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IMPACT OF ALASKAN GAS SUBSIDY

Prepared for:

Government of the Northwest Territories

Prepared by:

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*Houston – Los Angeles – London
Calgary – Buenos Aires – Singapore*

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I. INTRODUCTION

Objective of the Assignment

- Provide the Government of the Northwest Territories (GNWT) with an assessment of the impact of the Alaska natural gas tax credit proposed and passed in the U.S. Senate energy bill.
- The focus of the report is to analyze and present the findings with respect to the impacts and implications of the Alaska natural gas tax credit.
- Purvin & Gertz, Inc. (Purvin & Gertz) provides an independent and objective evaluation of these impacts and implications.

Scope and Methodology

- Purvin & Gertz analyzes the impact of the Alaskan gas subsidy on potential Mackenzie Delta/Beaufort Sea production, as well as existing and future production from other areas such as Western Canada, U.S. Rocky Mountains, and Gulf Coast.
- Purvin & Gertz describes the mechanisms through which other producing areas are affected.
- A “typical” volumetric impact is presented based on previous Purvin & Gertz’ Arctic gas studies, and market views using our proprietary gas models.
- Other impacts and implications are also presented.
- Purvin & Gertz explicitly provides its opinions on the impacts and implications of the subsidy.

Government of the Northwest Territories' Interest

- The GNWT has public interest, regional development, and revenue considerations related to developing natural gas resources in the Mackenzie Delta/Beaufort Sea region.
- The GNWT wants to maximize the benefits of Arctic gas development for its constituents.
- For example, the GNWT wants local jobs, local business and investment opportunities, revenue sources from various tax sources, gas service to local communities, and pipeline developments that would be synergistic in developing the sedimentary basins in the Northwest Territories.
- The GNWT views natural gas development positively insofar that it is consistent with its environmental and social values.
- The GNWT believes that its interests will be negatively impacted by subsidized Alaskan gas. It is Purvin & Gertz' understanding that the report will be used in the context of the GNWT's response to the Alaskan gas subsidy.

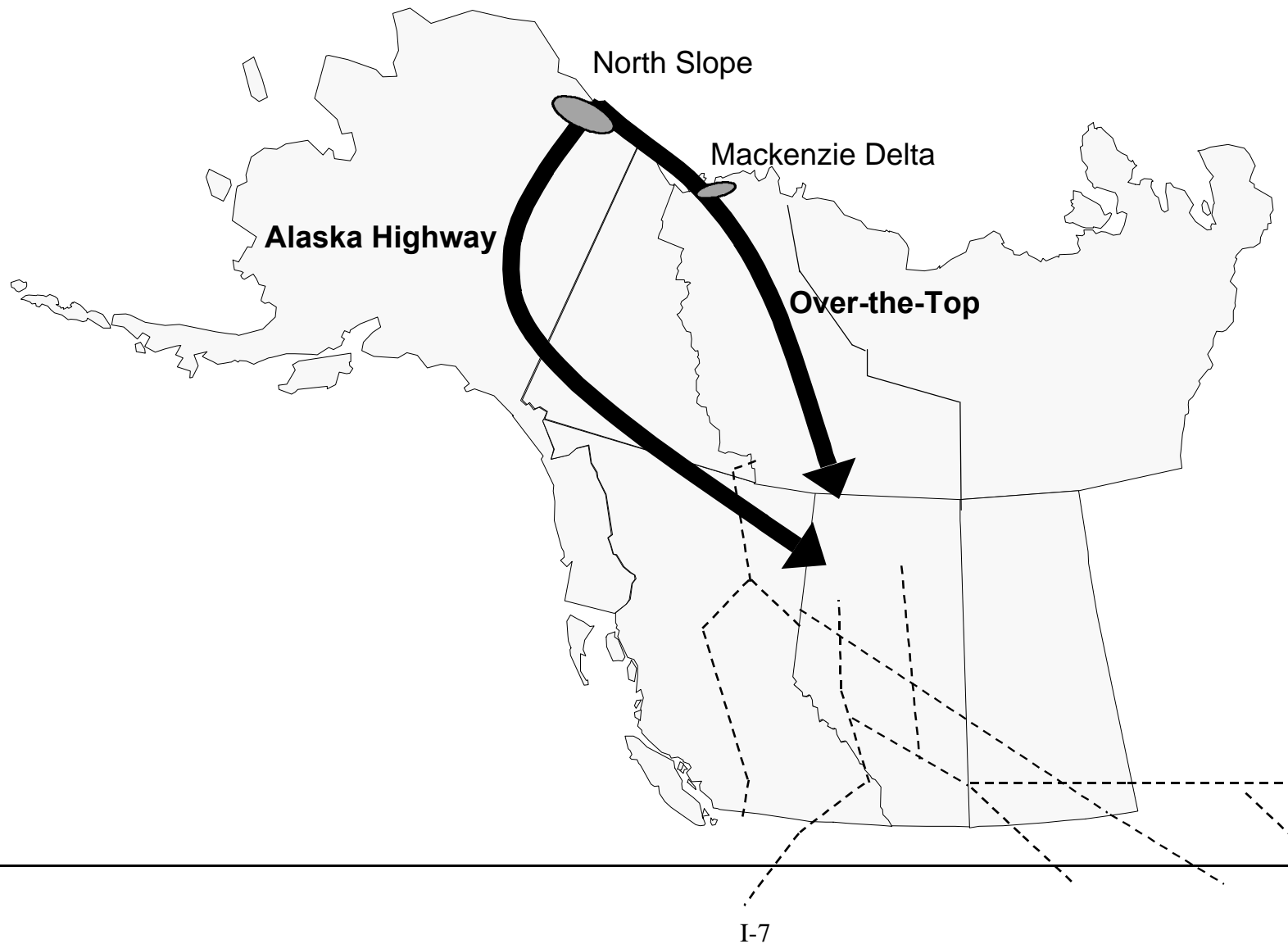
Background

- The tax credit for production of Alaskan natural gas included in the U.S. Senate energy bill applies to “... natural gas entering any intake or tie-in point which was derived from an area of the State of Alaska lying north of 64 degrees North latitude ...”.
- The tax credit effectively sets a floor price of \$3.25 (US)/MMBtu for the abovementioned natural gas at AECO. This floor price will be indexed to inflation starting in 2011 so Purvin & Gertz assumes that it will rise with inflation. The tax credit is therefore a subsidy to those “privileged” producers of the abovementioned natural gas.
- The tax credit applies for the period beginning with the later of January 1, 2010 or the initial date for the interstate pipeline for this gas and ends 15 years later.
- There are provisions for recapture of the tax credit if, after 3 years of gas flow, the average AECO price exceeds 150% of the floor price.

More Background

- The U.S. Senate energy bill, passed in April 2002, must be reconciled with the U.S. House of Representatives bill passed in Summer 2001.
- After reconciliation in conference, the joint bill must be passed both in the House and the Senate and then sent to the President to be signed into law.
- Both bills as well as Alaskan legislation mandate the Alaska Highway natural gas pipeline route and exclude the Over-the-Top route.
- Both these routes are shown in the following figure.

Alaskan Gas Pipeline Routes



Report Outline

- Section I provides an introduction to the report
- Section II provides an executive summary of findings and conclusions
- Section III presents the mechanisms through which the subsidy will impact the market
- Section IV shows potential market impacts and stakeholder implications

II. SUMMARY AND CONCLUSIONS

Summary and Conclusions

- The Alaskan natural gas subsidy is funded by a tax credit found in the U.S. Senate energy bill passed in April 2002.
- The Alaskan gas subsidy would produce a misallocation of resources and distort the continental North American natural gas market.
- The Alaskan gas subsidy will encourage overinvestment in Alaskan gas production since it works as a false signal to the “privileged few” that diverts resources from higher value activities to lower value activities.
- The Alaskan gas subsidy will create some significant winners (e.g. Alaskan producers and the Alaskan economy) and many losers (e.g. other resource owners and producers, taxpayers, etc.) with an overall loss to the economy because of a sub-optimal allocation of resources.

Summary and Conclusions (Cont'd)

- The American taxpayers are significant losers since they would finance the subsidy through a tax credit mechanism.
- Purvin & Gertz estimates that the total direct impact on taxpayers can reasonably be assumed to be between \$1.1 billion (US) to \$2.9 billion (US) per year or \$16.4 billion (US) to \$43.8 billion (US) over the 15 year period envisioned in the bill.
- Producers in existing producing areas and in potentially new producing areas such as the Mackenzie Delta/Beaufort Sea region would be faced with lower market prices due to the Alaskan gas subsidy which would reduce their investments. Given reduced drilling activity, production is reduced in all non-subsidized gas regions on the continent. The Alaskan gas subsidy is therefore counterproductive from a continental security of supply perspective.

Summary and Conclusions (Cont'd)

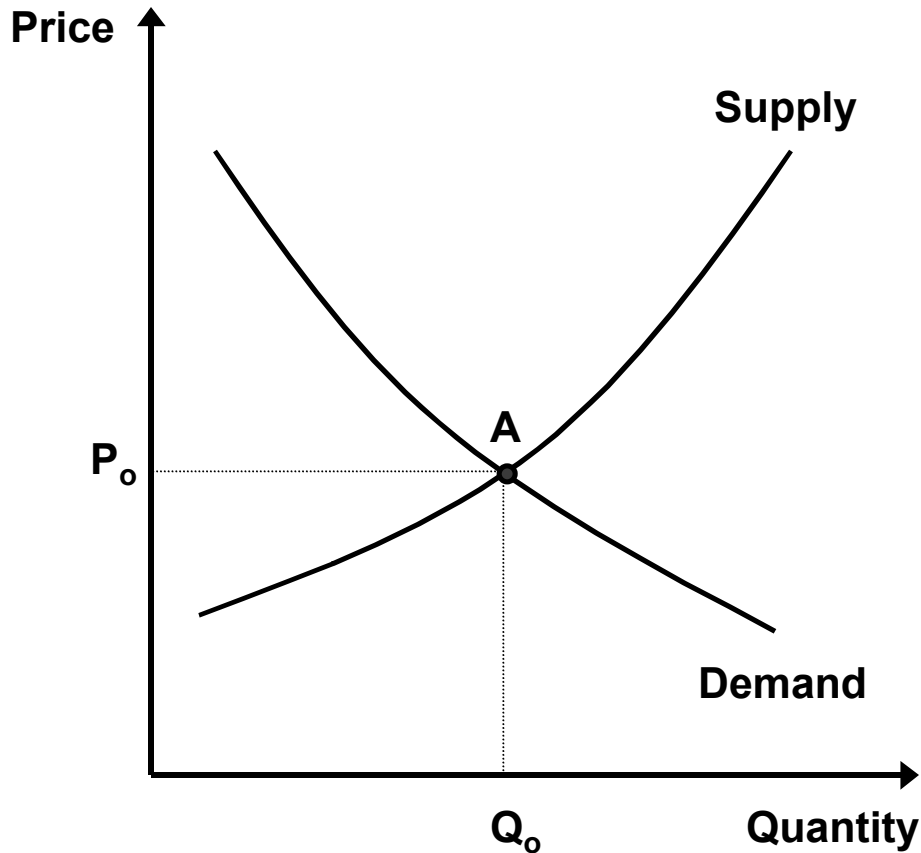
- The greater volumes and “artificial” competitiveness of Alaskan gas as well as the lower sustained market price could delay Mackenzie Delta/Beaufort Sea gas production beyond Purvin & Gertz’ 2020 long term forecast horizon given 15 years of subsidized Alaskan gas.
- Gas resource owners in Canada and the U.S. would be negatively impacted by subsidized Alaskan gas because of lower royalty and bonus payments given the artificially induced lower competitiveness and attractiveness of all non-subsidized gas on the continent.
- Existing gas infrastructure in non-subsidized regions would be underutilized.
- Goods and services providers with local expertise or who lacked mobility would see reduced business and investment opportunities in non-subsidized regions.
- There is strong potential for conflict between Canada and the U.S. due to the Alaskan gas subsidy. The subsidy might also contravene trade agreements.

III. MARKET IMPACT MECHANISMS

Competitive Natural Gas Market

- The competitive market supply/demand framework of analysis is assumed in this undertaking in order to simplify the complex reality of the North American natural gas market.
- It allows for a systematic discussion of the important factors of change and their impacts.
- The North American natural gas market is regarded as a competitive market since there are many buyers and sellers (price takers), natural gas is relatively homogenous, adequate market information exists and few barriers to trade are present.

Competitive Natural Gas Market (Cont'd)



- Perfect competition produces an optimum allocation of resources.
- That optimum is shown as point A, giving quantity Q_0 at price P_0 .
- A shift away from that optimum produces a misallocation of resources and distorts the marketplace.

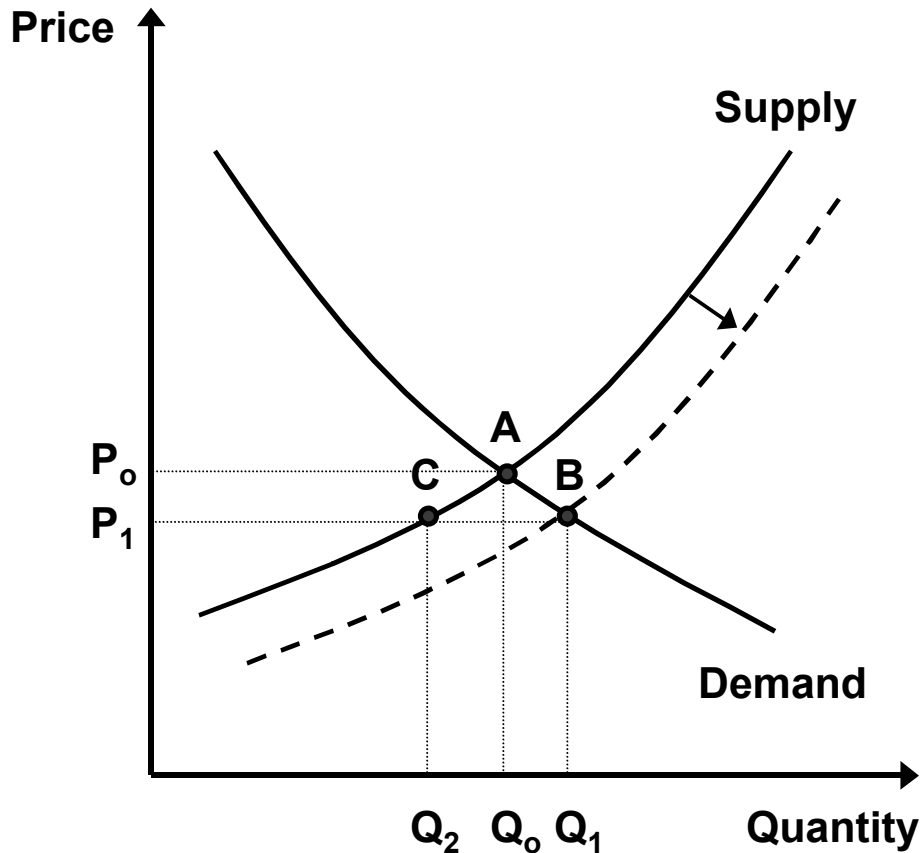
Discussion on Subsidies

- Subsidies are often justified to correct market failure or to promote a more equitable “solution”.
- This is not the case for the Alaskan natural gas subsidy since the North American natural gas market approaches the perfect competition model (approaches optimality). This subsidy creates significant winners (e.g. Alaskan producers and Alaskan economy) and significant losers (e.g. other resource owners and producers, taxpayers, etc.) with an overall loss to the economy (sub-optimal allocation of resources).
- Subsidies often encourage an overexpansion of facilities as price risk is reduced.
- The Alaskan natural gas subsidy will encourage overinvestment in Alaskan gas production since it works as a false signal to the “privileged few” that diverts resources from a higher marginal value activity to a lower marginal value activity.

Discussion on Subsidies (Cont'd)

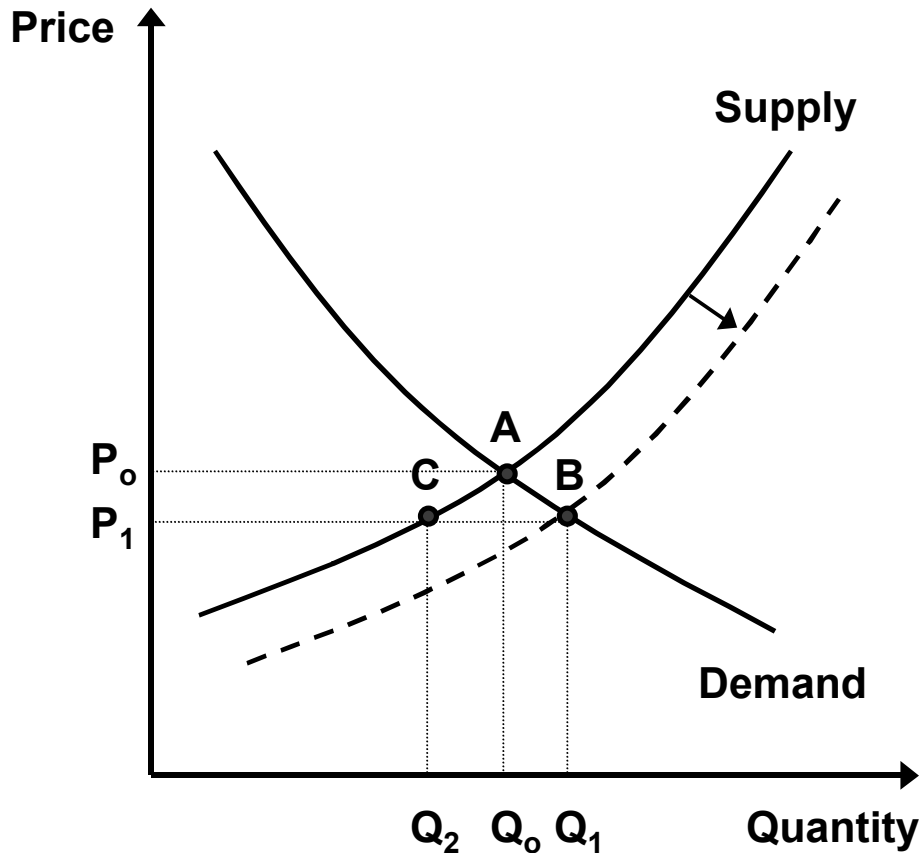
- Subsidies induce rent seeking behaviour on the part of the potential “winners”. A disproportionate share of the potential subsidy is spent in the political area to secure and then keep the subsidy instead of being allocated to productive activities. Again, this is a misallocation of resources.
- The Alaskan natural gas subsidy is targeted for gas produced north of the 64th parallel in Alaska. The floor price applies only to that gas. All other gas is sold at the market price.
- The following figure illustrates what happens to the market price with the advent of subsidized gas.

Market Impact of Subsidized Alaskan Gas



- A non-market government policy (subsidized Alaskan gas) increases supply from Q_0 to Q_1 (instantaneous effect).
- The new market equilibrium goes from point A to point B with price going down from P_0 to P_1 .
- The lower market price implies that existing producers will only supply Q_2 , down from Q_0 .

Market Impact of Subsidized Alaskan Gas (Cont'd)

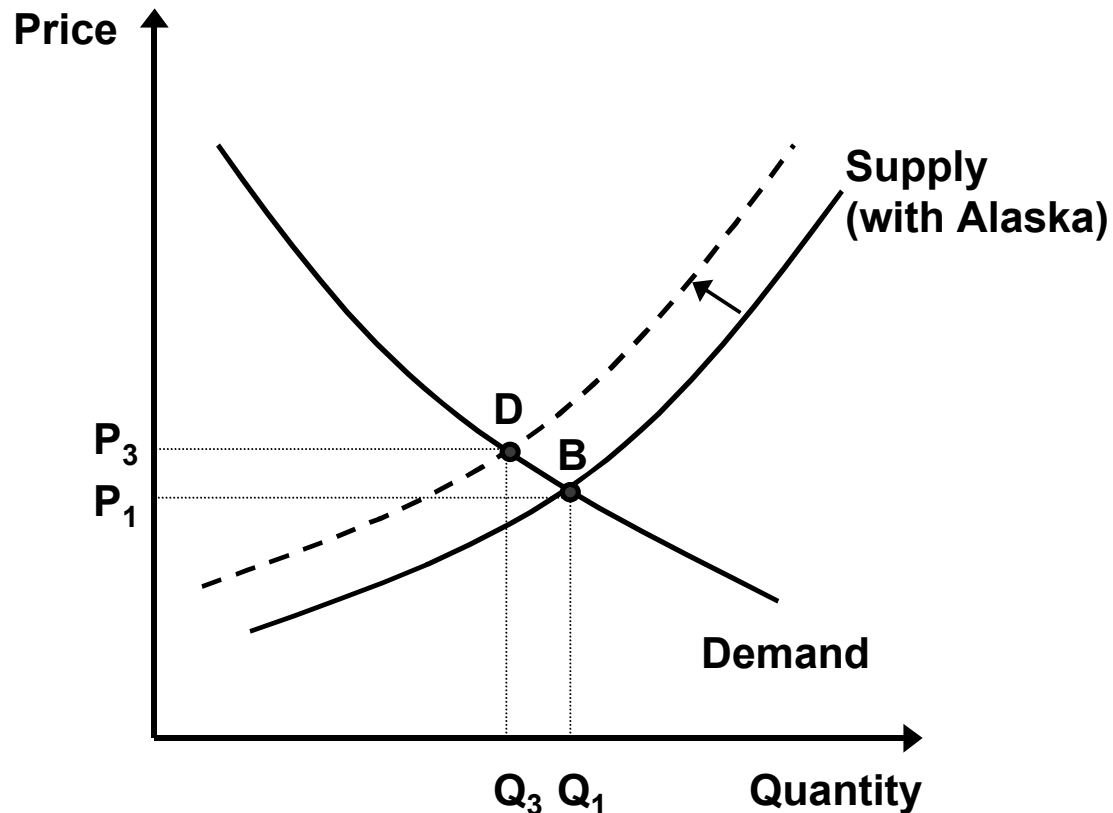


- The new market equilibrium for existing producers is at C.
- The difference between Q_0 and Q_2 is made up by subsidized Alaskan gas producer now producing $Q_1 - Q_2$.
- By reducing market risk with a price floor for the “privileged few”, they are able to further increase their market share.

Misallocation of Resources

- Alaskan producers overinvest in productive capability and infrastructure given their higher subsidized prices.
- Existing producers in the Lower 48 and Western Canada underinvest given the lower market price.
- Existing non-mobile capital and labour (e.g. infrastructure and specialized regional manpower) are underutilized.
- An underinvestment in potential new supplies occurs (e.g. frontier gas and new technologies) given the lower market price.
- On the demand side, given the lower market price, an overinvestment occurs in gas-using equipment.

Misallocation of Resources (Cont'd)



- When the subsidies expire, Alaskan gas supply decreases since “true” costs are higher.
- A reinvestment is required in the original producing regions to replace degraded infrastructure and retrain specialized manpower.
- The market equilibrium moves from B to D, with price going higher from P_1 to P_3 and quantity decreasing from Q_1 to Q_3 .
- The overinvested capital in Alaska and gas-fired equipment is now underutilized.

IV. POTENTIAL IMPACTS AND IMPLICATIONS

Potential Winners

State of Alaska

- The State of Alaska has a strong interest in having Alaskan gas subsidized by the American taxpayers through the tax credit mechanism.
- The subsidy increases the probability of developing Alaskan natural gas north of 64° latitude by reducing the market risk of potential producers.
- Legislative constraints mandate the Alaskan Highway route.
- The State of Alaska benefits from natural gas development by increased job opportunities, local business and investment opportunities, revenues from property taxes and other related tax sources, gas service to local communities, potential industrial developments related to natural gas, and pipeline development that would be synergistic in developing Alaska's sedimentary basins.

Potential Winners (Cont'd)

Yukon

- The Yukon could benefit in the same manner as the State of Alaska.

Producers

- Existing Prudhoe Bay producers (ExxonMobil, BP, Phillips) would see an increased probability of profitability monetizing their stranded gas assets.
- Other potential Alaskan natural gas producers north of 64° would benefit if a market link (e.g. the Alaska Highway natural gas pipeline) was built which enabled them to commercialize their gas properties. These producers would want to ensure that pipeline capacity built for the major area players will also allow for their production to reach market.

Potential Winners (Cont'd)

- Although producers are currently leading Alaskan gas pipeline development, it is likely that the operators and owners of these projects will eventually be pipeline companies and not producers. At the very least, the pipeline companies will be the major partners in the Alaskan gas pipeline projects. Given the legislative bias for the Alaska Highway route, the Alaska Natural Gas Transmission System (ANGTS) project is well positioned to benefit from Alaskan gas development. Pipelines that bring the Alaskan gas to the eventual end-use markets could also benefit.
- There are several other types of commercial entities that could benefit from Alaska gas development such as the products and services sector.
- Other potential winners include those natural gas end-users that can benefit from the initial decrease in natural gas prices.

Potential Losers

American Taxpayer

- The American taxpayers are potentially one of the largest groups of losers from an Alaskan gas subsidy since they are the ones that would finance the subsidy through a tax credit mechanism.
- Purvin & Gertz' base case forecast AECO price is approximately \$1.00 (US)/MMBtu less than the guaranteed floor price of \$3.25 (US)/MMBtu for Alaskan producers. The Alaskan gas flow in our base case forecast is 4 BCF/D.
- Purvin & Gertz' higher price scenario (lower probability) indicates an AECO price of approximately \$3.00 (US)/MMBtu. This translates into a subsidy of around \$0.25 (US)/MMBtu. Alaskan gas flow in this scenario increases up to 6 BCF/D.
- Since our higher price scenario does not reach \$3.25 (US)/MMBtu, we also do not expect the price to reach 150% (approximately \$4.87/MMBtu) when a tax credit recapture would potentially occur.

Potential Losers (Cont'd)

- The following table shows the annual subsidy over a reasonable range of circumstances.

ANNUAL SUBSIDY IN BILLION \$US⁽¹⁾

Subsidy Per Unit (\$US/MMBtu)	Volumes (BCF/D)		
	4.0	6.0	8.0
0.25	0.4	0.5	0.7
0.50	0.7	1.1	1.5
0.75	1.1	1.6	2.2
1.00	1.5	2.2	2.9

Note: (1) Assumes volumetric and energy content parity at 1 MCF = 1 MMBtu to simplify calculations for illustrative purposes. Assumes 365 days in a year. All dollar figures are in constant dollars (inflation adjusted). Forecast prices are approximations to simplify calculations for illustrative purposes.

Potential Losers (Cont'd)

American Taxpayer (Cont'd)

- The previous table illustrates that under Purvin & Gertz' base case price forecast, the annual subsidy could range between 1.5 to 2.9 billion dollars (US) per year. Over 15 years (without taking into account the time value of money), the American taxpayer would be expected to fund subsidies totalling between 21.9 to 43.8 billion dollars (US).
- In Purvin & Gertz' lower probability scenario with a higher market price forecast, the American taxpayer would be expected to fund subsidies between 365 million to 730 million dollars per year or between 5.5 to 11 billion dollars (US) over 15 years.
- The incentive to overinvest in Alaska would tend to push gas production higher and have a more significant market price impact. Purvin & Gertz therefore believes that the total direct impact on the taxpayers can reasonably be assumed to be between \$0.50-1.00 (US)/MMBtu on 6.0 to 8.0 BCF/D giving an annual subsidy of \$1.1 billion (US) to \$2.9 billion (US) per year or \$16.4 billion (US) to \$43.8 billion (US).

Potential Losers (Cont'd)

Other Producers Not Receiving A Subsidy

- As shown in the previous section's discussion, producers in existing producing basins and potential producers in new producing areas such as the Mackenzie Delta/Beaufort Sea region would be faced with a lower market price given the increased supply from subsidized Alaskan gas.
- The lower market price signals to producers, other than the subsidized Alaskan producers who receive the higher floor price, to reduce investments in the existing producing basins since cash flow is reduced. The lower investments mean that exploration and development activities such as drilling are reduced. Given naturally occurring reservoir decline rates, production is reduced. Less locally available and specialized goods and services are required. Lower infrastructure requirements reduce existing capacity utilization rates.

Potential Losers (Cont'd)

Other Producers (Cont'd)

- In previous studies, Purvin & Gertz showed that a large increment of Alaskan gas would temporarily reduce the market price. The lower price would reduce drilling activity and production in other areas. The greatest price impact would be on Western Canada because the large new flows would be passing through this producing region on its way to markets already supplied by Western Canada. The Mountain producing regions in the U.S. would then proportionately be the most affected Lower 48 area since the large increment of Alaskan gas would be going to the Mountain regions' most important market regions. The U.S. Gulf Coast region would have the greatest volumetric reduction in the Lower 48 given its dominant position in the Lower 48.
- With subsidized Alaskan gas, the market impact would be greater and longer in duration since the subsidized floor price would be continuously sending the signal Alaska producers to expand. The lower market price would be irrelevant to the investment decision in Alaska. The market price decrease would therefore not be temporary.

Potential Losers (Cont'd)

Potential Mackenzie Delta/Beaufort Sea Producers

- Potential Mackenzie Delta/Beaufort Sea producers face many uncertainties and risks just like many other project developers with respect to political, economic, social, technological, environmental, and regulatory considerations. Purvin & Gertz has identified market (price) risk and capital cost risks as the two most important quantifiable risk factors in its previous Arctic gas studies.
- In these previous studies, large volumes of Alaskan gas flows delayed Mackenzie Delta/Beaufort Sea gas production by at least three years because of the market impact and lack of resources available due to the Alaskan gas project.
- The prospect of facing subsidized Alaskan gas is much worse. The signal to Alaskan producers is to overinvest and increase production beyond the previous outlook in Purvin & Gertz' Alaskan gas studies. The greater volumes and "artificial" competitiveness of Alaskan gas as well as the lower sustained market price could delay Mackenzie Delta/Beaufort Sea gas production beyond our 2020 long term horizon given 15 years of subsidized Alaskan gas.

Potential Losers (Cont'd)

Gas Resource Royalty Owners

- Gas resource owners, either governmental or freehold, in Canada and the U.S., would be impacted by subsidized Alaskan gas because the lower production and investments in existing and potentially new areas would see lower royalty payments due to lower market prices and volumes as well as lower bonus payments given the artificially induced lower competitiveness and attractiveness of all non-subsidized gas on the continent.

Gas Infrastructure

- Gas gathering, processing, and transportation systems in all non-subsidized regions, e.g. all regions on the continent except for the subsidized Alaskan producers, will be underutilized with the advent of government funded Alaskan gas. These infrastructure owners could see their returns reduced if the higher unit costs cannot be passed on and/or the infrastructure users will see their unit costs increase for using underutilized capacity.

Potential Losers (Cont'd)

Goods and Services Providers

- Many goods and services providers have local expertise that is not easily transferred to other regions. There is also an issue with labour mobility. With investments being reduced in the non-subsidized areas, these providers would have reduced business and investment opportunities. The products and service sector includes core analysis, data processing, data providers, development and reclamation planning, ditching, drilling consultants, contractors and suppliers, earthmoving, emergency response, engineering and design consultants, environmental contracting, financial services, fuel, geo-services, transportation, insurance, land agents, line pipe, mapping, pipe coating, pipe installation, pipe testing, compressors, etc.
- Delays in developing Mackenzie Delta/Beaufort Sea gas would impact commercial entities in the Northwest Territories business community. More specifically, local firms providing expediting services, transportation services, construction services, fuel and other goods, accommodation and food services would not benefit from increased activity because of the delays. The opportunities in line clearing and camp related activities would also be delayed. Training and job opportunities would also be delayed.

Other Considerations

- The Alaskan gas subsidy is counterproductive from a continental security of supply perspective since some existing and potential production from other areas on the continent has been reduced to make room for the subsidized gas.
- There are possible international ramifications since there is a strong potential for conflict between Canada and the U.S. Canada has been a strong supporter of market-based solutions in the energy sector. Canada is an important supplier of energy (gas, oil, electricity) to the U.S. Canadian energy supplies have been secure. The Alaskan gas subsidy is seen as a serious break with market-based solutions. The Canadian Natural Resources Minister, Herb Dhaliwal, has indicated that the subsidy would violate an agreement between the two countries to let the market decide. He indicated that in such an event, the Government of Canada would be forced to reconsider its position.
- The Alaskan gas subsidy might also contravene free trade agreements between the two countries as well as World Trade Organization trade rules.

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