Energy Diversification - The Next Wave

- Converting Energy into Manufactured Products

- Adding Value to Natural Gas

Submission to the Energy Diversification Advisory Committee

Prepared by the Chemistry Industry Association of Canada

March 2017

CHEMISTRY INDUSTRY ASSOCIATION OF CANADA

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Executive Summary

The mandate of the Energy Diversification Advisory Committee (EDAC) is to provide advice to the government on additional steps Alberta can take to build a more diversified and resilient energy economy. This includes building on the value add related recommendations in the Royalty Review Advisory Panel Report. The Chemistry Industry Association of Canada (CIAC) shares the goals of seeking to optimize the return to Albertans and support continued industry investment, economic diversification and responsible development. To achieve this, Alberta should consider some new energy tracks and that is the focus of this submission.

This submission from CIAC is focussed on the pursuit of a value-add integrated economy and specifically the natural gas value chain. The goal is value-add economic diversification; Albertans are looking for opportunities to leverage abundant natural gas and associated liquids to move up the value chain. Government plays a key role providing the supportive business environment to allow investments, economic growth and value-add jobs to happen in a responsible fiscal and social manner.

Value add based on upgrading, mainly of natural gas and natural gas liquids, but also of all of Alberta resources represents over $16 billion in annual chemical sales, and over $8 billion in chemical exports from the province. The province of Alberta has realized the value added benefits of the petrochemical industry for a long time and the Province of Alberta and its oil, gas and petrochemicals industries have worked together in the value-added development of Alberta's energy resources, particularly natural gas. According Statistics Canada, Alberta already has major petrochemical facilities which consume in excess of 21% of Alberta's natural gas production, and add 5, 10, 20 times and more to the value of the original input and there is room for much more.

Economic diversification means more than access to and diversity of markets for Alberta energy as energy products alone. Export markets for natural gas are essential but not sufficient. The Alberta chemical industry adds value to natural gas and natural gas liquids (NGLs) through the conversion of energy into high value chemicals and polymers. This is done through upgrading the value of the molecules by creating higher value products, providing jobs for highly skilled works and revenue to governments. The Alberta chemical industry as well provides access to incremental markets which are not constrained by pipeline limitations.

Taking the basic molecules in natural gas, in particular methane, ethane, propane and butane and moving along value chains into basic petrochemicals takes low value molecules and moves them up the value chain by producing products that sell into local and global markets based on oil prices. In addition, diversity of markets is improved since the energy products are converted into chemical products which have their own unique market dynamics.

Oil and gas boom and bust cycles often run counter to manufacturing business cycles. The other major benefit from value-add economic diversification is growth stability. A good example of this is the Texas economy which does not experience the abrupt swings of a resource-only economy because it has diversified into high-value manufacturing, including petrochemicals. Ultimately resource availability, competitiveness and overall profitability will

decide what is built, when and where. Alberta enjoys an abundance of resources and when competitive opportunities exist, relative to other options for investors, some will choose to invest in Alberta to move along energy value chains and add value and diversify the Alberta economy. Albertans will benefit from this diversity.

The Alberta chemical industry through the CIAC's Responsible Care program strives to establish and undertake the highest level of social responsibility in terms of how our operations and products impact environment, employees, customers and other stakeholders. In addition, the products we upgrade and produce result in a lowering of carbon emissions that would otherwise occur at the burner-tip, providing a maybe not so obvious improvement and benefit in the area of climate change.

Albertans are looking for greater stability, quality of life and opportunity for growth. The chemical sector views itself as a responsible social partner and a solutions provider. CIAC members are committed to be world leaders, from both competitiveness and environmental perspectives. Priorities that do not reinforce each other are going to work against each other – the overall goals must be mutually reinforcing; we must connect the dots.

Recommendations

Overall it is the view of CIAC that Albertans need to broaden the dialogue and consider options to further integrate and leverage our resource-based economy to maximize the benefits of all stakeholders.

There is an opportunity today to create opportunity to invest in adding value to resources. Alberta can use the Royalty system as an effective government tool in providing economic diversity and responsible development.

Other fiscal incentives, from all levels of government, need to be considered when addressing the investment competitiveness of Canadian jurisdictions relative to the U.S. and other jurisdictions. The Alberta government should continue to champion investment in our sector and encourage the Federal government to do its part as well. Implementing a 100 per cent accelerated capital cost allowance (ACCA) for resource conversion to chemicals will further work to overcome the competitive advantage of incentives provided in locations such as the U.S. Gulf Coast.

Municipal governments, especially those that derive substantial benefit from the existing industrial clusters in the province, should also be asked to improve the competitiveness of new, incremental investment in their region. Infrastructure support, training, facilitated regulatory approvals and credits for site services that are of benefit to the region are examples where the local and provincial governments might work together to mutual benefit.

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The Energy Diversification Advisory Committee – Mandate

Mandate

The mandate of the Energy Diversification Advisory Committee (EDAC or "the Committee") is to provide advice to the government on additional steps Alberta can take to build a more diversified and resilient energy economy. This includes building on the value-add related recommendations in the Royalty Review Advisory Panel Report: to diversify Alberta's energy downstream sector to create stable, long term economic opportunities and employment.

EDAC will provide advice to government that answers the following key question:

What additional steps can Alberta take to build a more diversified and resilient energy economy that works with industry and communities to create jobs, moves the energy industry up the value chain, and diversifies the energy industry into new end products?

EDAC will review current analytical work, engage with targeted audiences, solicit feedback from the public, and provide advice to the Minister of Energy based on this work. Members of the Committee are accountable to the Minister of Energy.

Key Responsibilities

EDAC will provide advice to the Government identifying key opportunities for Alberta to expand our downstream sector, including looking at opportunities in hydrocarbon processing and the petrochemicals sector. This advice will reflect, primarily:

- The current knowledge and expertise of the EDAC members;
- Analyses that have been developed for and by the Government of Alberta;
- Literature search of other analytical work and assessments; and
- What EDAC hears from its engagement.

Key Principles for EDAC Engagement

- EDAC will ensure that the public is part of the conversation and will have ample opportunity to submit their input on what Albertans believe the future of energy industry diversification in Alberta should look like.
- EDAC will ensure that it engages with industry and non-industry experts to ensure that EDAC is well informed on the state of the energy industry, the outlook for the energy industry, the key opportunities in the energy industry, and the policy tools that can be used to facilitate energy industry diversification in Alberta.
- EDAC will provide a transparent engagement process on its website, laying out timelines for engagement and providing updates on the engagement process as it progresses.

Additional Detail on the Committee's Mandate

It is expected that EDAC will conduct a thorough review of the opportunities, and potential policy and financial tools the Government of Alberta has available to expand the downstream sector, including hydrocarbon processing and petrochemical opportunities. This would include upgrading, partial upgrading, refining, and petrochemical plants, and possibly other opportunities that may come up through the process. This review will consider the

opportunities in the downstream sector in the context of the scale of the resource in Alberta that is available as a feedstock for those opportunities.

There has been a significant amount of work done by the Government of Alberta in recent years, and commentary from other organizations, including that received during the Royalty Review Advisory Panel engagement phase. It is expected that the Committee can build primarily on that work and its own expertise to do forward-looking analysis of opportunities in these areas.

This is an ongoing advisory committee on technical and policy matters. The Committee is expected to engage with the public primarily through the EDAC website, as well as to work with stakeholders with interest and expertise in relevant areas to provide the best information for the Committee to make its recommendations and give advice.

There are a number of other policies of the government that have been implemented or are in the process of being implemented, and although they have relevance to the Committee's work, and potential options within the government's stated policy are welcome, the overall policies and positions of the Government of Alberta in those areas are not in scope of the Committee's work.

Introduction and Scoping

Resource Stewardship, Responsible Resource Development, Sustainable Development – Alternative uses for energy or "instead of burning"

Energy comes from many sources, including hydro, wind, solar, oceans (tidal and wave), biomass, uranium, crude oil, natural gas, coal, oil sands – bitumen, and coal bed methane; all are in abundance and all offer opportunities for development and growth. This assessment is focused on the natural gas and natural gas liquids opportunity, but applies to all unconventional gas, oil and liquids (natural gas liquids as a component part of natural gas and associated gas as a component of unconventional oil). As with each resource area, energy offers a portfolio of opportunities in Western Canada and responsibly optimizing these opportunities is a good goal for all Albertans. Alberta is not in this alone, as neighbours such as B.C. and Saskatchewan share in both the challenges, as well as the exponential value-add opportunities they present. But further, Alberta is in a global competition for investments – everyone wants value-add opportunities and investment.

The chemical industry, through the application of chemistry is already adding value and jobs, creating wealth, and diversifying the provincial economy. CIAC recommends an approach that recognizes the importance of responsible energy conversion and also resource upgrading to create value-added products based on energy inputs. Essentially, we are talking about an "all of the above" approach to economic development which can be applied to the shale gas opportunity, as well as to conventional, associated gas and other types of energy resource developments. While it is imperative that the owners and developers of resources have, in a responsible manner, the ability and right to maximize the value of what they produce it is also an important role for government to create an environment to advance competitive opportunities for upgrading and manufacturing of these resources. Government initiatives and policies directed at this end enable industry to thrive and benefit Albertans and more generally the entire Canadian economy so that both advance in a sustainable manner. And these initiatives will serve to match the competition as we seek diversification and value add in Alberta.

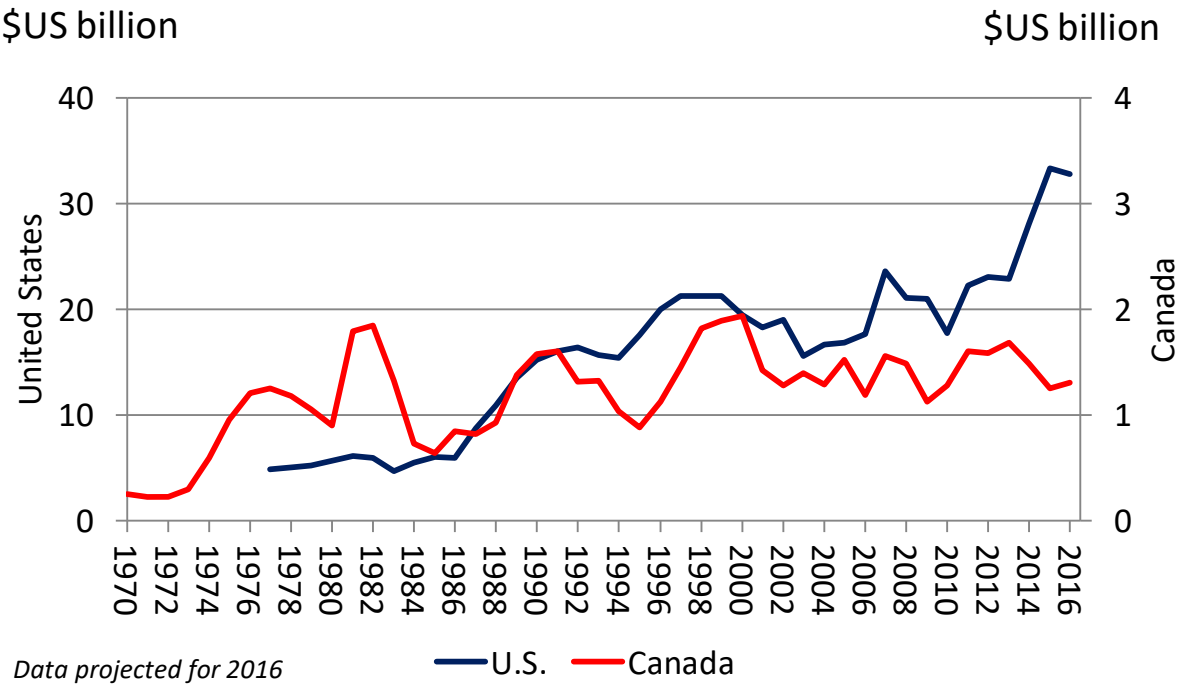
Overall, it is our view that Albertans need to broaden the dialogue and consider options to further integrate and leverage our resource-based economy to maximize the benefits of all stakeholders.

Unconventional energy production and shale gas specifically is providing North America with an economic growth opportunity that has not been seen for several decades. It is important to see how it is already making a difference and to realize how we can maximize the value and benefit of the opportunity!

A recent Canadian Energy Research Institute (CERI) study "Competition Analysis of the Canadian Petrochemical Sector" has direct bearing on the economic diversification and sustainable development messages. It should be used to illustrate how other jurisdictions analyzed the situation and assisted in developing plans and policies to realize goals. At this point in the development of unconventional oil and gas, most upgrading and petrochemical development is happening in the U.S. but does not appear to be happening here (see figure 1). It is the purpose

of this submission to show how some of that development can happen in Alberta. Fundamentally, for the chemical industry, this is the opportunity.

Figure 1: Chemical investment trends – Canada v. US

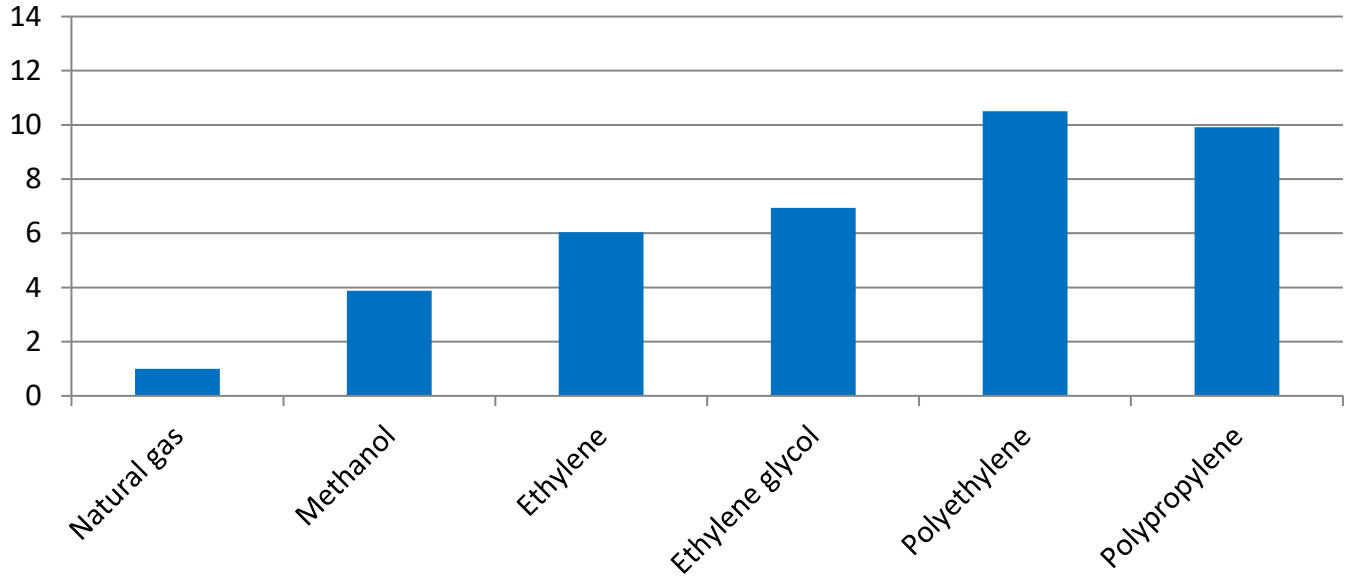


Data projected for 2016

The chemical industry is already a key contributor to Alberta's energy value-add strategy. Natural gas liquids, in particular ethane, and natural gas itself (methane) are converted into high value chemicals and fertilizers, $16 billion in sales this past year, with over $8 billion in exports. These are high value jobs; over 1/3 of our employees have university degrees (figure 6). These are jobs that have important multiplier effects within local economies – each chemical job results in another five in related sectors and services (source: Statistics Canada).

Feedstock or raw materials are core to the competitiveness of chemical producers, and its capacity to move along value chains (see figure 2). Alberta has the opportunity to move along energy value chains and provide a significant added value to the benefit of Albertans.

Figure 2:



Source: Chemistry Industry Association of Canada (CIAC)

A new world-scale ethylene/polyethylene complex requires on the order of 80,000-100,000 barrels per day of raw material (ethane). Equally of note, an integrated petrochemical site is a 30, 40 or 50-year investment. Using the USGC expansions and investment in new facilities as examples, a new petrochemical complex, including infrastructure and derivative facilities can cost in the range of US$ 8 billion. Even an investment on an existing site with infrastructure already in place can approach the US $5 billion range. With raw material (in this case ethane) at 70% or more of operating costs, clearly supply of feedstock is the first and essential consideration of the investor. Other examples are provided later in this document (page 19).

Today Alberta is heavily reliant on its natural gas industry to market its output but the major export pipelines are operating at only a fraction of their capacity. The problem is market access – the pipe delivers to locations that are now better served by growing U.S. production. Government policies and programs directed at increasing conversion of the components of natural gas, specifically methane, ethane and propane, into higher-value products can provide diversity and demand for these products. The products produced do not suffer from lack of market access, they do not move by pipeline, they already are moving to many global markets and many of them are sold based on oil-related pricing instead of the very much lower gas prices. This is investing in the petrochemical industry to achieve value creation.

One final “opportunity” is the global challenge of climate change. Alberta’s petrochemical producers consume energy and produce carbon dioxide in the process. But they also capture and sequester carbon into chemical products (e.g., insulation, car parts, counter tops, medical equipment, solar panels). As Albertans devise a climate change strategy we need to take advantage of a sector that prides itself on being a solutions provider. Life cycle analysis of the products produced by the chemical sector globally show that it is the most energy intensive

sector of all manufacturing sectors. But, from insulation to light-weighting of auto parts to specialty lubricants, this sector is about providing solutions. While the sector is very energy intensive and is the most traded sector globally, there is opportunity to make products here in Alberta from natural gas, rather than elsewhere from oil or coal which might result in a larger global carbon footprint. One example is methane (natural gas) conversion to methanol. If the same methanol is produced in China from coal, it will have a carbon footprint that is six to eight times larger than doing it here! CIAC urges doing it here with the best technologies and the lowest emitting feedstock, rather than elsewhere – that is responsible resource development.

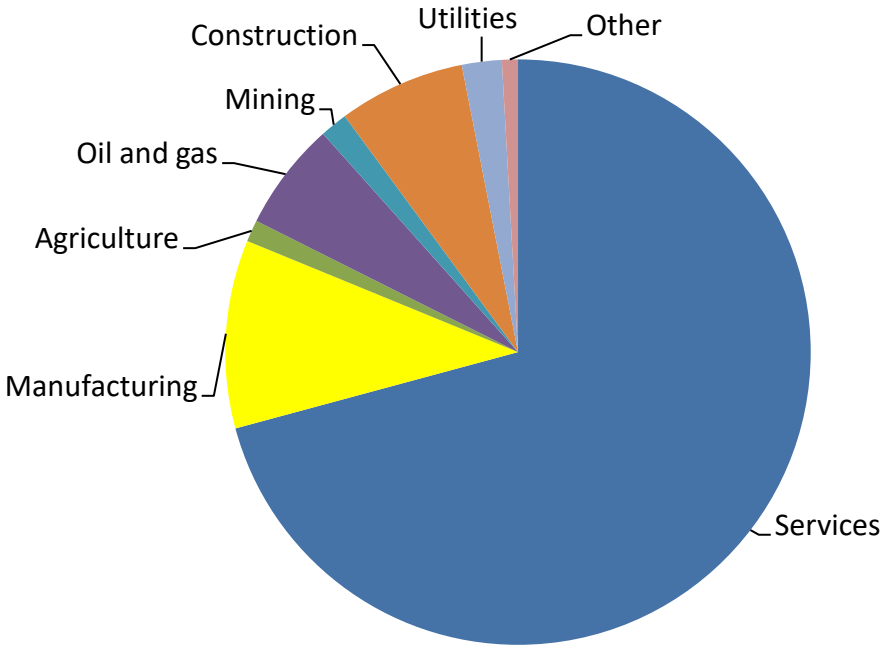
Background (chemical sector in Canada-energy intense, energy efficient and providing sustainable solutions).

This next section describes first the Canadian chemical industry and then goes specifically deeper into the Alberta data and how energy resources and natural gas in particular are a component part of the opportunity for economic diversification. The illustrations and data help to make the case for Alberta economic diversification.

Canada's Economy is Closely Linked to Natural Resources

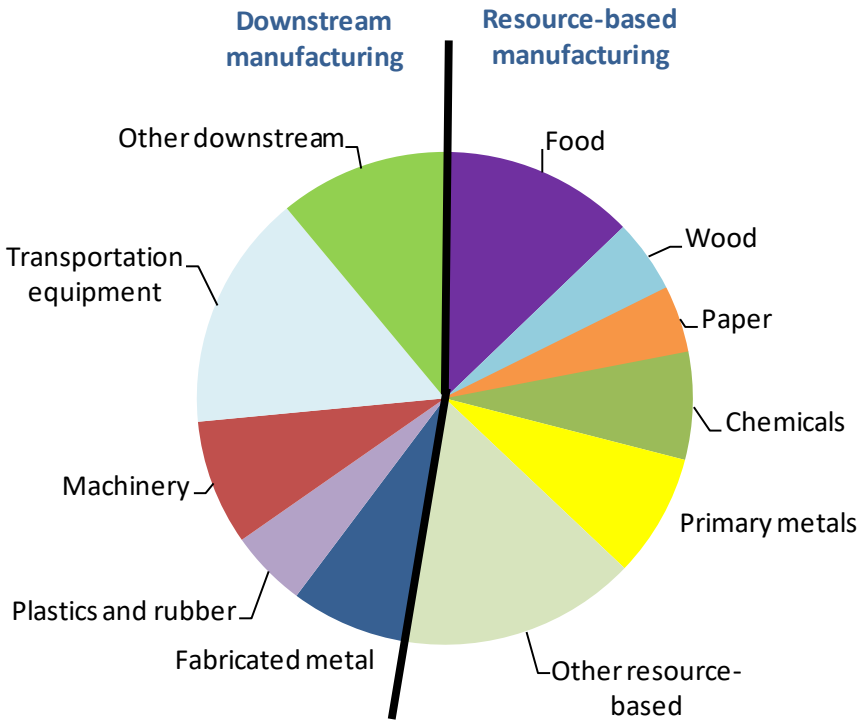
While the Canadian economy is mature and appears to be dominated by the service sector (figure 3) many of these services are related to manufacturing and resource development. Manufacturing is a very important component of our economy and figure 4 further breaks down manufacturing into industries based directly on resource upgrading and other further-downstream industries.

Figure 3: Canadian Economy by Sector, 2016



Source: Statistics Canada

Figure 4: Canadian Manufacturing (GDP Comparison, 2016)



Source: Statistics Canada

A good illustration of the resource-manufacturing linkage is chemical manufacturing which purchases 18% of gas, 5% of oil and 3% of electricity consumed in Canada. Those numbers are higher for gas upgrading in Alberta, exceeding 21%.

The Alberta chemistry industry consumes 21% of domestic gas, adding value here and across the Canadian economy.

In moving along resource value chains, Alberta needs to consider those factors that can enhance our global competitiveness. First, where there are duplicative and sometimes conflicting federal-provincial environmental regulations or significant incremental costs, this discourages potential investors. Regulatory streamlining must be a goal across all sectors of the economy. In particular, it must be facilitated where business is seeking to add value to resources, including energy and our Responsible Care ethic will ensure we are doing the right thing as we undertake resource upgrading (see Appendix 1 and 2).

An earlier CERI petrochemical study (2015) confirms that Alberta has abundant supply of competitively-priced raw materials or feedstock to run plants and provide for future growth. North America and central Canada in particular, has been experiencing a serious erosion of its manufacturing base. Adding value to our resources creates jobs and wealth across the economy and can help turn that trend around, starting right here in Alberta.

Manufacturing, a key market for chemical sector output, is a competitiveness concern today. Facilities have been closing and to reverse this trend, we need to attract new investments. Adding value to resources is the essence of the manufacturing sector, which creates jobs and wealth across the country.

Each chemistry industry job results in 5 additional jobs across the Canadian economy.

In the U.S., both governments and industry are aggressively pursuing investment opportunities. Alberta needs to focus its efforts if it wishes to participate in this "value-add" phenomenon. The CERI study, "Competitiveness Analysis of the Canadian Petrochemical Sector", clearly pointed out that the government supports on the USGC is on the order of 10%-15% of the capital cost of projects and has been sufficient to "win" virtually all of the projects under consideration for North America.

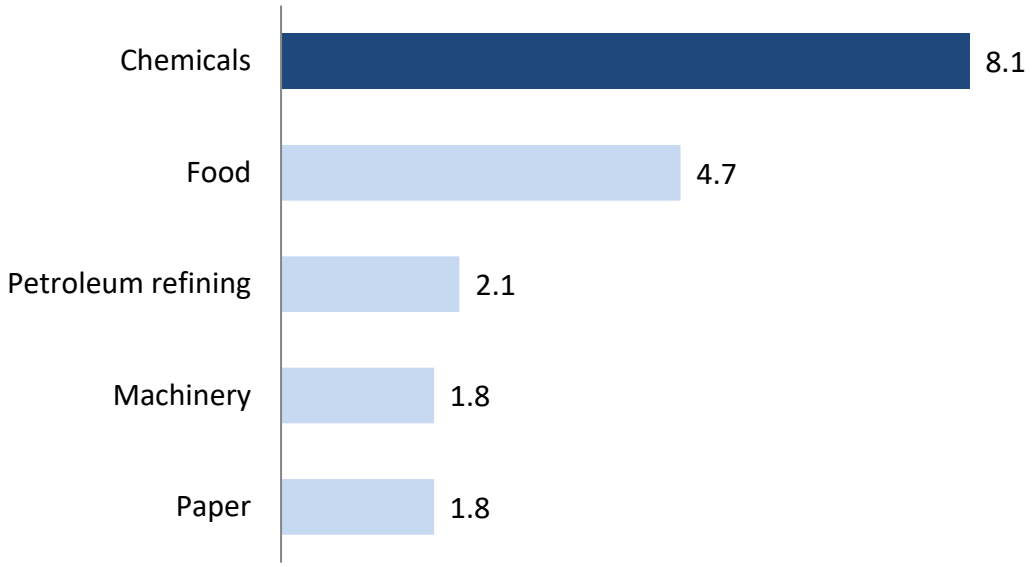
Competitiveness challenges are being discussed and industry and governments must continue to work together to remove remaining obstacles and on business and policy issues that will stimulate future growth in the chemical sector of our economy.

Alberta is a major source of all the necessary ingredients (energy, minerals, skilled workers, stable investment environment) to produce chemicals. Alberta has the potential to become the world's best upgrader of natural resources into value-added manufactured chemicals for domestic and global markets through several routes, but these require vision at a provincial as well as national level.

Here in Alberta, an energy strategy must be more than facilitation of energy project approvals and expeditious delivery of our energy to a broader suite of export markets. Our energy extraction and production must serve Albertans well and serve them responsibly.

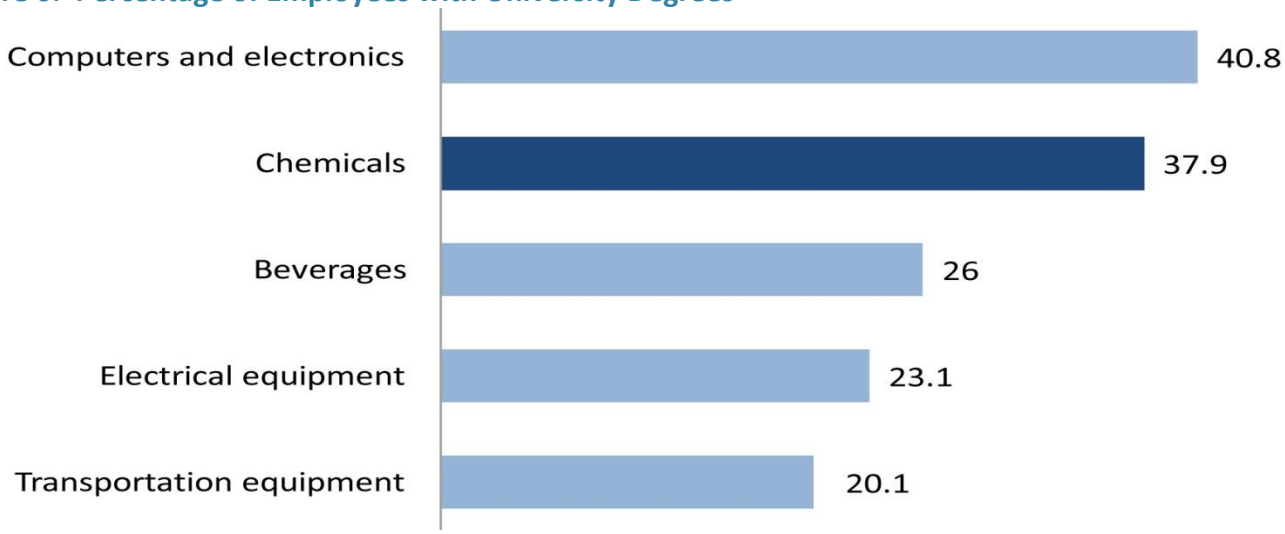
Specifically, in Alberta the chemical sector relies on access to affordable energy to add value and manufacture products for Albertans and for export (see figure 5). These are good jobs; good careers (see figure 6).

Figure 5: Alberta Export Ranking - $ Billion



Source: Statistics Canada

Figure 6: Percentage of Employees with University Degrees

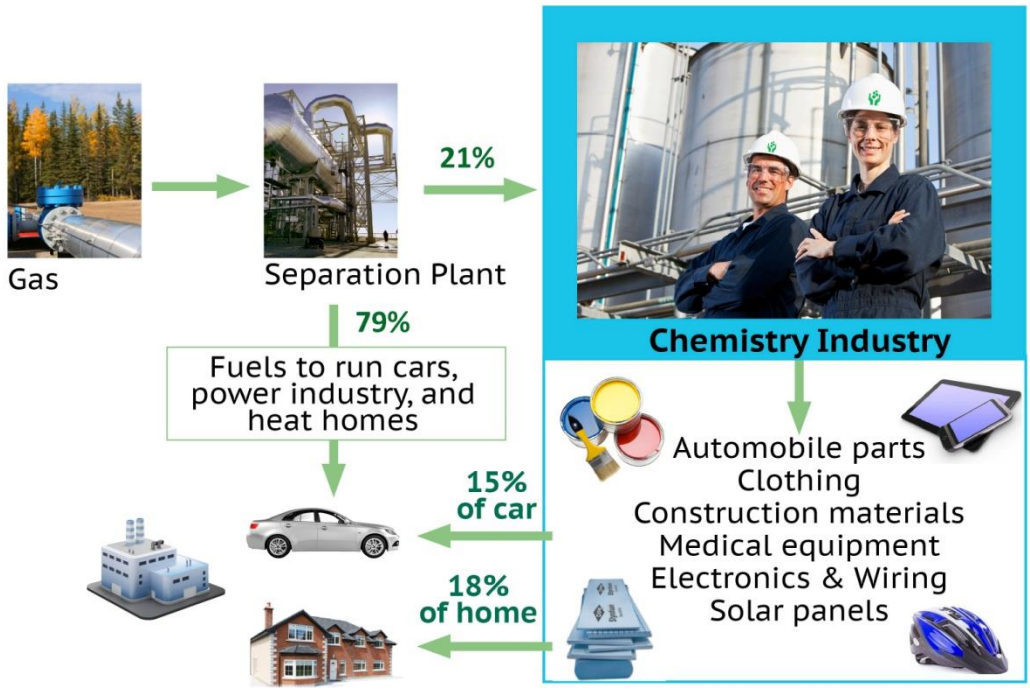


Source: Statistics Canada

Petrochemicals

Chemical companies use energy as both a fuel and as a raw material or feedstock for chemical production. The energy may be oil, gas, electricity or bio-based materials. In the case of natural gas, our impact is significant (see illustration 1).

Illustration 1: Gas-Based Chemistry Value-Chain



For the petrochemical sub-sector, members take components of natural gas and convert them into a broad range of petrochemicals such as methanol, ethylene, ethylene glycol, styrene and polyethylene and beyond into fabricated products and formulations. Once these basic building blocks are produced locally, there is opportunity for most to be exported to consumer markets. But there is also some room for further upgrading and just as the case in upgrading some energy into petrochemicals, in turn a portion of petrochemicals can and will be converted into consumer products for use right here in Alberta.

Making it Happen

Alberta will need to develop and implement the policies and deliberate targeted support that enhance the opportunities for extracting maximum value from energy resources, while respecting market principles. The 10-year extension announced by the federal government in Budget 2015 for the ACCA helped the competitiveness of value-added projects for Canada but it only matched treatment available already to U.S.-based projects. Canada (and Alberta) should consider a 100 per cent ACCA to encourage upgrading here now.

Achieving a diversified economy can smooth out the government revenues, dampen resource-base swings, diversify employment and create career opportunities right across Alberta. In this way, the chemical industry is uniquely positioned to unlock further expansion, investment and wealth creation in the province. By gaining competitive access to new energy and feedstock supply – like those found in Alberta – the Canadian chemistry industry has the potential to supply the world with environmentally sustainable value-add products.

Alberta can supply the world with value-added products

Future feedstock sources could include northern gas and new supplies from B.C., Saskatchewan and Alberta through a "Western Canada Energy Hub". For a review of competitiveness factors specific to the development of the chemical sector, refer to the Chemistry Industry Association of Canada (CIAC) competitiveness score cards (http://www.canadianchemistry.ca/index.php/en/fact-sheets-brochures).

Capital cost disadvantage (high construction costs) and higher transportation costs are a few examples of competitive issues beyond raw materials that must be addressed. Corporate tax is another readily measurable competitiveness factor. CIAC has provided comments on corporate tax in its recent pre-budget submission to the federal government. CIAC is recommending, when fiscal conditions permit, that the corporate income tax for value-add manufacturing (M&P) be set at 13% federally and 10% in Alberta.

A Broader Dialogue

CIAC believes that energy must remain a matter of Canadian priority, bringing together the federal and provincial governments and all energy stakeholders, with one clear purpose - to bring long-term balance and opportunity for sustained growth to Alberta and Canadian energy markets. A second goal is to competitively add value to our energy resources in the most sustainable way possible to create Canadian wealth and jobs, products that improve everyday living, and reduce our environmental footprint. The chemistry industry is actively engaged in finding solutions; our members are working with partners in the energy sector to address emissions, water use and site remediation issues.

The Options

CIAC believes that the government has the ability to offer choices within the context of the business environment – choices in "letting the market decide". First, as the owner of the resource, and in defence of representing the public interest, the government should not apologize for adopting policies that optimize benefits for its citizens.

That does not mean "interfering" with business. A fundamental principle is that ultimately decisions about how Canadian energy resources should be developed, produced and sold are best left to energy markets themselves, both domestic and international, to resolve. Indeed, individual decisions about who and where to sell an individual firm's energy production to and on what terms will continue to be made by firms involved and different market participants will have different opportunities, with different views on which market opportunities are most favourable for them.

A critical role for governments in this is to ensure that markets are enabled to work efficiently, openly and fairly, while appropriately safeguarding the environment and the rights of all participants. This includes helping ensure that Alberta's energy supplies are open to global energy markets and also open to value add opportunities right here in Alberta. And that in turn means, among other elements, ensuring efficient, fair regulatory processes that can expeditiously provide necessary energy transportation infrastructure developed in a safe, environmentally and socially responsible manner.

The option for Alberta, as the resource owner, is to offer programs to achieve desired outcomes. Examples of this have been demonstrated in the recent past through the creation and use of instruments such as IEEP, BRIK and PDP in most cases utilizing Royalties as leverage. To the extent that those programs used the royalties portion of government income to encourage further value-added upgrading and did not remove or limit choice, or hinder the market's ability to operate effectively and competitively, it offered more choices and is an approach the CIAC supports. This is not interfering with the business, it is offering real options that represent public interest and offer a way forward to achieving some additional value add.

There is a portfolio approach to energy development that sees some extraction and export, some upgrading and some further conversion or manufacturing into finished products. Adding "some" further value to "some" basic resources provides a diversity that optimizes opportunities for Albertans. That is portfolio development. And that exactly can fulfil the goals of EDAC.

The Recommendation- The Long-term Pursuit of Economic Diversification

CIAC supports policy initiatives that promote sustainable development of diverse energy supplies, energy conservation, and the concept of using some energy as a feedstock or raw material to be converted into high value-added chemical products. At the same time, energy development, environmental improvements and societal expectations should advance cooperatively and not in conflict. Chemistry solutions can address environmental concerns and issues. Alberta's energy, environmental and societal goals can be mutually reinforcing and take industrial competitiveness, value-added upgrading and sustainability should be pursued together.

Chemistry solutions can address Canada's environmental issues.

Energy is a key component of economic well-being and an essential input into an economy. Alberta needs access to markets, but also needs increased diversity of markets. Adding value to natural gas and NGLs through the production of chemicals and polymers provides significant incremental value creation in Alberta as well as providing access to incremental markets which are not, for example, constrained by inadequate transportation capacity. Adding value further adds to diversity of markets since the energy products are converted into chemical and polymer producing which have their own unique market dynamics, many of which run counter to basic resources such as oil and gas. Perhaps more significantly it represents a future option that transitions the resource into products that facilitate our continuously evolving economy.

The chemical sector is an excellent Alberta example of resource upgrading and value-add manufacturing. With shipments of over $16 billion, exports over $8 billion and strong prospects for growth, there is opportunity here for energy value chain developments going forward.

North America is experiencing significant chemical sector investments the result of unconventional oil and gas. There are approaching $250 billion in new capacity investments underway, announced or anticipated virtually all in the U.S. There is a real opportunity for Albertans and advantage for the Province to see more economic diversification. It can provide buffering and relief from the boom and bust cycles that result from an economy too weighted around resources and related services. The recent downturn in energy prices have curtailed investment and resulted in a loss of employment in the upstream sector, during which the chemical sector has continued to operate at high levels adding value to the Alberta economy.

But attracting a share of new North American investments will involve hard work by all of us; the competition is very good and competitors for investments are working hard to attract or keep these investments (figure 1). The US Gulf Coast has the same raw materials, it is on tidewater, the construction costs are purported to be lower – we will have to work to win investment opportunity here. If this opportunity is to be realized in Alberta it will be only because all levels of government and the investors are working together. In the end, it must be evident that it is more profitable to add value to energy in Alberta than elsewhere.

It is very clear that a healthy and viable oil and gas sector is a requirement to realize a healthy and viable energy value chain. For example, unless natural gas finds new markets we will not see the exploration and extraction that provides opportunity for natural gas liquids in sufficient incremental quantities to be upgraded into new world-scale petrochemical facilities.

What is not helping is hurting

Added costs of doing business such as the high cost of construction in Alberta, the increase in corporate tax and higher climate change charges make the case for investing in Alberta economic diversification much harder; the aggregate of these measures hurt chances for Alberta to stay in the mix for investment consideration.

We urge government to consider, as fiscal conditions permit, providing choices for investors. Our energy products can be extracted and exported. But with the right conditions, some energy value chain products can be produced here. Alberta must consider ways to encourage investing in value add. For example:

- Programs could be designed to encourage the upgrading of energy materials such as methane and natural gas liquids through the use of the government's share of royalties and taxes (provincial & municipal). These programs could target to encourage new investments through improving availability of competitive valued feedstock. The PDP was exactly this and the response of the investment community was very encouraging. Use of the Royalty system in this manner to further petrochemical investment in the province is not a subsidy - it is deliberately changing where Alberta chooses to share in wealth generation.
- Offer that the 12% corporate income tax rate can be reduced to 10% (the special manufacturing and processing or M&P corporate tax rate) if a company chooses to manufacture products (add value to energy resources) in Alberta;
- Consider tax abatement measures at the provincial and municipal level for a set period on the incremental tax increase from new investment;
- Explore areas for facilitating regulatory approvals process and commitments to set timelines;
- Find ways to work at both the local and provincial level to reduce construction costs and credit site-specific services which obviate the need to supply from the region, such as waste and water treatment, special fire-fighting and emergency response materials; and,
- Ensure that increased climate change charges take account of the holistic impact that the petrochemical industry has on carbon emissions and how similar production is treated in the U.S., our direct and closest competition for new investments in energy value-add. Ultimately, it is important to do some of the upgrading here where we control the environmental performance rather than elsewhere, potentially with higher net emissions.

Alberta's chemical sector already takes over 21% (source Statistics Canada) of its natural gas consumption and converts these natural gas components into high value manufactured products. The sector provides good careers for Albertans, with each direct job producing another 5 in your communities. The average salary is $110,000. The chemical sector is the number one value-add manufacturing sector in the province. The opportunity to grow is real and significant. Earlier, reference was made to the increasing investments in petrochemical facilities in North America based on the unconventional energy developments. The investments are important in restoring the health of manufacturing right across the continent

and Alberta can be a material part of that growth. But, to date as figure 1 indicates, we have not yet seized the opportunity.

What does it take to win?

There are a number of activities that are necessary to win investments. In the end, it must be as competitive to build and operate value-add resource-based manufacturing facilities here as anywhere else. There are many core factors to achieving global competitiveness and first is a willingness to compete.

In the past, the incremental ethane extraction policy and program (IEEP) successfully leveraged $350 million in forgone (immediate) revenues by the Province to generate 91,000 incremental barrels of ethane and that resulted in $1.8 billion in incremental investments in Alberta while it was in place. The measure did not require upgrading, but it offered the choice to pursue upgrading and helped to offset some of the added costs or competitiveness factors Alberta faced at that time. Redeveloping and creating new concepts that can leverage natural gas and natural gas liquids into value added processes in Alberta offer a real opportunity to achieving further economic diversification for the Alberta economy. The PDP may well leverage $500 million into over $8 billion in propane upgrading into polypropylene, but it also led to far more applications and potential projects being identified than could be accommodated. We are definitely on the radar screen of investors.

The right focus, on industrial development requires a clear awareness of the competition. What are competing capital costs, are logistics adequate to handle growth here in Alberta, do we have competitive returns for investors, can we build new projects on time and on budget? There are areas where industry and government need to work together. We must be the best we can be if Alberta is to be a location of choice for growth. A new petrochemical facility such as an ethane cracker can mean investments on the order of $10 billion, with a commitment to

Our industry is located across Canada, upgrading and resources

be operating and providing value to the Province for 30-40 years and beyond. A dedicated propane to propylene facility with polypropylene and related infrastructure comes in at over $4 billion. Methane to methanol world scale facilities can cost well over $1 billion. An economic strategy that rewards value add choices and shares in the up-front risks will be necessary. Everyone will need to be on their best game for this to work. As noted earlier, the competition is very fierce and options exist to add value elsewhere.

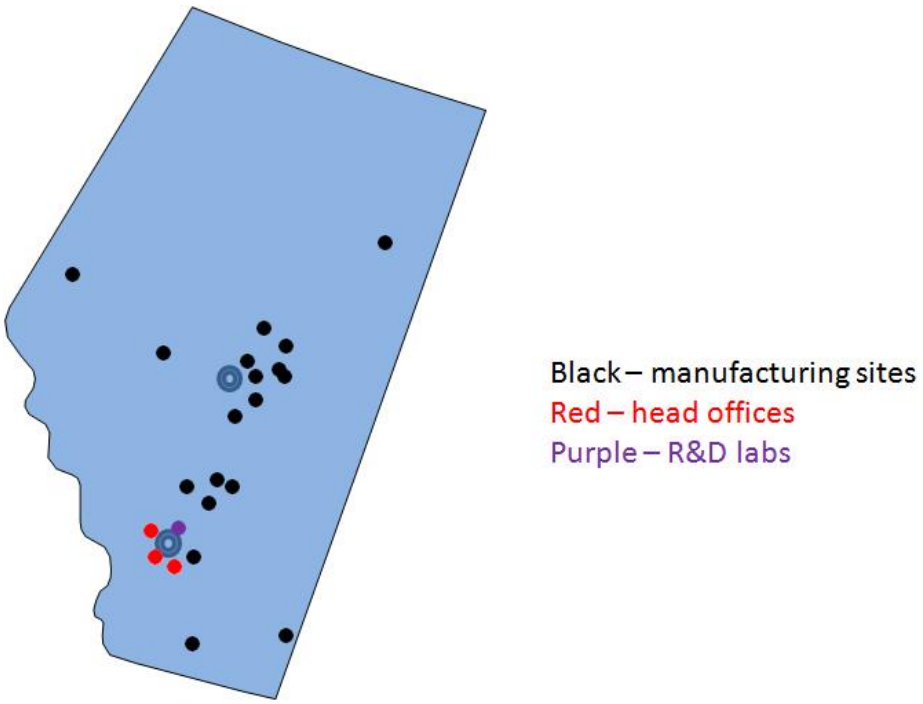
Right up front, CIAC members are offering to work with the Government of Alberta to get the details right. We are prepared to have industry experts work with government experts, to offer choices to industry to realize more value-add resource upgrading and economic diversification in the province.

For Alberta and across Canada, access to affordable and competitively-priced energy drives economic growth and sustains competitive advantage. Figure 7 illustrates where CIAC members are located; where we convert basic resources into products for Canadians and for export. Figure 8 provides some specific detail for Alberta. Competitive and market-based

access to natural gas and natural gas liquids for the chemical sector is crucial to Alberta's value-added growth and capacity for further value-added manufacturing.

Figure 7: The Chemical Sector Across Canada

Figure 8: Where is the Chemical Industry in Alberta



Natural gas can be exported, consumed, converted or sequestered into finished goods. CIAC will speak out on behalf of diversity and this as a solid option for sustainable hydrocarbon development. This is about much more than market diversity; it is about how Canadians can optimize the value of energy and any other resources. Moving along the value chain adds value, wealth and opportunities for good careers – the diversity it presents enables sharing a bigger opportunity. Chemistry can add value across energy and resource value chains

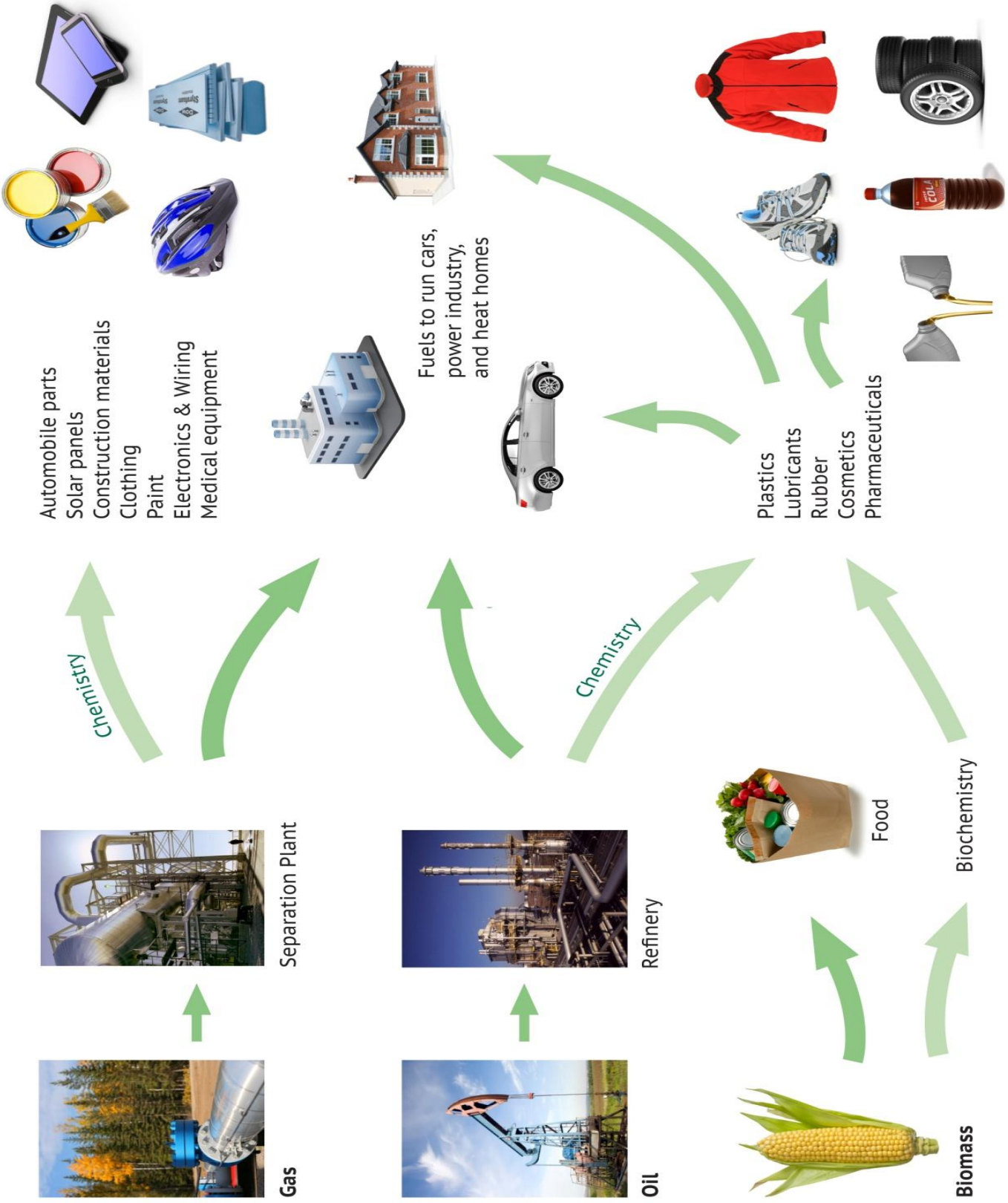
beginning here in Alberta, but ultimately clear across this country. Alberta is encouraged to consider policy options that result in moving some of its resource wealth along value chains to enhance economic diversity.

Recommendations

Overall it is the view of CIAC that in examining the energy sector Albertans need to broaden the dialogue and consider options to further integrate and leverage our resource-based economy to maximize the benefits of all stakeholders.

Alberta can create a culture to facilitate economic value-add manufacturing and resource upgrading by providing a champion in government, and in Cabinet where economic development/diversification can be the focus. Know how and where priorities are in support of or conflict with value-add economic diversification and purpose to be at the top of our game in every aspect of global competitiveness. Alberta can create opportunity to invest in adding value to resources and the Royalty system can be one effective government tool in providing economic diversity and responsible development.

Appendix 1


Automobile parts
Solar panels
Construction materials
Clothing
Paint
Electronics & Wiring
Medical equipment
Fuels to run cars, power industry, and heat homes
Plastics
Lubricants
Rubber
Cosmetics
Pharmaceuticals
Chemistry
Chemistry
Separation Plant
Refinery
Food
Biochemistry
Gas
Oil
Biomass

Appendix 2

Responsible Care® - Our Commitment to Sustainability

CIAC is the national trade association of Canadian chemical manufacturers, representing companies that manufacture basic chemicals and resins. Members range from family-owned companies to affiliates of global enterprises. Together, these companies generate revenues of more than $27 billion, representing over half of the total chemical sector which also includes fertilizers, pharmaceuticals and formulated products.

Responsible Care is the Association's commitment to sustainability – the betterment of society, the environment, and the economy. Our member operations are bound and guided by the ethics and principles of Responsible Care. A consequence of these ethics, our members constantly innovate for safer, more environmentally-friendly products and processes, and work cooperatively to identify and eliminate harm throughout the entire life cycle of their products. For a more complete description of the ethic and the membership commitment to sustainable development principles, visit www.canadianchemistry.ca.

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