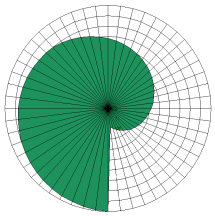

# The Alberta GPI: Economy, GDP, and Trade

by

Mark Anielski

*March 2002*

Pembina Institute
for Appropriate Development

## About the Pembina Institute

The Pembina Institute is an independent, citizen-based organization involved in environmental education, research, public policy development and corporate environmental management services. Its mandate is to research, develop, and promote policies and programs that lead to environmental protection, resource conservation, and environmentally sound and sustainable resource management. Incorporated in 1985, the Institute's main office is in Drayton Valley, Alberta with additional offices in Calgary and Ottawa, and research associates in Edmonton, Toronto, Saskatoon, Vancouver and other locations across Canada. The Institute's mission is to implement holistic and practical solutions for a sustainable world.

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The Pembina Institute
Box 7558
Drayton Valley, AB T7A 1S7
tel: 780-542-6272 fax: 780-542-6464
e-mail: info@pembina.org

## About this Report

This is one of 28 reports that provide the background for the Genuine Progress Indicators (GPI) System of Sustainable Well-being Accounts. It explains how we derived the index that was earlier published in *"Sustainability Trends 2000: The Genuine Progress Statement for Alberta, 1961 to 1999."* The research for this report was completed near the end of 2000. The appendices provide further background and explanation of our methodology; additional details can be obtained by contacting the authors. Appendix A includes a list of all GPI background reports.

This report examines the overall "economic" health of Alberta's economy from 1961 to 1999 as reflected in the provincial economic accounts from which the GDP is derived. The report examines the trends in GDP, personal consumption expenditures, business investment expenditures, government expenditures and the balance of trade (exports and imports). Critical issues important to economic well-being are examined including trends in GDP compared to personal consumption expenditures which can then be compared to other indicators such as disposable income and debt. The fundamental building block of the GPI Income Statement is personal consumption expenditures. The nature of consumption and the importance in defining well-being examined. Fundamental questions about the nature, sustainability, and trade (mostly exports) in produced (built), financial, natural and human capital or wealth are examined. Also, the changes in the contribution of various sectors to economic growth examined, in particular the changes in the contribution of the oil and gas, forestry, agriculture, manufacturing and service industries are reviewed. Finally, the diversity of the economy is examined to address fundamental questions about whether Alberta's economy is more resilient and diverse today than it was in the 1970s before the oil boom began and led to economic bonanza.

 ISBN 0-921719-

## About the Author

**Mark Anielski** is Director of the Green Economics team, and has considerable experience in public policy analysis including natural resource, energy, royalty and fiscal policy issues in both the public (Alberta Government) and private (GPC – Government Policy Consultants) sector. He also serves as Senior Fellow to the U.S. economic policy think-tank Redefining Progress in Oakland, California and authored the 1999 U.S. GPI report with journalist Jonathan Rowe. He currently advises the National Round Table on Economy and the Environment's Sustainable Development Indicator Steering Committee on the development of indicators for measuring sustainability in Canada. Mark teaches business and the environment in the University of Alberta's School of Business. His expertise is varied and broad including accounting for sustainable development, natural resource accounting, public policy analysis, business planning and performance measurement. Mark pioneered the development of natural capital accounts for Alberta's timber, oil, gas, coal and other natural capital as well as having experience in the development of performance measurement systems, land use planning and non-market resource valuation, royalty policy analysis (forestry, oil and gas), and analysis of subsidies for both government and private forestry, energy and financial service industries. He holds a Masters degree in forest economics, plus bachelor degrees in economics and forestry.

## Acknowledgements and Disclaimer

The author thanks Gary Howe with Alberta Treasury, and Hans Messinger of Statistics Canada for their guidance and advice in understanding national income accounting and the GDP methodologies. Gary was particularly helpful in providing historical GDP and provincial accounts data that made possible a time series from 1961 to 1999 for the economic GPI accounts. The author would also like to thank Dr. Clive Hamilton at the Australian Institute who provided guidance on the treatment of government expenditures in the monetary GPI accounts based on his work on the Australian GPI.

The high quality of the data compiled by Statistics Canada and the opportunity to use this data enabled us to undertake a much more thorough analysis than would otherwise have been possible. Finally, the Pembina Institute appreciates the vision of Western Economic Diversification in supporting this project – the first of its kind for Alberta, if not internationally.

The contents of this report are the responsibility of the Pembina Institute and do not necessarily reflect the views and opinions of those who are acknowledged above or the opinions or positions of Western Economic Diversification who helped fund the research.

We have made every effort to ensure the accuracy of the information contained in this document at the time of writing. However, the author advises that he cannot guarantee that the information provided is complete or accurate and that any person relying on this publication does so at their own risk. Given the broad scope of the project and time constraints, it has not been possible to submit the entire report for peer review. The material should thus be viewed as preliminary and we welcome suggestions for improvements that can be incorporated in any later edition of the work.

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# 1 Executive Summary

## 1.1 Economic Growth in Alberta: How Much?

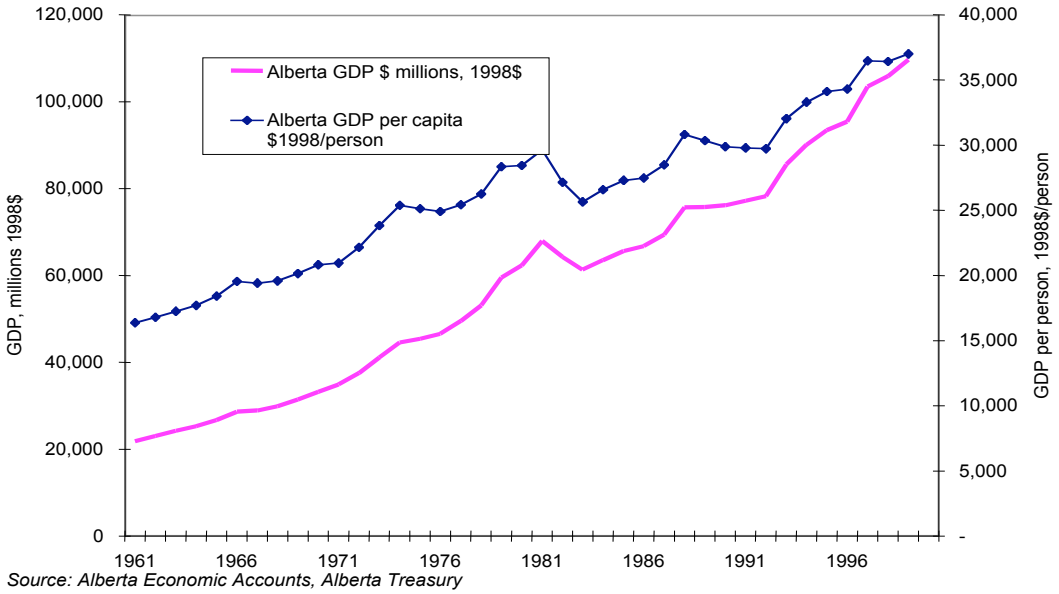
Alberta's Gross Domestic Product (GDP) has grown 401 percent since 1961 (in 1998$), or 126 percent per Albertan. According to these figures, we are spending more money than at any time in history. In 1961, Alberta's GDP was $21,887-million, or $16,395 per capita (1998$); in 1999, the GDP was $109,708-million, or $37,005 per capita (1998$). In current dollars, Alberta's GDP per capita in 1999 was $39,005; this was 1.22 times higher than the Canadian average of $31,414 per capita.

**Noteworthy**

- Alberta's Gross Domestic Product (GDP) has grown 401 percent since 1961.
- We are spending more money than any time in history.
- Alberta's GDP per capita in 1999 was $39,005 and was 1.22 times higher than the Canadian average of $31,414 per capita.
- The most important component of GDP is the personal consumption expenditures by Alberta households.
- GDP is an inadequate measure of the overall economic, social and environmental well-being of the households, communities, business, government and the environment.
- The GDP fails account for environmental costs.
- The GDP fails to account for the value of unpaid work (parenting, eldercare and volunteerism).
- The GDP does not distinguish between expenditure that contributes to the well-being of society and expenditure that detracts from it.

The figure below shows trends in total Alberta GDP and GDP per capita in constant 1998 dollars. Economic growth generally continued, with some downturns in 1981-1983 and 1988-1992. Economic growth was highest in the 1970s when the GDP grew by an average 8.7 percent per annum. The 1980s had the slowest GDP growth at 2.2 percent per annum. The 1990s showed a resurgence of growth, averaging an annual growth of 4.9 percent per annum up until 1999.

**Total Alberta GDP and GDP per Person, 1961 to 1999**



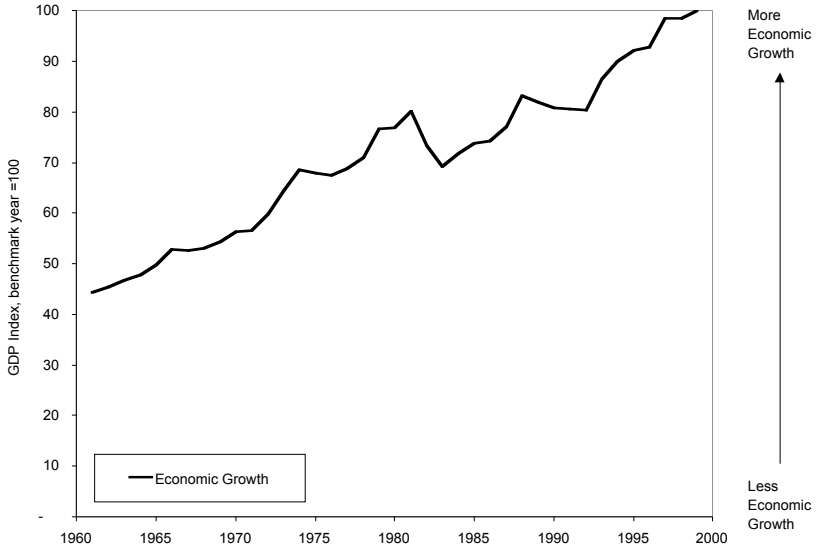

*Source: Alberta Economic Accounts, Alberta Treasury*

## 1.2 So What?

The figure below shows GDP as an index over time where the highest level of GDP over the study period equals 100. The value of the GDP in Alberta in 1999 was $109,708-million. As an index, GDP in Alberta in 1999 ranked 100 on a scale of 0 to 100 where 100 is the highest level of GDP that occurred from 1961 to 1999.

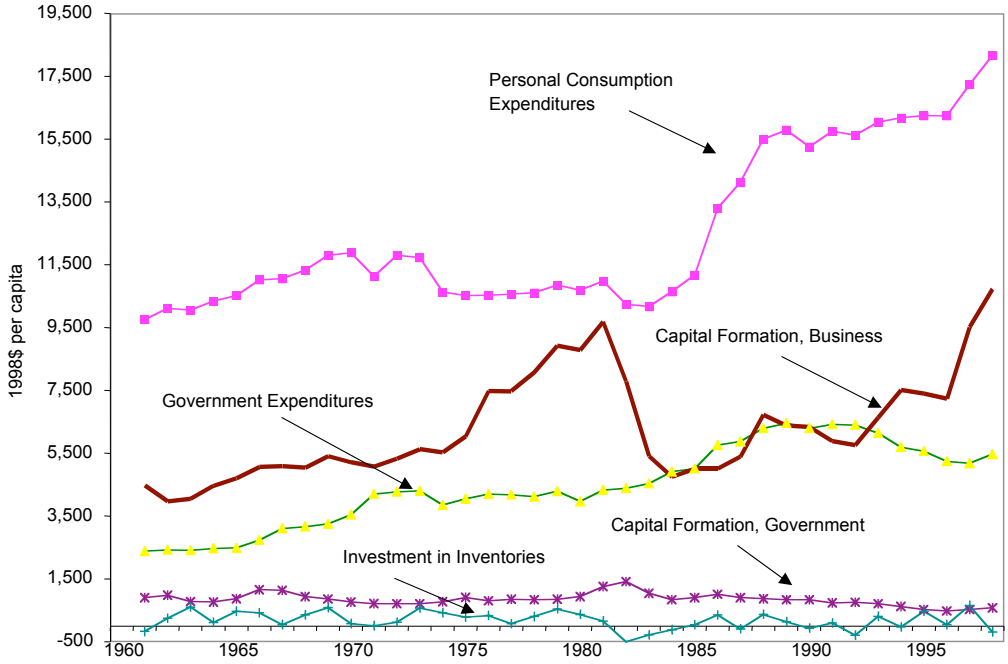
While the GDP is a useful measure of the gross expenditures or income of an economy, it is an inadequate measure of the overall economic, social and environmental well-being of households, communities, business, government and the environment. Alberta's GDP fails to account for the full costs of depleting oil and gas resource inventories, ecological degradation, air pollution, and many social costs such as crime and automobile crashes. The GDP does not account for unpaid work such as volunteerism, parenting and eldercare, nor does it discriminate between expenditures that society might regard as regrettable and as detracting from well-being. The GDP simply adds these up as part of the economic growth statistic. Finally, GDP does not account for inequitable sharing of the benefits of economic growth – income and wealth. Thus, when economists and policy makers focus only on the GDP to measure economic health and to guide economic policy, they violate the spirit of the word "economy" by failing to measure the genuine well-being and management of Alberta's households and the natural environment.

**Economic Growth Index: Where are we today?**



The following figure shows the relative importance of the individual components of Alberta's GDP. By far the most important component is the personal consumption expenditures by Alberta households, followed by capital expenditures by business, and then government expenditures.

## Contribution to Alberta's GDP Per Capita, 1961 to 1999




*Source: Alberta Economic Accounts1999*

# 2 GDP: Measure of Prosperity?

The gross domestic product (or GDP) is the traditional measure of economic prosperity and is the basis for the economic growth figures that appear in the media. We have grown used to hearing economic growth forecasts that project another robust year of two to five percent growth in GDP. We automatically assume that more growth is inherently better and that stagnant and negative GDP growth is bad. Few of us understand what economic growth and the GDP really mean and how they are measured.

The GDP can be expressed on the basis of expenditure or income.[1] Based on expenditures, it is calculated as follows (the figures in brackets represent the percent contribution to Alberta's GDP by each component):

GDP = personal consumption expenditures (of households) (48.2%)
+ government expenditures (14.1%)
+ government investment in fixed capital (1.7%)
+ business investment in fixed capital (26.0%)
+ investment in inventories (0.7%)
+ exports of goods and services (+ 53.3%)
- imports of goods and services (- 44.6%) (for a net trade balance contribution of +8.7%)

The GDP is the sum total of all monetary transactions of households, businesses and governments in the economy – the total money value of goods and services exchanged and consumed. The GDP is a good measure of monetary wealth and financial well-being but a poor measure of the overall well-being of the people, households, communities and the environment of a nation.

According to the GDP metric, the more we produce, the more we consume, the more money that changes hands, and the more money we make, the more GDP grows. Growth, expressed in terms of GDP, is automatically assumed to be good and to reflect genuine prosperity. But does it?

The GDP for the nation and provinces is calculated by Statistics Canada and is drawn from the national income accounts. Alberta Treasury also maintains provincial economic accounts from which the Alberta GDP and other economic indicators are derived. The Alberta Economic Accounts from 1961 to 1999, augmented with Statistics Canada data, were used in the Alberta GPI accounts.

The fundamental issue examined in the Alberta GPI accounting project is the sustainability of 40 or more years of steady economic growth in Alberta, as measured by the GDP and the Alberta economic accounts. We were interested in constructing a more holistic perspective on our economic growth paradigm by explicitly accounting for what costs and benefits contribute to economic growth. Which benefits are not being counted and which costs (that contribute to GDP growth) are in fact regrettable social, human or environmental costs or depreciation costs of human, social and natural capital?

[1] GPI, on the other hand, uses both expenditure-based GDP and national income accounts.

## 2.1 Shortcomings of the GDP

There is a growing consensus that the GDP and other economic measures of prosperity are inadequate measures of well-being, sustainability and quality of life of nations. The shortcomings of the GDP bear repeating. The GDP measures the total money value of market goods and services exchanged in a community or nation. It does a good job of accounting for all the money changing hands from one year to the next but provides little insight into changes in the true economic condition of households. By adding up the monetary transactions in an economy and calling this progress or prosperity obscures an honest accounting of our quality of life and the state of the environment.

Former Senator Robert Kennedy, in 1968, summed up the shortcomings of the GNP/GDP:

> *"The Gross National Product [and GDP] includes air pollution and advertising for cigarettes, and ambulances to clear our highways of carnage. It counts special locks for our doors, and jails for the people who break them. GNP includes the destruction of the redwoods and the death of Lake Superior. It grows with the production of napalm and missiles and nuclear warheads... And if GNP includes all this, there is much that it does not comprehend. It does not allow for the health of our families, the quality of their education, or the joy of their play. It is indifferent to the decency of our factories and the safety of our streets alike. It does not include the beauty of our poetry or the strength of our marriages, or the intelligence of our public debate or the integrity of our public officials... GNP measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile."*[1]

For more than 50 years the GDP and the national system of income accounts have been used by virtually every nation as the basis for measuring their economic prosperity. When the World Bank compares national incomes per capita, it uses the GDP figures per capita; so does the UN in its indicator of income and economic health of economies – the Human Development Index.

The GDP and national income accounts in general, embody many shortcomings that the GPI accounting framework seeks to address, namely:

1) The GDP fails to distinguish between the full costs and benefits of economic activity. It regards every expenditure as an addition to well-being, regardless of its purpose and impact. By this reasoning, an economic hero is a terminal cancer patient going through an expensive divorce, whose car is totaled in a twenty-car pile-up. Also, the costs of cleaning up after an environmental calamity, such as the Montreal ice storm, boosts provincial and national GDP figures alike. The economic villain, according to the GDP, is the healthy person in a solid marriage who cooks at home, walks to work and doesn't smoke or gamble.
2) The GDP ignores and excludes the functions of the household that lie outside the realm of monetary exchange. GDP excludes the value of the time spent at unpaid housework, childcare, eldercare, volunteer work and leisure. In the GDP figures, these expenditures of life-energy (time) count for nothing, even though they are vital to our well-being and quality of life. Yet purchases of daycare for our children, house-cleaning services, and eldercare services from the marketplace increase the GDP. Paradoxically, the cannibalizing of our time and quality of life actually increases economic growth, as measured by the GDP. GDP growth since the 1960s might actually have occurred because those who had been contributing unpaid work

(women in particular) sought paid work, and the household management services that they had been performing without pay were replaced by paid services from other workers. While economic growth is observed in this situation, there may have been no real increase in the well-being and quality of life of households because people now have less quality time with their families and friends.

3) The GDP does not account for the value and depreciation of natural resources and the environment required to sustain current and future economic well-being. Inventories of natural resources and the value of natural resources and environmental services count for nothing in the GDP and national income accounts. The GDP ignores the long-term costs of environmental degradation, focusing only on the present consumption of natural capital. The GDP counts the depletion of natural resources as current income rather than as the liquidation of an asset. Most companies would be out of business if they did not account for the depreciation of their assets. Thus, treating natural capital in this manner violates both basic accounting principles and common sense. Furthermore, when the depreciation of natural capital is ignored, the market receives the wrong signal – that investment in sustaining renewable natural resources is unimportant. Ignoring the depreciation of non-renewable natural resources (oil, gas, coal) also violates basic accounting principles for treatment of assets. Not reinvesting some of the revenues from a finite, non-renewable resource asset into savings or into alternative, sustainable forms of capital will also compromise the incomes of future generations.

4) The GDP ignores totally the distribution of income, the social costs of inequality, and poverty. Changes in GDP are insensitive to income inequality, poverty and the distribution of personal consumption and wealth. A rising GDP may obscure who is benefiting most from economic growth. We often assume that if an economy is getting bigger, all households are benefiting equally.

5) The GDP contains regrettable intermediate expenditures that do not necessarily contribute to economic well-being. For example, costs related to crime, auto accidents, commuting, and spending on divorce lawyers may be viewed as regrettable expenditures even though they add to the GDP. Government spending, termed "intermediate expenditures," such as military spending, environmental protection, and spending on prisons may also be viewed as regrettable.

6) The GDP includes expenditures on education, health care, social services and environmental protection that do not necessarily reflect the outcomes or returns on investment from such expenditures. Such outcomes might include physical well-being (e.g., life expectancy), intellectual and labour market skills, educational attainment, and the quality of the environment.

7) The GDP does not directly measure the benefits of investment in household, public and social capital. Social capital includes the investments in the health and wellness of communities, social institutions, and democratic processes.

# 3 Unfinished Economic Business

Simon Küznets, the U.S. economist who pioneered the development of national income accounting and the GDP/GNP metrics in the 1950s, following from the work of John Maynard Keynes and Sir Richard Stone, remarked:

> *"The welfare of a nation can scarcely be inferred from a measurement of national income as defined (by the GDP) ….Goals for more growth should specify of what and for what."*[2]

That is to say, we seek answers to the question: "If GDP is up, is that necessarily good if other human, social and natural capital indicators are down?"

Küznets went so far as to recommend the eventual construction of a single bottom line for national well-being as if foreshadowing the eventual attempts beginning with ~~Tobin and~~Nordhaus and Tobin ~~Nordhaus~~ (1971) and advancing with the Index for Sustainable Economic Welfare in 1989, and the Genuine Progress Indicator in 1994. Küznets (1965) noted:

> *"It does seem to me, however, that as customary national income estimates and analysis are extended, and as their coverage includes more and more countries that differ markedly in their industrial structure and form of social organization, investigators interested in quantitative comparisons will have to take greater cognizance of the aspects of economic and social life that do not now enter national income measurement; and that national income concepts will have to be either modified or partly abandoned, in favour of more inclusive measures, less dependent on the appraisals of the market system… **The eventual solution would obviously lie in devising a single yardstick** that could then be applied to both types of economies – a yardstick that would perhaps lie outside the different economic and social institutions and be grounded in experimental science (of nutrition, warmth, health, shelter, etc.)*[3]

Was Küznets foreshadowing the Alberta GPI Accounting framework?

While Küznets presented this important challenge to economists 50 years ago, modern economists have sustained that challenge. John Kenneth Galbraith, in a 1999 public address, noted that the most important "*unfinished business*" issues for economics [as we approach the new millennium] include: the shortcomings of GNP/GDP as an economic measure, economic instability (cycles of boom and bust), and poverty and income inequality.[4] Galbraith said:

> *"There is a major flaw in measuring the quality and achievement of life by the total of economic production – (GNP/GDP) – the total of everything we produce and everything we do for money."*

Galbraith echoes the words of Küznets by noting that measures such as GNP override and obscure deeper and more important aspects of economic life, failing to "take sufficient account of the value and enjoyment of what is produced."

Herman Daly, Professor at the University of Maryland School of Public Affairs, former senior economist at the World Bank, and co-founder of the International Society for Ecological Economics has been one of the most important voices for raising awareness of the shortcomings of modern economics and redefining our notion of economic progress and measurement of sustainable well-being. Daly (1996: 111-112) states:

> *"Economic development as it is currently understood and measured is neither sustainable for a long future nor generalizable to all presently living people….the macroeconomic activity of*

> *national economic growth does not conceive of having an optimum extent…GNP is a conflation of costs, benefits and changes in accumulation, and is no better a guide to determine the optimum level of economic activity than the stock of gold bullion."*

Daly (1996: 113) suggests that instead of one income account (that is, the GNP/GDP), nations should adopt:

1) a benefit account to measure the value of services yielded by all accumulations;
2) a cost account to measure the value of depletion, pollution and those kinds of labour that are irksome; and
3) capital accounts; that is, an inventory of the accumulation of stocks and funds (produced and natural capital, and ecosystem infrastructure) and their ownership distribution.

We have adopted Daly's model, in part, for the Alberta GPI accounting framework.

The challenges of these visionary economists are as relevant today as they were in the 1950s. Yet, until recently, few efforts had been made to modify or improve the measurement system and economic prosperity indicators that every nation uses as a basis of measuring the health of the economy. Indeed we argue that economics is more focused on money-related accounting than on measuring the genuine well-being or condition of households of the nation. It is time to reorient both macro- and micro-economic analysis toward stewardship of the household, the community, society and the environment. The Alberta GPI accounting system offers a new, elegant and pragmatic approach designed to do just that.

# 4 Sustainable Income

Most economists will agree with the standard definition of income by Hicks (1946):

> *Income is the maximum amount an individual can consume during a period and remain as well off at the end of the period as at the beginning.*

Statistics Canada defines the income of a nation or province as "the amount it (nation) can collectively spend during a period without depleting the capital base (or wealth) upon which it relies to generate this income."[5]

Given our clarification that wealth encompasses more than financial capital and includes natural, social, human and built capital, we can extend the definition of income to the notion of sustainable income – that is, living off the "interest" of natural, human, social and built (produced) capital without compromising the integrity or productivity of the stock of capital to produce products and services in the future as they are today.

This has led to the economic interpretation of sustainable development by Bartelmus (1990) as:

> *Economic sustainable development is development that generates non-declining per capita national income by replacing or conserving the sources of that income; that is, the stocks of produced and natural capital.*

GPI Accounting is consistent with this wider definition of income, capital and wealth. Thus the traditional definition of income, which generally applies to financial capital, is congruent with the notion of sustaining the services (interest) from the current and future stock of living and produced capital. The orientation is on stewardship or management of all capital for sustained benefits and mitigation of risks or liabilities to future streams or flows of benefits.

Measuring sustainable income requires an assessment of the condition and monetary valuation of the stock of all capital, as well as an account of the physical quantity, quality and monetary value of the flow of goods and services derived from this capital. This is essentially what GPI accounting accomplishes both at the macro level of the economy or community, and at the micro level of the organization (firm, household, individual).

# 5 Personal Consumption Expenditures as the GPI Cornerstone

Since personal consumption is the largest component of GDP, this presumed correlation between consumption and well-being is the conceptual starting point for those who use GDP as a measure of economic progress. To be conservative and contemporary, the GPI implicitly accepts that premise. The U.S. and Australian GPI analyses begin with personal consumption expenditures as the starting point for deriving a GPI net sustainable income line to compare against the GDP, based on the idea that the expenditures on goods and services by households are a first order measure of economic welfare.

The GPI Income Statement uses gross personal consumption expenditures as the basis on which a series of unaccounted-for human, social, produced, financial and natural capital benefits and costs is used to derive a sustainable income estimate for Alberta. The primary driver of Alberta's GDP is personal consumption expenditures by households, which accounted for 48 percent of 1999 GDP (compared to 60 percent in 1961). From 1961 to 1999, personal consumption expenditures in real dollars have increased 305.6 percent, or 82.6 percent on a per capita basis (real 1998 dollars) for an annualized per capita, real growth rate of 2.2 percent. Compared with the U.S. where personal consumption expenditures make up roughly 65 percent of U.S. GDP, spending by households is less important given the importance of the petroleum and other industries (mostly export-based) to Alberta's economy, plus the importance of government spending.

Thus the GPI is already strongly biased upwards because personal consumption expenditures have risen at approximately the same rate as GDP. Much of what we count as personal consumption may not represent genuine development of the quality of the lives of households at all, but instead account for the circulation of money in an economy chasing goods and services that most households do not actually require beyond some basic level.

There is little doubt that the consumption of the many goods and services we purchase does add to the quality of our lives, particularly for those who lack enough calories or adequate health care or shelter. But beyond the level of basic necessities for food, clothing, shelter and health, the question of increasing consumption of "luxury" items such as cigarettes, recreational toys, gadgets, processed foods and restaurant meals becomes more complex and even questionable. Indeed, the potential exists to be consuming manufactured goods and services that are in fact so "processed" that they may actually diminish our physical well-being. Furthermore, a society may be exporting much of its surplus natural and human capital at rates that could also diminish long-term sustainable well-being. Much of this excess consumption may diminish the natural capacity of our environment and natural resources to sustain our demands for more consumption.

# 6 Alberta Economic Growth...Unprecedented

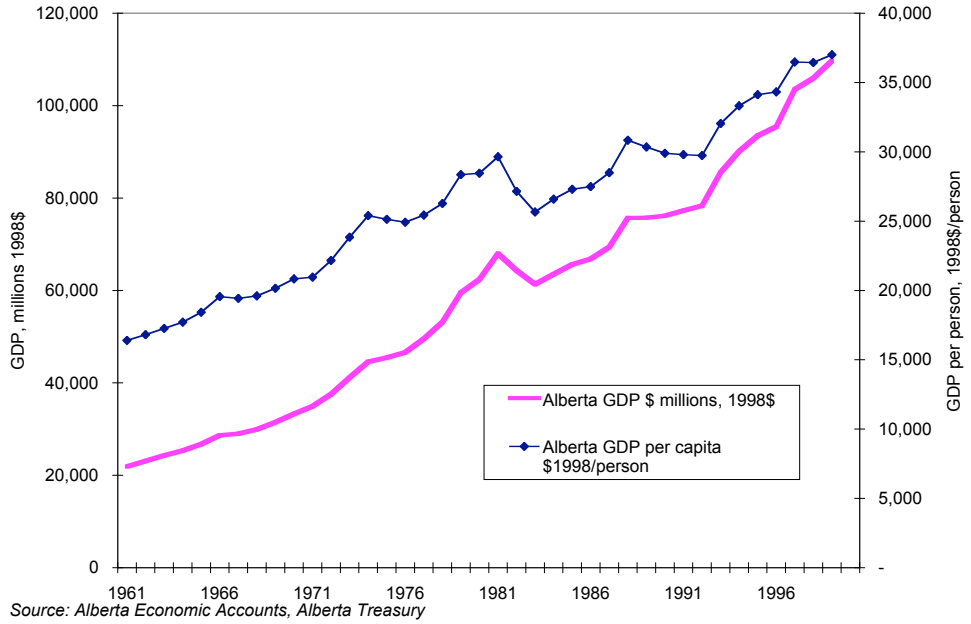
Between 1961 and 1999, Alberta's economy, as measured by real (1998$) GDP grew by 401 percent – an average of 10.5 percent per annum over almost 40 years. On a per capita basis, Alberta's GDP grew 126 percent while the average annual rate of real (1998$) GDP growth per capita growth was 2.2 percent from 1961 to 1999. According to these figures we are better off than at any time in our history, producing and consuming more and spending more money in the process. The GDP growth figures suggest we are better off, but are we missing something in this limited view of well-being?

In 1961, Alberta's GDP was $21,887-million or $16,395 per capita (1998$); in 1999, the GDP was $109,708 million or $37,005 per capita (1998$). In current dollars, Alberta's GDP per capita in 1999 was $39,005 – 1.22 times higher than the Canadian average of $31,414 per capita.

If Alberta were a country, it would have ranked 18th out of 163 countries in 1997 with GDP at US$20,900 (World Bank 1999, Statistics Canada 1999).[67] In purchasing power parity, Canada ranks 11th, while Alberta ranks 6th in the world. Alberta's GDP per capita expressed in US dollars for 1998 is approximately $25,411 or 91 percent of U.S. GDP per capita of $27,939.[8]

Figure 1 and Table 1 show the trends in total Alberta GDP and GDP per capita in terms of constant 1998 dollars. Economic growth continues over time with some downturns in 1981-1983 and 1988-1992. Economic growth was highest in the 1970s when the GDP grew by an average 8.7 percent per annum. The 1980s had the slowest GDP growth at 2.2 percent per annum. The 1990s showed a resurgence, averaging 4.9 percent per annum up until 1999 (all figures expressed in 1998 dollars).

**Figure 1: Alberta's Total GDP and GDP per capita (1998$), 1961 to 1999**




*Source: Alberta Economic Accounts, Alberta Treasury*

## Table 1: Alberta's Gross Domestic Product, Total 1998$ millions, and 1998$ per capita, 1961 to 1999

**ALBERTA GROSS DOMESTIC PRODUCT, 1961-1999**

| YEAR | TOTAL (million 1998 dollars) | PER PERSON (1998 dollars) |
|---|---|---|
| 1961 | 21,887 | 16,395 |
| 1962 | 23,075 | 16,806 |
| 1963 | 24,286 | 17,261 |
| 1964 | 25,345 | 17,712 |
| 1965 | 26,736 | 18,426 |
| 1966 | 28,645 | 19,553 |
| 1967 | 29,000 | 19,424 |
| 1968 | 29,935 | 19,604 |
| 1969 | 31,492 | 20,161 |
| 1970 | 33,273 | 20,835 |
| 1971 | 34,920 | 20,964 |
| 1972 | 37,546 | 22,163 |
| 1973 | 41,133 | 23,841 |
| 1974 | 44,565 | 25,399 |
| 1975 | 45,461 | 25,135 |
| 1976 | 46,592 | 24,925 |
| 1977 | 49,541 | 25,436 |
| 1978 | 53,124 | 26,276 |
| 1979 | 59,484 | 28,358 |
| 1980 | 62,373 | 28,449 |
| 1981 | 68,004 | 29,642 |
| 1982 | 64,311 | 27,156 |
| 1983 | 61,328 | 25,656 |
| 1984 | 63,534 | 26,583 |
| 1985 | 65,617 | 27,307 |
| 1986 | 66,837 | 27,495 |
| 1987 | 69,391 | 28,492 |
| 1988 | 75,684 | 30,832 |
| 1989 | 75,735 | 30,345 |
| 1990 | 76,163 | 29,896 |
| 1991 | 77,264 | 29,802 |
| 1992 | 78,338 | 29,737 |
| 1993 | 85,564 | 32,038 |
| 1994 | 90,116 | 33,316 |
| 1995 | 93,479 | 34,118 |
| 1996 | 95,430 | 34,319 |
| 1997 | 103,495 | 36,478 |
| 1998 | 105,927 | 36,440 |
| 1999 | 109,708 | 37,005 |

SOURCES: Alberta Treasury, Economic Accounts, various issues
Population statistics are from Statistics Canada
1998 dollars estimated using the Alberta GDP Implicit Price Index

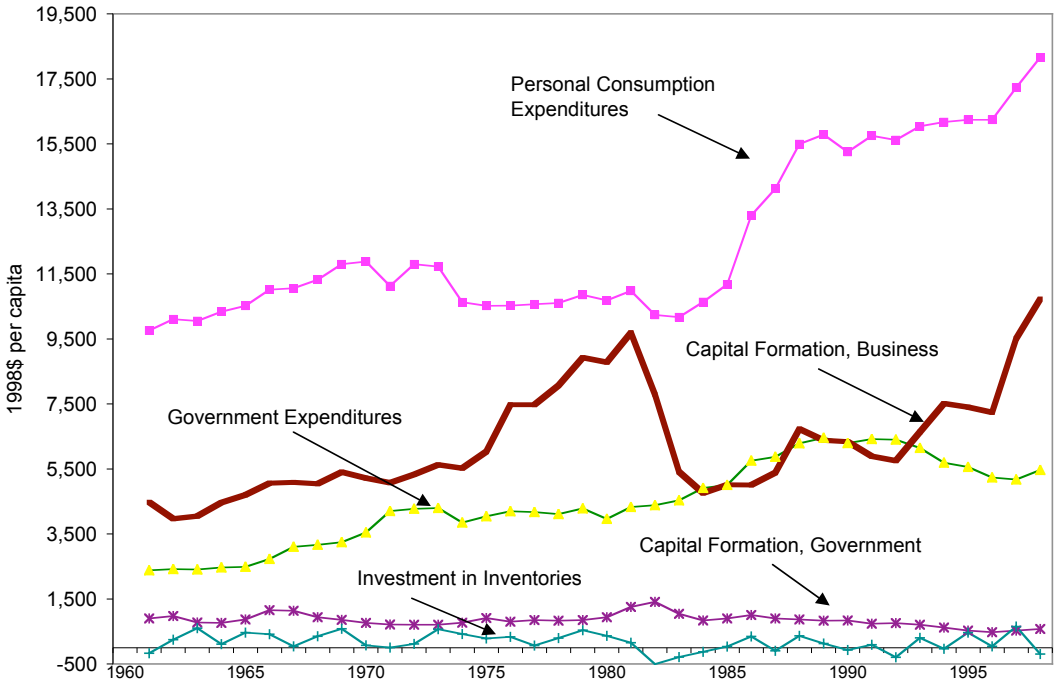
# 7 More Growth of What?

The GDP can be expressed in terms of expenditures or income. Generally we express the GDP statistics in terms of expenditures by households, business, government, farms and other institutions. The GDP on an expenditure basis comprises the following components; their contribution to Alberta's 1999 GDP is shown in brackets:

- personal consumption expenditures by households on goods and services (48.2% of 1999 GDP);
- net government expenditures on goods and services (14.1%);
- gross fixed capital formation by business (26.0%);
- gross fixed capital formation by government (1.7%);
- investments in inventories (0.7%);
- exports (53.3% of GDP value) less imports (-44.6% of GDP value).

Figure 2 shows the relative importance of these components to Alberta's GDP. By far the most important component is the personal consumption expenditures by Alberta households, followed by capital expenditures by business, and then government expenditures. Personal consumption expenditures by households make up the second largest component of Alberta's GDP but have fallen in importance from a high of 60.1 percent of GDP in 1962. Government expenditures on goods and services also make up a decreasing share of GDP at 14.1 percent of 1999 GDP, falling from a high of 21.5 percent in 1991. The rest of Alberta's GDP is made up of government and business fixed capital expenditures and investments in inventories.

**Figure 2: Contribution to Alberta's GDP, per capita (1998$), 1961 to 1999**




*Source: Alberta Economic Accounts1999*

# 8 Public (Government) Consumption Expenditures

## 8.1 Introduction

All government expenditures on goods, services and capital are included in the GDP and in national and provincial economic accounts without distinguishing between those expenditures that contribute to genuine improvements in well-being and those that are defensive, or regrettable. GPI Accounting attempts to make a clear distinction between public (that is, government) consumption expenditures that improve well-being of society and the environment and those that merely compensate for damage or erosion to human, social, and environmental capital.

Deciding which government expenditures genuinely contribute to well-being can be difficult and fraught with philosophical challenges. Drawing from the earlier work by ~~Cobb and Daly~~Daly and Cobb (1989), Cobb and Cobb (1994), and more recently Hamilton and Denniss (2000), we can develop some guidelines for distinguishing between regrettable expenditures and those that are genuine contributions to welfare. A wider forum in which to debate and refine such guidelines is much needed. But in the absence of broadly accepted value "screens" to guide us in the Alberta GPI accounting project, we have proposed some guidelines that we hope will open up the public debate about what constitutes an improvement over current practices, which do not now discriminate between expenditures.

Attributing changes in social, human, economic-financial, and environmental capital conditions to government expenditures is the key challenge in GPI accounting. Attribution analysis is made possible with the GPI accounting framework, allowing decision makers to compare trends in the condition of human, social, economic, and natural capital with government expenditures to discern correlations. GPI accounting would allow decision makers to have a more informed debate about the full costs and benefits of government spending as they relate specifically to social, human, environmental and economic well-being outcomes. For example, is increased spending on health and education improving human health and raising levels of intellectual or knowledge capital? Are environmental expenditures rising as a result of a degraded environment or unsustainable resource use?

This challenge raises some fundamental issues such as:

- Should all health care and education spending be considered as a positive investment in human capital and genuine well-being? Should we not distinguish between health expenditures that may be viewed as regrettable expenditures that would not have been necessary had it not been for the consequences of unhealthy lifestyles, stress, accidents, a degraded environment and other declining social, economic and environmental conditions, which are captured in the GPI accounts?
- Should expenditures on justice, the environment, and social services be considered as regrettable since they relate to pollution, mitigation against unsustainable resource use, social degradation and crime and violence?

If the answer to these questions is yes, then such expenditures should be presumably be excluded from the GPI sustainable income statement for the nation or province.

## 8.2 Methodologies for Treatment of Government Expenditures

Despite years of analysis and academic debate, no clear consensus has emerged on how to deal with government or public expenditures in economic well-being accounting such as the GPI accounting work. The original U.S. GPI, which uses only personal consumption expenditures (a portion of total GDP and economic accounts) as its fundamental building block, treats all public or government expenditures, except for the value of services to persons generated by streets and highways, as intermediate (defensive, protective or regrettable) in nature thus excluding them from the GPI estimates of economic well-being. Private spending on health and education are included in the U.S. GPI estimates through inclusion in personal consumption expenditures while public spending is ignored. The Alberta GPI accounts attempt to consider both public and private expenditures in their contribution to overall economic well-being.

Prior to the U.S. GPI work by Redefining Progress, Daly and ~~John~~ Cobb ~~Jr~~(1994) inr. and ~~Herman Daly~~ in *For the Common Good* ~~(1994)~~ developed the Index for Sustainable Economic Welfare, providing some guidance to treatment of government expenditures. With the exception of a portion of expenditures on health and education, they exclude government expenditures. They argue that, "government program [expenditures] does not add much to net welfare as prevent the deterioration of well-being by maintaining security."[9] They also argue that expenditures on public utilities, such as sewage, utilities and transit provide services for a fee just as private businesses do and thus already show up in personal consumption expenditures by households. They only identify the value of streets and highways as a government expenditure that contributes to economic well-being since such services could theoretically be offered through the market. They exclude most government expenditures with the argument that "increases in government spending and real increases in welfare are tenuous because of the difficulty of measuring the demand for the kinds of services that government offers."

~~Cobb and~~ Daly and Cobb (1994) count only 50 percent of public spending on advanced or higher education and health expenditures by government as a contribution to welfare and thus propose adding them to personal consumption. They consider that the other 50 percent of higher education is neither consumption nor investment but rather defensive spending, contributing little to productivity gains. They argue that, "People attend school because for most the failure to attend would mean falling behind in the competition for diplomas and degrees that confer higher incomes on their recipients." (Cobb and Daly, 1994: ~~p.~~ 468). They also argue that one-half of post-secondary education is pure consumption in that "it is sought for its own sake rather than to serve another purpose." While there is little doubt that post-secondary education spending does help to built up intellectual and knowledge capital in society, we concur with Daly and Cobb's argument that some of this consumption by households is simply being done to "keep up with the intellectual capital of the Joneses."

The original work by Nordhaus and Tobin (1970) ~~in the 1970s~~ on the Measure of Economic Welfare considers all public and private health and education spending as positive investments in human capital, treating the change in the net spending as in investment in human capital.[2] Nordhaus and Tobin estimate the value of education spending invested in the labour force as the average cost per student multiplied by the average number of years of educational attainment per individual in the labour force. They also estimate the value of health spending as the cumulated public and private spending on health reduced by an annual exponential and arbitrary

[2] Some issues are raised as to why health spending on the elderly should be included since the elderly may no longer contribute to the labour market and thus to traditional accounts of economic well-being.

depreciation rate of 20 percent. U.S. economist Robert Eisner developed a Total Income System of Accounts that included only 50 percent of health expenditures as a rough estimate, to exclude health expenditures for the retired or elderly population. He considered some elements such as health and education spending as positive contributions to economic well-being.

In the most recent Australian GPI, Hamilton and Denniss (2000) divides public sector expenditures (both operating and capital expenditures) into two categories in the Australian GPI accounting work:

- general government services, defence, public order and safety, education, health, social security; and
- welfare, housing and community amenities, recreation and culture, transport and communication, and other.

Because some part of recurrent expenditures comprises transfer payments, these are excluded from GDP.

The fundamental questions to be asked when choosing which public consumption expenditures to include in contributions to economic well-being are:

- Was the decision to increase spending in a given public program area made to increase the level of well-being in society (non-defensive expenditures); or
- Were the expenditures defensive in nature; that is, made to offset declining levels of well-being in human, social, and environmental capital?

While these questions may be difficult if not impossible to answer with consensus, some reasonable positions can be explored. As a general rule, we must first decide whether public expenditures are:

a) non-defensive, adding to welfare;
b) defensive (off-setting welfare loses or erosion of human, social and natural capital); or
c) investments in capital.

We include only those expenditures that are non-defensive consumption spending in the GPI income statement. Public expenditures that are made to offset declines in capital values are excluded, as are investments in capital, *per se*. The GPI accounting system distinguishes between consumption expenditures (and value of services from capital) and investments in capital stocks. Part, none or all of public consumption expenditures are included in the GPI Income Statement while investments in human, social and natural capital stocks are excluded; this is consistent with accounting practices.

For the Alberta GPI, we have adopted the rules of Hamilton (2000):

1. **Defence, public order and safety (justice), environmental protection, and social security (social services)**: We assumed that 25 percent of spending in these categories (Alberta has no defence spending) contribute to advancing well-being rather than offset increasing insecurity. Many of these expenditures would not have been made if society were peaceful, law-abiding and socially-just, and the economy provided full employment and an adequate living wage.
2. **Housing and community amenities**: These expenditures are not included because they have already been included as part of the estimates of the Value of Services from Public Infrastructure (see GPI report on Public Infrastructure).

3. **Transport and communication**: Fifty percent of spending on transport and communications is included as consumption in the GPI accounts as positive additions to well-being. This may create some double counting given that the estimates of the value of public infrastructure (including the value of services from roads and highways) are already counted.
4. **Public education:** Because public education spending is an investment in human intellectual capital, all of these expenditures are excluded from the GPI Income Statement. In principle, we should not simply count the expenditures but rather the value of services received from the stock of human intellectual capital that has been developed through public education spending.
5. **Public health**: While it is difficult to distinguish between health expenditures that are defensive rather than non-defensive, like Hamilton (2000), we assume that 50 percent of health expenditures are defensive in nature (excluded from GPI) and 50 percent contribute to genuine improved well-being.
6. **Recreation and culture**: These are considered fully consumptive, non-defensive expenditures and included in their entirety in the GPI Income Statement.
7. **General government services:** These include all other government expenditure categories including expenditures on tax collection (Treasury), policy advice and other services essential for government operations. We assume that 50 percent of general government services make a positive contribution to welfare rather than mitigating against declining conditions, and are thus added to the GPI).
8. **Debt Charges:** Debt repayment expenditures are excluded from the GPI Income Statement assuming that they are defensive or regrettable in nature, and perhaps a result of fiscal imprudence.

## 8.3 Government Expenditures in the Alberta GPI

Applying the Australian GPI rules to Alberta government spending in 1999-2000, we can estimate how much of public consumption expenditures contribute to genuine improvements in welfare and well-being and which are defensive in nature.

Table 2 illustrates Alberta Government expenditures for 1999-2000, based on the Alberta Government's *Budget 2000*. :

### Table 2: Alberta Government Expenditures that would be included in the GPI Income Statement, 1999-2000 Expenditures

**Alberta Government Expenditures 1999-2000**
Budget 2000, $ millions

| | Expenditures $ millions | Amount included in GPI Income Statement $ millions | GPI Accounting Rule |
|---|---|---|---|
| Health and Wellness | 5,166 | 2,583 | 50% |
| Learning (Education) | 4,078 | 2,039 | 50% |
| Infrastructure | 1,306 | 653 | 50% |
| Debt servicing costs | 1,090 | - | 0% |
| Human Resources & Employment | 988 | 494 | 50% |
| Treasury | 662 | 331 | 50% |
| Agriculture, Food and Rural Development | 556 | 278 | 50% |
| Children's Services | 468 | 117 | 25% |
| Justice | 406 | 102 | 25% |
| Community Development (culture) | 348 | 348 | 100% |
| Environment | 317 | 79 | 25% |
| Gaming | 179 | - | 0 |
| Innovation and Science | 163 | 163 | 100% |
| Resource development | 140 | 35 | 25% |
| Municipal Affairs | 132 | 66 | 50% |
| Economic Development | 51 | 25.5 | 50% |
| Government Services | 46 | 23 | 50% |
| Legislative Assembly | 41 | 20.5 | 50% |
| International and Intergovernmental Relation | 34 | 17 | 50% |
| Executive Council | 13 | 6.5 | 50% |
| Totals | 16,184 | 7,380 | 45.6% |

Source: Alberta Government, Budget 2000

Based on the Alberta Government expenditures for 1999-2000, roughly 45.6 percent ($7,380-million of a total expenditure of $16,184-million) would be included in the GPI Income Statement as positive, non-defensive government consumption spending that contributes to improved welfare of Albertans. The rest of the expenditures of $8,804-million would be considered either defensive or regrettable expenditures, or investments in human, social, and natural capital that should be excluded from the GPI Income Statement.

Given the absence of resources to complete a longitudinal analysis of Alberta Government expenditures using the 1999-2000 expenditure categories and the Hamilton (2000) guidelines, we

were unable to calculate the full benefits of public consumption expenditures by the Alberta Government in the GPI accounts. However, our estimates based on 1999-2000 government expenditures suggest that the total GPI net sustainable income figure for 1999 would be adjusted upwards by roughly $7,390-million or $2,489 per capita

In future GPI accounting work we would ideally wish to construct an analysis of non-defensive expenditure dating back to 1961. This would require considerable and careful work.

While this is an arbitrary exercise and short list, it illustrates the potential application of GPI accounting in terms of considering the benefits to well-being that arise from public consumption expenditures.

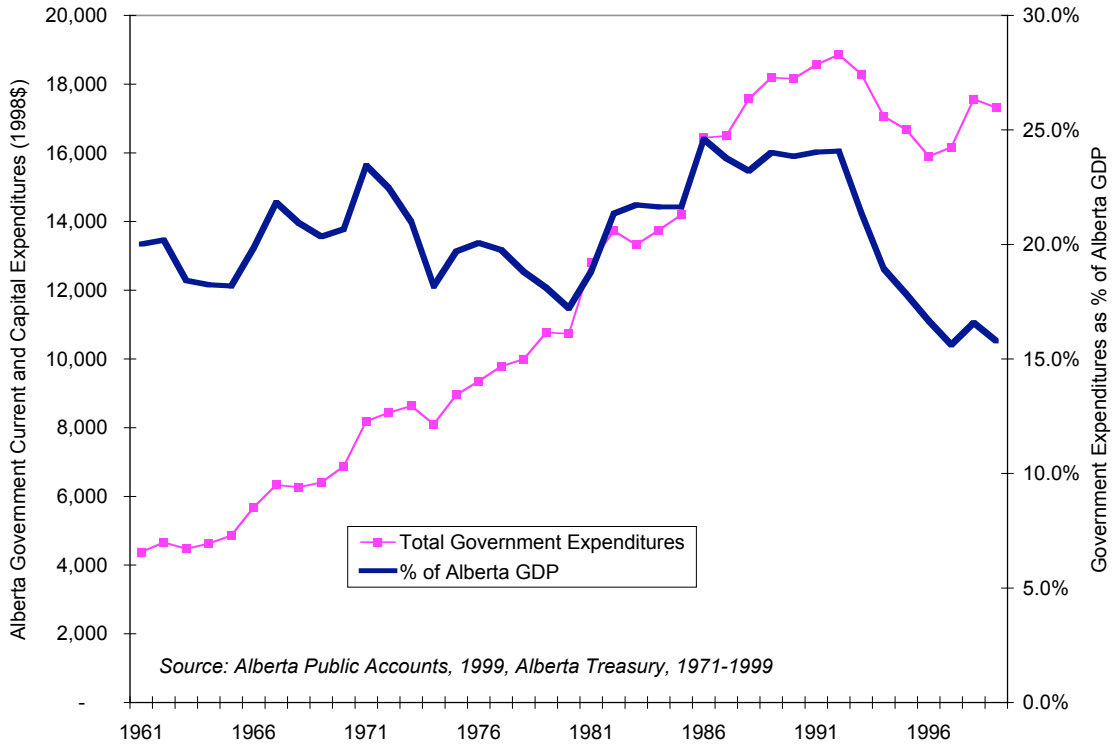
## 8.4 Government Spending and GDP

Government spending on goods, services and fixed capital formation all contribute to the GDP and economic growth. The Alberta economic accounts provide data on total government (all levels of government in Alberta) net current expenditures on goods and services and on government net fixed capital formation. The GPI accounts consider the trends in both current expenditures on goods and services and on fixed capital formation. Government expenditures on goods and services are far greater than spending on fixed capital, representing roughly 89 percent of total government expenditures. Government spending on fixed capital formation is less important to GDP, contributing $1,862-million (1998$) in 1999, or 1.7 percent of GDP.

Historically government spending on net current expenditures on goods and services has contributed significantly to Alberta's GDP, ranging from 15.8 percent of GDP in 1999 (the lowest rate in 40 years) to 24.6 percent in 1986. In 1999, total government spending totaled $17,318-million (1998$), or 15.8 percent of Alberta's GDP. Real per capita net government expenditures in 1999 was $5,957 per capita (1998$), a decrease from 1998 levels of $6,109 per capita (1998$). The maximum level of total government expenditures was $7,409 per capita in 1989.

Figure 3 shows the trend in government spending (1998$) by all governments. Total spending increased in real and per capita terms steadily from $4,380-million ($3,379 per capita, 1998$) in 1961 to a peak of $18,859-million in 1992 ($7,274 per capita, 1998$). The highest rate of per capita government spending was in 1989 at $7,409 per capita (1998$). However, since 1992 government expenditures have declined in total dollars and in percentage of GDP. As a percentage of Alberta's GDP, government spending has declined to an all-time low of 15.8 percent; in 1961, government spending was 20.0 percent of GDP and reached a high of 24.6 percent in 1986.

**Figure 3: Government Expenditures on Goods, Services and Capital Formation in Alberta's GDP Accounts and Percent Contribution to Alberta's GDP, 1961 to 1999**




## 8.4.1 Alberta Government Spending

Turning specifically to expenditures drawn from Alberta Government budget documents, between 1983 and 1999,[10] real per capita spending has been declining since 1992, including government budget forecasts to 2002-2003. Figure 4 shows the trends in total real (1998$) government spending per Albertan, while figure 5 shows spending on health, basic and advanced education, and all other program expenditures on a per capita basis (1998$). Total Alberta government spending increased from $5,350 per Albertan (1998$) in 1983 to a peak of $6,490 in 1992. By 1999, Alberta government spending had fallen 19.2 percent from its 1992 high to $5,245. By 2002, the Alberta Government forecasts that its spending will decline even further to $4,582 per capita, representing a significant 29.4 percent decrease in real per capita spending.

**Figure 4: Alberta Government Spending (1998$) per capita, 1983 to 1999 (2000-2002 forecast)**

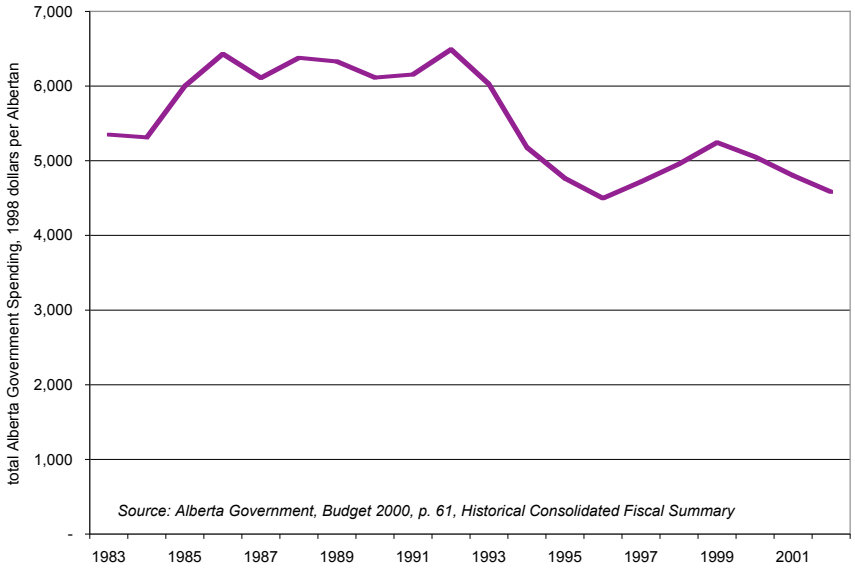
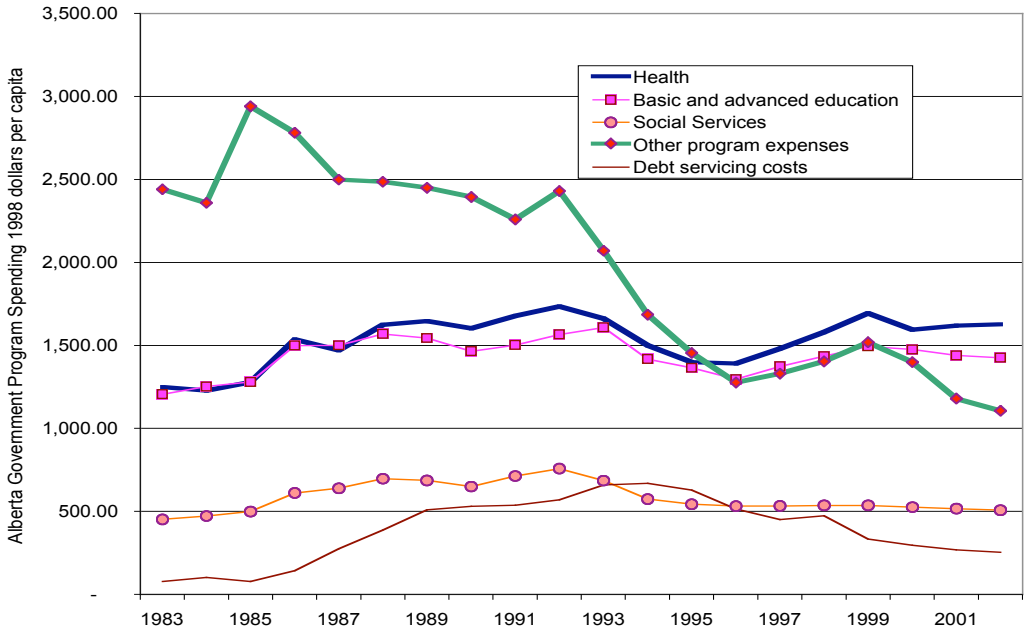



Figure 5 clearly shows that other Alberta government portfolios (including environment, justice, transportation and utilizes and other ministries) suffered the greatest reductions in real spending per capita.

**Figure 5: Total Alberta Government Spending per Albertan, 1998 dollars, 1983 to 2001 (Forecast)**



Real spending on health care rose from $1,250 per Albertan in 1983, peaking at $1,735 per Albertan in 1992 and falling to $1,694 in 1999. The Alberta Government's 2000 Budget forecasts real per capita health care spending to decrease slightly to $1,627, a reduction of 6.2 percent from the high in 1992.

Education spending on basic and advanced education increased from $1,206 per Albertan in 1983 to a maximum of $1,608 in 1993. By 1999, spending had fallen 8.9 percent from the 1993 high to $1,495 per Albertan. Forecasts to 2002 suggest that education spending per capita in real dollars will fall to $1,426, a decline of 11.3 percent from the 1993 high.

Spending on social services increased from $452 per capita (1998$) in 1983 to a peak of $757 in 1992, then falling to $537 in 1999, for a 29.1 percent decrease from 1992. By 2002, social services expenditures per capita are forecast to reach a low of $507, for a 33.1 percent reduction from 1992 levels.

The greatest reduction in government spending has been in other government ministries (such as environment, agriculture and food, justice, transportation and utilities and others). While spending rose from $2,441 per capita (1998$) in 1983 to a high of $2,940 in 1985, by 1999, spending in this category had declined 48.3 percent to $1,519 per capita (1998$) and is forecast to decline even further to $1,108 per capita by 2002 representing a 62.3 percent drop since 1985.

The good news is that debt servicing costs have continued to decline with debt reduction efforts of the Alberta Government, falling from a high of $670 per capital (1998$) in 1994 to $333 per capita in 1999. By 2002, debt servicing costs are expected to reach $255 per capita for a 62 percent decrease from 1994. While this trend should be celebrated, debt servicing costs are still higher than the low of $78 per capita in 1983.

# 9 Business Spending

The GDP and economic accounts include spending or investment by businesses on fixed capital formation. As a rule, spending by business is not considered to contribute to the economic well-being of households. Most of the economic benefits attributed to business activities are already captured in personal consumption expenditures by individuals and households. Thus we must be careful to avoid double counting and double attribution of expenditures to economic welfare.

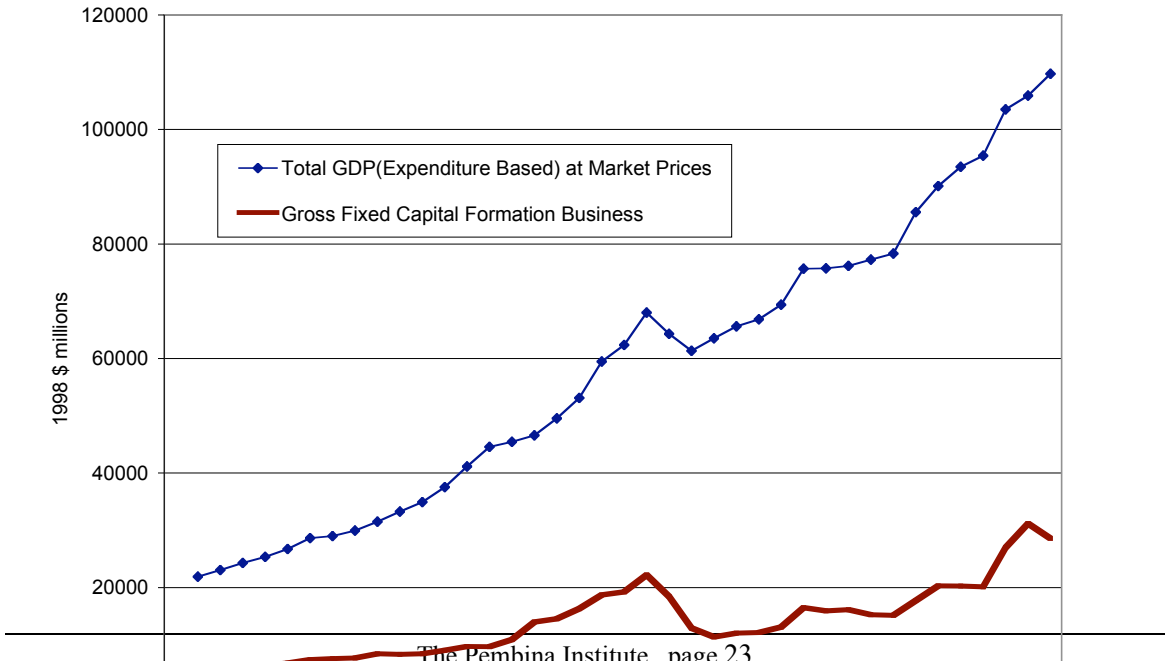
The Australian GPI deducts for the value of advertising by business as a contribution to genuine well-being (see www.gpionline.net). While acknowledging the importance of information and product awareness, 50 percent of advertising expenditures are deducted as an allowance for the cost of increased prices caused by advertising that provides no meaningful information and may do harm through disinformation or visual noise.

A lack of data precludes an adjustment of advertising expenditures in the Alberta GPI. Although no portion of business spending is considered in the GPI Income Statement, this may be open for debate, as some investments (such as those for research and development) should be considered as potential contributions to overall societal well-being.

Spending on fixed capital by Alberta business far exceeds the contribution by all government spending and is second in importance to only exports (53.3 percent of 1999 GDP) and personal consumption expenditures (48.2 percent of 1999 GDP). In addition, spending on inventories by business are contributions by industry to GDP. These fluctuate from negative to positive figures depending on the year, and in 1999 such spending contributed $790-million or 0.7 percent to 1999 GDP.

In 1999, business investment in fixed capital totaled $28,554-million (1998$), an increase of 378 percent over 1961 at $5,975-million (1998$). The real rate of increase in fixed capital investment averaged 8.3 percent from 1961 to 1999. Fixed capital investment represented 26.0 percent of Alberta's GDP in 1999 and varied from 17.9 percent of GDP in 1984 to 32.7 percent in 1981. Figure 6 shows the trend in business fixed capital investment.

**Figure 6: Alberta Business Expenditures on Fixed Capital versus GDP, 1998$**



**millions, 1961 to 1999**

# 10 Trade – Exports and Imports

Alberta's economic prosperity is highly dependent on the trade of capital assets, primarily the export of natural capital – oil, gas, coal, timber, and agricultural products. In 1999, over 53 percent of the value of Alberta's GDP resulted from exports of all forms of capital; this was balanced by imports, which as a negative deduction in GDP calculations, made up almost 45 percent of Alberta's 1999 GDP value.

The Alberta economy would not be as prosperous had it not been for the endowment of natural capital stocks, in particular non-renewable fossil fuel resources, most of which is exported to Canadian, U.S. and other international markets for financial returns. Natural capital has been the foundation for the growth in Alberta's economy over the past 40 or more years, with a smaller contribution from the value of produced capital as well as increasing exports of intellectual or knowledge capital. However, Alberta remains highly dependent on natural capital exports. Thus, a clear understanding of the condition of natural capital and the environment (which provides natural resources and environmental services) is critical to determining whether or not Alberta can continue to benefit from natural capital exports.

To achieve long-term sustainable well-being, we must balance the domestic needs for natural, human, social and produced capital with the economic paradigm of exporting a portion of domestic capital stocks for short- to medium-term monetary gains. In most cases, Alberta's natural capital (petroleum products, agricultural products, forest products) far exceeds its current domestic requirements. Nevertheless, sustainability and stewardship of wealth for current and future generations requires that we ask some fundamental questions:

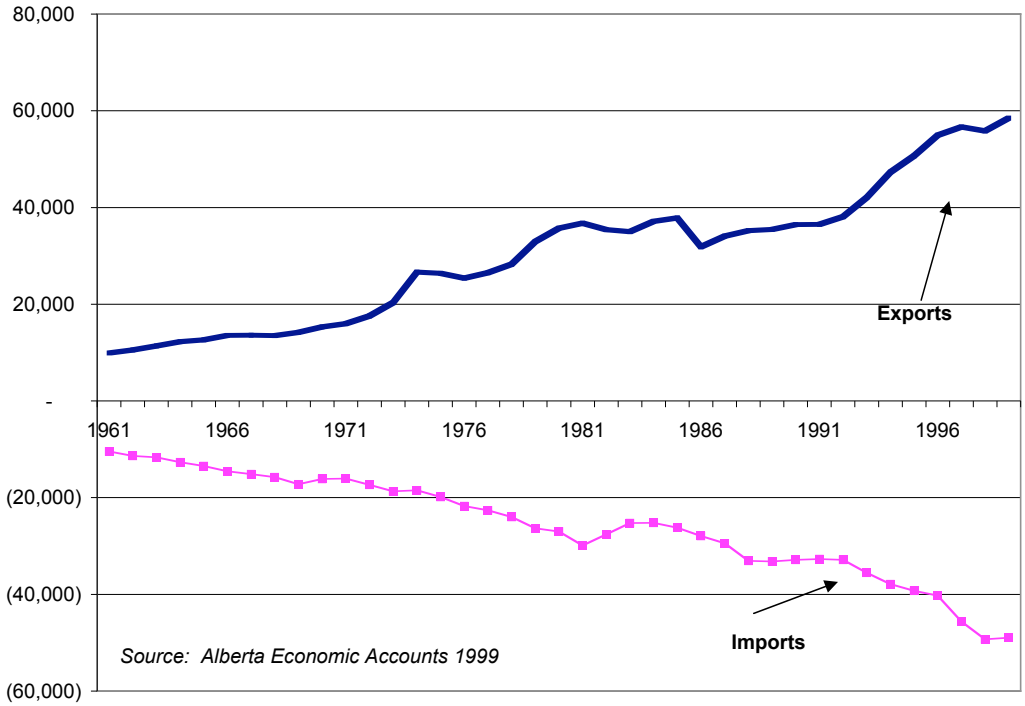
a) How much of our capital, over and above that required to meet our current basic needs, demands or wants, are we willing to export for monetary gains?
b) How much of our natural capital should we be setting aside, reserve or save for future generations?
c) Are there thresholds to the export of natural capital stocks where we acknowledge that exporting any more could lead to the erosion of ecological integrity, the depletion of natural capital, and the erosion of human and social capital?
d) What environmental and social costs are Albertans willing to accept for the short-and medium-term financial benefits of exporting of our surplus wealth to other markets and communities?

The GPI accounts can help answer these questions with evidence of the stocks, flows and export/imports of all forms of capital.

The monetary value of exports to the Alberta economy represented 53.3 percent of Alberta's GDP in 1999. Exports have been as high as 59.8 percent of the GDP in 1974 and as low as 45.0 percent of GDP in 1969 (see Figure 7). In 1961, the value of exports totaled $9,673-million (in 1998$), growing to $58,510-million (in 1998$) in 1999, an increase of 463 percent. In the 1990s, the value of exports grew 60 percent (to 1999). Most exports are in the form of natural capital (oil, gas, coal, agricultural products, and forest products), and trade in services (human capital) contributes the most to our economic growth

Exports are offset by imports, however, as the value of imports in 1999 represented -44.6 percent of Alberta's GDP.

**Figure 7: Alberta's Exports versus Imports, 1998 dollars, 1961 to 1999**

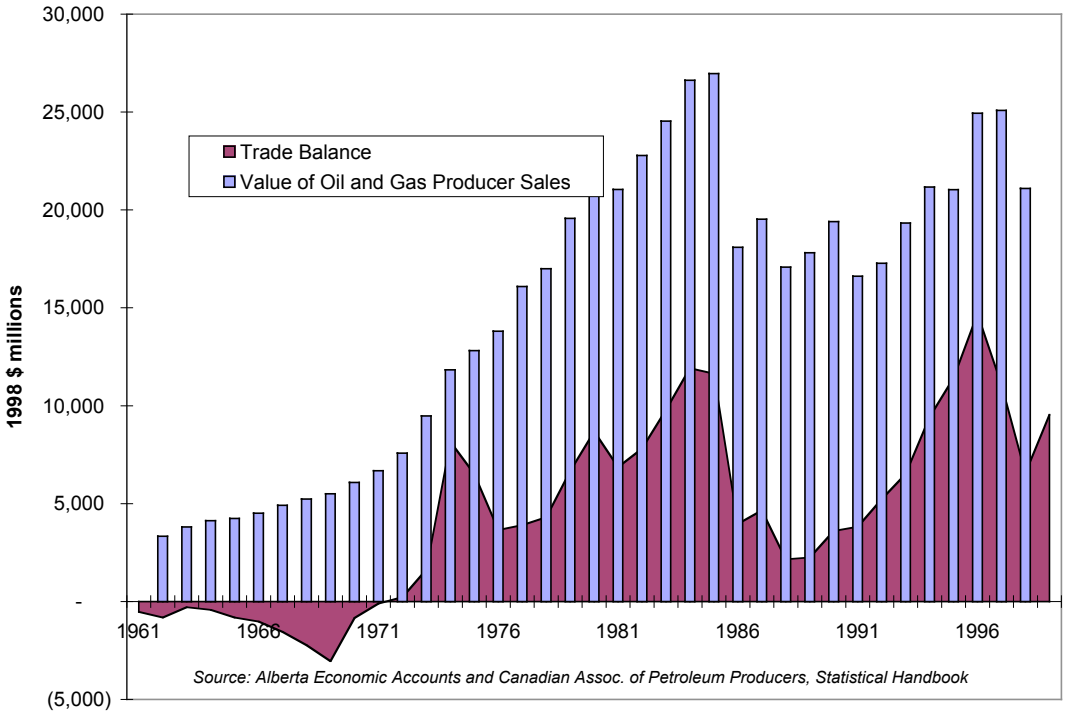



The balance of trade (export value minus import value) improved from an all-time low, negative trade balance of - $3,048-million (1998$) in 1969 to an all-time high trade surplus of $14,463-million (1998$) in 1996. In 1999, Alberta's trade surplus was $10,041-million (1998$).

Figure 7 also reveals an interesting trend: that imports have increased over time in almost perfect unison with exports. This balance of trade tells us something about our capacity as a people and society to achieve sustainability and self-sufficiency at a personal, household and societal level. The graph shows that the more of our natural resources and human capital we export, the more we spend on imports. The question is how sustainable and at what risk is our economy with this heavy reliance on exports of natural capital stocks? How sustainable are the natural resources that fuel exports? How much of our natural capital "comparative advantage" should we be exporting beyond a level of self-sufficiency that meets current and future generational needs for natural resources? These are complex issues but important in a discussion of sustainability and well-being.

The importance of oil and gas exports and refined petroleum products is apparent when comparing Alberta's balance of trade with the value of petroleum shipments (Figure 8). Much of this export value comes from oil and gas exports to the U.S. and the rest of Canada, which have grown 612 percent since 1962 to $20,454-million in sales in 1998.[11]

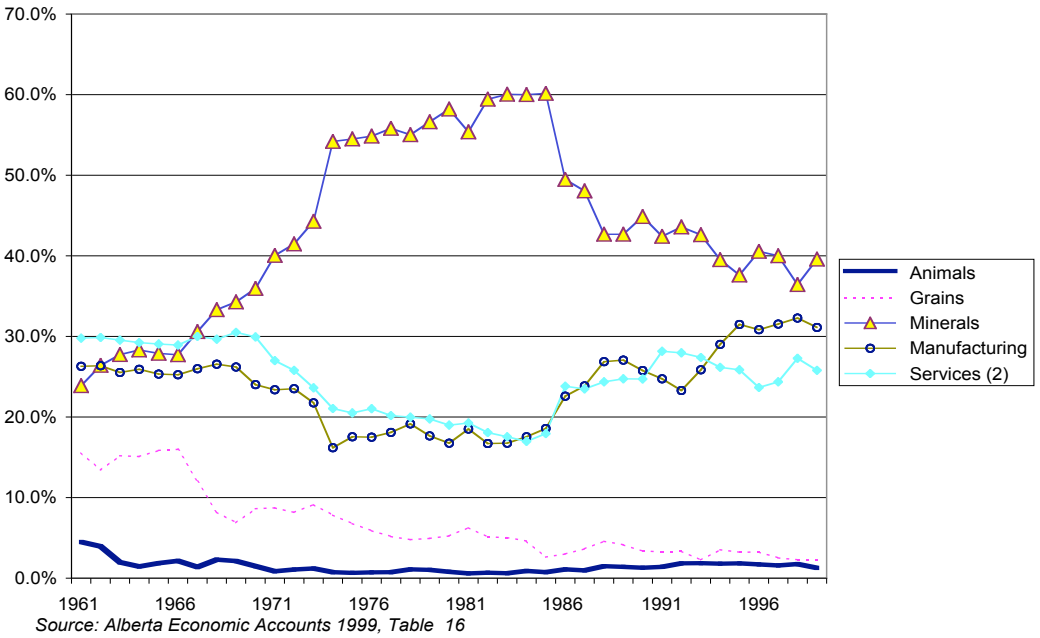
**Figure 8: Alberta's Balance of Trade (Exports less Imports versus Oil and Gas Sales, 1998$), 1961 to 1999**




Despite diversification of the economy, minerals (oil, gas, coal, and petroleum products) still make up the lion's share of Alberta's exports (see Figure 9). In 1999, mineral exports comprised 39.6 percent of the value of total exports (current dollars) compared to 23.9 percent of exports in 1961 and 40.0 percent of exports in 1971, the onset of Alberta's oil and gas boom. At the peak of oil and gas importance in 1983, mineral resources made up 60 percent of Alberta's exports; thus it could be argued that we have become less reliant on mineral exports for trade. However, much of the decline in the importance of oil and gas exports since 1983 is due to the 1985 collapse in oil prices. It took until 1999 for oil and gas prices to again rival the peaks in 1983 to 1984.

The most important mineral resource is natural gas, which in 1999 made up 20.1 percent of Alberta's export value; this was followed by oil, which made up 16.4 percent of exports (compared to 44.1 percent of 1974 exports). Manufactured exports as a percentage of total exports have not changed much since 1961; in 1961, they made up 26.3 percent of exports and in 1999, manufactured goods made up 31.1 percent of exports. Export of services has ironically declined in relative importance since 1961, contributing 25.8 percent of exports in 1999 compared with 29.8 percent in 1961.

**Figure 9: Alberta's Exports, Percentage of Total Exports Contribution by Each Industry or Commodity Group, 1961 to 1999**.




*Source: Alberta Economic Accounts 1999, Table 16*

# 11 Economic Diversification and Resource Dependence

Alberta's economy has long depended on primary, natural capital-intensive industries – agriculture, oil and gas, coal, and the forestry industry. Was Alberta's economy more diversified in 1999 than it was in the early 1970s before the oil boom? Are we less or more dependent on natural capital as the basis of economic prosperity?

Diversification of the province's economy does not necessarily have positive implications for the well-being of citizens. However, an economy with a more diverse base is healthier, more resilient and thus more sustainable than one that depends on a single sector or cluster of sectors.

Economic diversity can be measured by the relative distribution of the value to GDP of various sectors in the economy. We developed an **Economic Diversification Index** for Alberta based on the work by economist Frank Hachman (1971) , Bureau of Business and Economic Research, University of Utah, Salt Lake City (December 8, 1994). The Hachman Index measures how closely the employment distribution of a state or region resembles that of a nation. The value of the index ranges from zero (where the two are least similar) to one (where the state's industrial sectors, expressed in terms of labour, are most similar to that of the nation). Given the assumption that the nation's economy is diversified, a larger value of the Hachman Index relative to the nation means that a subject region is more diversified (and therefore less specialized).

Our Economic Diversification Index is based on a concept similar to the Hachman Index except that we compare the distribution of GDP by sector for Alberta with that of the nation.[12] We construct the Diversification Index by comparing the percentage share of GDP of each sector in the Alberta economy (based on provincial economic account statistics) with the percentage share

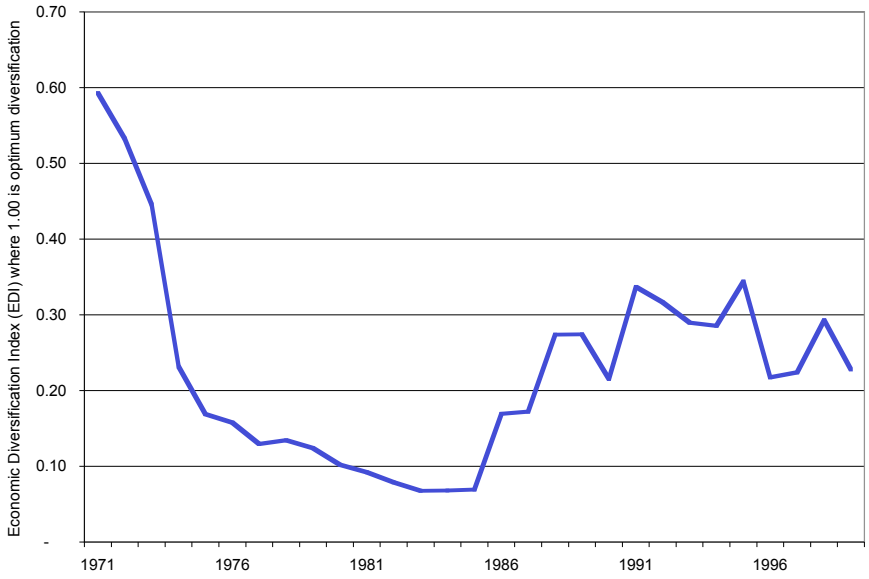
of GDP by the same sectors in the Canadian economy. We assume that the national distribution or share of GDP by industry or sector represents the optimum diversification of the economy.

The Hachman Index can then be converted to an index between 0 and 100 for purposes of creating the GPI indicator accounts and composite GPI indices. We assumed that the benchmark for economic diversity would have Alberta's economy match the diversity of the overall Canadian economy and distribution of GDP by sector. For example, the share of GDP by manufacturing industries in 1999 in Alberta is 11.2 percent of Alberta's GDP and 18.1 percent of Canada's GDP making the index of diversification for the manufacturing sector the ratio of 11.2 percent / 18.1 percent = 0.62. A ratio of 1.00 suggests a provincial economy as diverse as the nation's; a ratio less than 1.00 suggests an economy less dependent on that sector; an index greater than 1.0 suggests an economy more dependent on that sector than the national average. We then calculate an index for each of the sectors reported in the Alberta and national economic accounts, and sum all the indices, equally weighted, to yield a composite Economic Diversification Index (EDI). This index requires more development and refinement.

Our examination of Alberta's diversification began with 1971, an important benchmark year in Alberta's history just before the 1973 OPEC oil crisis that ushered in Alberta's petroleum boom. The results of our EDI calculations reveal an interesting trend (see Figure 10). In 1971, the Alberta economy was more diversified, relative to the Canadian economy than at any time since. The EDI was 0.59 in 1971 then fell to a low of 0.07 in the mid-1980s. In the 1990s, the EDI rose, reaching 0.34 in 1995 but falling again in 1999 to 0.23 as the oil and gas sector began to predominate once more.

The EDI reflects the economic cycles in Alberta's economy. Even in the 1990s, while the economy has diversified into other intellectual-capital-intensive sectors, the economy remains dependent on natural capital, drawing heavily from non-renewable natural resources such as oil, natural gas, and coal and the many secondary industries that service this primary industry.

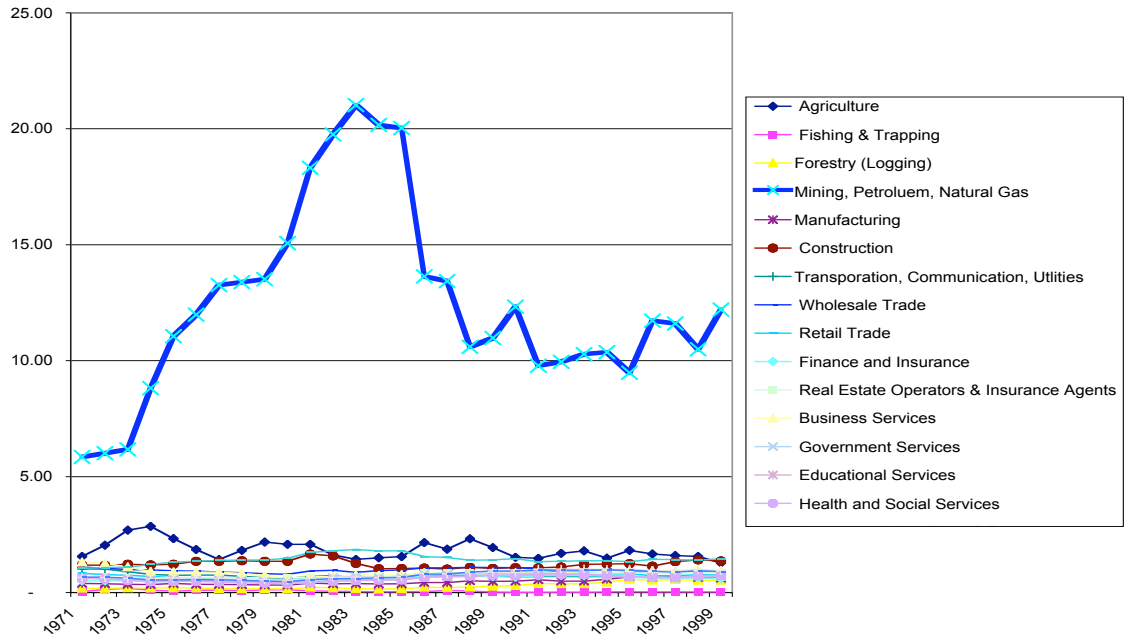
**Figure 10: Alberta Economic Diversification Index (EDI) 1971 to 1999**




The predominance of Alberta's petroleum economy is shown most dramatically in Figure 11. The ratio of the percentage share of GDP by sectors in the Alberta economy is compared with the percentage share of GDP for the same sectors in the Canadian economy. This figure shows just how dominant the oil and gas sector is in Alberta's economy relative to the national economy.

**Figure 11: Ratios of Percent of GDP by Sector of Alberta and Canada, 1971 to 1999**

Another way of assessing diversification of the economy is to examine the relative distribution of



GDP by industry or sector over time. Table 2 shows the change in the relative contribution of each sector or industry to Alberta's GDP comparing 1971, 1981, 1991 and 1999.

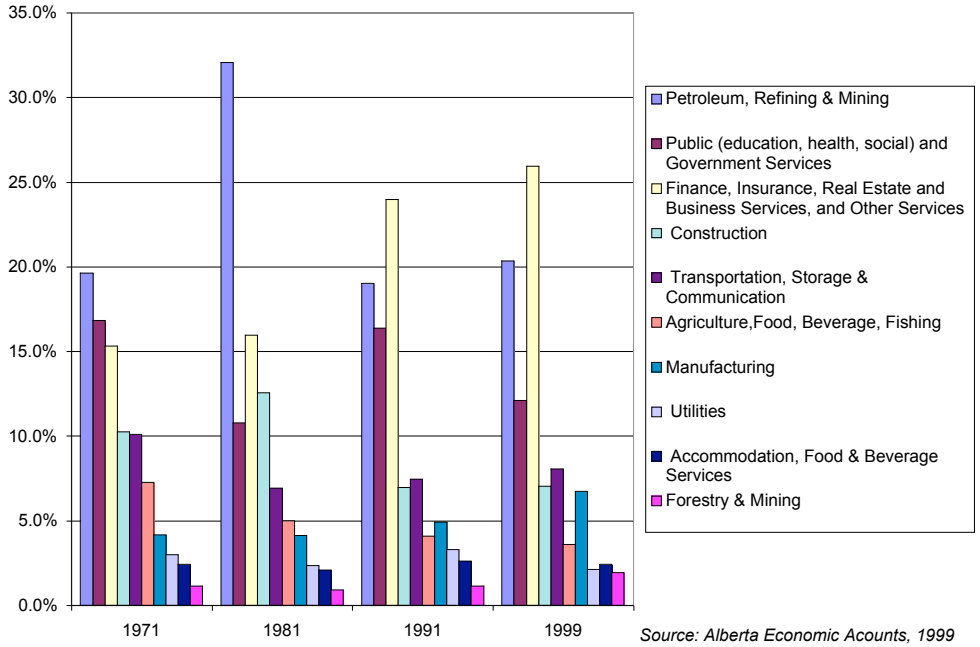
**Table 3: Percentage Contribution to Alberta's GDP by Sector or Industry**

| Sector | 1971 | 1981 | 1991 | 1999 |
|---|---|---|---|---|
| Petroleum, Refining and Mining | 19.6% | 32.1% | 19.0% | 20.4% |
| Public (education, health, social) and Government Services | 16.8% | 10.8% | 16.4% | 12.1% |
| Finance, Insurance, Real Estate and Business Services, and Other Services | 15.3% | 16.0% | 24.0% | 25.9% |
| Construction | 10.2% | 12.6% | 6.9% | 7.0% |
| Transportation, Storage and Communication | 10.1% | 6.9% | 7.4% | 8.1% |
| Agriculture, Food, Beverage, Fishing | 7.3% | 5.0% | 4.1% | 3.6% |
| Manufacturing | 4.2% | 4.1% | 4.9% | 6.7% |
| Utilities | 3.0% | 2.3% | 3.3% | 2.1% |
| Accommodation, Food and Beverage Services | 2.4% | 2.1% | 2.6% | 2.4% |
| Forestry and Mining | 1.1% | 0.9% | 1.1% | 1.9% |

Source: *Alberta Economic Accounts 1999*, Alberta Treasury

This chart can also be expressed graphically (Figure 12) showing the contribution of each sector to Alberta's GDP. One could argue that Alberta's economy was most diverse in 1971 when no one sector dominated (that is, exceeded 20 percent of GDP).

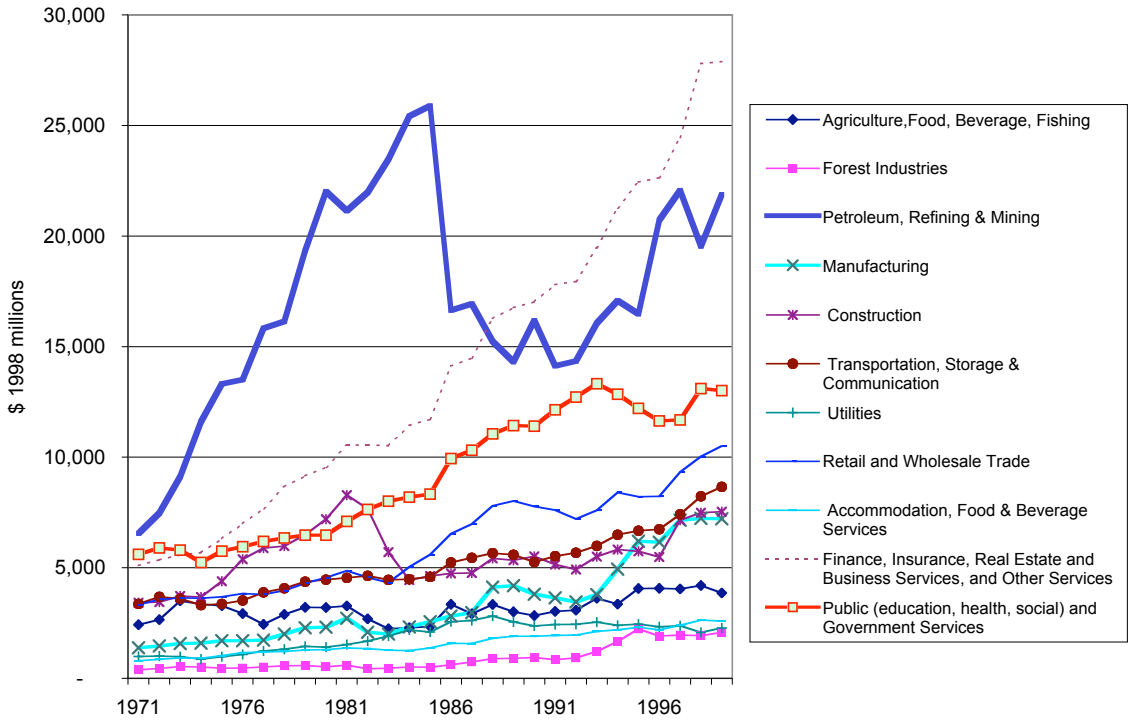
**Figure 12: Percent Contribution to Alberta's GDP by Sector, 1971, 1981, 1991, 1999**




*Source: Alberta Economic Acounts, 1999*

Figure 13 shows a dramatic change over time in Alberta's economy since 1971. In 1971, Alberta's economy was relatively diverse with no single industry sector dominating the GDP. The petroleum, mining and petroleum refining industries contributed $6,543-million (1998$) or 19.6 percent of Alberta's economy, followed by the public sector (government, health, education, social services) at $5,608-million (16.8 percent of GDP), and financial, insurance and other business services at $5,106-million (15.3 percent of GDP). By 1984, the petroleum sector dominated Alberta's economy at $25,415-million (1998$) or 37.6 percent of GDP, but by 1999 the petroleum sector had declined to 20.4 percent of GDP, or $21,878-million, exceeded by the financial, insurance and other business services sector..

**Figure 13**: **Economic Diversification: Alberta's GDP by Industry, 1998 dollars, 1961-1999**




The sector comprising financial services, real estate and other business services has shown the most dramatic increase in contribution to Alberta's GDP, rising from $5,106-million (1998$), or 15.3 percent of GDP, to the dominant position in Alberta's economy in 1999 at $27,890-million (1998$), or 25.9 percent of GDP. The manufacturing sector (excluding petroleum refining, food and beverage, and wood and pulp and allied industries, which are included with respective industry clusters) is also important to diversification, but it has increased only marginally in importance from 6.2 percent of GDP in 1971 to 8.2 percent in 1999.

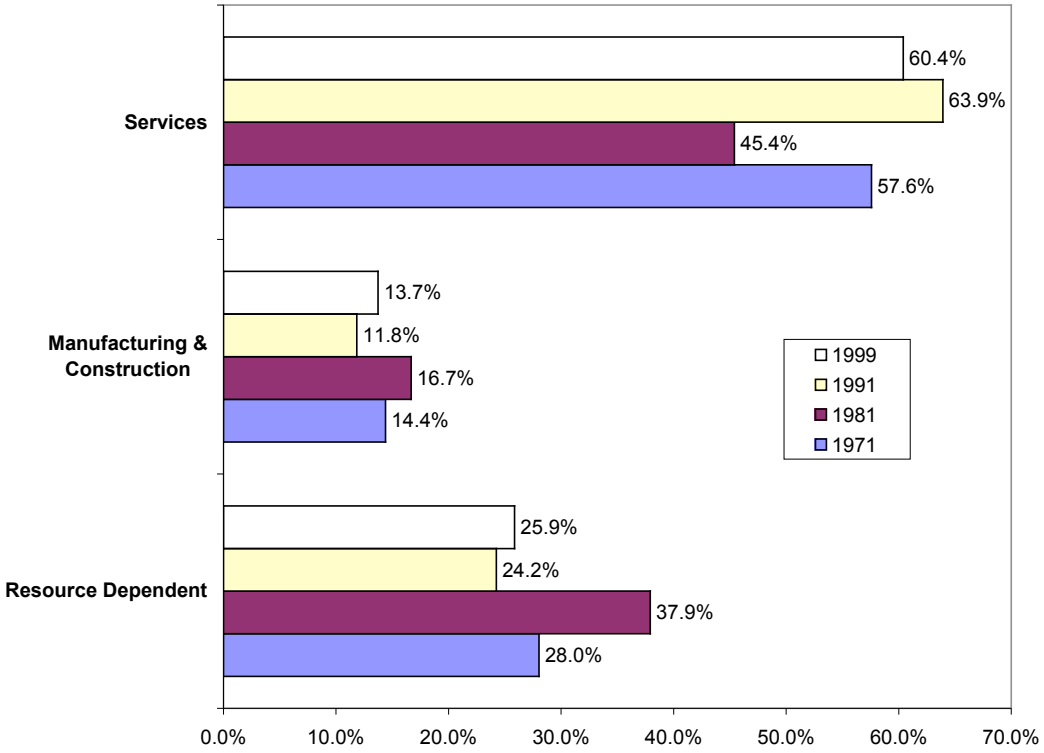
In 1999, the most important sectors in Alberta's economy (expressed in 1998$) were:

1. Financial Services, Real Estate and Other Business services ($27,890-million, or 25.9 percent of GDP);
2. Petroleum Industries ($21,878-million, or 20.4 percent of GDP);
3. Public Sector (Health, Education, Social Services) and Government Services ($13,016-

million, or 12.1 percent of GDP);
4. Retail and Wholesale Trade ($10,503-million or 9.8 percent of GDP); and
5. Transportation, Storage and Communication ($8,658-million, or 8.1 percent of GDP)

Figure 14 summarizes the contribution of major sectors to Alberta's GDP over the study period.

**Figure 14: Contribution of Resource-Dependent, Manufacturing and Construction, and Services Industries to Alberta's GDP in 1971, 1981, 1991 and 1999**




Source: Alberta Economic Accounts, 1999
Note: "Resource-Dependent" industries include Agriculture, Food, Beverages, Forestry, Mining, Wood, Pulp and Allied, Petroleum, Refining and Mining.

# 12 More Growth? Of What?

Simon Küznets challenged us to continually ask that calls for "more economic growth define of what and for what." When we examine the Alberta evidence over the past 40 years, the sectors showing the most growth since 1971 include the financial services (banking, investment), insurance and real estate sector, forest industries, manufacturing and petroleum refining (see Table 4).

**Table 4: Sector Growth (percentage) since 1971**

| **Growth in Sectors**<br>% growth 1971 to 1999 (constant 1998$) | |
|---|---|
| Finance, Insurance, Real Estate and Business Services | 446% |
| Forest Industries | 445% |
| Manufacturing | 421% |
| Petroleum, Refining and Mining | 234% |
| Accommodation, Food and Beverage Services | 224% |
| Retail and Wholesale Trade | 215% |
| Transportation, Storage and Communication | 157% |
| Public (education, health, social) and Government Services | 132% |
| Utilities | 131% |
| Construction | 121% |
| Agriculture, Food, Beverage, Fishing | 59% |

Source: *Alberta Economic Accounts 1999*

As Figure 14 has shown, Alberta's economy was only slightly less dependent on resource-based industries in 1999 (25.9 percent of GDP) than it was in 1971 (28.0 percent of GDP). The importance of the service and knowledge-based economy has grown only marginally in importance from 57.6 percent of the GDP in 1971 to 60.4 percent in 1999.

# 13 So What?

Is Alberta's economy healthier and more diverse than in 1971? Are we on the verge of a new era of economic prosperity? That depends on your perspective. One could argue that Alberta's economy was no more diverse in 1999 than in 1971 and was at least as dependent on natural capital consumption. This may come to a surprise to those who focus only on the improvement in economic diversity since the petroleum industry boom in 1984/85 when oil prices were the highest in history. While the increasing contribution of service industries to Alberta's economy is a welcome sign of increasing economic diversity and health, it is also clear that Alberta's prosperity remains reliant on natural capital extraction (oil, gas, coal, agriculture, timber). Exactly how dependent the service industries are on resource-based sectors is difficult to determine. We could examine the multiplier impact of each dollar of resource-dependent GDP on service industries. This could range anywhere from 1.0 to 2.0 times resource-dependent GDP. The manufacturing sector, a key contributor to economic diversification, has shown a healthy 421 percent increase in growth since 1971 even though it still makes up a relatively small proportion of Alberta's economy at 6.7 percent of GDP. While the desired future is a knowledge-based economy it appears that at least in the foreseeable future Alberta's economy will continue to depend on oil, gas, agriculture and timber, and thus we must be concerned with the sustainability and health of natural capital.

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MISSING:

Tobin and Nordhaus (or Nordhaus and Tobin??)
Cobb and Cobb
Hamilton

# Appendix A. List of Alberta GPI Background Reports

A series of Alberta GPI background reports accompanies the *Alberta Sustainability Trends 2000* report and this report. These documents are being released in late 2001 and early 2002 and will be available on the Pembina Institute's website at www.pembina.org.

### Alberta GPI Background Reports and Sustainability Indicators

| GPI Background Reports | GPI Accounts Covered by Report |
|---|---|
| 1. Economy, GDP, and Trade | • Economic growth (GDP)<br>• Economic diversity<br>• Trade |
| 2. Personal Consumption Expenditures, Disposable Income and Savings | • Disposable income<br>• Personal expenditures<br>• Taxes<br>• Savings rate |
| 3. Money, Debt, Assets and Net Worth | • Household debt |
| 4. Income Inequality, Poverty and Living Wages | • Income distribution<br>• Poverty |
| 5. Household and Public Infrastructure | • Public infrastructure<br>• Household infrastructure |
| 6. Employment | • Weekly wage rate<br>• Unemployment<br>• Underemployment |
| 7. Transportation | • Transportation expenditures |
| 8. Time Use | • Paid work time<br>• Household work<br>• Parenting and eldercare<br>• Free time<br>• Volunteerism<br>• Commuting time |
| 9. Human Health and Wellness | • Life expectancy<br>• Premature mortality<br>• Infant mortality<br>• Obesity |
| 10. Suicide | • Suicide |
| 11. Substance Abuse; Alcohol, Drugs and Tobacco | • Drug use (youth) |
| 12. Auto Crashes and Injuries | • Auto crashes |
| 13. Family Breakdown | • Divorce |
| 14. Crime | • Crime |
| 15. Gambling | • Problem gambling |
| 16. Democracy | • Voter participation |
| 17. Intellectual Capital and Educational Attainment | • Educational attainment |
| 18. Energy (Oil, Gas, Coal and Renewable) | • Oil and gas reserve life<br>• Oilsands reserve life |
| 19. Agriculture | • Agricultural sustainability |
| 20. Forests | • Timber sustainability<br>• Forest fragmentation |
| 21. Parks and Wilderness | • Parks and wilderness |
| 22. Fish and Wildlife | • Fish and wildlife |
| 23. Wetlands and Peatlands | • Wetlands |

| GPI Background Reports | GPI Accounts Covered by Report |
|---|---|
| | • Peatlands |
| 24. Water Resource and Quality | • Water quality |
| 25. Energy Use Intensity, Greenhouse Gas Emissions and Air Quality | • Energy use intensity<br>• Air quality-related emissions<br>• Greenhouse gas emissions |
| 26. Carbon Budget | • Carbon budget deficit |
| 27. Municipal and Hazardous Waste | • Hazardous waste<br>• Landfill waste |
| 28. Ecological Footprint | • Ecological footprint |

# Appendix B: GDP, Trade Balance and Economic Diversification Index Data

**Alberta Gross Domestic Product per capita, Trade Balance (Exports less Imports by value per capita), and Economic Diversification Index.**

| | **Economic Growth (GDP)** | | **Trade Balance (Export value less import value)** | | **Economic Diversification** | |
|---|---|---|---|---|---|---|
| | GDP at market prices, expenditure based (1998$ per capita) | GDP Index where maximum (1999=$37,005) = best (100 points) | Trade Balance 1998$ per capita | Trade Balance index is where maximum (1996 =$5,284) is best benchmark (100 points) | Economic Diversification Index, based on Hachman Index, closer to one means closer to National average. | Economic Diversification Index, where 100 is set equal to the level of diversification in Canada |
| 1961 | 16,395 | 44.31 | (393.32) | (7.44) | | |
| 1962 | 16,806 | 45.42 | (596.96) | (11.30) | | |
| 1963 | 17,261 | 46.65 | (205.60) | (3.89) | | |
| 1964 | 17,712 | 47.86 | (296.15) | (5.60) | | |
| 1965 | 18,426 | 49.79 | (560.62) | (10.61) | | |
| 1966 | 19,553 | 52.84 | (695.54) | (13.16) | | |
| 1967 | 19,424 | 52.49 | (1,036.96) | (19.62) | | |
| 1968 | 19,604 | 52.98 | (1,463.28) | (27.69) | | |
| 1969 | 20,161 | 54.48 | (1,951.09) | (36.92) | | |
| 1970 | 20,835 | 56.30 | (522.47) | (9.89) | | |
| 1971 | 20,964 | 56.65 | (60.31) | (1.14) | 0.59 | 100.0 |
| 1972 | 22,163 | 59.89 | 133.53 | 2.53 | 0.53 | 89.9 |
| 1973 | 23,841 | 64.43 | 943.00 | 17.85 | 0.45 | 75.2 |
| 1974 | 25,399 | 68.64 | 4,649.40 | 87.99 | 0.23 | 39.1 |
| 1975 | 25,135 | 67.92 | 3,604.91 | 68.22 | 0.17 | 28.5 |
| 1976 | 24,925 | 67.36 | 1,954.85 | 36.99 | 0.16 | 26.6 |
| 1977 | 25,436 | 68.74 | 2,002.94 | 37.91 | 0.13 | 21.8 |
| 1978 | 26,276 | 71.01 | 2,130.37 | 40.32 | 0.13 | 22.7 |
| 1979 | 28,358 | 76.63 | 3,172.72 | 60.04 | 0.12 | 21.0 |
| 1980 | 28,449 | 76.88 | 3,962.68 | 74.99 | 0.10 | 17.2 |
| 1981 | 29,642 | 80.10 | 2,993.59 | 56.65 | 0.09 | 15.5 |
| 1982 | 27,156 | 73.38 | 3,297.52 | 62.40 | 0.08 | 13.3 |
| 1983 | 25,656 | 69.33 | 4,096.34 | 77.52 | 0.07 | 11.4 |
| 1984 | 26,583 | 71.83 | 4,985.30 | 94.35 | 0.07 | 11.5 |
| 1985 | 27,307 | 73.79 | 4,844.74 | 91.69 | 0.07 | 11.7 |
| 1986 | 27,495 | 74.30 | 1,630.00 | 30.85 | 0.17 | 28.6 |
| 1987 | 28,492 | 77.00 | 1,911.67 | 36.18 | 0.17 | 29.1 |
| 1988 | 30,832 | 83.32 | 878.23 | 16.62 | 0.27 | 46.2 |
| 1989 | 30,345 | 82.00 | 900.99 | 17.05 | 0.27 | 46.2 |
| 1990 | 29,896 | 80.79 | 1,416.03 | 26.80 | 0.22 | 36.3 |
| 1991 | 29,802 | 80.54 | 1,472.98 | 27.88 | 0.34 | 56.8 |
| 1992 | 29,737 | 80.36 | 1,984.91 | 37.56 | 0.32 | 53.4 |
| 1993 | 32,038 | 86.58 | 2,441.20 | 46.20 | 0.29 | 48.8 |
| 1994 | 33,316 | 90.03 | 3,482.36 | 65.90 | 0.29 | 48.2 |
| 1995 | 34,118 | 92.20 | 4,169.71 | 78.91 | 0.34 | 58.0 |
| 1996 | 34,319 | 92.74 | 5,284.10 | 100.00 | 0.22 | 36.7 |
| 1997 | 36,478 | 98.58 | 3,900.53 | 73.82 | 0.22 | 37.8 |
| 1998 | 36,440 | 98.47 | 2,256.38 | 42.70 | 0.29 | 49.4 |
| 1999 | 37,005 | 100.00 | 3,219.35 | 60.93 | 0.23 | 38.5 |
| Source: | *Alberta Economic Accounts*, 1999 Table 3 Gross Domestic Product, expenditure based (for 1971-1999), Other data is from special run of historical economic accounts 1961-1999 based on Statistics Canada data. | | *Alberta Economic Accounts* 1999. Table 3 Gross Domestic Product expenditure based, for 1971-1999. Other data is from special run of historical economic accounts 1961-1999 based on Statistics Canada data. | | Derived by authors by comparing GDP by sector of Alberta with GDP by sector for Canada | |

## Endnotes

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[10] More detailed historical analysis the pre-dates 1983 could be conducted in future GPI accounting analysis.
[11] Canadian Association of Petroleum Producers "Statistical Handbook" for 1998.
[12] The Hachman Index is based on comparing the share of employment by sector or industry of any given state to the national average. Hachman, a professor of economics, applied his methodology for comparing Utah's economy and diversification with the U.S. national average. Source: "Diversification and the Utah Economy," an article excerpted from the 1995 Utah Economic Report to the Governor, pages 207-213. The index is calculated as the inverse of the difference between the share of a states employment (EMP) in sector/industry j in year t less the share of U.S. employment in industry j in year t, all square and divided by the share of sector j of Canada's GDP in year t, as per the following formula: $1/DIVR_t = \_j ((EMP_{Statejt} - EMP_{USjt})^2)/ US_{USjt}$