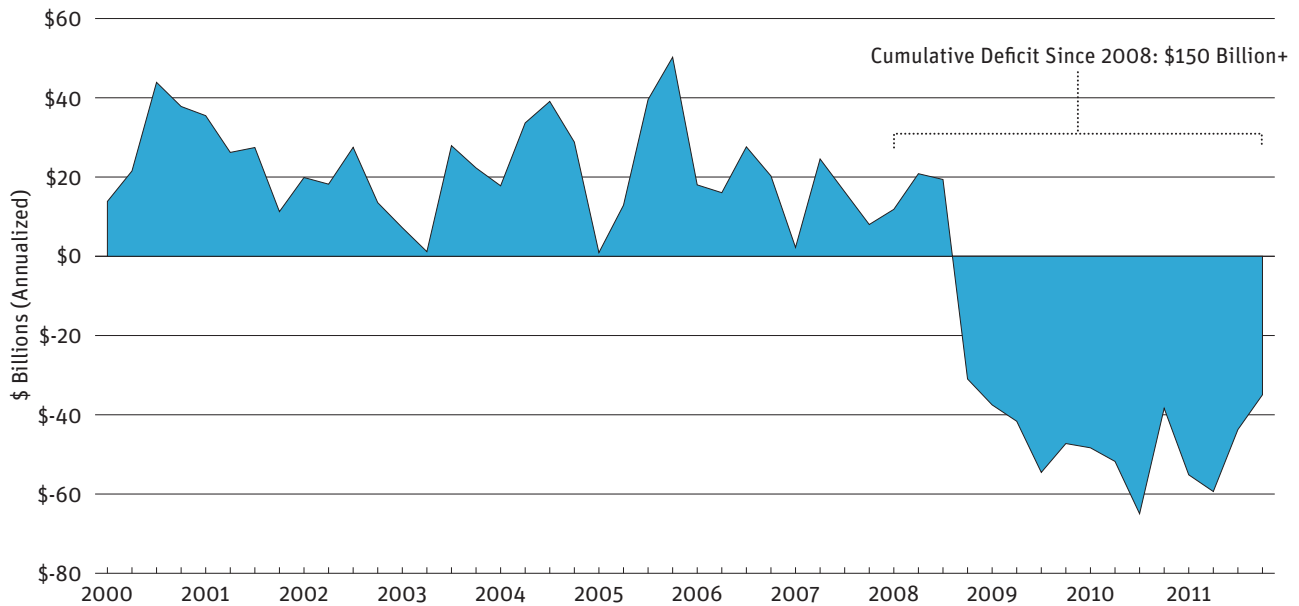
The Parkland Institute conducted further research into popular dissatisfaction with the effects of the oil boom; this research showed that “the benefits of the boom are disproportionately going to higher income Albertans, most notably the top income bracket.”⁵⁵ Although middle-income Albertans had seen small increases in their incomes, these resulted from working more hours to maintain their standard of living. Moreover, in the overheated Alberta economy housing prices have skyrocketed, and housing affordability and accessibility have been eroded,

In this and subsequent studies, the Parkland Institute documented that the number of poor and homeless in Alberta continued to grow, despite the petroleum-led expansion. Alberta had the second highest food bank usage on record in 2011 and the province leads the nation for the percentage of houses with employment income served by a food bank.⁵⁶ Very low social assistance and minimum wage rates have contributed to the failure of the overall economic expansion to translate into better living conditions at the bottom of the income ladder. In other words, not only does Alberta’s top 1 percent have among the highest portion of concentrated wealth in the country, but the province also has the greatest poverty intensity (the poor are much poorer) than other provinces. In effect, while Alberta’s top 1 percent have by far the highest average income in the nation, the poor are the furthest from the poverty line; the rich are the richest and its poor are the poorest in Canada.⁵⁷

International Trade

Most energy produced in Canada is now exported, almost exclusively to the U.S. market. In this regard, the dramatic expansion in Canadian petroleum production and exports should theoretically make an important contribution to Canada’s overall balance of payments situation. In practice, however, the trade balance effects of the bitumen boom are more complicated than this. As indicated above in *Figure 2*, non-petroleum exports have declined faster than petroleum-based exports have expanded over the past decade. It is not just manufacturing exports that have contracted (although the contraction in manufacturing has been dramatic and painful); all other classes of Canadian exports declined during the past decade, including tourism and exports of tradable services. In sum, the contraction in exports from Canada’s non-petroleum sectors vastly overwhelmed (by a combined factor of 8.5-to-1, measured as shares of GDP) the growth in petroleum exports.

FIGURE 8 Current Account Balance



Source: Statistics Canada CANSIM Table 376-0003. Annualized data.

The combined result has been a noted deterioration in Canada's overall balance of payments, considering merchandise trade, services trade, tourism, and other current flows.

Figure 8 illustrates the decline in Canada's international current account balance of payments. The current account deficit has expanded dramatically in recent years, and in 2011 averaged almost 3 percent of Canadian GDP — considerably larger than Canada's federal deficit, which attracts far more public attention. This current account deficit represents an accumulating debt to the rest of the world.⁵⁸ Another contributing factor to this current account deficit is the continuing net outflow of profit and dividends on foreign direct investments in Canada; these are also expanding (as discussed below), especially in the resource extraction sector, as a result of the growth in foreign ownership in Canadian resource industries.

In sum, the overall net impact of the bitumen boom on the national trade and current accounts balances has been clearly negative: despite the accelerated pace of resource extraction and export, Canada is, on balance, a much less successful exporter (in aggregate terms) than at the turn of the century (when the bitumen boom started to accelerate). The dramatic contraction in overall exports as a share of GDP (from 46 percent of GDP in 2000 to just

31 percent in 2011⁵⁹) seems counterintuitive, given the increasing presence and reach of globalization into all segments of the economy. The impact of the energy industry on the currency is clearly a part of this story. The result has been a reorientation of Canada's entire economy toward non-traded goods and services production, with negative implications for productivity (discussed further below).

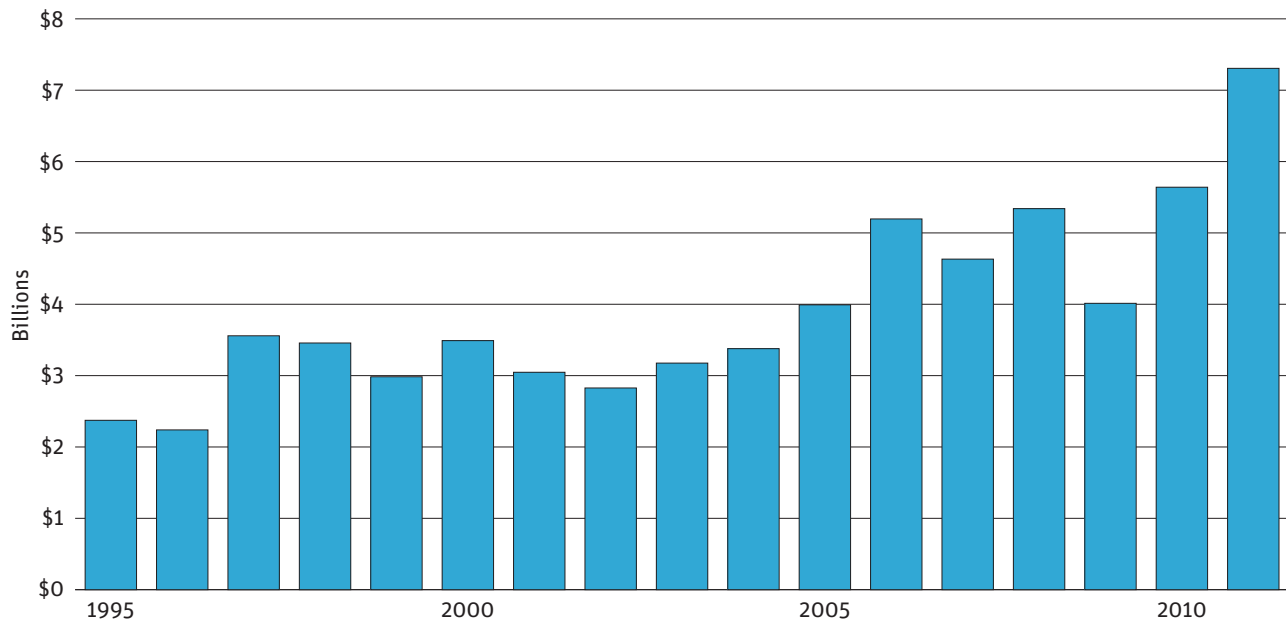
A good example of the decline in Canada's relative trade competitiveness, coincident with the energy export boom, is provided by the case of missed opportunities in the industrial machinery sector. Alberta alone spends over \$20 billion per year on machinery and equipment purchases, driven in large part by the enormous capital spending associated with bitumen developments and related projects. Ninety percent of industrial machinery and equipment in Alberta is purchased by private sector firms, with the petroleum sector obviously dominating.

Potentially, those significant capital asset purchases could provide an important market for Canadian machinery manufacturing, including specialized transportation equipment (such as large mining trucks), boilers and processing equipment, and other tools and equipment. However, the vast majority of capital machinery used in Canada is imported: upwards of three-quarters of all industrial machinery is manufactured by specialized producers in other countries. To take an especially painful example, most of the heavy trucks used in bitumen sands mining are manufactured by Caterpillar in the U.S. — a company that just closed its only Canadian manufacturing facility (a locomotive plant in London, Ont.) and shifted production to Mexico and Indiana.

A more robust industrial machinery sector would diversify the Canadian economy beyond just oil extraction, and could help bridge the transition between bitumen and the green economy. A strategy to develop a low-carbon industrial machinery sector could be focused on reducing the carbon intensity of bitumen production in the short-term, and finding new applications for domestically produced machinery in an emerging green economy in the long-term.

There is no strategy on the part of policymakers at either the provincial or federal level to increase the proportion of machinery purchases that can be supplied by manufacturers in Alberta or elsewhere in Canada. Without such a policy, the effort by developers to purchase all inputs at minimum cost is leading them to rely increasingly on imports — all the more so in light of the distortionary impact of the overvalued currency on relative Canadian costs.

FIGURE 9 Trade Deficit, Mining and Construction Equipment



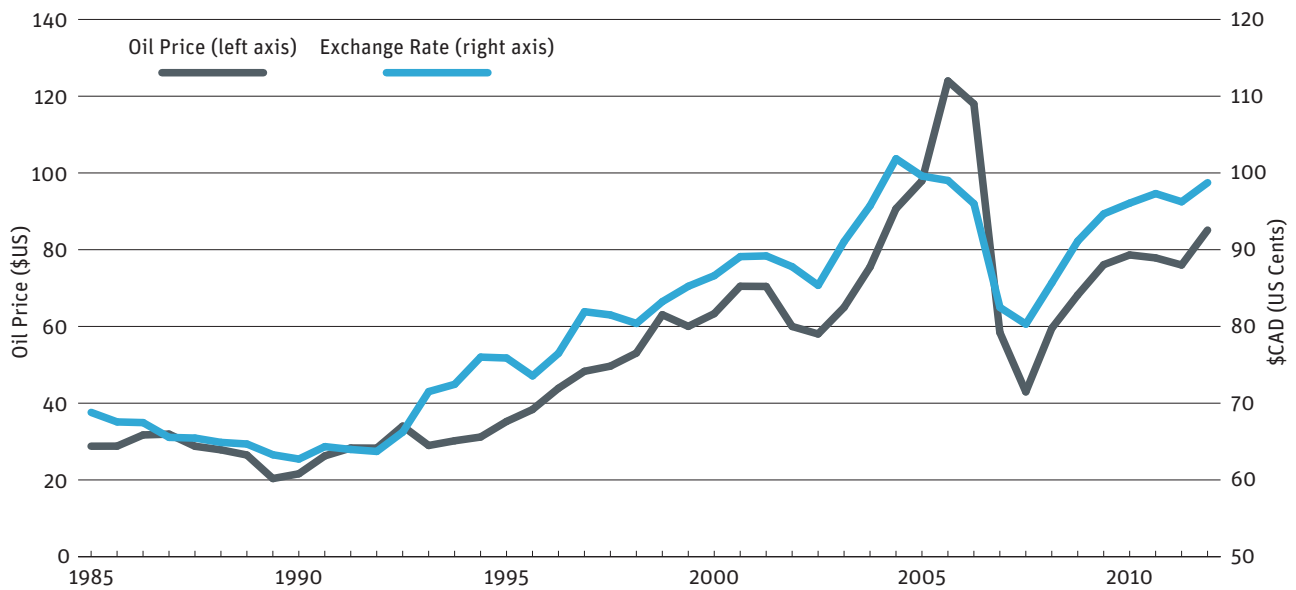
Source: Industry Canada Strategis database, NAICS sector 3331.

The end result is the emergence of a large and growing trade deficit in machinery that is especially pronounced in mining and construction equipment. The faster investment is pumped into new energy extraction projects, the larger the drain on Canada's overall balance of payments. As indicated in *Figure 9*, this trade deficit reached over \$7 billion in 2011, accounting for 15 percent of Canada's overall \$50 billion current account payments deficit that year. Furthermore, the focus on energy extraction instead of building linkages to a more diversified and sustainable value-added economy squanders opportunities to facilitate transition from the bitumen industry toward the emerging green economy.

Currency Effects

The negative net impact of the bitumen boom on Canada's international trade performance has been both mediated and accentuated as a result of its impact on the international value of the Canadian dollar. During the past decade, the value of the Canadian dollar has become increasingly linked to the price of commodities in general, and oil in particular, on internation-

FIGURE 10 Oil Prices and the Loonie



Source Bank of Canada, OECD

al money markets. As a widely traded financial asset, the value of the Canadian dollar primarily reflects the judgments of currency speculators and other financial investors who buy and sell currencies around the world.

The international value of Canada's currency has become closely associated with movements in the world price of oil. As illustrated in *Figure 10*, the currency's value (expressed in U.S. cents, measured on the right axis) has followed the rise and fall of oil prices (measured in U.S. dollars per barrel,⁶⁰ on the left axis). This correlation became especially pronounced after the turn of the century. At that time, global commodity prices began to increase significantly, and output and exports from Canada's petroleum industry (led by bitumen) began to increase dramatically.

By using econometric techniques, we can examine the relationship between oil prices and the Canadian dollar more formally. *Table 5* presents the results of a univariate least squares regression of the Canadian exchange rate (in U.S. cents) on the oil price (in U.S. dollars). This simple regression demonstrates a strong fit; variations in the oil price explain over 85 percent of the variation in the Canada-U.S. exchange rate. And a simple forecast simulation of the exchange rate that uses the oil price to predict variations

TABLE 5 Regression Results, Canadian Dollar and Oil Price

Dependent Variable: EXRATECENTS
Method: Least Squares
Sample: 2000:1 2010:4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	56.36826	1.639462	34.38218	0
OILUS	0.453373	0.027595	16.42949	0
R-squared	0.865354	Mean dependent var	80.69792	
Adjusted R-squared	0.862148	S.D. dependent var	12.56845	
S.E. of regression	4.666471	Akaike info criterion	5.963072	
Sum squared resid	914.5899	Schwarz criterion	6.044172	
Log likelihood	-129.1876	F-statistic	269.9281	
Durbin-Watson stat	0.608522	Prob(F-statistic)	0	

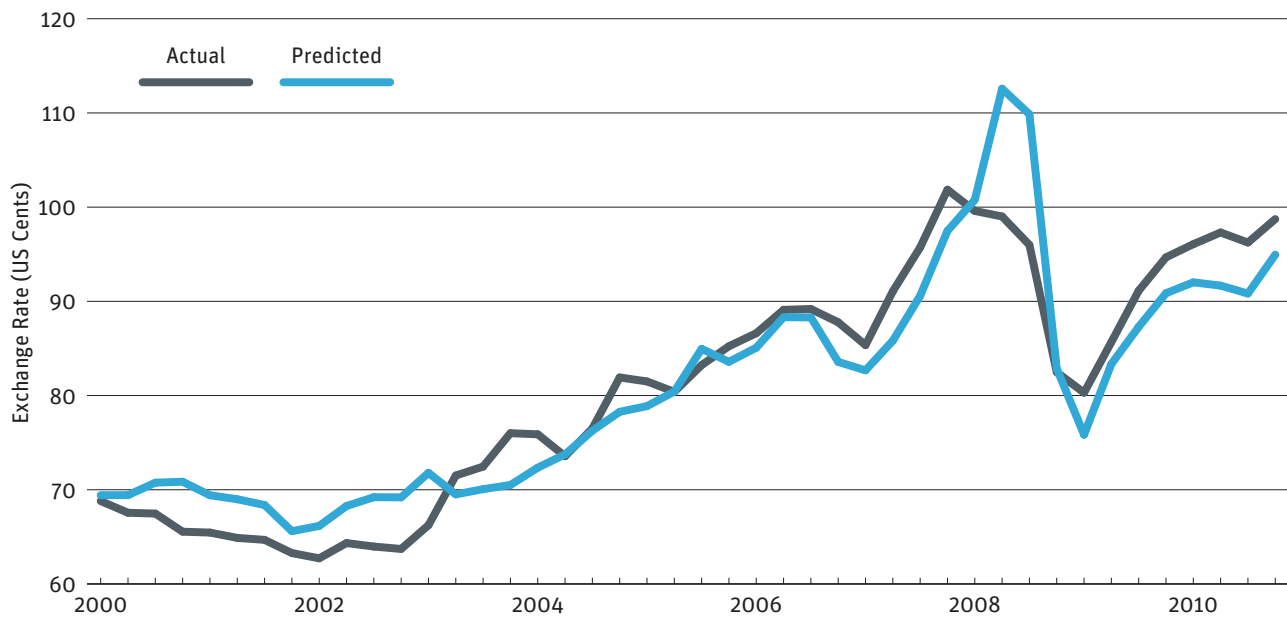
Source Authors' calculations as explained in text.

in the exchange rate accurately describes most of the movement in the actual exchange rate, as illustrated in *Figure 11*.

Canada's currency has been trading for most of the last several years at levels far above its "purchasing power parity." This is a benchmark measure of the exchange rate based on international comparisons of nominal prices and costs. Traditionally, economists have considered purchasing power parity to be a centre of gravity for the fluctuations of exchange rates. A purchasing power parity (PPP) exchange rate is one that equalizes the real purchasing power of two equivalent amounts of currency, measured relative to the prevailing prices in the domestic economy.⁶¹

According to recent research from the OECD,⁶² the purchasing power parity exchange rate for the Canadian dollar is approximately 81 cents (U.S.). At that exchange rate, the purchasing power of an equivalent amount of value is equalized between the two countries.⁶³ But with the Canadian and U.S. dollars trading at approximately par in recent years, the Canadian currency is around 25% over-valued relative to its PPP level. What that means concretely is that relative to domestic prices (and costs, including the cost of labour), Canadian products and services look 25% "too expensive" in the eyes of foreign purchasers. This overvaluation has led to dramatic declines in Canadian industries that supply non-resource goods and services to foreign purchasers.

FIGURE 11 Canadian Dollar: Actual and Predicted Values



Source Author's calculations as explained in text

There are few observers – including financial professionals who trade billions of dollars' worth of currency every week – who would deny the obvious and empirically documented link between the price of oil and the value of the Canadian dollar. However, this begs a subsequent question as to why there is such a close relationship between the price of oil and the loonie's exchange rate. In other words, what is the “transmission mechanism” that explains why oil prices (and the expanding Canadian oil industry) have pushed up the dollar?

Many analysts explain the link simply as reflecting strong world demand for the “things Canada produces” – namely, oil. This is not directly true. As shown above, Canada's exports of petroleum and a few other staples have boomed, yet Canada's overall trade balance sagged badly during most of the last decade's energy boom. The decline in non-resource exports of all kinds (both goods and services, undermined by the overvalued currency) has far outweighed the expansion in resource exports.

It is not so much global hunger for Canada's actual *output* (including petroleum) that explains the escalating currency, but rather the appetite of global investors for a piece of the uniquely accessible and lucrative resource base itself. Canada's unique policy of allowing foreign investors largely un-

fettered access to ownership of non-renewable resources (and petroleum in particular) helps to explain why the currency has become so correlated with the price of oil — despite the modest share of petroleum output in Canada's overall GDP, and despite the marked deterioration in Canada's trade performance.

Over 70 percent of known oil reserves in the world are controlled by state-owned companies.⁶⁴ Most major oil-producing countries have maintained management and ownership of this strategic, non-renewable resource through government enterprise, presumably in the interests of the public. This means less than 30 percent of known oil reserves are available for exploitation by private companies. Incredibly, well over half of those privately exploitable reserves are in Canada. Canada is the only country among the top ten largest petroleum reserves in which the oil industry is not dominated by state-owned firms. Given sky-high oil prices and oil profits, and the relentless decline of their existing reserves, the global petroleum industry has set its sights firmly on Canada as a key solution to the long-run challenge of replacing depleting privately-owned reserves. Indeed, even foreign state-owned companies (from Norway's Statoil to China's CNPC) are getting in on Alberta's bitumen action — most recently with China's CNOOC purchasing Nexen for \$15 billion, and Malaysia's Petronas purchasing Progress Energy for \$6 billion. It seems especially ironic that foreign public corporations see value in investing in Canadian oil, yet Canadians presently have no public capacity to do the same thing (since Canada possesses no publicly owned oil company).

This hunger on the part of global petroleum companies for Canada's oil (which is uniquely accessible to private capital) is the key structural reason why our currency has so closely tracked the price of oil over the past decade. Our petroleum exports are important, but still constitute just 18% of total exports (including natural gas). This is reflected in high valuations for Canadian assets (especially anything related to petroleum), and (to a lesser extent) in strong inflows of real foreign investment as oil resources are steadily sold off to the highest bidder. It is this asset market effect that drives the currency far above its fair or sustainable value, further undermining Canada's national capacity to produce and sell a broader range of products and services to the rest of the world.

The link between oil prices and the dollar is experienced broadly, therefore, in the form of enhanced foreign appetite for Canadian assets (and especially resource assets). This relationship does not even require actual FDI flows, or capital flows of any kind, since forward-looking currency traders

build those expectations of value into their judgments and portfolio decisions. Petroleum super-profits have made Canadian resource companies attractive assets for investors of all nationalities. Substantial corporate tax cuts reinforce this unique profitability. Meanwhile, Canada is unique among major oil-exporting countries in having very weak limitations on foreign ownership of the non-renewable resource itself.⁶⁵

This analysis of the link between the price of oil and Canada's currency anticipates a policy response that could help to break that link. Measures aimed at slowing and more carefully regulating the pace of energy developments (especially in the oil sands), reducing the profitability of those projects (through higher taxes and royalties), and restricting foreign ownership of petroleum assets would all contribute to a "cooling off" on the part of international investors for Canadian assets (and the Canadian currency).

"Dutch Disease" and the Failure of Canadian Innovation

These troubling trend lines in the Canadian economy are reminiscent of the so-called Dutch Disease. The term originates from a period in the Netherlands in the 1960s following the discovery and exploitation of natural gas deposits in the North Sea. This newfound wealth caused the Dutch currency to rise, making exports of non-oil products less competitive on the world market and causing disruptive structural shifts in the national economy. In the 1970s, a similar economic condition occurred in Great Britain, when the price of oil quadrupled and it became economically viable to drill for North Sea Oil off the coast of Scotland. By the late 1970s, the country had become a net exporter of oil, and the pound soared in value — yet the country soon fell into recession, in part due to a weakening of industrial capacity in the economy. Similar economic episodes have been documented for other resource-exporting countries, including Australia (where the phenomenon is called the "Gregory Effect"⁶⁶) and modern-day Brazil. The common term "Dutch Disease" does not fully convey, therefore, the breadth and specificity of experience from these various cases of resource-driven crowding-out.

There are several potential conduits through which a resource boom can cause negative side-effects for other sectors of the economy, and hence undermine the country's overall economic prospects.

- Booming resource projects can divert productive factors (including capital and labour) from other industries, and cause a general increase in costs that squeezes out other industries. This effect is es-

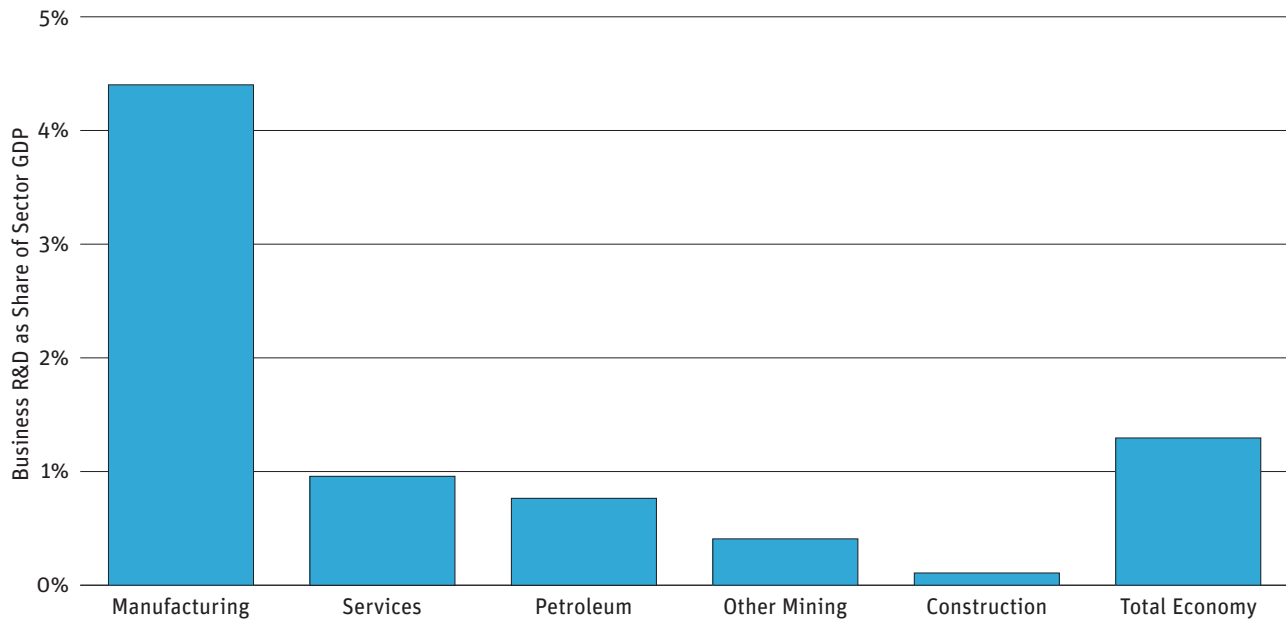
pecially relevant if the economy is close to full productive capacity (including full employment).

- A natural resource boom might attract an inflow of foreign capital, and/or a rise in the apparent value of Canadian assets. Through financial market mechanisms, this puts upward pressure on the domestic currency and renders other exporting industries less competitive.
- When an economy is largely geared towards large-scale development and export of an unprocessed resource (like bitumen), it may lose the critical mass and capabilities required for the development of other sectors. In particular, the economy's ability to innovate in new product areas may be hampered, as more attention and resources are dedicated to the simple process of extraction and export of raw resources.

All three of these channels may be relevant in the Canadian case. For example, in terms of the impact of a resource boom on domestic innovative capacity, commentators and policymakers have expressed continuing concern about the poor performance of the Canadian economy in the areas of research, science, innovation, and productivity. Despite a slate of pro-business policy measures implemented over the past decades aimed supposedly at boosting business innovation activity (including tax cuts, tax subsidies of various forms, and other measures), Canada's innovation effort continues to lag behind other industrialized countries. Clearly as a consequence of this failure, Canada's productivity performance has been abysmal. *Figures 12 and 13* indicate that troubles with productivity and R&D are coincident with the take-off of the export-oriented bitumen boom.

Figure 12 illustrates the proportion of GDP dedicated by private businesses to R&D activity in Canada. The petroleum sector devotes just three-quarters of 1 percent of industrial GDP to research (despite the increasingly pressing environmental challenges associated with the extraction of this non-renewable, polluting resource), well below the average for Canadian businesses as a whole. In contrast, the manufacturing industry allocates over five times as much to research. The decline in Canadian manufacturing further weakened our already inadequate innovation effort (overall R&D spending as a share of GDP in Canada has declined by about one-third since the turn of the century). This establishes a cumulative chain of causation, as the flagging innovation effort further undermines the global competitiveness of Canadian-made products and services, and undermines

FIGURE 12 Business Sector R&D Spending, 2008

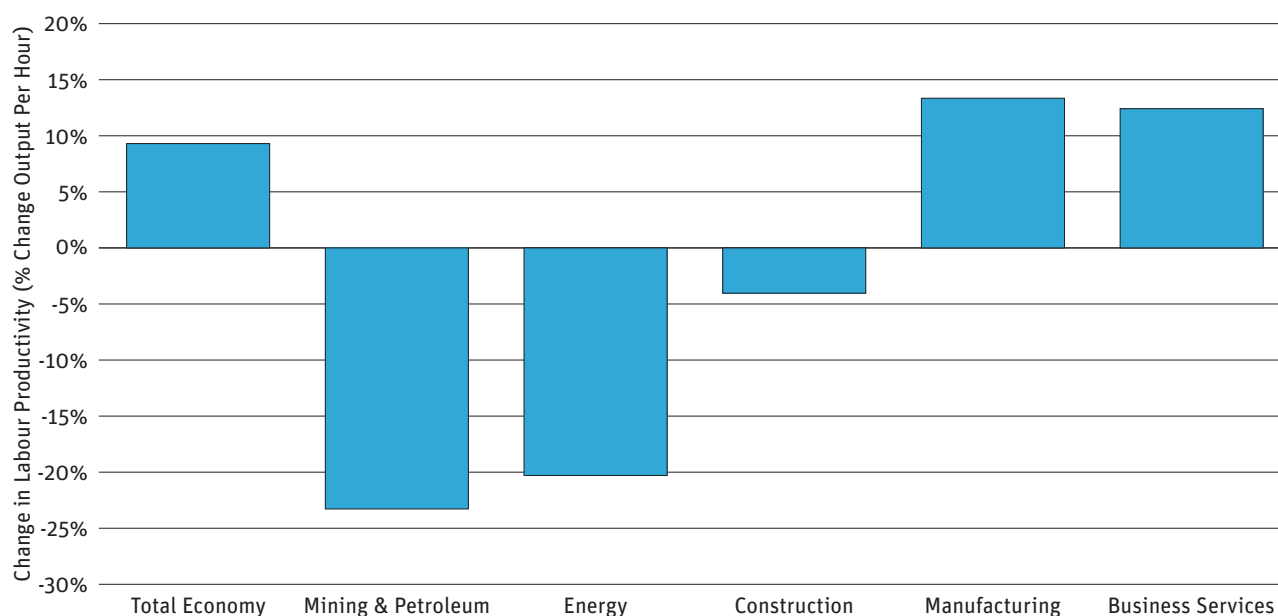


Source Authors' calculations from Statistics Canada CANSIM Table 383-0011.

national capacity to develop new, innovative industrial sectors (hence reinforcing our reliance on what we seem to “do best” – namely, extract and export raw resources).

The shift in output and employment from manufacturing to resource extraction has further consequences for Canadian productivity growth. Productivity in resource extraction tends to decline over time. As readily available non-renewable reserves are exploited and depleted, it requires increasing labour and other inputs to develop harder-to-produce reserves. The decline of productivity in resource extraction is readily visible in Canadian data, as indicated in *Figure 13*. Labour productivity in the mining and petroleum sectors declined by a cumulative total of almost 25 percent over the last decade (in contrast to a 10 percent productivity improvement in the overall economy, and a 13 percent improvement in manufacturing). Ironically, then, as the bitumen boom accelerates, Canada is shifting an increasing share of national resources toward a sector with negative productivity potential. No wonder Canada's overall productivity performance has gone from bad to worse: average labour productivity in Canada grew at an annual rate of well under 1% per year in the last decade (as the bitumen boom accelerated), our worst productivity performance in the entire postwar era.⁶⁷

FIGURE 13 Productivity Growth By Sector, 2001–11



Source Authors' calculations from Statistics Canada CANSIM Tables 358-0024, 379-0023, and 379-0024.

A country that allows its innovative and productivity capacities to atrophy during a period when it becomes increasingly dependent on the extraction and export of a non-renewable resource, is likely to be left in a highly vulnerable state once the resource is depleted, and/or when markets shift against the staple product being exported. This risk was explored in our discussion of the “staples trap” in Part I. When the non-renewable resource is depleted, or its price drops to the point where it is no longer viable to extract it, the ability of the rest of the economy to respond is hampered if the development of other sectors has been neglected in the interim years.

In the case of the bitumen industry, however, this vulnerability may lie less with an exhaustion of the resource or even a lowering of world oil prices — although the risk that future oil price declines will wreak havoc on the Alberta economy is not inconceivable.⁶⁸ Instead, the larger danger to the industry may come from the erosion of markets for high-polluting fossil fuels like bitumen. If the world wishes to prevent highly dangerous levels of climate change, then countries have little choice but to reduce fossil fuel production and consumption quickly in order to achieve a full transition to clean renewable energy sources by mid-century. This imperative is being increasingly recognized by many of Canada’s trading partners, includ-

ing Europe and China. The long-term implications of global energy conservation and renewable energy development for Canada's enormous bitumen industry could prove dramatic, and should spark careful consideration of a policy of orienting our national economy around an unsustainable activity.

Manufacturing Crisis

The brunt of resource-driven sectoral restructuring in Canada's economy has clearly been borne by the manufacturing sector, although it is important to note that other export-oriented sectors such as forestry, tourism, and tradable services also contracted during the decade, in part as a side effect of the bitumen boom and its impact on the Canadian dollar. A net total of almost 500,000 jobs were lost in the manufacturing sector over the past decade, and losses were experienced in all provinces.

When measured as a share of total employment in Canada, the decline in manufacturing jobs began as early as 1999, about the same time as Canada's manufacturing exports and manufacturing trade balance began to decline. By 2011, employment in manufacturing dropped to barely 10 percent of total employment in the country, by far the lowest in postwar history, and lower now than the relative share of manufacturing employment in the U.S. economy. Compared with other OECD economies, Canada's manufacturing sector has declined much more rapidly as a share of total employment. The crisis in the sector cannot therefore be attributed to universal or inevitable trends (such as the faster-than-average productivity growth that is traditionally demonstrated in manufacturing); the unique speed and depth of the downturn reflects specific Canadian factors, including the devastating impact of the overvalued currency.

A prime example of the crisis in manufacturing has been the rise and fall of Canada's once-vaunted auto industry. When the industry peaked in 1999, Canada ranked as the fourth-largest assembler in the world and benefitted from a \$15 billion trade surplus in automotive products. Canada's auto industry was well placed in terms of labour productivity and cost competitiveness. By 2006, however, the large automotive trade surpluses had melted away, generating Canada's first automotive trade deficit in a generation. By 2011, Canada was running a chronic automotive trade deficit of \$15 billion per year. During the same period, some 50,000 well-paid auto jobs were lost. Similar painful stories can be told about many other sub-sectors in Canadian

manufacturing: overall, Canada's manufacturing trade balance shifted from balance at the turn of the century, to a \$90 billion annual deficit by 2012.

For several reasons, the health of manufacturing is key to the health of the overall economy. Indeed, the manufacturing sector makes a disproportionate contribution to overall productivity and well being in the Canadian economy:

- By producing products that ensure successful participation in global trade. Manufactured products account for 54 percent of all global trade in goods and services.⁶⁹ To support overall engagement with the global economy and avoid chronic balance of payment difficulties, an economy such as Canada's must be able to effectively participate in global markets for manufactured products.
- By generating both higher productivity levels and higher rates of productivity growth than other sectors of the economy. To make the most of this potential demand for manufactured output must grow fast enough to absorb higher-productivity labour.
- By providing well-paid, high quality employment for working Canadians. Higher productivity allows manufacturing employers to pay incomes that are, on average, 25 percent higher than in the rest of the economy. This is important in order to maintain decent income and employment opportunities in key communities throughout the country.
- By allocating a greater share of GDP to research and development activity and other forms of innovation. Although manufacturing industries account for just 13 percent of Canada's GDP, they account for well over half of all private sector R&D in Canada.
- By providing the potential to strengthen innovation linkages throughout the economy. Far more than other sectors, the manufacturing sector employs engineers and uses high-tech services, such as telecommunications and computer system design, to continuously improve production processes. This increases the overall level of skill and technical knowledge in the economy. By applying this pool of knowledge to existing and new sectors, Canada can improve its innovation performance.

For all these reasons, the long-run health of Canada's manufacturing sector is a matter of national economic importance. Yet many policy-makers

ers have been lulled into assuming that so long as resource exports can “pay the bills,” there is no need to pay special attention to manufacturing. This approach leaves Canada vulnerable to a de-industrialized future once the volatility inherent in resource-based economies shows its negative side, and/or once resources are no longer demanded by a world that is transitioning rapidly toward an alternative energy future.

Foreign Direct Investment

Statistics Canada reports that over one-third of the assets and more than half of the operating revenues in the Canadian petroleum sector are associated with foreign controlled firms.⁷⁰ The bitumen industry has become an especially attractive target for foreign investment.⁷¹ To be sure, some forms of foreign direct investment have been beneficial for enhancing the genuine capacity of some important industries in Canada in the past. However, in the case of the bitumen industry, the benefits of foreign investment are hard to identify. The foreign investors do not generally bring unique technology to the industry (since the extraction technology is largely Canadian-developed anyway, given the unique nature of the resource). They bring financial capital, but Canada has no shortage of finance: our financial sector is sophisticated and strong, and capable of supplying credit in various forms to meet the industry’s needs.

The benefits of foreign ownership in the resource sector seem questionable. In contrast, foreign investment in the petroleum sector imposes clear costs on Canada’s economy in at least three ways:

- The inflows of foreign finance have reinforced the link between Canada’s currency and the price of oil, with the resulting negative impacts on other sectors.
- The long-term payments back to foreign-based owners (in the form of profits, interest and dividends) further weaken Canada’s already deteriorating current account balance.
- The high degree of foreign ownership and investment undermines overall Canadian control of the energy industry, and reduces our national capacity to manage its social and environmental costs.

During the last decade, there have been several waves of foreign takeovers in the bitumen industry. The first wave came from large oil compan-

ies in the U.S., followed by major EU oil companies. More recently, China's state-owned oil companies also have made a significant incursion.⁷² The following examples illustrate this trend.

In keeping with the shift of U.S. energy policy away from dependence on Middle East oil imports in favour of increased imports from Canada, several U.S. oil giants have staked-out their own ground in the Canadian bitumen sector:

- *ExxonMobil*, the world's largest oil company, through its Canadian subsidiary, Imperial Oil, owns 25 percent of Syncrude, the oldest and largest operator in the bitumen sands.⁷³ Imperial Oil also owns and operates in-situ and mining operations in the bitumen sands, which are projected to be producing 510,000 barrels per day by 2020.⁷⁴
- *ConocoPhillips*, the third-largest U.S. petroleum company has two major investments in Canada's bitumen sands,⁷⁵ namely, a joint venture with the Cenovus at Christina Lake and Foster Creek plus a joint venture with Total SA of France called the Surmont Project which has the potential to produce 137,000 bpd by 2015.⁷⁶
- *ChevronTexaco*, the second-largest U.S. oil company, through its Canadian subsidiary, Chevron Canada, holds a 20 percent interest in the Athabasca Oil Sands Project (AOSP) along with Shell (60%) and Marathon Oil (20%). AOSP currently produces approximately 255,000 barrels per day from its Jackpine and Muskeg River mines.⁷⁷
- Smaller U.S. oil companies such as Marathon, Occidental Petroleum, and Devon have made additional investments in the Alberta bitumen sector as well.

Several European oil companies have also made significant investments in the Canadian bitumen industry:

- *Shell Oil*, the international oil conglomerate based in the U.K. and the Netherlands, has the controlling interest (60 percent) in the Athabasca Oil Sands Project (described above).
- *Total SA*, the largest oil corporation in France, through its subsidiary Total E&P Canada, not only has its joint venture in the Surmont Project with ConocoPhillips, but also has a 50/50 partnership with Sinocanada Petroleum Corp. in the Northern Lights Project, operates and owns 38.25% the Joslyn North Mine which is expected to

be producing 100,000 barrels per day by 2018, holds a 39.2% interest in the Fort Hills project and is a partner with Suncor in the Voyageur upgrader project.⁷⁸

- *Statoil*, the Norwegian public oil company, has controlling investment in the Kai Kos Dehseh project in the bitumen sands.⁷⁹
- *British Petroleum*, based in the United Kingdom is involved in a number of joint venture projects in the bitumen sands including: Sunrise as a 50% owner with operator Husky Energy; Pike with joint venture partner and operator Devon energy; and Terre de Grace along with partner Value Creation Inc.⁸⁰

More recently, China's state-owned petroleum companies have made several major moves to increase ownership and investment in the bitumen industry:⁸¹

- *Sinopec Corporation*, China's largest refiner and marketer of petroleum products, made a significant investment (\$4.65 billion) in the Sycrude consortium in 2010. Sinopec also owns Northern Lights, a strip mine and upgrader facility in Alberta's bitumen sands, through its Canadian subsidiary, Synenco. In December 2011, Sinopec also took over Daylight Energy Ltd. for \$2.2 billion.
- *China Investment Corporation* bought up \$1.25 billion worth of shares in Penn West Petroleum in 2011, the *Chinese Offshore Oil Corporation* gobbled up Opti Canada for \$2.34 billion, and *Petro China* became the owner and manager of the Mackay River oil sands project for \$1.9 billion early in 2012.
- *CNOOC Group*, the third-largest state-owned oil company in China, made a \$15.1 billion bid in 2012 to purchase the Calgary-based Nexen Corporation. Approved by Nexen shareholders, the CNOOC take-over bid was given formal approval by the Canadian Government in December 2012.
- In addition, other Asian oil companies are now investing. These include the *Korea National Oil Co.*'s purchase of Harvest Energy in 2009 (including its oil sands assets), the Thai oil company *PTTEP*'s purchase of a 40 percent share of *Statoil*'s Kai Kos Dehseh project in 2010, and the purchase by Malaysia's state-owned oil company, *Petronas*, of Progress Energy Resources Corp.

These developments raise serious concerns for Canadian policymakers about foreign control of Canada's energy. Indeed, recent NAFTA challenges have shown that the risks to the national public interest are real. Canada lost a battle with Exxon Mobil Corp. and Murphy Oil Corp. over whether the U.S. companies could be forced to boost their research-and-development spending in Newfoundland. Currently a U.S. energy company is suing Canada under NAFTA over Quebec's ban on fracking.

If requiring higher R&D spending is enough to trigger successful litigation, similar suits are certain to follow if a future Canadian government decides it is in the national interest to intervene in ways that undermine short-term profitability of the bitumen industry, re-orient the industry towards a low-carbon economy, or limit the export of bitumen and heavy crude to foreign markets in the interest of domestic energy security. Foreign control of the industry would surely be a major barrier to the successful implementation of such measures.

Similar risks exist in the construction of new pipelines (such as the Keystone XL, Northern Gateway or Trans Mountain pipelines) to bring Canadian bitumen to export markets in the U.S. and Asia. Heavy foreign ownership in the industry reinforces pressure to accelerate the overall rush toward a staples-based economy.

Conclusion

FROM THE OUTSET, we have endeavoured to examine the deep structural implications of the bitumen boom for the Canadian economy. After all, the industry constitutes the largest industrial project on the planet. While recognizing that much public attention has been focused — rightly — on the ecological impacts of this mega-resource development project, it's important to also consider the bitumen industry's widespread implications for the Canadian economy as a whole, and indeed for the Canadian federation.

In doing so, we have reviewed the structural impacts of the recent bitumen boom and the resource sector, through the lens of Canadian economic history. As a country largely built and still precariously dependent on the extraction of natural resources, our economy has been vulnerable to the “staples trap.” Now, in an age of climate change, this staples trap has also increasingly become a “carbon trap.” Together, the “staples” and the “carbon” traps pose a double threat to the Canadian economy.

In the end, we are left to answer a challenging question: How can Canada's economy escape both traps? We recognize that this is an enormously complex and long-term undertaking, and it is not our intention to present a detailed blueprint for change. Instead, our objective is to outline a menu of strategies and policy alternatives pertaining to the bitumen industry, with an emphasis on how Canada's economy may be reoriented to meet the economic and climate challenges of the 21st century.

In this context, we propose a two-track approach: (1) tighter regulation and control of the bitumen industry, with the objective of slowing the

pace of extraction and attaining a better balance between sectors and regions of the economy, and (2) re-orienting Canada's economy to build a balanced, low-carbon and more equitable economic future. Appendix 2 provides some illustrative discussion of potential policy initiatives that could support both tracks.

Track One

The objective here is to put the brakes on the “gold rush” mentality currently driving the development of Canada's bitumen sands. It is clear that unfettered bitumen development is causing considerable environmental, social and economic damage. At the same time, history shows that any economy that places all its eggs in one basket (especially a non-renewable basket!) is gambling with its future. Moreover, in the case of petroleum, we now have the advantage of knowing that the product must become obsolete in an age of climate change.

One strategy is to slow the pace of bitumen development, to use the resource for domestic needs first, and to upgrade more of the resource in this country before it is exported. These goals could be promoted by imposing stronger environmental controls on bitumen production; enforcing more stringent rules concerning energy conservation, GHG pollution and reduced exports; and requiring the industry to incorporate the costs of these measures within its business model. Pro-active measures could also be taken to maximize the economic participation of Canadian stakeholders (including equity-seeking groups) in all stages of the industry, particularly the supply chain, thereby enhancing the net benefits across the country (e.g., greater use of Canadian-made equipment and services). In addition, royalties and taxes should be increased to ensure that Albertans and Canadians receive fair value for the resource and that the petroleum industry contributes to financing the broader costs of economic and environmental transition over the long term. Canadian content could be further enhanced by mandating greater utilization of existing Canadian refineries. Macroeconomic measures could reinforce these efforts to manage the bitumen boom and its side effects, including efforts to curtail the rise of the Canadian dollar.

This approach would slow the expansion of bitumen production, internalize some of the environmental costs of that production, and enhance the domestic economic activity it generates. It does not, however, fully or adequately address the longer-term challenge posed by climate change and

the inevitable transition to a sustainable economy. Track One must therefore be seen as a transitional strategy, aimed at reducing the costs and enhancing the benefits of existing bitumen operations, while laying the economic and political basis for a more far-reaching transition in the future. For example, policies and strategies are also needed to promote and support green industries that could make use of the knowledge, skills, and capital accumulated in bitumen production, along with plans to strengthen training, upgrading, and mobility for workers.

Track Two

The long-term objective of this second policy track is to stimulate the transition to a low-carbon economy. This transition includes not only a shift from overreliance on the resource sector to a more balanced and diversified economy, but also from an economy powered by non-renewable fossil fuels to one more reliant on renewable energy sources. As well, it will likely entail moving from an economy dependent on the private sector and markets to one in which the public sector plays a more significant leadership role. Indeed, not unlike the challenges this country faced during the Great Depression and the Second World War, the magnitude of the resources, skills and coordination required for this “great transition” to a low-carbon future can only be marshaled with the active participation and leadership of the state.

Canadians must make this transition a top economic and social priority. Otherwise, Albertans and Canadians alike risk being stranded by the worldwide evolution away from petroleum, which we can neither stop nor control. It is far better to get ahead of change we know is coming than to continue investing in bitumen extraction and export with no thought for its long-term viability.⁸²

To move in this direction, Canada must develop strategies to encourage the broader structural shifts needed to combat de-industrialization and build a more diversified, low-carbon economic future.⁸³ Finding a path toward that low-carbon model does not involve choosing one particular vision, sector, or technology. It requires new ways of looking at sector development strategies generally, with the goal of fostering an ecology of innovation and investment that is flexible enough to grapple with emerging environmental constraints, carving out spaces for domestically-rooted industries that can employ Canadians and generate export opportunities as the economy transitions away from fossil fuels.⁸⁴ Instead of prioritizing specific companies

or products, focus should be placed on the macro-development of entire technological systems. Steps must be taken to develop, in a collaborative way:

1. a set of common visions and scenarios for a low-carbon economic future;
2. an appropriate diversity of sectors and technologies for making the transition to a low carbon economy; and
3. strategic opportunities for making this transition given Canada's existing pool of knowledge and expertise, institutional capabilities, and natural resource endowments.

By establishing *sector development councils* the federal government could bring together stakeholders in strategic industries and sectors of the economy to support emerging low-carbon products and technologies. In addition to assisting these councils in accessing eco-industrial expertise, the government could assist in supporting the implementation of their proposed plans through capital-financing, public procurement and related incentives. Other initiatives to support the longer-term transition could include investing in a national low-carbon energy grid and renewable energy sources; investing in a high-speed public rail network in urban corridors; and investing in a variety of green manufacturing opportunities. To be effective, however, these new developments must be simultaneously accompanied by “just transition strategies” to provide retraining, mobility and income security for the workers and communities affected (e.g., a new, green social contract).

These two tracks indicate the broad directions required to more effectively manage the current bitumen boom in the public interest and facilitate an effective transition to a low-carbon economy. It should be emphasized that, given the extent to which our governments already demonstrate many of the features of a “petro-state”, both tracks will require a conscious rebuilding of the capacities of governments and the public sector to counteract the current dominant power of private business (and especially the petroleum industry). Moreover, these policy options need to be put forward for discussion and debate in the context of a national dialogue about future directions. This is essential for working toward a democratic national consensus on the need for a new energy and economic strategy for Canada. Such a dialogue would also constitute a sharp and welcome contrast to the recent tone of Canadian public debate on this subject, marked as it has been by attempts to vilify and marginalize any voices of caution or dissent regarding the energy export boom.

Appendix 1

Annotated Bibliography of Recent Research on the Economic Effects of Bitumen Developments

IN REACTION TO public debates regarding the net costs and benefits of bitumen developments and associated infrastructure projects (such as export pipelines), a number of studies have appeared in recent months that consider the direct and indirect consequences of the bitumen boom on national economic performance. Some pundits have cited these reports selectively in an effort to debunk public concerns regarding the side effects of the bitumen boom on the exchange rate, de-industrialization, and regional economic imbalances. This appendix reviews the methodology and main findings of these reports; the summary considers the weight of the evidence.

Bank of Canada (2012a). “Globalization, Financial Stability, and Employment,” Remarks by Mark Carney, Governor of the Bank of Canada, to Canadian Auto Workers (CAW), Toronto, Ontario, 22 August 2012.

Bank of Canada (2012b). “Dutch Disease,” Remarks by Mark Carney, Governor of the Bank of Canada, Spruce Meadows Round Table, Calgary, Alberta, 7 September 2012.

In these two widely-reported speeches, Bank of Canada Governor Mark Carney addressed the issue of the resource boom’s impact on the Canadian dollar, the manufacturing sector, and regional economic imbalances. In both speeches, Carney explicitly rejected the idea that the Bank of Canada should intervene to bring down the value of the Canadian dollar (in order to protect manufacturing jobs). In the Bank’s view, it is more important that it focus strictly on meeting its inflation target. The value of the dollar is considered indirectly by the Bank in setting interest rates (since a very strong dollar tends to reduce the inflation rate, partly by creating unemployment and partly by cheapening import prices). But except in unusual or emergency situations, the Bank will not intervene directly to influence the value of the currency.

However, while the Bank rejects the proposed treatment that some critics of untrammelled resource development have advanced for the problem of “Dutch disease,” Carney’s speeches do not reject the diagnosis that the bitumen boom (and other resource developments) are causing dislocation in other sectors. He confirmed that real commodity prices are well above long-term averages (due, he says, to growth and urbanization in emerging economies). High commodity prices (especially but not exclusively for oil) explain about half of the dramatic appreciation in the Canadian dollar over the past decade. Other explanations for the loonie’s rise include weakness in the U.S. dollar (40%), and the view among investors that Canada is now a low-risk destination for their funds (10%). Meanwhile, Carney estimates that the rise of the dollar has been the dominant factor in the erosion of competitiveness experienced by Canadian exports; two-thirds of the decline in competitiveness is due to the high dollar, and one-third to low productivity growth (resulting largely from weak investment). Reduced competitiveness in turn explains about one-third of the marked decline in Canada’s share of world exports (Carney pointed out that Canada’s export performance was the second-worst among the G20 nations in the first decade of the century); most of the decline in exports, he says, is due to the structural composition of our trade (too reliant on the slow-growing U.S., and underexposed to faster-

growing China and other emerging economies). Carney also confirmed that manufacturing output and employment in Canada have fallen three times faster since the turn of the century than the OECD average.

In regional terms, Carney's data confirmed that sales of merchandise from Central Canada (Ontario and Quebec) to Alberta declined sharply in absolute terms between 2000 and 2008, despite the rapid increase in demand in Alberta. He pointed out that some of this decline in merchandise exports to Alberta was offset by sales of services to Alberta, including financial services and transportation. Nevertheless, Central Canada's total exports to Alberta have declined throughout the period of the bitumen boom (in absolute terms, as a share of Alberta GDP, and as a share of Central Canada GDP), refuting the notion that there have been major net spillover benefits to the rest of Canada from the resource expansion in Alberta.

Carney's analysis confirms that high commodity prices and the rapid growth of commodity industries in Canada have been the dominant cause of the appreciation of the Canadian dollar, which in turn has been the dominant factor behind eroding Canadian competitiveness. This eroding competitiveness explains some (but not most, in his view) of Canada's uniquely poor export performance and uniquely rapid de-industrialization over the past decade. His suggestions for addressing this problem include measures to increase purchases of Canadian-made inputs by resource industries, and measures to add more value to Canadian resources (rather than exporting them in raw form).

Beine, Michel, Charles S. Bos, and Serge Coulombe (2009). "Does the Canadian Economy Suffer from 'Dutch Disease'?", mimeo, University of Ottawa.

This research was funded in part by Industry Canada. The authors begin with a review of international economic literature on so-called "Dutch disease," pointing out that resource-driven appreciations (with their consequent side effects on other industries) have been experienced in several countries, not just the Netherlands. Dutch disease can have permanent effects, lasting even beyond the expiration of a commodity price upswing, due to the path-dependence of manufacturing development. If manufacturing industries fall below a certain critical mass during an episode of Dutch disease, for example, they may not be capable of bouncing back when commodity prices (and hence the exchange rate) come back down.

The authors' unique contribution is to use econometric techniques to attempt to disentangle the effects of a strong Canadian dollar (driven by resource prices) from a weak U.S. dollar (driven by macroeconomic, financial, and fiscal problems). Both would have negative impacts on Canadian manufacturing employment, but only the former is considered "Dutch disease" in their analysis. They find that slightly over half of the rise in the Canada-U.S. exchange rate was due to U.S. dollar weakness, and slightly less than half due to Canadian dollar strength. They then conducted subsequent econometric tests to confirm the negative effect of both forms of appreciation on Canadian manufacturing employment. The authors find that 63% of manufacturing job losses reflected Dutch disease mechanisms. In later research, using slightly different econometric techniques and a different data period, the authors downgraded that estimate, suggesting that 33–39 percent of manufacturing job losses were due to Dutch disease.⁸⁵

Burt, Michael, Todd Crawford, and Alan Arcand (2012). *Fuel for Thought: The Economic Benefits of Oil Sands Investment for Canada's Regions*. Ottawa: Conference Board of Canada.

Preparation of this report was funded by the Government of Alberta and Industry Canada. The report begins by forecasting the future growth of bitumen investment and production over the next quarter-century. The report predicts \$364 billion (inflation-adjusted) capital spending on bitumen projects and associated infrastructure by 2035. Bitumen extraction will account for 86 percent of total Canadian oil production by the end of that period; oil exports will double (to 4 million barrels per day). The report confirms that greenhouse gas emissions from the Canadian petroleum industry will grow by 50 percent over this period, adding 50 megatonnes of CO₂ to national annual emissions.

Direct employment creation in the oil and gas sector arising from this boom will be modest: 49,000 new jobs over the period (an average of under 2,000 new jobs per year, or less than 1 percent of normal Canadian employment growth). Indirect effects are much larger, however. Direct and indirect employment in Canada generated by these investments, by income effects (as oil and gas workers spend their wages), and by supply-chain effects (associated with purchases of inputs for new bitumen projects) will total 3.2 million person-years over the period (equivalent to an average of about 130,000 new full-time jobs). One-quarter of those benefits (or just over 30,000 jobs) are experienced outside of Alberta. Of those, Ontario captures

about 45 percent of the jobs (or 15,000 positions); this is equivalent to Ontario's share of GDP in the provinces outside of Alberta.⁸⁶ The annual new jobs expected to be generated outside of Alberta by all this bitumen investment over the next 25 years (1,400 new jobs per year, on average) are equivalent to less than one-hundredth of one percent of current employment in provinces other than Alberta.

The report models supply chain impacts on the basis of Statistics Canada input-output tables, which have not been updated since 2008; therefore, the model does not consider the consequences of the decline in Canadian manufacturing production and employment (including inside Alberta) which has occurred since then. Moreover, by basing its calculations on fixed input-output coefficients, the model assumes no changes in relative price competitiveness of inputs from various sources, including no change arising from the exchange rate (affecting the competitiveness of Canadian versus imported inputs); it implicitly assumes, therefore, a constant exchange rate. The report acknowledges that bitumen investment projects purchase considerably more supplies and inputs from foreign firms than from those in the rest of Canada, and hence much of the economic stimulus provided by the investments is dissipated. The report estimates that each \$1 billion of bitumen investment stimulates a total of \$382 million in imports (due to both supply-chain and income effects).

The report also predicts that federal and provincial governments will receive additional revenues as a result of the economic activity stimulated by the bitumen investments. That fiscal gain totals \$79 billion over the 24-year period considered; the federal government receives \$45 billion, the Alberta government receives \$26 billion, and other provincial governments receive \$8 billion.⁸⁷ Outside of Alberta, those revenues amount to a small share of existing government revenues. There is no effort made to consider whether the bitumen investment boom has any negative indirect effects on other sectors or provinces (through exchange rate effects or other channels), and hence potentially on government revenues, trade balances, and other macroeconomic indicators.

Most of the numerical conclusions in this report are added up over many years, and hence they *appear* very large (phrasing employment effects in "person-years," for example, rather than "jobs").⁸⁸ Relative to the overall size of GDP and employment in the provinces outside of Alberta, however, the report's estimated interprovincial spin-offs from bitumen investments into the rest of Canada confirm that those linkages are small (amounting

to increases of just a fraction of one percent in GDP, employment, and government revenues).

Cross, Philip (2013). *Dutch Disease, Canadian Cure: How Manufacturers Adapted to the Higher Dollar* (Ottawa: Macdonald-Laurier Institute), 10 pp.

This report aims to debunk concerns that Canadian manufacturing has been harmed by high commodity prices and the resulting appreciation of the currency. It reports and re-interprets other published sources to argue that strong oil and commodity prices have not been the primary cause of the Canadian dollar's rise since 2002.⁸⁹ It argues that the manufacturing sector has performed better than some observers commonly assume during this period. Declining employment reflects growing productivity more than falling real output, Cross argues. Moreover, the fact that nominal manufacturing shipments have been more stable through this period than real GDP or employment is taken as evidence that Canadian manufacturers have successfully “adapted” to the strong dollar.⁹⁰ The report disaggregates Canadian manufacturing industries into two broad categories: those whose nominal sales increased between 2002 and 2011, and those whose nominal sales decreased. This categorization splits manufacturing roughly in half, since nominal manufacturing shipments in 2011 were roughly equal to those in 2002. Among the declining sectors, most of the total decline is attributable to three broad sets of industries: automotive products, textiles and clothing, and forestry-related products (including wood products, paper, and publishing). Since most of those industries, the report argues, also contracted in the U.S. economy during this time, this is evidence that deeper structural problems (not exchange rate issues) explain their contraction. The success of those manufacturing sectors whose nominal shipments grew during the decade of appreciation is attributed in part (without evidence) to demand arising from Canadian resource developments.

Canadian exports in aggregate, the report argues, performed broadly as we should have expected given demand conditions in Canada's major export markets (including, particularly, the struggling U.S. economy); this again is taken as evidence that broader economic conditions, not the exchange rate, are the main factors affecting Canadian manufacturing.⁹¹ The report suggests that Canadian manufacturing industries have adapted to the strong currency (which, a decade into its appreciation, should now be considered a long-standing feature of the Canadian economy) by reducing

their dependence on export markets, and increasing their use of imported inputs. This has left the manufacturing sector less vulnerable to future negative impacts from a strong currency.

The conclusion that only a few manufacturing sectors contracted during the last decade, while others have grown (with an approximately offsetting impact) is open to challenge.⁹² Real GDP and employment across the whole manufacturing sector have declined markedly since 2002; these are more legitimate indicators of an industry's real activity level than nominal sales (which reflect changes in prices, not just changes in real activity).⁹³ Moreover, as a share of total employment and output, the decline of manufacturing (including those few sectors which did expand in real terms over the past decade) has been even more marked. The disaggregation of manufacturing into growing and contracting sub-sectors (according to the criteria of nominal sales) raises another interesting dimension of comparison: the sectors with declining nominal sales demonstrate a higher average export intensity (64% of sales going to exports in the starting year, 2002) than those with growing nominal sales (45%). This greater exposure to the negative impacts from a stronger currency could reasonably be concluded to have been a relevant factor in their subsequent contraction. In contrast, the two strongest industries among the growing sub-sectors (food manufacturing and petroleum products, which together accounted for two-thirds of the gross sales increase experienced by all the expanding sectors) enjoy uniquely low exposure to export markets: under 30% for both sectors. The bifurcation of manufacturing into expanding and contracting sub-sectors thus in fact indicates that industries more exposed to international trade performed worse over the past decade than those which were oriented around the domestic Canadian market. This finding seems to confirm concerns about "Dutch disease," rather than refuting them.⁹⁴

Finally, Cross's assertion that manufacturers have "adapted" to the strong currency by reducing their reliance on export markets, and increasing their use of imported inputs, is curious. These two trends are indeed confirmed by the data: for example, export intensity declined among both the expanding and the contracting manufacturing sub-sectors (and the reallocation of output to the less-export-oriented expanding sub-sectors reinforced that trend through a composition effect). As a result, export intensity in total Canadian manufacturing fell from 55% in 2002 to 49% by 2011. This reorientation of Canadian manufacturing *away* from exports (counter-intuitive in light of increasing globalization) has occurred in a context of declining overall real activity. So the decline in export intensity hardly im-

plies that manufacturers have successfully adapted; rather, it merely indicates that after a decade of declining export sales (reflecting an erosion of relative competitiveness, as well as demand weakness in key export markets), Canadian markets now account for a larger share of remaining industry sales. This is a symptom of weakness, not a sign of resilience. Similarly, the growth in imports of intermediate goods merely reflects that Canadian manufacturers have also become less competitive in home markets for those products: it is also a sign of weakness, not a sign of adaptation. Both the increase in manufactured imports, along with the decline in manufactured exports, have contributed to the emergence of an enormous and chronic trade deficit in manufactured goods.

Honarvar, Afshin, et al. (2011). *Economic Impacts of New Oil Sands Projects in Alberta (2010–35)*. Calgary: Canadian Energy Research Institute.

The research institute that published this study is funded by oil companies, and by the Alberta and federal governments. Their work has been widely cited by industry and government leaders as attesting to the extensive Canada-wide benefits that are generated by the bitumen boom in Alberta. The analysis is rooted in an input-output model, based on fixed 2006 Statistics Canada parameters. Like the Conference Board study noted above, this methodology inherently overstates the spillover benefits of oil industry activity for provinces other than Alberta. It does not consider the notable proportional decline in the use of Canadian-made manufactured inputs that has occurred since 2006 (due to the continuing rise of the Canadian dollar and other factors).⁹⁵ Moreover, like the Conference Board study above, it assumes no future change in those parameters due to changes in the exchange rate or other shifts in relative competitiveness. The CERI study explicitly assumes a fixed exchange rate throughout the period of analysis.

The study projects the future expansion of bitumen activity on the basis of industry announcements and other data, and concludes that this expansion will indeed be enormous. The report considers the economic effects arising both from new capital investments in the bitumen industry, and the subsequent operation of those projects.⁹⁶ The CERI authors expect total investment of \$2.1 trillion (in 2010 Canadian dollars) over the quarter-century between 2010 and 2035.

The report then considers the direct and indirect economic effects of that expansion. They consider direct GDP and employment effects (associ-

ated with the bitumen projects themselves), indirect effects (experienced in industries which sell inputs and services to bitumen operations), and induced activity (occurring when bitumen industry workers spend their incomes). The report projects total incremental GDP (from all three effects) also equal to \$2.1 trillion over the same quarter-century period. The study estimates that 94.5 percent of that Canadian GDP gain will be experienced in Alberta, and just over 5 percent in the rest of Canada. The cumulative gain in GDP experienced over those 25 years in the rest of Canada (\$117 billion in 2010 dollars) sounds large. But given the starting level of ex-Alberta GDP in 2010 (\$1.4 trillion), it actually implies only a very small increment in annual GDP growth in provinces outside of Alberta.⁹⁷ The CERI results suggest that growth will be 0.027% faster (i.e., less than three one-hundredths of a percent) over the 25-year period — too small of a boost to even register on official Statistics Canada estimates of GDP. The U.S. also enjoys a boost in GDP from the bitumen expansion that is approximately 5 times as large as the GDP increment experienced in the rest of Canada.⁹⁸

Significant employment gains are seen to result from that new growth. The CERI report anticipates a total cumulative increase in employment (considering again direct, indirect, and induced effects, and counting both full-time and part-time workers) of 830,000 jobs by 2035. This is equivalent to 32,000 new jobs per year. Eighty-six percent of those new jobs are in Alberta. New employment from the bitumen expansion in the rest of Canada is expected to average 5,000 jobs per year in provinces other than Alberta (equal to three one-hundredths of a percent of total employment in the rest of Canada). Once again, this is too small to meaningfully register in aggregate Statistics Canada data.

One side effect of this dramatic expansion is that CERI expects greenhouse gas emissions from the bitumen industry to more than double by 2035, adding over 50 megatonnes per year of CO₂ equivalent to total Canadian emissions.

Lemphers, Nathan, and Dan Woynillowicz (2012). *In the Shadow of the Boom: How Oilsands Development is Reshaping Canada's Economy*. Drayton Valley: Pembina Institute.

The Pembina Institute is Canada's leading environmental think tank. This report represents its effort to analyze the positive and negative economic consequences of the bitumen boom. The report begins with a review of the dramatic expansion in bitumen production since 2001, far in excess of in-

itial projected timetables. It reviews evidence regarding the strong statistical correlation between oil prices and the Canadian dollar; the authors' own estimates suggest a correlation of 0.92 between the exchange rate and the oil price since 1999.⁹⁹ On the basis of this evidence, the authors conclude that the stronger currency is closely associated with the documented decline of non-resource exports, and the contraction in manufacturing output and employment.

The authors provide an extensive review of past economic literature studying “Dutch disease” side effects from a resource boom. They conclude that there are several unique features to the Canadian resource boom, which make it misleading to apply the standard “Dutch disease” moniker to the Canadian case. In particular, the reallocation of economic activity to resource extraction (and bitumen in particular) is clearly of a more longer-term, structural nature than was the case in the Netherlands and some other countries that experienced more fleeting resource price or quantity cycles. Secondly, the unique regional structure in Canada’s economy (whereby the distribution of resource wealth and manufacturing activity do not overlap) imposes unique adjustment challenges on the national economy. Even in Alberta, the economic benefits from the bitumen boom are undermined by currency appreciation and rapid inflation; they cite estimates showing that the rising dollar substantially undermines provincial government resource revenue (landed Canadian-dollar prices for petroleum exports are lower when the Canadian dollar is higher).

The Pembina authors provide five broad policy recommendations to more carefully regulate the pace of bitumen developments and enhance their net benefits to Albertans and Canadians. These include establishing a national wealth fund to channel tax revenues collected from the bitumen industry into regional adjustment and clean energy projects; eliminating preferential tax treatment for bitumen producers; and working to develop a more sustainable national energy strategy.

**Organization for Economic Cooperation and Development (2012).
OECD Economic Surveys: Canada. Paris: Organization for Economic
Cooperation and Development.**

In its regular biennial economic report on Canadian economic performance and prospects, the OECD addressed the side effects of the resource boom for other sectors and regions of Canada’s economy. The report highlighted the “structural adjustments” occurring in the national economy due to commod-

ity price shifts since the early 2000s. It notes that the share of manufacturing in national GDP shrank by fully one-third between 2000 and 2011 (falling to only 12.6% of total value added, down from 18.6% in 2000); manufacturing also shrank by a similar proportion as a share of total employment. “Both outcomes have been clearly correlated with exchange-rate developments,” the OECD concluded bluntly (p. 13). The OECD report highlighted the appreciating exchange rate (“largely explained by sharp increases in commodity prices, especially for energy”) as a key cause of the sharp deterioration in Canada’s current account balance (now in deficit to the tune of 3% of GDP). The report did not provide detailed original analysis of the resource boom—exchange rate—deindustrialization relationship. However, the fact that this orthodox international body views these relationships as largely self-evident provided a striking contrast to the rhetoric within Canada (where in official circles in Ottawa and Edmonton merely noting that the resource boom has had an economic “downside” is viewed as a traitorous act).

The OECD report did provide some interesting original analysis regarding the relationship between the resource boom and growing regional inequality within Canada. It noted that changes in fiscal policy in Ottawa (in particular, the Harper government’s new formula for Canada Health Transfer payments to the provinces) would exacerbate the economic and fiscal gaps between provinces, which are already widening as a result of the resource boom. The OECD report also considered the relationship between Canada’s growing resource-dependence, and its continuing underperformance in business innovation. *Figure 1.7* in the report (p. 59) demonstrates a strong negative relationship between reliance on resource extraction and business R&D effort. “Resource-rich countries like Canada, New Zealand and Norway all appear to underperform when it comes to innovation (controlling for GDP), whereas their resource-poor counterparts like Israel, Korea and Japan, are highly innovative” (p. 59). The same relationship is visible across Canadian provinces: business R&D activity has been disproportionately concentrated in Ontario and Quebec. Stagnant GDP trends in Central Canada (linked to the structural adjustments discussed above) are thus further undermining Canada’s already poor innovation performance. The OECD report thus describes a mechanism through which Dutch-disease-type restructuring could permanently undermine national economic potential, by reinforcing negative trends in innovation activity.¹⁰⁰

Shakeri, Mohammad, Richard S. Gray and Jeremy Leonard (2012).
Dutch Disease or Failure to Compete? A Diagnosis of Canada's Manufacturing Woes. Montreal: Institute for Research on Public Policy.

This report uses econometric techniques to estimate what proportion of the downturn in Canadian manufacturing industries reflects pressures arising from a high Canadian dollar, and how much of the rise in the dollar reflects the resource boom and high commodity prices. It begins with a useful literature review regarding the theory of Dutch disease, specifying the ways in which a booming resource sector can indeed “squeeze out” other parts of the economy, including by raising the exchange rate. It also reviews past economic research on other incidences of Dutch-disease-type problems in a range of other resource-producing countries (in Europe, Africa, and Asia).

The authors' econometric tests (using data from the 1992–2007 period) find that the dollar's rise has indeed been driven predominantly by both oil and non-oil commodity prices. They then conduct a large number of industry-specific regressions to investigate the impact of the higher dollar on various Canadian manufacturing sectors. They consider that impact relative to a range of other variables, including industry-specific price changes, interest rates, government spending, non-energy GDP, and the change in output in comparable industries in the U.S. This latter variable is held to be a proxy for general “competitive pressures” in the global economy. The authors find mixed results: some sectors are sensitive to the exchange rate, others are not. They state that 11 of 18 major sub-groups (encompassing 55 percent of all manufacturing output) indicate some evidence of Dutch-disease-type contraction.¹⁰¹ In their words, Canada is seen to have a “mild case” of Dutch disease. The authors' policy conclusion is that the federal government should use some of the extra tax revenue it receives as a result of the resource boom, to invest in infrastructure which would boost productivity and hence competitiveness in the manufacturing sector.

Some methodological issues could be raised with their econometric approach. First, the data period (1992–2007) may not be the most appropriate for testing the presence of Dutch-disease effects in the present setting. The author's exchange rate regressions indicate that the close relationship between commodity prices and the Canadian dollar really became evident beginning in 2003. Thus, less than one-third of the sample period covered by the manufacturing regressions corresponds to the period in which commodity prices were exerting their maximum impact on the exchange rate.¹⁰² This

could affect the perceived significance of Dutch-disease effects; the authors might have tested for a change in the structural significance of these effects for more recent years (as they did in the exchange rate regressions). Second, the assumption that the change in output in comparable U.S. manufacturing industries is a valid representation of the state of general global competition is questionable. The close supply-chain linkages between Canadian and U.S. manufacturing predetermine that changes in U.S. manufacturing will be correlated with changes in corresponding Canadian sectors (and indeed the U.S. variables were very significant in the manufacturing regressions, potentially reducing the significance of other included variables, including the exchange rate). This does not necessarily indicate (as the authors suggest) a broader “failure to compete” on the part of Canadian firms. At any rate, the authors do not directly consider any evidence regarding non-exchange-rate dimensions of Canadian manufacturing competitiveness, and hence their conclusion that Canadian manufacturers have contracted because of their own “failure to compete” (e.g., poor productivity growth) is not supported by evidence included in this report.

Spiro, Peter (forthcoming). *Dutch Disease in Ontario?* Toronto: Mowat Centre for Policy Innovation.

This report introduces the concept of “Dutch disease” with reference to historic experience in the Netherlands and other resource-exporting countries. It argues that the Ontario economy displays many classic symptoms of resource-driven de-industrialization, largely as a result of the Canadian exchange rate trading some 25 percent above its fundamental value. The real share of Ontario-made manufactured goods in the U.S. market has declined by one-quarter; the income effects of this decline are made worse by the fact that U.S.-dollar revenue (when repatriated to Ontario) is much lower in Canadian-dollar terms than in the past. Ontario’s exports to other provinces have also declined, also largely due to declining relative price competitiveness associated with the high dollar. Spiro refutes the oft-made claim that the bitumen boom in Alberta is stimulating demand for Ontario-made manufactured goods. Oil prices are the dominant empirical determinant of the value of the Canadian dollar in recent years, but the author doubts that real fundamentals (even with the bitumen boom) justify the dollar being that high. Spiro suspects that self-fulfilling market psychology and speculative motivations explain much of the dollar’s linkage with the oil price. The author proposes that efforts to guide the Canadian currency toward its

fundamental value (including through public statements from the Bank of Canada recognizing that benchmark) would reduce these negative side effects of resource developments on the Ontario economy.

Summary

Every study that has empirically investigated the rapid appreciation of the Canadian dollar since 2002 has concluded that the run-up in commodity prices (especially oil), and the corresponding increase in Canadian oil production and exports, are central causes of this historic change in the Canadian currency. This relationship is accepted as non-controversial and largely self-evident within the Canadian financial community — which, after all, is the institution most invested in understanding and predicting the value of the dollar. Similarly, each of the studies that attempted to explain the rapid decline in Canadian manufacturing output and employment over the same period — a decline that is shown to have been much more dramatic during this time than in other industrialized countries — highlights the sharp rise of the Canadian dollar as the most important (but not the only) factor behind the eroding competitiveness of Canadian non-resource exports. In this regard, concluding that the rapid expansion of the bitumen industry (and other export-oriented resource sectors), combined with high global prices for those products, has generated important and in some dimensions negative consequences for the rest of the Canadian economy (via an appreciating currency and a shrinking manufacturing industry) should be non-controversial. However, the uncomfortable political and policy implications that arise from those obvious conclusions are undesirable to governments (in Alberta and Ottawa) that are so committed to continuing their “energy superpower” vision. Hence they have attempted to bury the economic evidence beneath an ideological barrage that purports that even raising such questions is somehow “divisive.” Selective and misleading references to some of the studies surveyed above have played a role in that barrage — yet as the review indicated, the twin hypotheses that the oil boom has contributed to the appreciation of the Canadian dollar, which in turn contributed to the rapid contraction of Canadian manufacturing, seem strongly supported by the published research.

Where the research surveyed above shows some diversity of finding is regarding two subsidiary questions:

- How much of the decline in Canadian manufacturing reflects Dutch-disease-type mechanisms? Some authors believe that rising resource prices and exports (via the appreciating currency) are a partial and minority factor explaining Canadian deindustrialization; others conclude it has been a more dominant factor.
- How should policymakers respond to these challenges? Here there is sharp disagreement over whether monetary authorities (and the Bank of Canada in particular) should attempt to control the upward pressure on the Canadian dollar. More unanimity is developed around proposals to moderate the regional imbalances arising from the resource boom; invest in measures to support the competitiveness of Canadian manufacturing and other non-resource exports despite the strong currency; and measures (such as those proposed by the Bank of Canada Governor) to enhance Canadian value-added content in resource production chains.

Alone among the reports surveyed above, the CERI and Conference Board studies attempted to quantify the economic spin-offs from the bitumen boom to the rest of Canada. Despite using an optimistic modeling approach (rooted in fixed input-output coefficients dating back as far as 2006), and despite reporting their results aggregated over a quarter-century (which naturally creates “large numbers”), these studies actually confirm that the spin-off economic and employment gains outside of Alberta from the bitumen boom are very small, and would not even be discernible in regular GDP and employment data for those other provinces.

This review of existing literature therefore confirms that there are significant economic side effects associated with the bitumen boom, and relatively small economic spin-offs to provinces other than Alberta. The existing literature thus underpins the conclusion of this report that active measures to more carefully regulate the economic (and environmental) dimensions of the bitumen expansion, and aim deliberately to achieve larger Canadian benefits (and fewer costs), are needed to improve the net cost-benefit balance from this historic change in Canada’s economic trajectory.

Appendix 2

Broad Components of the Policy Response to the Bitumen Cliff

MANY POLICIES AND STRATEGIES will be required for Canada to make progress along the two broad policy tracks outlined in the conclusion of this report over the next few decades. We proposed a first track focusing on regulating petroleum developments more closely, to control their pace, internalize environmental costs, and maximize Canadian value-added spin-offs; and a second track aimed at facilitating a long-run transition away from reliance on bitumen as part of a broader strategy to “green” the national economy. The following initial catalogue provides a possible menu of the kinds of policy and strategy interventions that will be required to manage the bitumen boom consistent with Canada’s environmental, economic, and national goals – to reduce and ameliorate the costs associated with those massive developments, and to enhance the benefits. We also contend that in order to build a consensus among Canadians from the various regions and stakeholder constituencies around the need to more actively and carefully manage bitumen developments, an extensive and participatory na-

tional dialogue around the problems and the possible cures will be needed if common ground and broad buy-in to the policy agenda is to be attained.

Many other environmental and economic analysts have also recognized the challenges and pitfalls of unconstrained resource developments for Canada's environmental, economic, and social performance, and have made their own recommendations regarding the best policy responses.¹⁰³ These suggestions must also be considered as part of the national dialogue we propose. To start that dialogue, we list some of the potential policy tools and reforms which could play an important role in an over-arching effort to both regulate the bitumen industry more carefully, and facilitate a long-term transition to a lower-carbon economy:

Macroeconomic Strategies

To enable forward movement on both tracks one and two, macroeconomic interventions could include the following:

- **Make Canada's currency more stable and sustainable:** The Bank of Canada could be instructed to take more explicit account of the need to preserve a broader level of competitiveness in the Canadian economy and the impacts of currency fluctuations on export and investment flows. This would be all the more important in light of efforts by other central banks to actively manage their currencies (such as the new monetary policy in Japan).
- **Rein-in foreign takeovers of Canadian companies:** Tighter control over foreign investment inflows to Canada (especially in resources) would help to address the over-valuation of our currency, which has so badly damaged non-resource export industries, and ensure that more of the profits from non-renewable resources stay in the country.
- **Support more capital investments in non-resource sectors:** Instead of across-the-board corporate income tax cuts, fiscal incentives could be used to reward incremental investments (in both fixed capital and innovation) by businesses through accelerated depreciation allowances for non-resource companies, an investment tax credit, or direct public co-investments in green industries and technologies.
- **Recoup a larger share of windfall from resource profits:** The federal and provincial governments could secure a better share of wind-

fall profits from the petroleum industry either through increased royalty rates, higher corporate income taxes, or by imposing an excess profits tax which would generate funds needed to finance public investments in value-added non-resource sectors as well as the transition to a renewable energy future.

- **Challenge and change free trade regimes:** The federal government could also challenge and change the proportionality clause in NAFTA by regulating the amount of bitumen that can be exported based on grounds of environmental and energy conservation.

Green Transitions

Support for the emergence of low-carbon industries could be delivered through a variety of measures, including:

- **Stimulating innovation and research & development:** Given the spillover effect of R&D the whole economy, the federal government has a leadership role to play in the development of new advanced technologies. This could be done by upgrading existing programs like Sustainable Development Technology Canada (SDTC), a federal arms-length initiative that promotes research and development and financing support for clean technology projects in Canada.
- **Investing in green technology industries:** Public investments can play a key role in developing new green technology industries such as renewable energy. As evidenced by the public procurement provisions in the Ontario Green Energy Act, new industries can be supported to produce wind turbines and solar panels that, in turn, create new green jobs in local communities along with training for workers to develop the new skills required.
- **Creating a national low-carbon energy grid** to eventually eliminate reliance on coal-fired electricity by strategically using the flexibility of hydro resources, along with other low-carbon technologies and Canadian expertise, to integrate large shares of renewable energy. The objective would be to establish a 100 percent renewable energy-based grid that could, in turn, be used to increase the electrification of transport to offset fossil fuel use.

- **Greening current manufacturing industries:** The federal government also has a role to play in stimulating green manufacturing industries. In the auto sector, for example, regulatory measures are needed not only to substantially improve fuel efficiency standards, but also to encourage green innovation (such as the production of electric vehicles) and to support the made-in-Canada manufacture of these new products.
- **Sustainable transportation strategies:** Moving people and freight in this country accounts for 24 percent of our carbon emissions, primarily generated by the massive use of gasoline-burning cars and trucks. A major component of new green industrial strategies in this country, therefore, must be the expansion of public transit within our cities and towns coupled with the development of high-speed rail in urban corridors, which will also create tens of thousands of new jobs.

Energy Transitions

At the same time, Canada's economy will require a major energy shift from dependency on oil and fossil fuels to a viable renewable energy base. To this end, a made-in-Canada energy policy and strategy could include measures such as:

- **Generating energy conservation and efficiency:** A bold energy conservation and efficiency plan should be a central feature of a new national energy plan, including energy audits plus efficiency incentive programs for all industries, businesses, and homes, plus community and government facilities. Under such a plan, manufacturing and other industrial production processes would be assessed for energy waste and incentives provided for upgrading energy efficiencies, including combined heat and power generation.
- **Securing more public control over key energy sectors:** The kind and scope of energy transition needed cannot be left to market forces alone. More democratic national control over key energy sectors like the petroleum industry is needed in terms of ownership, investment, development and export. A publicly owned petroleum company could be mandated with performance objectives that include targets for environmental improvements and low-carbon tran-

sitions, the maximization of spin-offs for economic diversification, plus measures for community participation and control.

- **Multiplying public investments in clean, renewable energy:** While Canada possesses an abundant supply of renewable energy potential (including hydro, wind, solar, geo-thermal, and tidal), significant public investments will be required to put the renewable energy sector on an even footing with the fossil fuel sector. Larger public investments are also needed in strategic areas such as electricity infrastructure, innovation, and community mobilization.¹⁰⁴ To generate revenues needed, government subsidies to the fossil fuels industry would be terminated and reallocated.
- **Establishing clear energy export policies and guidelines:** A made-in-Canada energy policy requires limits on the export of bitumen products. Export ceilings could be determined according to the depletion of Canada's conventional petroleum reserves, through the re-enactment of the National Energy Board's former 25-year domestic supply threshold. Similarly, a moratorium on the construction of new export pipelines would not only reduce serious environmental risks and threats to Indigenous peoples but prevent further lock-in to an economic future based on resource exports.

Just Transitions

Any transition to a low-carbon economy needs to guarantee that Canadians will not be left behind. Indeed, Canadians' economic security and work life can be enhanced by this transition if we manage it strategically. History has demonstrated that successful transitions to new economic paradigms often correspond with the establishment of an implicit social contract that provides a framework for economic security.¹⁰⁵ What is needed today is a "*green social contract*" that includes provisions for:

- **Targeting the development of spin-off industries** for a low-carbon economy that make use of the workers, knowledge, skills and infrastructure developed in the fossil fuel industries. For, example, new green industries that could evolve from the petroleum sector could include enhanced geo-thermal energy (making use of geological exploration and drilling expertise), bio-refining and industrial energy and efficiency techniques.

- **Retraining and skills development for workers** to be carried out in collaboration with apprenticeship programs in secondary and post-secondary institutions across the country. This calls for determined efforts to develop and coordinate the skills development required in these institutions along with provision of income and mobility allowances for the workers participating.
- **Advancing community-owned renewable energy projects** through government policies that encourage co-operatives and other community-based renewable energy projects, the development of an energy efficiency service delivery infrastructure, and innovative energy project financing mechanisms.¹⁰⁶
- **Promoting social equity for low-income Canadians** through targeted energy efficiency programs that provide upgrades at no cost to the participants, along with social safety net provisions that provide immediate assistance to households with very high energy burdens.¹⁰⁷
- **Providing guarantees for First Nations communities** that there will be consultation and “free, prior and informed consent” before new green industries such as renewable energy projects are developed on their traditional lands, along with concrete opportunities to participate in and benefit from such developments.
- **Developing regional sharing agreements for more equitable distribution** of benefits in the transition to a green economy future by putting priority on decentralized green technologies that use resources found in every region and by ensuring those regions transitioning from fossil fuels receive more benefits.

Notes

1 For the purposes of this report, the term “bitumen” is used in place of the more controversial terms, “tar sands” or “oil sands.” Alberta’s deposits were originally called “tar sands” because of their thick, sticky properties. The term “oil sands” gained popularity in the mid-1990s after government and industry efforts to improve public perception of the dirty-sounding “tar sands.” Pembina Institute, “Oil Sands 101,” www.pembina.org/oil-sands/os101, citing *National Task Force on Oilsands Strategy, The Oilsands: A New Energy Vision for Canada* (Edmonton: Alberta Chamber of Resources, 1995) p. 5.

2 See Dan Woynillowicz, Chris Severson-Baker and Marlo Reynolds, *Oil Sands Fever: The Environmental Implications of Canada’s Oil Rush*, Pembina Institute, November 2005, p. 15. Also, footnote 21.

3 A few recent studies are summarized and critiqued in Appendix 1.

4 In May 2011, the Canadian Energy Research Institute concluded in its sixth annual oil sands update report that \$2.1 trillion would be pumped into 47 new oil sands projects between 2010 and 2035. This includes \$253 billion for initial capital for construction plus, over the longer term, \$1.8 trillion for operation, maintenance and sustaining capital. Melanie Collison, *The Calgary Herald*, June 25, 2011.

5 International Energy Agency, *World Energy Outlook 2010* and <http://www.pembina.org/blog/668>, quoting oil sands review.

6 For a comparison of Canada and Alberta’s management of the bitumen boom with that of Norway, see Bruce Campbell, “The Petro-Path Not Taken,” (Ottawa: Canadian Centre for Policy Alternatives; 2013).

7 See address by the Prime Minister at the Canada-U.K. Chamber of Commerce, July 14, 2006 available at <http://pm.gc.ca>.

8 Ibid.

9 Ibid.

10 Cited in National Energy Board, *Canada’s Oil Sands: Opportunities and Challenges to 2015*, May 2004.

- 11** Canadian Association of Petroleum Producers, *Statistical Handbook*, www.capp.ca.
- 12** Canadian Association of Petroleum Producers, *Canadian Crude Oil Forecast and Market Outlook* (2012), www.capp.ca.
- 13** Authors' calculations from Statistics Canada CANSIM Table 187-0001, 2002 through 2011.
- 14** Authors' calculations from Statistics Canada CANSIM Table 376-0038.
- 15** This chart originally appeared in Brendan Haley (2011). "From Staples Trap to Carbon Trap: Canada's Peculiar Form of Carbon Lock-In," *Studies in Political Economy* 88, pp. 97–132.
- 16** In 2002 Canadian refineries shipped refined products equivalent to over 130% of Canada's needs, while in 2011 this "self-sufficiency" ratio fell to just 107%. It is quite possible that Canada may become a net importer of refined petroleum products in coming years—a stunning irony given the enormous expansion in our petroleum production. Authors' calculations from Industry Canada Strategic database and Statistics Canada CANSIM Table 304-0014.
- 17** Marc Lee and Amanda Card (2011). *Peddling Greenhouse Gases: What is the Carbon Footprint of Canada's Fossil Fuel Exports?* (Ottawa: Canadian Centre for Policy Alternatives), 8 pp.
- 18** Other specialty vehicle industries, including truck, bus, and public transit equipment, also expanded during this time.
- 19** The national deficit in manufactured goods was almost twice as large as the trade surplus in petroleum, indicating that even the accelerated extraction and export of raw resources is inadequate to maintain balance in international trade when non-resource export industries are allowed to wither. Authors' calculations from Industry Canada Strategis database.
- 20** We define an undervalued currency as one whose international exchange rate is lower than its indicated purchasing power parity, such that products and services in that country seem artificially inexpensive in the eyes of international customers. The reverse is true, obviously, of an overvalued exchange rate—which has been the case for Canada's dollar since 2006.
- 21** More recently, the stock of incoming FDI has expanded dramatically—reaching almost 40 percent of Canada's GDP by 2011; authors' calculations from Statistics Canada CANSIM Table 376-0037.
- 22** See J.N.H. Britton et al., "Technological Change and Innovation: Policy Issues" in *Canada and the Global Economy*, J.N.H. Britton, (ed.), (Montreal; Kingston: McGill-Queen's University Press, 1996), pp. 433–444.
- 23** Authors' calculations from Statistics Canada CANSIM Table 228-0043.
- 24** The ECOENERGY Carbon Capture and Storage Task Force, "Canada's Fossil Energy Future," Natural Resources Canada, 2008.
- 25** The data for this sidebar is drawn from the Pembina Institute at [http://www.pembina.org/oil-sands/os101/climate impacts](http://www.pembina.org/oil-sands/os101/climate%20impacts). It is based on data contained in Environment Canada, *National Inventory Report, 1990–2008* and Environment Canada, "Canada Emissions Trends" (2011) 25, Table 5, and 22, Table 3.
- 26** C. Freeman and F. Louçã, *As Time Goes By* (Oxford University Press, 2001); C. Perez, "Structural Change and Assimilation of New Technologies in the Economic and Social Systems," *Futures* 15/5 (1983), pp. 357–375; C. Perez, *Technological Revolutions and Financial Capital* (Cheltenham, UK: Edward Elgar, 2002).
- 27** See original suggestion in C. Freeman, "A Green Techno-Economic Paradigm for the World Economy?" in *The Economics of Hope* (London: Pinter, 1992).
- 28** See <http://environmentaldefence.ca/reports/divided-we-fall-tar-sands-vs-rest-canada>.

29 National Round Table on the Environment and the Economy, *Framing the Future: Embracing the Low Carbon Economy*, 2012, p. 18.

30 Ibid, p. 19.

31 For example, the International Energy Agency's most recent *World Energy Outlook* highlights the dramatic rise in U.S. domestic crude oil production resulting from shale oil and other new sources, projecting a 30 percent increase in production by 2020. This will depress further the North American continental price for Canadian oil exports, which has already languished well below European and other benchmarks. See International Energy Agency, *World Energy Outlook 2012* (Paris: International Energy Agency).

32 Nikiforuk, Andrew (2008). *Tar Sands: Dirty Oil and the Future of a Continent* (Vancouver: Greystone).

33 Examples include Geoff Norquay, a prominent public spokesperson for the Harper government who, while working for Earncliffe Strategy Group, an influential Ottawa lobbying firm, represented Suncor between 2006 and 2008 and Shell Canada in 2006; and Yaraslov Baran, a senior communications strategist for the Conservative Party also in the 2004 and 2006 elections, who also worked for the lobby firm Tactix Government Consulting in 2006 where his clients included Shell Canada and Enbridge. Cited in Tony Clarke, *Tar Sands Showdown: Canada and the New Politics of Oil in an Age of Climate Change* (Toronto: James Lorimer & Co./ CCPA publication, 2008/9), pp. 107–8 ff.

34 “Big Oil’s Oily Grasp: The making of Canada as a Petro State and how oil money is corrupting Canadian politics,” a report of the Polaris Institute, December 4, 2012. This report is based on an analysis of data provided by the Office of the Commissioner of Lobbying and The Registry of Lobbying in Canada.

35 Based on figures provided by Finance Minister Jim Flaherty, cited in John Dillon and Ian Thompson, *Pumped Up: How Canada Subsidizes Fossil Fuels at the Expense of Green Alternatives*, KAIROS, April 2008.

36 Diana Gibson, *Selling Albertans Short: Alberta’s Royalty Review Panel Fails the Public Interest*. Parkland Institute, University of Alberta, October 2007.

37 Douglas Radke, *Investing in Our Future: Responding to the Rapid Growth of Oil Sands Development* (Edmonton: Oil Sands Sustainable Development Secretariat, December, 2006).

38 The Royal Society of Canada Expert Panel, *Environmental and Health Impacts of Canada’s Oil Sands Industry*, Executive Summary, December 2010.

39 Hanneke Brooymans, “Alberta cutting spending on environmental monitoring of oil sands,” *Edmonton Journal*, September 24, 2010.

40 Documented via Access to Information Requests by Climate Action Network, *Dirty Oil Diplomacy: the Canadian Government’s Global Push to Sell the Tar Sands*, 2012, pp. 17–18.

41 Ibid, pp.14–17.

42 Dawn Walton, “Alberta researchers receive apology for attack on oil sands study,” *The Globe & Mail*, June 2, 2010.

43 Subsequently, the College rejected all those charges and the Alberta Cancer Board released a study confirming higher-than-expected levels of rare cancers. See Alberta Cancer Board, “Cancer Incidence in Fort Chipewyan, Alberta 1995–2006” Division of Population Health and Information Surveillance, February 2009. The O’Connor case has been widely reported on and documented in publications like William Marsden, *Stupid to the Last Drop*, (Toronto: Alfred A Knopf, 2007), pp. 185, 186, 191 and in Clarke, Op. Cit. pp. 193–195.

- 44** Markusoff, Jason, “Head rolls in EUB spy scandal,” *Edmonton Journal*, October 15, 2007.
- 45** Article 3 of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).
- 46** The Athabasca Chipewyan First Nation has been forced to resort to litigation on both the Land Use Regional Plan (LARP) and Shell Jackpine mine because its input and interests have not been respected. <http://acfnchallenge.wordpress.com/2012/08/24/for-immediate-release-lower-athabasca-plan-fails-to-address-the-concerns-of-athabasca-chipewyan-first-nations/>
- 47** All industry employment data cited in this section are derived from Statistics Canada CANSIM Table 281-0024.
- 48** In regional economics, a “base” industry is defined as a core tradable sector, which exports much or most of its output to other regions, and hence serves as an economic “anchor” for the non-tradable industries (including domestic services production) that constitute the bulk of total employment in any region. Important base industries in various regions of Canada include agriculture, fisheries, forestry, resources, and manufacturing; tradable services sectors may also serve as base industries in certain regions, including tourism, transportation, and specialized business and educational services.
- 49** This claim is made, for example, in Honarvar Afshin, *et al.*, *Economic Impacts of New Oil Sands Projects in Alberta (2010–35)* (Calgary: Canadian Energy Research Institute, 2011).
- 50** The employment rate measures employment as a proportion of the working age population; it is a better measure of an economy’s employment performance than the absolute number of jobs since it takes into account changes in the overall population. Between 2008 and 2011, the employment rate in Canada declined by close to 2 percentage points, with the 219,000 net new jobs created during this period lagging far behind the half-million increase in the working age population. Authors’ calculations from Statistics Canada CANSIM Table 282-0002.
- 51** For example, at just 23 percent in 2011, the unionization rate in Alberta is the lowest in Canada (authors’ calculations from Statistics Canada CANSIM Table 282-0078). This is due at least partly to very restrictive rules regarding union certification and bargaining rights (see Michele Campolieti, Chris Riddell, and Sara Slinn (2007), “Certification Delay Under Elections and Card-Check Procedures: Empirical Evidence from Canada,” *Industrial and Labor Relations Review* 61(1), pp. 32–58, for example). Minimum wages in Alberta and Saskatchewan are presently the lowest of any provinces in Canada (Human Resource and Skills Development Canada (2012), Minimum Wage Database, <http://srv116.services.gc.ca/dimt-wid/sm-mw/menu.aspx?lang=eng>).
- 52** Authors’ calculations from Statistics Canada CANSIM Table 202-0703.
- 53** Seventeen percent of respondents felt worse off, and 34 percent felt no change, according to Environics Research Group, Focus Alberta Survey, March 2007, cited in Diana Gibson (2007), *The Spoils of the Boom: Incomes, Profits and Poverty in Alberta* (Edmonton: Parkland Institute), 32 pp.
- 54** “Overwhelming Majority of Albertans Support a Pause on New Oilsands Approvals,” Pembina Institute, May 8, 2007 <http://www.pembina.org/media-release/1445>.
- 55** Gibson, *op. cit.*, p. 6.
- 56** Alberta Food Bank Network Association, *Hunger Count*, 2011.
- 57** Gibson, Diana. 2012. “A Social Policy Framework for Alberta: Fairness and Justice for All,” Parkland Institute and Alberta College of Social Workers, University of Alberta, October 2012.
- 58** The important long-term consequences of a chronic current account deficit are discussed further by Arthur Donner and Doug Peters, “Canada’s Current Account Deficit is a Huge Drain,” *The Globe and Mail*, April 9, 2012, p. A23.

- 59** Authors' calculations from Statistics Canada CANSIM Table 380-0017.
- 60** The analysis appropriately uses the U.S. continental benchmark oil price, at Cushing, Oklahoma.
- 61** The famous "Big Mac" exchange rate, published by the *Economist*, is an example of a purchasing power parity index, based in this case on just one commodity: McDonald's hamburgers. A more complete and accurate methodology is to compare currencies based on prices of a standardized basket of goods and services.
- 62** Organization for Economic Cooperation and Development, "Purchasing power parities for GDP, national currency units per US dollar": Key Tables, 10.1787/ppp-gdp-table-2012-1-en.
- 63** And at that exchange rate, to use a very Canadian analogy, there is no incentive for cross-border shopping in either direction. With the currency far above its PPP level, Canadian products and services look artificially expensive, and hence many consumers cross into the U.S. for their purchases; the reverse was true during most of the 1990s, when the Canadian currency was below its PPP value and Americans crossed north to take advantage of Canadian bargains.
- 64** Mark Thurber, "NOCs and the Global Oil Market: Should We Worry?" Stanford University Energy Seminar 6, February 2012.
- 65** Policy regarding foreign takeovers of Canadian resource companies has evolved through twists and turns under the Harper government, and still remains contradictory and unclear. In approving the latest takeovers of petroleum companies in December 2012, Prime Minister Harper indicated that future majority purchases of bitumen companies by foreign state-owned firms would be prohibited; other takeovers of bitumen firms by foreign private firms, and takeovers of non-bitumen petroleum assets by state-owned firms, would still seem to be allowed. Specific directives regarding the stance of Canadian policy toward foreign resource takeovers have still not been expressed.
- 66** Named after a seminal article by Robert Gregory, "Some Implications of the Growth of the Mining Sector," *Australian Journal of Agricultural Economics* 20(2), 1976, pp. 71-91.
- 67** Authors' calculations from Statistics Canada CANSIM Table 383-0012.
- 68** The recent collapse in the price of natural gas, reflecting technological change, shifting demand, and the development of alternative sources, is a warning for those who assume the price of oil can only go in one direction. The International Energy Agency (IEA) recently suggested that the global energy map is being redrawn by the resurgence in oil and gas production in the United States (due largely to the rapid spread of new technologies for producing oil and gas from shale formations), and could be further reshaped in the future by continued rapid growth in the use of wind and solar technologies and other factors. International Energy Agency, *World Energy Outlook 2012*.
- 69** World Trade Organization, *International Trade Statistics 2011* (Geneva: World Trade Organization).
- 70** Statistics Canada CANSIM Table 179-0004.
- 71** Forest Ethics Advocacy found 71 per cent of the ownership of bitumen production was foreign-owned based on an analysis of shareholder information in January 2012 from Bloomberg Professional. <http://www.canada.com/business/Majority+oilsands+ownership+profits+foreign+says+analysis/6599547/story.html>.
- 72** "Who Benefits? An Investigation Of Foreign Investment In the Tar Sands," *Forest Ethics Advocacy*, May, 2012.
- 73** Syncrude website, <http://www.syncrude.ca/users/folder.asp?FolderID=5626> accessed February 15, 2013.

- 74** “Project Status,” *Oilsands Review*, March 2013.
- 75** ConocoPhillips Canada website, <http://www.conocophillips.ca/EN/about/oil-sands/Pages/Ouroilsandsassets.aspx> accessed February 15, 2013.
- 76** “Project Status,” *Oilsands Review*, March 2013.
- 77** Ibid.
- 78** Total Canada EP website, http://www.total-ep-canada.com/upstream/northern_lights.asp accessed February 15, 2013.
- 79** “Project Status,” *Oilsands Review*, March 2013.
- 80** BP website, <http://www.bp.com/sectiongenericarticle.do?categoryId=9028907&contentId=7061534> accessed February 15, 2013.
- 81** Ibid. See also, Terry Glavin, “The Real Foreign Interests in the Oil Sands,” *Ottawa Citizen*, January 13, 2012.
- 82** For examples of regional economies in Sweden and Germany that got ahead of the curve by making transitions in their economies see: Philip Cooke, “Transversality and Transition: Green Innovation and New Regional Path Creation,” *European Planning Studies* 20, no. 5 (05/01; 2012/07, 2012), 817–834; and also Dirk Fornahl, Robert Hassink, Claudia Klaering, Ivo Mossig, and Heike Schröder, “From the Old Path of Shipbuilding onto the New Path of Offshore Wind Energy? The Case of Northern Germany,” *European Planning Studies* 20, no. 5 (05/01; 2012/07, 2012): 835–855.
- 83** For proposals being developed in Canada, see *Making the Shift to a Green Economy: A Common Platform of the Green Economy Network*, 2011, available online at www.greeneconomynet.ca.
- 84** See Jim Stanford, “A Cure for Dutch Disease: Active Sector Strategies for Canada’s Economy,” Technical Paper for 2012 Alternative Federal Budget, Canadian Centre for Policy Alternatives.
- 85** The latter study included more data points covered by the global financial crisis of 2007–09, and hence incorporated more of the effects of the U.S. financial problems experienced during that time.
- 86** It has often been noted in commentary on this report that Ontario receives the “largest” interprovincial spin-off benefits from the bitumen projects, but this share is only proportional to the size of Ontario’s economy (Ontario obviously represents the largest share of non-Alberta GDP in Canada).
- 87** \$8 billion over 24 years translates into some \$300 million per year, or about one-tenth of one percent of current provincial own-source revenue in the nine provinces outside of Alberta.
- 88** The most misleading example of this approach is on p.37 of the report, which states that the new federal revenues expected to be generated thanks to bitumen investments are equivalent to 18.8 percent of federal revenues in 2011. But the numerator of that fraction contains 24 years of revenue flows, while the denominator contains only one. The appropriate ratio would be to calculate annual incremental revenues over the 2012–35 period as a share of existing revenues. A similarly misleading statistic is reported on the same page for provincial revenues.
- 89** Cross cites the Bank of Canada (2012b) and Shakeri et. al (2012) studies also surveyed in this Appendix. As noted, both of those studies in fact identified high commodity prices as the most important (though obviously not exclusive) single cause of the dollar’s rise, so it is odd that Cross would interpret the same studies to downplay the role of commodity prices in explaining the strong loonie. Cross’s statement (p.1) that “There is a growing consensus that the largest part of the stronger dollar was due to the multilateral decline of the U.S. dollar and increased investment inflows into Canada” is an especially misleading interpretation of the cited studies, which in fact confirm that high commodity prices are indeed the most important single cause of the appreciation.

90 Few observers would normally highlight an industry which experienced stagnant nominal sales over a decade-long period, during a time in which overall nominal GDP in the national economy increased by 50 percent, as an example of economic success or resilience.

91 Comparing trends in total exports (including non-manufactured exports, notably energy) to trends in foreign demand does not disprove the deindustrialization thesis, since manufactured products have declined substantially as a share of total Canadian exports – falling from 74% of total merchandise exports in 2002 to 61% by 2011. This implies that Canadian manufacturing exports, which are the variable of concern in this debate, have indeed underperformed relative to levels expected on the basis of foreign demand.

92 Even Cross's claim (p.3) that 10 of 19 manufacturing sub-industries expanded is curious and misleading. According to Statistics Canada's normal disaggregation of manufacturing at the 3-digit level, there are 21 manufacturing sub-industries – 12 of which experienced declining nominal sales between 2002 and 2011. Cross aggregates four of those declining sectors into one sector (called textiles and clothing), while splitting up one sector (transportation equipment) into two portions, the smaller portion of which (non-auto) experienced growing nominal sales even though the overall sector contracted. This rearrangement of traditional sector boundaries allows the author to report that a narrow majority of manufacturing sectors experienced growing nominal sales, whereas according to traditional sector definitions the reverse is true.

93 Almost half of the combined gross increase in nominal sales accounted for by the expanding sectors came from the petroleum products sector, on the strength of huge increases in nominal energy prices. This can hardly be interpreted as a sign of manufacturing robustness in the face of the commodities boom; it is, to the contrary, an indicator of that commodities boom. Higher prices for some other manufactured goods (such as metals) usually reflect rising prices for the raw minerals and/or energy used in their production, and similarly should not be interpreted as an indication of growth in manufacturing.

94 As has been noted with other studies reviewed in this Appendix, there is a clear effort on the part of some commentators to attempt to “disprove” the deindustrialization hypothesis no matter what the actual data indicate.

95 The CERI model uses 2006 parameters on its input-output model, even older than the 2008 parameters used in the Conference Board study.

96 In contrast, the Conference Board paper reviewed above considers only the investment dimension of the industry's expansion, not the benefits generated by production.

97 By way of comparison, consider that the cumulative decline in Canadian manufacturing GDP from 2001 when the manufacturing industry began to shrink through to 2011 has already reached \$184 billion (in 2010 dollar terms). Without a substantial recovery in Canadian manufacturing output in future years, that cumulative decline will total over \$800 billion by 2035. The contraction in manufacturing is thus reducing GDP outside of Alberta by many times more than the bitumen expansion is projected by CERI to add to it.

98 As with the Conference Board's input-output analysis, the CERI paper finds that the spill-over effects of the bitumen expansion are much stronger into the U.S. economy, than to the rest of Canada, reflecting the largely north-south orientation of the supply chain which feeds the Alberta oil industry.

99 This estimate is broadly consistent with the econometric results presented earlier in this report.

100 An earlier draft of the OECD report recommended that Ottawa establish a sovereign wealth fund, similar to Norway's, to channel royalties from resource industries and thus limit the effects of Dutch-disease-type mechanisms. That recommendation was removed, however, at the request

of the federal government. See “More on the OECD and Dutch Disease,” by Andrew Jackson, Progressive Economics Forum blog, www.progressive-economics.ca.

101 Curiously, Table 2 of their report seems to indicate that 14 of 20 major manufacturing sub-groups demonstrate some degree of Dutch-disease effects, with the other 6 indicating some degree of positive correlation between output and the exchange rate.

102 A related question is why the regressions ended in 2007, thus excluding the period of the most dramatic decline in Canadian manufacturing. Data on the variables considered in the study are certainly available for more recent years.

103 Important contributions to this emerging policy discussion have been made by Nathan Lemphers and Dan Woynillowicz, *In the Shadow of the Boom: How Oilsands Development is Reshaping Canada's Economy*, (Drayton Valley: Pembina Institute, 2012) ; Bruce Campbell, “The Petro-Path Not Taken: Comparing Norway with Canada and Alberta's Management of Petroleum Wealth,” (Ottawa: Canadian Centre for Policy Alternatives, 2013); Jim Stanford, “A Cure for Dutch Disease: Active Sector Strategies for Canada's Economy,” Alternative Federal Budget Technical Paper (Ottawa: Canadian Centre for Policy Alternatives, 2012); and the Green Economy Network, “Making the Shift to a Green Economy,” (Ottawa: www.greeneconomynet.ca).

104 For an example of such a policy and strategy, see “Priority #1, Public Investments in Renewable Energy Development,” in *Making the Shift to a Green Economy*, pp. 4–7.

105 See for example John Cornwall and Wendy Cornwall, *Capitalist Development in the Twentieth Century*. Cambridge: Cambridge University Press, 2001; Chris Freeman and Carlota Perez. “Structural Crisis and Adjustment,” in *Technical Change and Economic Theory*, edited by Giovanni Dosi, London, New York: Pinter Publishers, 1988; Alain Lipietz *Towards a New Economic Order: Postfordism, Ecology, and Democracy*, Europe and the International Order. Cambridge: Polity Press, 1992.

106 See for instance, the “pay-as-you-save” property tax based financing proposals in the Green Economy Network's *Making the Shift to a Green Economy*, May 2011; also the Property Assessed Payment for Energy Retrofits <http://www.davidsuzuki.org/publications/downloads/2011/Property-Assessed-Payments-for-Energy-Retrofits-recommendations-1.pdf>.

107 For more information on energy cost options see Brendan Haley “Energy Cost Politics and the Environment in Nova Scotia” <http://www.policyalternatives.ca/publications/reports/energy-cost-politics-and-environment-nova-scotia>



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