Government Support to Upstream Oil & Gas in Russia

How Subsidies Influence the Yamal LNG and Prirazlomnoe Projects

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JULY 2014

Lars Petter Lunden and Daniel Fjaertoft, Sigra Group

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This report has been peer-reviewed by:

- Mikhail Babenko, PhD in Economics, Oil & Gas Officer, WWF Global Arctic Programme
- James Henderson, Senior Research Fellow, Oxford Institute for Energy Studies
- Kathrin Keil, PhD in Political Science, Project Scientist at the Institute for Advanced Sustainability Studies and Europe Director, the Arctic Institute
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- Arild Moe, Candidate Political Science, Assistant Director, Fridtjof Nansen Institute
- Roman Sidortsov, Scott Polar Research Institute, University of Cambridge, Senior Global Energy Fellow, Institute for Energy and the Environment, Vermont Law School

The views expressed in this report are those of the authors, and should not be attributed to the funders or peer reviewers. Likewise, all remaining shortcomings of the paper remain the responsibility of the authors.

DISCLAIMER

The data for this report have been collected from publicly available sources. Therefore the sections on the Yamal Liquid Natural Gas (LNG) and Prirazlomnoe projects differ to some extent due to large differences in data availability and quality. This is especially the case for environmental impact assessments. Moreover, the projects are different in terms of size, location, hydrocarbon composition, government support programs and development history. The description of the projects is therefore not necessarily similar. We nevertheless aim to measure the impact and influence of subsidies using the same methodology as described in the methodology section below.

The main objective of the report is to demonstrate whether subsidies to Yamal LNG and Prirazlomnoe projects exist, and if so, estimate their magnitude and influence on project economics. This approach differs and is complementary to the existing debate of the many economic and political reasons for granting government support to these projects. Big-picture hypotheses and explanations on why subsidies have been granted are outside the scope of this report, which seeks to be factual and focused. Therefore, the authors have not scrutinized discussions regarding strategic significance and political economy around the Yamal LNG and Prirazlomnoe projects for the Arctic and the Russian energy sector.

Assumptions for the economic analysis of upstream oil and gas projects are always subject to uncertainty. Expected future values for parameters such as currency exchange rates and prices for oil and gas are difficult to estimate and discount rates are often subject to heated debates. Uncertainty also exists with respect to project development costs and recoverability of reserves. This uncertainty should be kept in mind when interpreting the results and analysis below. All assumptions and approximations have been explicitly stated, enabling both transparency as well as an opportunity for open discussions on the applicability of the chosen input values.

The cash flow analysis is based on Sigra Group's internally developed RusTax-model (RTM). The RTM model is tailored to assess the economic impacts of government support in the form of tax breaks and investment subsidies on petroleum projects in Russia. This flexible model has been developed within the PETROSAM project financed by the Research Council of Norway and has been successfully used and adapted to assess the economics of field developments projects in Russia, Norway and the United States (the Chukchi Sea).

The final draft report was submitted on June 1, 2014. Any developments for these continuously evolving projects after this date therefore remain outside the scope of this report.

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1.0 EXECUTIVE SUMMARY

The objective of this study is to identify, quantify and evaluate measures of government support to two upstream oil and gas developments in the Russian Arctic. The first is Yamal Liquefied Natural Gas (LNG), owned by the Russian company Novatek together with foreign partners, which in 2017 is planned to become Russia's first Arctic LNG producer. The second is the Prirazlomnoe oil development, owned by Gazprom, which in 2013 became the first producing offshore field in the Russian Arctic.

The general public has expressed a lot of interest in both field developments over recent years, but the public debate has suffered from a lack of transparent and comprehensive analysis. This report seeks to fill in the gap and inform discussions around the expediency of fiscal support measures to Yamal LNG and Prirazlomnoe against their social costs and benefits.

The report follows up on the previous work of the Global Subsidies Initiative (GSI) of the International institute for Sustainable Development (IISD) on national-level inventories of fossil-fuel producer subsidies in Canada, Norway, India, Indonesia and Russia, and, in particular the report "Fossil Fuels—At What Cost? Government Support for Upstream Oil and Gas Activities in Russia" published jointly by IISD-GSI and WWF Russia in February 2012.

The identified avenues of government support to upstream oil and gas activities in Russia include government investment into exploration and infrastructure development, tax breaks (relief on mineral extraction tax, export duties, property tax and some other levies), coverage of environmental risks, and some other measures.

Using Sigra Group's RusTax-model and information collected from publicly available sources, the analysis demonstrates how the measures of government support to the two projects have altered their economics. The modelling assumptions are clearly explained in the report. For both Yamal LNG and Prirazlomnoe the analysis follows the same algorithm, seeking answers to several research questions (marked in bold).

The first question sets the baseline for analysis: **would the projects be economically viable if there were no fiscal policies (that is neither taxes nor subsidies) at all?** For Yamal LNG the answer is positive if the cost of infrastructure development is not included in the analysis: the project's net present value (NPV) is US$1.81 billion at a discount rate of 12 per cent. If the cost of the new project-specific infrastructure development (presently covered by the government in the assumed amount of US$5.75 billion) is included, the answer is negative: the project would not be viable. For Prirazlomnoe the cost of infrastructure development is not that significant, and the project would be viable in a "world without fiscal policies" with NPV at US$2.77 billion using 2002 as the base year, and at US$16.27 billion using 2013 as the base year.

What would project economics look like, if both projects were developed under the benchmark system of taxation for the Russian oil and gas industry (that is without tax breaks and other government support measures)? Yamal LNG would not be economically viable regardless of infrastructure costs. For Prirazlomnoe, the situation is twofold. If the base year for the analysis is 2002 (the actual start year of the project), the answer is negative—the project appeared economically unviable without government support, which, however, was not granted at that time. In the meantime, even though beset with delays, the project still went ahead, and received tax breaks as late as in 2013 (with more possibly to come in the future). However, by that time the capital costs had already been incurred. Economic theory suggests that all past costs should be treated as sunk and should not impact decisions. If 2013 is used as the base year for analysis, the Prirazlomnoe project shows positive economics even without subsidies. In other words, in 2013 it would make sense for Gazprom to complete the project even if subsidies were not granted. The tax breaks granted thus resemble more a gift, in the amount of US$16.5 billion in undiscounted terms, from the government to the company rather than a step to fine-tune the taxation system.

If the project was found economically unviable without government support, does government policy make its economics positive in the real "world with fiscal policies"? For Yamal LNG tax breaks raise project return compared to benchmark taxation, but not above return in a "tax-free world." The tax breaks therefore rectify distortionary effects of the Russian gross-income tax system. Counting infrastructure investments, government support makes an inherently uneconomic project profitable for investors. For Prirazlomnoe the tax breaks, when computed as if they were given in 2002, raise project return compared to the benchmark tax system but not above the project's inherent return in a "tax-free world." As in the case of Yamal LNG the tax breaks for Prirazlomnoe serve to rectify distortionary effects of the Russian gross-income tax system. When calibrated from 2013, however, the year when tax breaks were actually given, the project shows positive economics under the benchmark tax system. Accordingly, the tax breaks would not affect investors' decisions in 2013.

What are the social benefits and costs of the Yamal LNG and Prirazlomnoe, two projects "cherry-picked" by the Russian government? First, both projects can be expected to generate tax payments, albeit of different scale. For Yamal LNG, the government take is 24 per cent of the project's net cash flow. The NPV of tax payments is US$4.35 billion and the government fails to recoup its investments into project-specific infrastructure (US$5.75 billion). These infrastructure investments are asserted to be part of a larger strategy to develop Arctic regions, but Yamal LNG is the only project so far to benefit from this government support. For these policies to make economic sense, substantial additional activity without additional government support must follow. For Prirazlomnoe, the NPV of tax payments is US$22.34 billion, and the government take is around 53 per cent. For comparison, in Norway the government take from the oil and gas sector amounts to roughly 78 per cent.

Second, both projects have generated employment opportunities (up to 7,000 workers for Yamal LNG and up to 2,500 workers for Prirazlomnoe at the most labour-intensive construction phase). Third, there have been some benefits for Russian suppliers, in particular, Technopromexport and Mezhregiontruboprovodstroy in the case of Yamal LNG and design bureaus such as Rubin and Coral and shipyards such as Sevmash and Zvyozdochka in the case of Prirazlomnoe. In the meantime, a significant share of supply contracts, especially for Yamal LNG, have been granted to foreign companies. With regard to the local economy, there is little reason to expect significant positive ripple effects going forward.

Third, there are significant concerns related to the environmental impact of both projects. For Yamal LNG, the primary concern relates to changes in the salinity levels in the Bay of Ob as a result of dredging activities, which might fundamentally alter a unique ecosystem. For Prirazlomnoe, the major environmental concern relates to the possibility of oil spills and whether the project is adequately equipped to limit this risk and capacity to clean up a potential spill.

What are the lessons learned for policy-makers from the analysis of Yamal LNG and Prirazlomnoe? The conclusion that post-tax economics are negative in both cases under the benchmark oil and gas taxation system in Russia demonstrates the challenge of raising investment for inherently profitable projects under the existing benchmark tax system. Tax breaks and other measures of government support seek to eliminate these distortions.

However, such "corrective" tax breaks and other measures of government support are not built into the Russian taxation system automatically and do not follow systematic selection criteria. Instead, they appear to be granted on ad hoc basis to high-profile developments based on considerations such as projects' potential to generate demand for services of military shipyards or exploitation of the Northern Sea Route. While the Russian government has reserved the right to "cherry-pick" such projects, there is no guarantee that one at the same time is not overlooking other projects that could bring greater returns to the Russian state. Furthermore as the tax breaks increase in multitude the system gets steadily more complicated, thus undermining the administrative simplicity that serves as the main justification for today's system.

Moreover, such "manual control" of tax breaks and other measures of government support to "cherry-picked" projects often comes at the cost of unnecessarily large rent transfers from government (and taxpayers) to companies. The history of Prirazlomnoe shows that determining tax breaks based on actual costs transfers cost-related risk to the government that should be expected to discourage savings and efficiency gains among companies. Continuing the cherry-picking of projects through ad hoc tax breaks and government infrastructure investments will most likely lead to rent transfers from the government to companies in the future.

In the meantime, the lack of solid quantitative estimates precludes a straightforward answer to the question of whether or not the overall social benefits of such developments overweigh their overall social costs, including significant environmental risks.

2.0 RATIONALE AND OBJECTIVE OF THE REPORT

The objective of this study is to identify, quantify and evaluate government support to two Russian field development projects in upstream oil and gas: Yamal LNG (gas) and Prirazlomnoe (oil). Specifically, the analysis will demonstrate how government support measures to these projects have altered project economics and thus provided investment incentives. Moreover, an inventory of the main social costs and benefits associated with each project will be presented.

The report builds on the Global Subsidies Initiative (GSI) report series "Fossil Fuels – At What Cost" in general, and the report on "Government Support for Upstream Oil and Gas Activities in Russia" from February 2012 specifically (Gerasimchuk, 2012). The present report has been prepared in parallel to an analogous report on the Meadowbank gold mine in Nunavut, Canada (Cunningham, Gerasimchuk, Kitson, & Gerrard, in press).

GSI is an initiative launched by the International Institute for Sustainable Development and is dedicated to increasing transparency over subsidies and their impact on sustainable development. GSI focuses on subsidies to both consumers and producers predominantly of fossil fuels and biofuels, but also to renewables and nuclear energy. The main objective is to identify support measures that contribute to overuse of energy resources and propose advice on reform of those subsidies that undermine sustainable development.

In general, governments provide support to upstream oil and gas projects to reach one or more of the following goals: secure future budget revenue, support or create jobs, stimulate industrial development and innovation, secure sufficient production of energy domestically and/or to preserve market power in world markets, attract foreign direct investment, support regional development, support efficient development of resources and some others. However, as explained below, subsidies often result in misallocation of economic resources (in particular, overutilization of energy resources) and are associated with economic, social and environmental costs.

As shown in the report "Government Support to Upstream Oil and Gas Activities in Russia" (Gerasimchuk, 2012), the Russian government has provided ample support to the oil and gas industry in the past. For example, the Sakhalin 1, Sakhalin 2 and Kharyaga projects have been confronted with claims that the production-sharing agreements for the projects have skewed benefits towards the companies at the expense of the government. At present, the Russian government does not resort to production-sharing agreements anymore, but is increasingly introducing preferential tax breaks for companies with plans to invest in development projects (Tax-Code, 2013).

More recent energy policy discussions in Russia have to a significant extent revolved around government support measures to new developments offshore and onshore in the Arctic. Based on the demand for independent data integration, information availability and significance for socioeconomic developments, the GSI has selected the Prirazlomnoe and the Yamal LNG upstream projects in the Russian Arctic for this case study (see Figure 1). These projects are clearly individual cases, but there is no reason to assume that they are outliers in terms of the government support received and social costs or benefits.

FIGURE 1. LOCATION OF THE YAMAL LNG AND PRIRAZLOMNOE PROJECTS IN THE RUSSIAN ARCTIC.

Source: Sigra Group

Both Yamal LNG and Prirazlomnoe projects have received tax breaks as well as other forms of government support. Further, like any other upstream oil and gas projects, Yamal LNG and Prirazlomnoe developments could be associated with negative effects such as greenhouse gas emissions, potential oil, fuel and natural gas liquids (NGL) spills as well as loss of habitats and biodiversity. These costs should be weighed against the expected economic and social benefits of the projects.

The remainder of this report is organized to support the discussion of costs and benefits of the two projects. Section 5 outlines the scope and approach of the study. Section 6 discusses the Yamal LNG project in detail, focusing on the magnitude and impact of identifiable government support measures, including social benefits and costs such as local job creation and adverse environmental effects. This structure is replicated in Section 7 for the Prirazlomnoe project while Section 8 concludes.

3.0 STUDY SCOPE AND APPROACH

3.1 DEFINING SUBSIDIES

Subsidies are typically provided from public to private sources to achieve a socially favourable situation that would not have occurred without government support. However, according to standard economic theory, subsidies contribute to waste and economic inefficiency (Varian, 1991). By distorting economic decisions, subsidies stimulate non-optimal allocation of resources such as labour, natural resources and capital, creating dead-weight losses with society at large bearing the full cost.

This study's methodology is based on the subsidy definition given in the WTO's "Agreement on Subsidies and Countervailing Measures" (ASCM), to which over 150 countries have agreed. Russia signed the ASCM as part of the documents package under its accession to the WTO on December 16, 2011 (Gerasimchuk, 2012). In Article 1 "Definition of a Subsidy" the Agreement defines four ways in which governments can confer support to industries and projects:

- Direct transfer of funds (e.g., grants, loans, equity infusion) or potential direct transfers of funds (e.g., loan guarantees).
- Revenue foregone or not collected (e.g., tax credits).
- Provision and/or purchase of goods or services (other than general-purpose infrastructure).
- Income or price support.

According to Article 2, for the subsidy term to apply, government support has to be specific to an enterprise, a group of enterprises, an industry, or a group. In its work, the GSI has deviated from this approach, identifying cases where government support can significantly benefit the recipient even though it is not exclusive to it (for instance accelerated appreciation allowances that significantly benefit extractive industries, but normally apply to all businesses). Thus, the GSI's definition of a subsidy includes situations where government support is granted to:

- Selected companies inside an industry (market level).
- One sector or product when compared with other sectors (national level).
- Sectors or products in one country when compared internationally (global level).

International definitions of government support are chosen due to ambiguous definitions in Russian legislation. Although the term "subsidy" is frequently used in Russia, the term is not defined in national legislation (Gerasimchuk, 2012). Specifically, the Budget Code of the Russian Federation lacks a definition of subsidies, raising criticism from legal experts (Andreyeva, 2010). Nevertheless, the term "subsidy" is used in the Budget Code implying targeted, *ad hoc* transfers of funds from, for example, federal to regional budgets to fulfill specified policy objectives. In addition, government bodies such as the Ministry of Finance employ subsidy-related notions such as government revenue foregone, budget shortfalls, or tax expenditure. Further, since Russia has joined the WTO and its ASCM, the WTO approach is appropriate for the purposes of this study.

Resource Rent Taxation: The concept of neutrality

Normally, taxation of natural resources differs from taxation of other activities. The presence of resource rents, i.e., extra return above an investor's risk-adjusted rate of required return, warrants additional taxes to be levied on extractive industries securing rent for the benefit of society. In theory, the government should

collect all resource rents, but this goal is often hard to achieve in practice. The goal of maximizing government tax revenue is complicated by the dilemma of providing incentives for investments versus collecting as much taxes as possible. In Russia, tax breaks, which are the prevailing form of government support to upstream oil and gas, have been thought needed to stimulate field developments, but this could undermine the goal of maximizing tax revenue.

Following Lund (2002), tax breaks can be defined as subsidies if an economically unviable project pre-tax becomes viable post-tax. Similarly, economic theory on resource rent taxation says that optimal taxation policies are non-distortive, i.e., the relative profitability estimate is the same before and after tax so investment decisions do not change (Sandmo, 1989). The literature on neutrality is specifically oriented towards designing tax systems that do not undermine marginally profitable projects, but that also do not make non-economic investments become profitable, i.e., stimulating projects that would not have been developed in a tax-free world. Thus, neutrality in the tax system protects both against over-investments and under-investments.

In Russia, however, hydrocarbon taxation is not neutral since resource rent taxes are levied based on gross income (revenue) rather than net income (Lunden, 2014). Gross taxation was introduced in 2001 because imperfect cost monitoring allowed companies to report high costs with resulting low taxable profits leading to low tax receipts in the 1990s. According to Lund (2002), it is often rational to combine net and gross taxation in environments with limited capacity to accurately monitor costs and the tax reform of 2001 vastly increased Russia's tax receipts from the petroleum industry.

Revenue-based taxation provides low-risk revenue for the government. However, since cost-related risk is born by the companies, these will require a higher expected return to invest in new projects. In other words, revenue-based taxation comes at the cost of fewer development projects implying reduced overall government revenue from the industry.

Government Support in Russia: Subsidies or counterweight to distortionary taxation?

Because of the gross-income-based tax system, development projects in Russia often go from viable pre-tax to unviable post-tax. That is, following the definition above, taxation creates the opposite distortionary effect compared to subsidies: it penalizes projects by making them economically unattractive.

In Russia, the government has opted to introduce targeted *ad hoc* tax breaks in order to incentivize new project developments. In theory, tax breaks should be set at a level where the neutrality criteria are met, i.e., at a level where the resource rent is captured by the government, the company receives its required return and project profitability is unaltered by taxes. In practice, however, it is easier said than done to achieve this goal. Since tax breaks are derived from the underlying gross-income-based system, post-concession taxation inherits the weaknesses from the pre-concession tax system: failure to adequately capture resource price hikes, cost overruns etc. Moreover, tax concessions normally follow negotiations between companies and the tax authorities, who have diametrically opposed interests when estimating the expected future revenues and costs, which profitability assessments are based on. Thus, whether tax concessions are generous (i.e., subsidizing), fair or remain penalizing for the companies is not straightforward to assess.

In other words, the extent to which underlying petroleum taxation negatively distorts investments in hydrocarbon development projects in Russia must be accounted for when discussing the level of potential government subsidies. This caveat must be kept in mind both when assessing tax breaks and other forms of government support such as government provision of infrastructure (e.g., port investments at Yamal). That is, after having identified government support measures, these must be netted against the distortionary effects of the underlying tax system to determine whether they qualify as a subsidy as defined by Lund (2002).

In addition, the *ad hoc* nature of Russian petroleum taxation (i.e., project-by-project tax breaks) implies the risk of not granting tax breaks to the most cost-efficient projects. For example, there might exist more profitable projects than Yamal LNG, but Novatek's success in securing tax breaks could be due to the size and high profile of this project or Novatek's better negotiation position vis-à-vis the tax break-granting authorities (Grib, 2010). If this is the case, the government foregoes the revenue that it could have earned if it incentivized another (more profitable) project instead, and this loss should be counted as a subsidy to the Yamal LNG project. In other words, by introducing differentiated gross-income-taxation rather than profit-based taxation the Russian government has removed the automatic stimulus to develop the inherently more profitable projects first. As a consequence, petroleum companies could choose to develop projects where they have highest chances of receiving tax concessions (large, high-profile projects) rather than their most cost-efficient projects. Correspondingly, the government may give preferential treatment to companies with good connections and bargaining abilities rather than companies with good projects.

The study of these effects remains beyond the scope of this study, but the inability of Russian petroleum taxation to automatically stimulate more profitable development projects increases the risk for, and magnitude of, subsidies.

3.2 DATA AND APPROACH

This report relies on information gathered from public sources. As much information as possible has been drawn from primary sources, i.e., financial reports, company presentations and other published information by Gazprom (including subsidiaries) for Prirazlomnoe, and Novatek and its partners for Yamal LNG. Other sources of information include government statistics, federal budget information and tax legislation as well as official information from environmental impact assessments. In addition, information has been gathered from peer-reviewed papers, third-party analytical coverage and other media reports. For environmental impact assessments, WWF Russia and Greenpeace Russia have also provided data, analyses and comments.

This report includes cash flow-based valuations of government support for the Yamal LNG and Prirazlomnoe projects. The valuations are based on the cash flow analysis of Sigra Group's internally developed RusTax-model (RTM). The RTM discounted cash flow model is tailored to assess the economic impacts of government support in the form of tax breaks and investment subsidies on petroleum projects in Russia. This flexible model has been developed within the PETROSAM project financed by the Research Council of Norway and has been successfully used and adapted to assess the economics of field developments projects in Russia, Norway and the United States (the Chukchi Sea).

The quality of the valuations necessarily reflects the quality of input data. Where available, data have been collected directly from company presentations. Nevertheless, although information on gross production volumes and cost levels can be found, the timing of costs and production is not readily available. As a result, a number of assumptions and approximations have been made based on experience from similar projects, in particular, in Norway.

Assumptions and approximations are listed explicitly, allowing a transparent discussion by a wider community on what assumptions are rational and reasonable to apply. Project-specific assumptions such as on markets are listed in the following sections on Yamal LNG and Prirazlomnoe respectively.

For both projects, a discount rate of 12 per cent in real terms has been selected based on a standard oil industry risk discount rate of 10 per cent in real terms with a risk-premium of 2 per cent to take into account the projects' localization in Russia (Imperial-College, 2012). For government revenue, the discount rate is set at 8 per cent in real terms, which is based on an average of the last years' yield on 10-year government bonds (Investing.com, 2014).

The ruble/US$ exchange rate is set at 30 rubles per dollar based on a rough average over 2012-2013 (Google Finance, 2014).

The oil price is assumed to amount to US$100 per barrel, based on a prolongation of the Ministry of Economic Development's forecast of US$100 per barrel in the years 2015 and 2016.

4.0 OVERVIEW OF THE YAMAL LNG PROJECT[1]

The South-Tambeyskoye field (hereafter used interchangeably with Yamal LNG) was discovered in 1974 and is located on the northeastern part of the Yamal peninsula. Based on U.S. Security Exchange Commission (SEC) standards, it has proven reserves of 481 billion cubic meters (BCM) of gas and 13.4 million tonnes (mmt) of liquid hydrocarbons as of December 31, 2012. However, using the less conservative PRMS[2] standard, proven and probable total gas reserves are estimated to 907 BCM. By Russian reserves classification, Yamal LNG contains 1,256 BCM (including categories C1 and C2) (Energy-Pedia, 2009).

Field development includes three LNG trains, each with a capacity of 5.5 mmt per year, implying peak production of 16.5 mmt LNG per annum corresponding to a total production of 27 BCM per year. Condensate production capacity will be 1 mmt per year. Plateau production is expected to last 16 years (Gyetvay, 2011). First priority is given to wet gas reservoirs for early maximization of gas condensate output. The field consists of five shallow gas horizons and 27 deeper gas condensate horizons, with depths varying from 900 to 2,850 meters. 208 wells will be drilled from 19 well pads. A total of 188 kilometres (km) of gas gathering lines, 121 km of roads and 143 km of high voltage lines will be constructed. Figure 2 presents visualization of the project.

By the end of 2013 total capital expenditure was estimated at US$26.9 billion, US$2.6 billion of which have already been financed by the shareholders (Novatek, 2013). This was an increase of US$6.9 billion compared to the initial estimate of US$20 billion (Vukmanovic, 2013).

The partners in Yamal LNG took the final investment decision on December 18, 2013, and production is planned to commence in 2017.

In the presentation "Harnessing the Energy of the Far North," Novatek highlights the main advantages of the Yamal LNG project (Gyetvay, 2013):

- Concentrated reserves and location at the coast minimizes transportation costs from wells to the LNG plant.
- An efficient gas liquefaction process due to sub-zero temperatures implies low liquefaction expenditures per unit of LNG production.
- Access to both European and Asian markets (see the paragraph on marketing strategy below and Figure 3).
- Strong government support from the Russian state.

1 Unless otherwise specified, information in this section is taken from www.novatek.ru.
2 Petroleum Resources Management System, http://www.spe.org/industry/reserves.php

FIGURE 2. YAMAL LNG AS PORTRAYED BY PROJECT PARTNERS

Source: Novatek Press Service. Reproduced with permission of Novatek.

Shipment infrastructure includes LNG storage facilities and an ice-protected jetty with two loading berths for tankers at the port of Sabetta. From the port, LNG tankers with ice-breaking capacity able to operate up to 2.1 meters of ice will be used to transport LNG to international markets.

By 2012, front-end engineering design work (FEED) of the project was completed and a contractor was selected for drilling the first production wells. Two rigs were subsequently dispatched to the field and work commenced on preparing the well pads. Moreover, work was underway on construction of roads, a fuel depot, housing facilities, canteens, a power station as well as a boiler house.

Marketing Strategy

LNG marketing options from Yamal are illustrated in Figure 3 below. Through the Northern Sea Route (NSR) Yamal LNG has the possibility to reach Asian markets relatively fast during the navigating season, but as illustrated, LNG can be routed to virtually all relevant markets year-round. From November through June, when the NSR becomes inaccessible, gas will preferably be transferred to Asian markets via Europe. However, this will often not be physical deliveries, as swaps can be utilized to route Yamal LNG's shipments to European markets in exchange for deliveries to its Asian customers from other LNG producers.

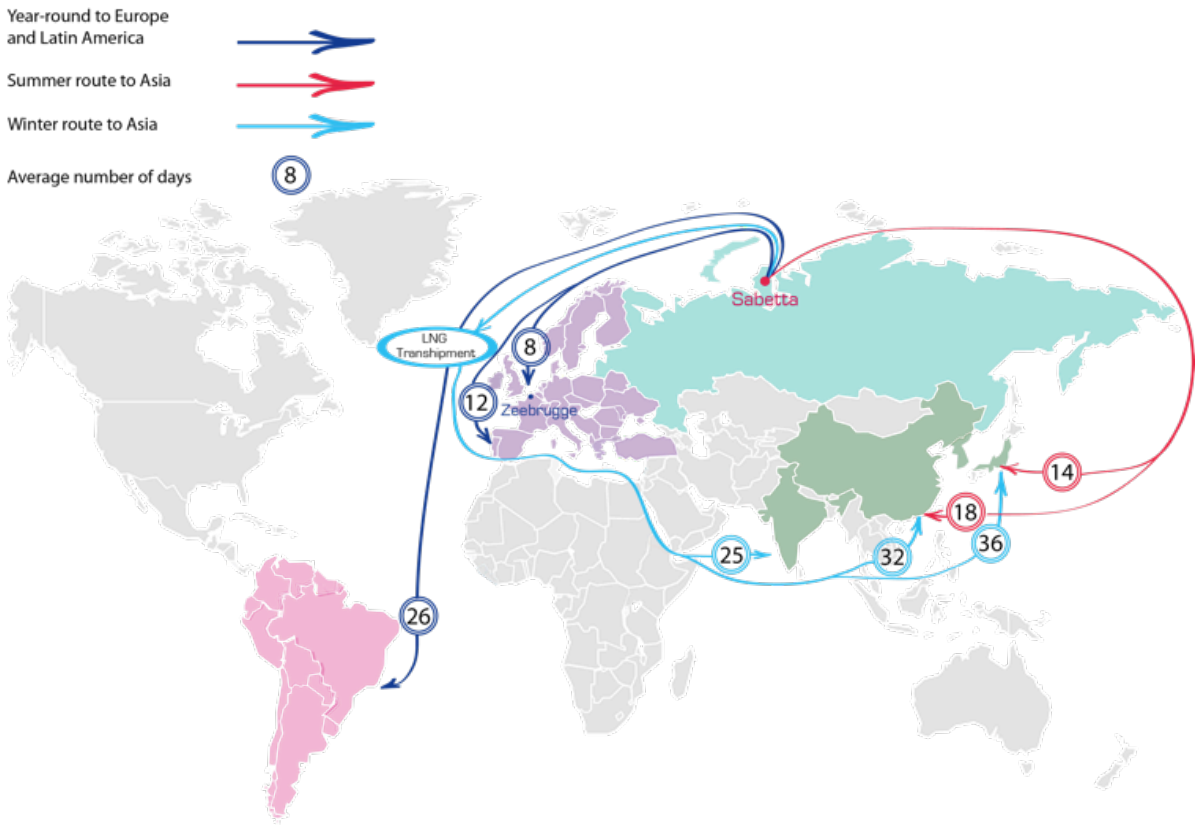

FIGURE 3. YAMAL LNG SHIPPING OPTIONS

Source: Novatek Press Service. Reproduced with the permission of Novatek.

To reduce risks, Yamal LNG has already entered into a range of sales agreements: 93 per cent of volumes at Yamal LNG are already contracted, both to European and Asian customers, with the bulk of volumes routed to Asia (Total, 2013; Shiryaevskaya, 2013; Pronina, 2014). For example, on October 31, 2013 an agreement was concluded with Natural Fenosa of Spain for 2.5 mmt LNG, equivalent to roughly 10 per cent of Spain's annual consumption. This followed just a week after Novatek entered a 15-year supply deal with the Chinese company CNPC for delivery of 3 mmt of LNG per year. Moreover, on May 23 2014 Gazprom entered into an agreement with Novatek for 3 mmt of LNG per year for 20 years (Gazprom, 2014b). This comes in addition to agreements with Total and Novatek Gas & Power for sales of 4 and 2.86 mmt, respectively (Staalesen, 2014).

According to M. Gyetvay, Chief Financial Officer at Novatek, European supply contracts will be based on a combination of National Balance Point (NBP) in the UK, i.e. hub prices, and contract prices linked to crude oil price levels. In contrast, the contract with CNPC is linked to the so-called Japanese Crude Cocktail (JCC) (Vukmanovic O., 2013). The formula for USD/MMbtu is 12.67% x JCC+$0.26, implying almost US$13/MMbtu at a JCC price of US$100 (RAMESH, 2013).

Ownership history

OAO Yamal LNG holds the license for exploration and production at the South-Tambeyskoye field. The license is valid until 2045.

The owners of OAO Yamal LNG at the beginning of 2014 were Novatek (with 80 per cent) and Total (with 20 per cent). However, an agreement had been signed September 5, 2013 with government-owned Chinese CNPC to acquire 20 per cent of the project, leaving Novatek with 60 per cent. A memorandum on project

finance for Yamal LNG with a Chinese bank consortium and the above-mentioned agreement on LNG sales quickly followed the agreement.

Following approval of CNPC's purchase, a share of 9 per cent was still left for other companies following Novatek's stated interest of retaining 51 per cent in the project (Kuzmin, 2013). An Indian consortium is reportedly interested in acquiring this stake (Jacob, 2013).

Total entered the project in 2011 with a 20 per cent share for a consideration of US$425 million and compensate for previous expenses with an amount of US$11 million (Novatek, 2013a). In addition, Total should add US$375 million to the share capital by 2012 with the obligation to increase it further with an amount up to US$500 million, dependent on project capital requirements. Simultaneously, Total acquired 12 per cent of Novatek shares for US$4 billion, which was planned to increase to 19.4 per cent within 3 years (Bierman, 2011). By June 2013, Total's share had increased to 16 per cent (Marson, 2013).

The license for South Tambeyskoye has had several owners over the years. Novatek entered the project in 2009, when it acquired 51 per cent in OAO Yamal LNG for US$650 million. Previous license holders included Orsel Consultants Ltd, Aldi Trading Ltd and Innecto Ventures Ltd, which were all connected to Volga Resources. Volga Resources is controlled by Gennady Timchenko, thought to be close to President Putin, and the Yamal LNG share was bought from another oligarch, Alisher Usmanov, one year before.

Until 2005, the license for Yuzhno-Tambeyskoe belonged to OAO Tambeyneftegaz, which was controlled by Nikolay Bogachev. Novatek then owned 25,1 per cent of OAO Tambeyneftegaz, which was subsequently sold to Gazprombank. However, at the same time, the license for Yuzhno-Tambeyskoe was reassigned to OOO (OAO) Yamal LNG. Gazprombank challenged this move in the courts, and Bogachev sold his share to Metalloinvest, partially owned by Usmanov, in 2006 (Grib N., 2009).

On September 30, 2011, Novatek increased its share to 100 per cent after realizing two options for 23.9 and 25.1 per cent in July 2009 and March 2011, respectively. The largest share belonging to Varyks Enterprise Ltd controlled by Petr Kolbin was purchased for US$526 million while the smallest share belonging to Inecto Ventures Ltd controlled by Gennady Timchenko was sold for US$450 million. Novatek discloses a total purchase sum of US$986 million, the difference of US$10 million most likely due to timing of exchange rate application (Novatek, Consolidated Financial Report, 2013).

4.1 GOVERNMENT SUPPORT FOR YAMAL LNG

Identified sources of Government Support for Yamal LNG are summarized in Table 1 below in line with the methodology of the Global Subsidies Initiative.

TABLE 1. GOVERNMENT SUPPORT FOR YAMAL LNG – GSI TYPOLOGY (SINCE 2009)

Type of Government Support		Identified Measures of Government Support
Direct and indirect transfer of funds and liabilities	Direct spending	See the section on infrastructure development below.
	State enterprise ownership	No government ownership
	Credit support	Possible involvement of Vneshekonombank in financing the LNG tanker fleet. No information on possible preferential terms.
	Insurance and indemnification	Not identified
	Occupational health & accidents	Not identified
	Environmental costs	Environmental concerns are listed in Yamal LNG's "Environmental and Social Scoping Report." Government funds pay most of the environmental fines for harmful project activities such as dredging.
Government revenue foregone	Tax breaks	Federal tax breaks: • **Federal Law 258-FZ, July 21, 2011:** Mineral Extraction Tax (MET) exemption for natural gas for up to 250 BCM within 12 years from the first gas production and gas condensate for up to 20 mmt within 12 years from first condensate production. • Government Instruction 1029, November 18, 2013: Exemption for export duties for LNG and Stable Gas Condensate. Regional tax breaks (Regional Law No. 151-ZAO, December 23, 2010) • Exemption for property tax until 250 BCM of gas has been produced, but within 12 years from when property is registered for accounting purposes. • Reduced profit tax rate, 13.5% compared to 18%, for the first 250 BCM of gas production within 12 years from the first gas production.
	Accelerated depreciation	Federal legislation on accelerated depreciation: Tax Code of the Russian Federation (Articles 258-259.3) • Immediate depreciation allowance for up to 30% for fixed assets • Accelerated depreciation schedule (up to twice as fast) for fixed assets employed in an aggressive environment (e.g., north of the Arctic Circle)
Provision of goods or services below market value*	Government-owned oil and gas resources	Unclear how Tambeyneftegaz got access to the license for Yuzhno-Tambeyskoye.
	Government-owned infrastructure	The government supports the Yamal LNG project through substantial infrastructure development. See the section on infrastructure development below.
	Government procurement	No information. Some gas is procured by government-owned Gazprom, but no information on possible preferential terms of the contract.
	Government-provided goods or services	The government offers services connected to its infrastructure investment (logistics services etc.); however, it is difficult to assess whether these are offered below "market rates" due to lack of information.

Income or price support	Market price support and legislation	Amendments to legislation on export rights allowing LNG to be exported outside of Gazprom's monopoly, which represent an important change to allow Yamal LNG the opportunity to market its gas abroad. This can, however, be viewed as a removal of market distortion rather than a subsidy.

* This category normally includes relief on royalties as a payment for the use of government-owned reserves. However, the Russian fiscal policies allocate the function of royalties to the mineral extraction tax and the export duty, exemptions from which are discussed as subsidies under the "government revenue foregone" category.

4.2 INFRASTRUCTURE DEVELOPMENT

The government supports the development of the Yamal LNG project through substantial infrastructure investments in the area:

- Construction and operation of the Sabetta seaport
- Construction and operation of the icebreaking fleet through Atomflot, which is state-owned
- Financing and construction of an LNG tanker fleet through Sovcomflot, which is state-owned
- Construction of the Sabetta airport

Seaport Construction and Operation

As can be seen in Figure 4, the port of Sabetta is a substantial infrastructure development. The government has responsibility for constructing and operating:

1. Administrative facilities
3. Ice-protection construction
4. Port harbor
5. Approach channel
6. Seaway channel

Yamal LNG is responsible for: administrative facilities (shared with the government) and berths, jetty and utility systems (Gyetvay M., 2011).

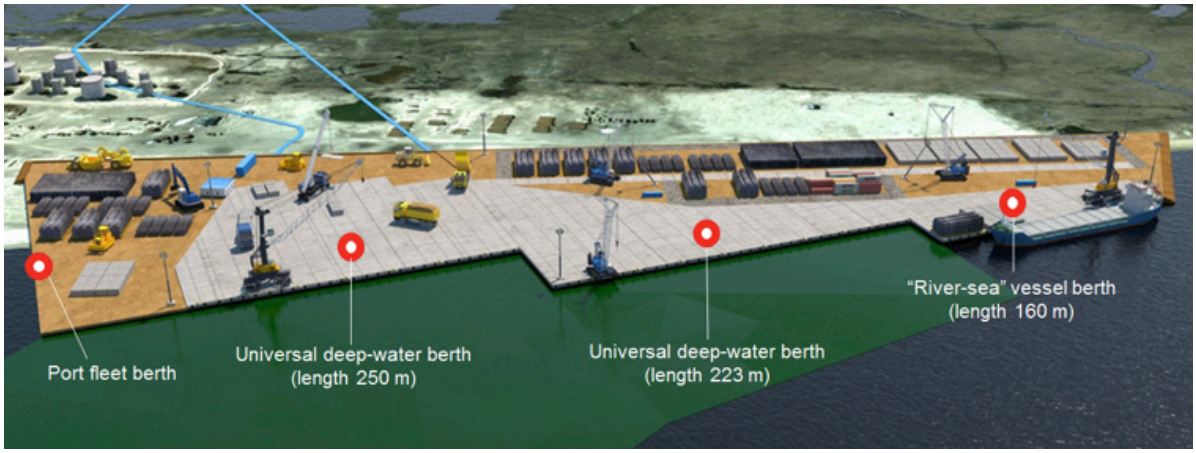

FIGURE 4. SEAPORT DEVELOPMENT SCHEME

Source: Novatek Press Service. Reproduced with permission of Novatek.

The seaway channel will be a dredged channel 12 meters deep, 35 nautical miles long and 350 meters wide. Dredged material will thereafter be utilized to construct an ice-protection barrier.

In July 2012, construction started in Sabetta on four cargo berths that will receive construction materials and finished LNG modules. By August 2013, early phase installations such as facade and anchored walls as well as rows of covered piles had been completed, enabling commencement of dredging activities. The total length of the four quays will be 915 meters, and they will be capable of receiving both Ro-Ro and Lo-Lo (roll-on/roll-off and lift-on/lift-off) vessels. The early construction phase is expected to be concluded in June 2014 enabling offloading of process modules weighing more than 8 000 tonnes (Sas, 2013).

The contractor for the early-phase port facilities is JSC Mezhregiontruboprovodstroy (MRTS). According to Decree No. 1128-r, issued by the Russian Government, dated July 4, 2013, the Sabetta port will be open for entry by vessels under a foreign flag.

According to President Putin (2013), 47 billion rubles (corresponding to US$1.5 billion) have been reserved for port development projects in Sabetta. The port infrastructure, especially the approach channel and the seaway channel, is part of a wider scheme of developing the Yamal Peninsula until 2035 and is supposed to be amortized over a period of 50 years: its users are to pay operating fees.[3] Thus, the costs cannot be solely attributed to the Yamal LNG project. Nevertheless, in the absence of other projects, the Yamal LNG project must be regarded as the main beneficiary of these federal support measures.

Ice-Breaking Vessels and LNG Carriers

The LNG tankers should be able to perform 200 voyages per year, corresponding to loading every 44 hours and total transportation of roughly 15 mmt LNG.[4] On July 4, 2013, OAO Yamal LNG signed an agreement with Daewoo Shipbuilding and Marine Engineering on construction of up to 16 LNG tankers. According to Sovcomflot representative D. Rusanov, each vessel should have a cost of approximately US$350 million, bringing total costs for transportation to US$5.6 billion (Vesti-Finance, 2013). A shipping company has not been selected for all tankers, but Sovcomflot signed a memorandum with Novatek and Vneshekonombank, a government-owned bank, on construction and finance of two pilot tankers in June 2013 (Sovcomflot, 2013). Subsequently, in November 2013, Vneshekonombank agreed with Korea Exim Bank to set up a US$1 billion fund for energy, infrastructure, shipbuilding and other projects. A part of the capital was intended to finance vessels for Yamal LNG (MAREX, 2013).

Since a third party will undertake LNG transportation, it is questionable whether subsidies are granted. Only if Yamal LNG will be charged lower-than-market transportation rates can this be regarded as a subsidy. Since tankers have not yet been constructed, information on transportation rates is not available. Sovcomflot has proposed creating a consortium between many LNG shipping companies to "streamline" operations, but could meet resistance from the Anti-Monopoly Service since the consortium-idea resembles a cartel. At the same time, a lockout of non-Russian shipping companies could provoke reactions from the WTO. Other companies that reportedly have shown interest are Dynagas, Stena, NYK, Teekay and Prisco (PortNews, 2013). Thus, if transportation contracts are awarded based on international tenders, there is little reason to believe there would be any government support involved in transportation.

In the meantime, if Sovcomflot is selected on a non-competitive basis, further investigation is required to analyze whether this will be a form of government support (below-market transport rates) or in fact will penalize Yamal LNG through forced selection of a suboptimal contractor caused by limited competition for the transport contracts. Yamal LNG will nevertheless possibly benefit from third-party construction and operation of the LNG carriers insofar as the third party can finance their operations more cheaply and offer Yamal LNG

3 Comments by L. Mikhelson during Q&A session following M. Gyetvay's presentation (Gyetvay M. , 2011).
4 Comments by L. Mikhelson during Q&A session following M. Gyetvay's presentation (Gyetvay M. , 2011).

transportation rates that are lower on NPV-terms compared to a situation where Yamal LNG would finance, construct and operate the LNG tankers.

In terms of nuclear icebreakers, the state company Atomflot has four operational vessels, one in reserve and one under construction, plus two more planned to be constructed towards 2018–2020. These vessels benefit all users of the NSR and cannot straightforwardly be attributed entirely to Yamal LNG as they constitute an integral part of Russia's presence in the Arctic waters. However, since the development of Yamal LNG supports rationale for constructing new icebreakers, the government support to Yamal LNG can either be seen as a subsidy towards enhancing icebreaking capacity, or icebreaker construction can be seen as a subsidy to Yamal LNG.

Airport Development

Sabetta International Airport was able to receive its first passengers by the end of 2013 and is the largest airport on the Yamal Peninsula. It can accommodate planes such as Ilyushin 76, Antonov 148 and Boeing 737, and the passenger terminal can receive 200 people per hour, including 50 international travellers (ArcticInfo, 2013). Although the airport is owned by Novatek, it is reportedly constructed using government funds (Putin, 2013).

4.3 DISCOUNTED CASH FLOW ANALYSIS

This section analyzes the Yamal LNG project in three incremental steps using Sigra Group's RTM discounted cash flow model described above. First the Yamal LNG project is valuated in isolation from government funded infrastructure investment in order to identify the effects of government support through tax breaks. In the next step, the effects of accelerated depreciation are analyzed. Lastly, the share of government investments in infrastructure that can be counted as government support to Yamal LNG are added to the project's CAPEX, allowing an analysis of project economy with and without state infrastructure support.

Project-level Evaluation

The Net Present Value (NPV) analysis presented below rests on a number of assumptions and simplifications. The main variables and assumptions are summarized in Table 2 below.

TABLE 2. DISCOUNTED CASH FLOW ASSUMPTIONS

Variable	Assumption
Field Reserves	481 BCM gas*
13.4 mmt condensate*	No government ownership
CAPEX	US$26.9 billion
OPEX	US$800 million / year*
Transport Costs	US$3.7/MMBtu*
Government Support	US$2 billion
Gas price	US$12/MMBtu*
Condensate Price (same as Oil Price)	US$100/bbl**
MET Gas	RUB 788/1000 cubic meter
MET Condensate	RUB 679/tonne condensate
Export Duty Gas	30%
Export Duty Condensate	US$49.3/bbl @ oil price US$100/bbl
Discount Rate	12%**
Depreciation Schedule	8 years average (due to no information on equipment classification)
USD/RUB exchange rate	30 to 1 **

* Further explanation below ** As explained in Section 3.2. on Data and Approach

Gas Price and Transport Cost Explanation

For price and transportation costs it is assumed that one third of total production is routed to Asia via the Northern Sea Route during the navigable season, one third is routed to Europe and the last third to Asia via the Suez Canal. In Asia, gas prices are calculated by the JCC formula mentioned above, yielding a price of US$13/ MMBtu while NBP prices are assumed to be US$10/MMbtu, yielding an average price of US$12/ MMBtu.

Transport costs are extrapolated from calculations made by Armstrong Atlantic State University. Given the market orientation assumed above, the relevant transportation costs are US$1.15/MMBtu to Europe, US$7.04/ MMBtu to Asia via the Suez Canal and US$2.85/ MMBtu to Asia via the NSR. Average transportation costs are thus US$3.7/MMBtu (Armstrong-University, 2013).

No official information has been found for operational expenditures for Yamal LNG. Therefore, a level of 3 per cent of total capital expenditure has been chosen, based on a general industry rule of thumb (White, 2012).

A CAPEX increase from US$20 to 26.9 billion was announced in December 2013.

Production Profiles

Production profiles for gas and condensate are based on Figure 5 below. Calculations are based on SEC reserve estimates and profiles approximated based on the shape of the figures below. Plateau production of 25.2 BCM gas / year is assumed to last 16 years (Gyetvay M., 2011). Condensate production is assumed to peak after five years and decline thereafter.

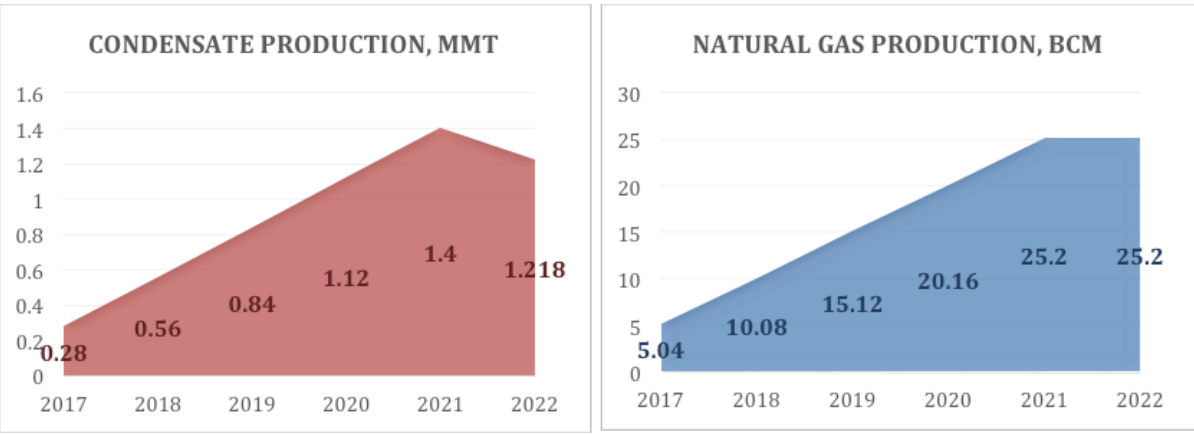

FIGURE 5. PRODUCTION PROFILES

Source: Plotted by the Sigra Group based on data from Gyetvay (2011).

Taxation Assumptions

Taxation of hydrocarbons in Russia is not straightforward. Novatek enjoys several tax breaks as outlined in Table 2 above, but to analyze the effect that these potential subsidies have, one has to establish the level of taxation the Yamal LNG project would face without tax breaks. Tax conditions under both scenarios are summarized below in Table 3.

TABLE 3. TAXATION ASSUMPTIONS

Tax	Normal Taxation Scenario	Tax Break Scenario
Export duty gas	30%	0%
Export duty condensate	US$49.3/bbl @ US$100/bbl oil price	0 US$
MET gas*	Domestic formula (Tax-Code, 2013), in 2015 set at 0.701*788, i.e. 552 rubles/1000 cubic meters	0 US$ for 250 BCM within 12 years
MET condensate	Domestic formula (Tax-Code, 2013), in 2015 set at 679 rubles/tonne	0 US$ for 20 million tonnes
Profit tax	18% regional budget, 2% federal budget	13.5% to regional budget for 250 BCM within 12 years. Federal share of 2% unchanged, thus total profit tax is 15.5% for 250 BCM within 12 years.
Property tax	2%	0% for 250 BCM within 12 years

* Further explanation below

The MET formula for gas derives the tax from sales prices. For gas producers other than Gazprom, calculations are based on the domestic price. For Gazprom, which is the owner of the unified gas transportation system and holds monopoly rights over pipeline exports, prices in export markets are factored in, yielding a higher MET. Since Novatek is not an owner of the unified gas transportation system, MET is calculated using domestic prices only. However, since all gas from Yamal LNG is routed abroad, one could argue that the applicable MET rate should be calculated based solely on export prices. That would change the applicable MET rate to 1194 compared to 552 rubles per 1000 cubic meters.

Moreover, it could be questioned whether export duties on gas should be included in the analysis since LNG in general is exempted from this gross levy. However, in terms of government support LNG projects should be evaluated on the same basis as other gas projects and therefore export taxes for gas are included to determine the overall level of government support, even though they are not project-specific.

Valuation Analysis Including Tax Breaks

Based on the assumptions outlined above, the pre-tax NPV for Yamal LNG is US$1,813 million, with an internal rate of return (IRR) of 13 per cent. I.e., in a theoretical "tax-free" world, the Yamal LNG project shows positive economics.

TABLE 4. NPV YAMAL LNG (MILLION US$)

Tax	Normal Taxation Scenario	Tax Break Scenario
Export duty gas	30%	0%
Export duty condensate	US$49.3/bbl @ US$100/bbl oil price	0 US$
MET gas*	Domestic formula (Tax-Code, 2013), in 2015 set at 0.701*788, i.e. 552 rubles/1000 cubic meters	0 US$ for 250 BCM within 12 years
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Profit tax	18% regional budget, 2% federal budget	13.5% to regional budget for 250 BCM within 12 years. Federal share of 2% unchanged, thus total profit tax is 15.5% for 250 BCM within 12 years.
Property tax	2%	0% for 250 BCM within 12 years

Source: Sigra Group.

However, after introducing taxes without tax breaks, NPV is negative, with a value of US$(-)10.962 billion and an IRR of 4.4 per cent. After introducing tax breaks, NPV increases by US$10.337 billion to US$(-) 585 million and an IRR of 11.6 per cent, i.e., project economics are still negative. Thus, based on the discussion on subsidies above, the tax breaks are measures to correct distortions in the underlying tax system rather than subsidies. As long as post-tax IRR remains below pre-tax IRR, tax breaks are in fact not generous enough to reach the desired state of neutrality in the tax system. For the tax breaks to be characterized as subsidies, they should increase post-tax IRR above its pre-tax level, i.e., above 13 per cent.

Figure 6 shows post-tax cumulative cash flows excluding and including tax breaks. As can be seen, removing gross taxes has a large positive influence on project economics. The largest of these is the 30 per cent export duty on gas, and total difference in undiscounted terms is US$35 billion.

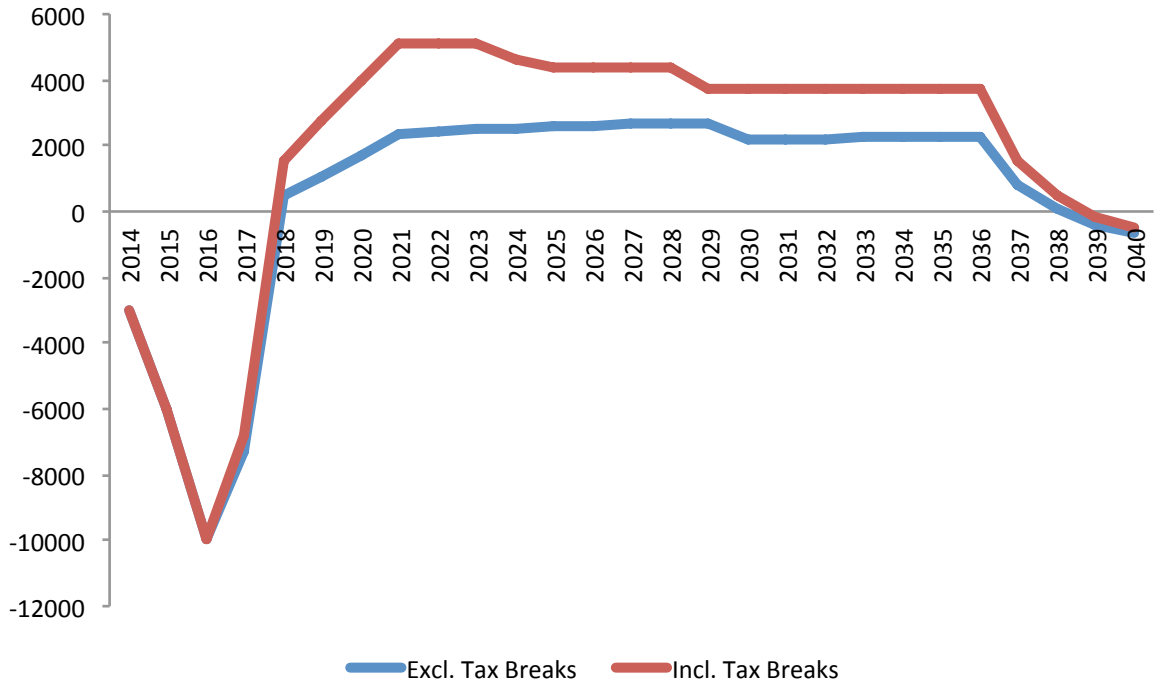

FIGURE 6. POST-TAX CASH FLOW EXCL./INCL. TAX BREAKS

Source. Sigra Group.

Sensitivity Analysis

The valuation of Yamal LNG is strongly influenced by the underlying assumptions from Table 2. Therefore, it is interesting to see how changes to these assumptions change project economics. For example, the prices Yamal LNG will receive for its LNG may be substantially higher than what is assumed above; even though contract details are not disclosed, prices depend on fluctuations in the price of oil and other variables.

Figure 7 shows a sensitivity analysis for the Yamal LNG field development. As can be seen, with a price increase of 30 per cent or an increase in production of 25 per cent, the IRR for Yamal LNG is in the range of 15 per cent. The same result is achieved by a decrease in CAPEX of 25 per cent, which corresponds to the previous CAPEX estimate of US$20 billion.

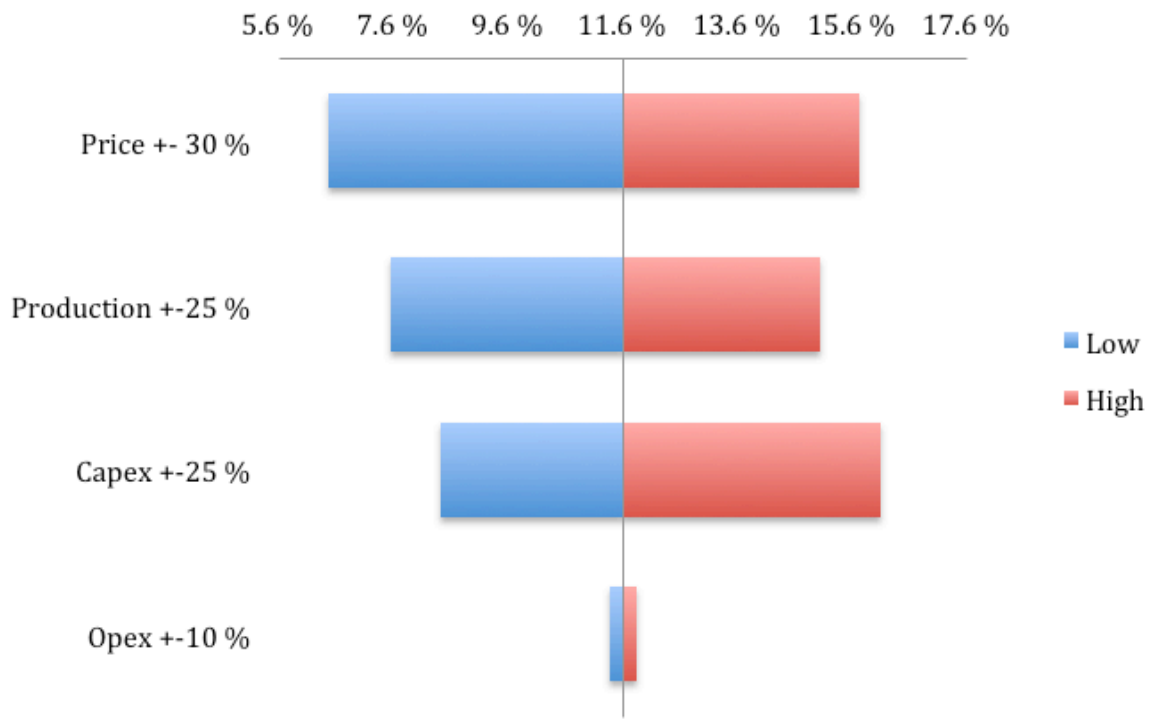

FIGURE 7. SENSITIVITY ANALYSIS IRR, YAMAL LNG

Source: SIgra Group.

Introducing Accelerated Depreciation

The Tax Code of the Russian Federation (Articles 258-259.3) stipulates accelerated depreciation allowances to encourage capital-intensive development projects (Gerasimchuk, 2012). Up to 30 per cent of the cost of newly acquired fixed assets and/or expenses incurred in connection with the extension, modernization or partial dismantling of fixed assets may be expensed immediately (Tax Code, Article 258.9). In addition, fixed assets employed under the conditions of an aggressive environment, such as locations north of the Article Circle, can employ accelerated depreciation up to two times the ordinary schedule (Tax Code, Article 259.3).

However, employing 30 per cent first-year deduction and an accelerated depreciation schedule (from eight to four years, straight line) to the Yamal LNG project yields no impact under the employed assumptions for production profile and timing of capital expenditure. The reason is that Russian rules for consolidating profit tax bases across subsidiaries requires the holding company's stake in these subsidiaries to exceed 90 per cent (Federal Tax Service, 2014). This is not the case for Yamal LNG, and profit tax is therefore calculated at the project level as if it were ring-fenced. Thus, when the first capital expenditures incur, there are no profits to deduct the costs from since capital expenditures necessarily precede income.

With the production and cost profile employed, it takes seven years for Yamal LNG to enter profit tax position, i.e., reach the level where net revenue is higher than that year's depreciation, thus yielding a positive Earnings Before Interest and Tax (EBIT). However, in the preceding seven years, Yamal LNG has obviously built up a significant tax balance. Thus even though EBIT is positive, it will still take some five years before tax balance (loss carry forward) has reached a level that is lower than EBIT and Yamal LNG actually has to start paying profit taxes.

Since the baseline depreciation schedule of eight years straight line provides full depreciation before EBIT, less loss carry forward becomes positive, accelerated depreciation (30 per cent first-year deduction and four years straight line depreciation) has no effect on NPV and IRR.

This result would be different had the project had higher revenue earlier or if the underlying depreciation schedule had been longer than eight years. For example, for fields that are already producing and are undertaking investments in, for example, enhanced oil recovery (EOR), the effect of the accelerated depreciation schedule should be significant.

Valuation Analysis Including Tax Breaks *and* Infrastructure Investments

In its entirety, the Yamal LNG project's CAPEX should take into account project-specific infrastructure investments that are currently paid for by the government.

The level of government support in terms of infrastructure development is somewhat unclear. Total Yamal LNG costs are reported to be RUB 1 trillion, corresponding to US$33 billion (Ria-Novosti_a, 2011). At the time this figure was released, company project costs for Yamal LNG stood at US$20 billion, leaving US$13 billion unaccounted for. According to Novatek CEO L. Mikhelson, the US$33 billion figure included: project development costs, port and airport construction as well as construction costs for LNG tankers and icebreakers. Expected costs for the tankers are US$5.6 billion, leaving US$7.4 billion unaccounted for. As mentioned above, port construction is expected to cost approximately US$1.5 billion, leaving US$5.9 billion unaccounted for. A part of this is attributable to construction of new icebreakers. Including the unknown costs for airport construction, ice protection facilities as well as cost contingency could add up to an overall cost level of US$33 billion.

The question is if, and how much of, the US$7.4 billion can be counted as project-specific investments. Airport and port construction costs could to some extent be counted as government support for the Yamal LNG project. However, these investments cannot exclusively be attributed to Yamal LNG because they could also benefit future projects such as, for example, the Novoportovskoe field. For example, construction of the seaway approach channel will be of benefit to more projects than the Yamal LNG project. In contrast, the approach channel, port harbor, ice protection construction, port administrative facilities and the airport will predominantly be used by the Yamal LNG project.

The dredging activities are reported to cost around RUB 100 billion, equal to US$3.3 billion. Out of the US$7.4 billion of government support mentioned above, that leaves US$4.1 billion for development of the Sabetta area, including port development costs of US$1.5 billion. Assuming that Yamal LNG, due to early field development and corresponding trigger effects for area development, should be ascribed 50 per cent of the seaway channel dredging costs, total infrastructure government support to Yamal LNG amounts to US$5.75 billion.

Adding these project-specific infrastructure investments to Yamal LNG's CAPEX estimate of US$26.9 billion, yields a total CAPEX of US$32.65 billion.

Table 5 repeats the results from Table 4 above, but also includes NPVs and IRRs after including CAPEX of US$5.75 billion in project specific investments that are provided by the government.

When project-specific investments are included in CAPEX, pre-tax IRR drops from 13 per cent to 10.1 per cent. Thus in its entirety, the project is uneconomic given a 12 per cent required rate of return. Government support to project-specific infrastructure investments raises project IRR over its pre-tax IRR without state intervention and makes an otherwise unviable project economically viable for investors. Thus, with reference to the discussion on subsidies above, government support to project-specific infrastructure investments should be considered a subsidy.

TABLE 5. COMPARISON OF NPV YAMAL LNG (MILLION US$) PROJECT ECONOMICS WITH AND WITHOUT SUPPORT

Project Economics Including Government Support to Project Specific Investments		
	NPV at 12 % discount rate	**IRR**
Pre-Tax	1,813	13.0%
Post-Tax, excl. Tax Breaks	- 10,962	4.4%
Post-Tax, incl. Tax Breaks	- 585	11.6%
Project Economics in Absence of Government Support to Project Specific Investments		
Pre-Tax	-3,825	10.1%
Post-Tax, excl. Tax Breaks	-16,312	2.1%
Post-Tax, incl. Tax Breaks	-5,811	8.9%

Source: Sigra Group.

One could argue that insofar the government support to infrastructure in Yamal incentivizes development of other hydrocarbon development projects that would have not been economically feasible without subsidies, the whole amount of government support should be included in the analysis. Even though this could not be attributed to the Yamal LNG project only, it could be counted as a subsidy to the Russian petroleum industry's expansion into the Arctic. The amount of the subsidy would thus approach US$13 billion, which is the amount spent on strategic development of the area around Yamal LNG. In the meantime, if discounted tax revenues from projects that benefit from shared infrastructure surpass government investments, there is reason to question whether this can be counted as government support at all.

4.4 DIRECT SOCIAL BENEFITS OF THE YAMAL LNG PROJECT

Direct benefits of the project to society comprise tax revenues, job creation, tenders and contracts for Russian companies and community investments.

Expected Tax Revenues

Expected tax revenues from the Yamal LNG project are displayed in Table 6. The first row shows expected tax revenues had there not been any tax breaks granted for the Yamal LNG project. Clearly, this is a hypothetical situation since, as is shown in the valuation section, the NPV of the project under such conditions is clearly negative and the IRR correspondingly low. The second row shows expected tax receipts with the granted tax breaks. Subject to the assumptions shown above, the government can expect tax receipts just below US$16 billion. This is roughly in line with the expected tax receipts of RUB 425 billion reported by Arctic Info (Arctic-info, n.d.). The government's NPV of the expected tax revenues is US$4.3 billion using a discount rate of 8 per cent.

TABLE 6. EXPECTED TAX REVENUES FROM YAMAL LNG

	Government Take*	Tax Receipts, US$ million	NPV Tax Receipts,* US$ million	Gross Tax Share
Excl. Tax Breaks	77 %	51,648	19,224	92%
Incl. Tax Breaks	24 %	15,852	4,351	27%

*Government take defined as total tax receipts divided by total cash flow; NPV of tax receipts is calculated at 8 per cent discount rate.

The tax revenue should of course be netted against the infrastructure investments paid by the government. With government investments around US$7.4 billion, expected tax receipts decrease by roughly half in undiscounted terms. Discounted tax receipts fail to recoup government expenditure, with the government collecting about 60 per cent of its investment. Applying the project discount rate of 12 per cent, the NPV of tax receipts drops to US$2.4 billion, i.e., just over 30 per cent of government expenditure.

Even though the project would clearly be unviable if tax breaks had not been granted, making the comparison between the two scenarios is interesting since it shows a significant drop in government take. In a "non-tax break" situation, the government could collect 77 per cent of project cash flows, whereas after tax breaks are introduced this share decreases to 24 per cent.

Keeping in mind the debate on resource rent taxation in section 5.1 above, it should be possible to maintain the investors' IRR after taxation has been introduced, whereas the valuation section above showed a decrease in the project's IRR. We can compare the results with, for example, petroleum taxation in Norway, where the government is left with a share of 78 per cent after tax for a project that yields positive NPV. This comparison makes the tax breaks seem to have been granted at a high cost. In other words, in comparison with a perfectly plausible scenario that the project had been developed with a high profit tax only, substantial rent has shifted from the government to the project investors.

This rent transfer is perhaps not a subsidy as defined above, but it is nevertheless puzzling why the Russian government insists on maintaining a system of *ad hoc* tax breaks when it clearly comes at a high price in terms of expected government tax revenue. Opponents of profit-based taxation in Russia often point out that the ability to collect taxes in such a system would be inadequate, thus allowing companies to hide resource rents behind bloated costs. However, the Russian government has been successful at counting costs at their three Production Sharing Agreement (PSA) projects, and it should be possible to boost capacity for project monitoring for ring-fenced offshore projects too (Lunden, 2014). For the time being, it nevertheless seems Russia is bent on continuing the practice of project-specific tax breaks (Shatalov, 2012), allowing the government to keep picking winners and losers.

Job Creation

According to Yamal LNG's "Environmental and Social Scoping Report" (Yamal LNG, 2013) the number of skilled workers is estimated to peak in 2014 with approximately 7,000 people working in rotation, implying about 3,500 workers present at the site in Sabetta at any time. The workers will be accommodated at Sabetta, some six kilometers from the main LNG site. The accommodation quarters will not be needed during the production period of the project and will be dismantled and the areas reinstated (Figure 8).

FIGURE 8. SABETTA CAMP

Source: Novatek Press Service. Reproduced with permission of Novatek

As there is no permanent settlement in the Sabetta area, there will be no local employment effect nor any impact on regional housing. Personnel may be recruited from Yamalo-Nenets Autonomous Okrug, but no information on specifically targeted programs for local employment has been identified, and workers at the Yamal LNG site will most likely originate from throughout Russia as well as from abroad.

Tenders and Contracts

The bulk of contracts for Yamal LNG will be or have already been awarded to foreign companies. Table 7 displays contractors that have already been selected by Yamal LNG. The list does not include any Russian companies, except for Tekhnopromeksport, which will provide the power plant required to run the LNG facilities. However, the contract with Daewoo included clauses on providing a Russian shipyard of Yamal LNG's choice with necessary competence for constructing LNG tankers, including transfer of project and engineering documentation, training of Russian engineers and staff as well as transfer of construction works to a Russian producer. In addition, Mezhregiontruboprovodstroy (MRTS), a gas pipeline constructor, has been engaged in constructing early phase facilities at the Sabetta Sea Port (MRTS, 2013)

TABLE 7. SELECTED CONTRACTORS

#	Equipment	Contractor
0.	EPC	Technip/JGC
1.	Cryogenic Heat Exchangers	APCI
2.	Turbine Cryogenic Compressors	General Electric
3.	Boil-Off Gas Compressors	Siemens
4.	Air CooledHeat Exchangers	Hamond'Hondt
5.	Integrated Control & Safety System	Yokogawa
6.	Gas Turbines for the Power Plant	Siemens
7.	LNG Tanks	Entrepose/Vinci
8.	Power Plant	Technopromexport
9.	Acid Gas Removal System	BASF
10.	Arc-7 LNG Carriers	Daewoo Shipbuilding & Marine Engineering

Source: Gyetvay (2013).

Community Investments

According to Total, Yamal LNG has developed a EUR 76 million (~US$103 million) action plan for a community commitment program that includes (Total, 2014):

- Campaigns to prevent soil and water pollution, together with compensation contracts in the event of any damage caused to the region's ecosystem and fragile natural resources.
- Cooperation agreements with local authorities focusing on cultural issues and measures to protect sacred landscapes and places of worship.
- Construction of logistical infrastructure, housing, educational and medical centers, the supply of equipment, machines, fuel and food.
- Close cooperation with NGOs and local indigenous associations.

In addition, Total is planning independent initiatives for the indigenous population, including free French lessons and a French Literature Day and has translated a French regional tourist guide into English and Russian.

In its Stakeholder Engagement Plan (Yamal LNG, 2013), Yamal LNG informs that is has agreed compensation payment agreements with the Yamalo-Nenets Autonomous Region's regional government of RUB 3 billion between 2011-2013 (equaling Total's community commitment program of EUR 76 million), which will be administered by the regional government. The payment is (among other things) meant to assist housing development in rural areas as well as social and transport infrastructure.

In addition, there is a payment agreement with the Yamal District municipal administration that include provision of services and in-kind support to the indigenous communities, targeted financial assistance, and allocation of facilities for use by indigenous communities. The following services are applicable within this framework:

- Transportation assistance with delivering fuel wood and timber to the tundra residents.
- Assistance with the provision of emergency medical help.
- Provision of emergency means of communication.
- Land reinstatement in the lease areas within the Project License Area, including the rehabilitation of reindeer pastures within the License Area.
- Allocation of funds for purchase and delivery of diesel fuel and kerosene for migratory population of Yamal District.
- Financial medical care assistance for representatives of the migratory population of Yamal District, particularly in cases of expensive surgeries that are not covered by the mandatory health care insurance.
- Financial assistance for the organization of activities/events related to indigenous cultural traditions.
- Allocation of funds for a survey expedition to identify sacred, worship, and burial sites of importance to the Indigenous Peoples of the North located in the northernmost segment of the Yamal Peninsula (Malygin Strait area).
- Allocation of funds for the purchase of a diesel generator for the Tambey Factoria.
- Financial assistance for the purchase of staple goods and fuel wood, and assistance in their transportation to remote areas of the tundra.
- Utility payments assistance to pensioners in the indigenous communities and multi-child families involved in nomadic activities.
- Provision of assistance to Yamal District's Public Association of the Indigenous Peoples of the North "Yamal."
- Assistance with professional education/training to the indigenous communities.
- Financial assistance for the provision of materials and facilities for educational and cultural institutions in the District.
- Assistance with provision of aero-transportation for the needs of nomadic reindeer herders and fishermen migrating in the inter-settlement territories of Yamal District.

In addition, Yamal LNG contributes to modernizing the Seyakha village, which is the closest larger settlement to the project site, located 120 km south of Sabetta. Yamal LNG's development program for the settlement in 2011-2015 includes:

- Optimization of the spatial arrangement of built-up areas in the settlement and expansion through the removal of dilapidated dwellings and buildings in poor condition.
- Enhancement of the architectural layout of the settlement.
- Construction of new buildings and residential housing with the use of modern technologies and quality construction materials.

Yamal LNG funds the investments with about RUB 1 billion to help construct six 3-storey and two 1-storey apartment blocks, a diesel power station, a boiler plant, a bakery/store, a trade/retail unit, water treatment facilities as well as water and heating supply utilities. In addition, the local hospital and the ambulance were upgraded in 2013.

4.5 SOCIAL AND ENVIRONMENTAL COSTS OF THE YAMAL LNG PROJECT[5]

Local Environment Description

Based on the 2010 National Census, the total population in Yamalo-Nenets Autonomous Okrug was 525,094 residents, amounting to 0.4 per cent of Russia's total population. Indigenous peoples accounted for roughly 7 per cent of the population. The population of the Yamalsky District, where the project site is located, was 16,310 persons, of which 69 per cent belong to indigenous peoples. About 50 per cent of the indigenous population was involved in traditional nomadic activities.

The closest larger settlement to the project site is the Seyakha village, located 120 km to the south of Sabetta. According to the 2010 Census, Seyakha had a population of 2,600. In addition, there are two trading stations used by nomadic reindeer herders: Sabetta Factoria located within the license area and Tambey Factoria, some 30 km north of the project facilities. The Tambey Factoria had a permanent population of 34 people and about 600 people (118 households) used the trading station.

The local economy is characterized by traditional activities such as reindeer breeding and herding (the Yamalsky district has the largest amount of domesticated reindeer in the world, with over 290,000 animals as of January 2010), fur farming, fishing and hunting as well as meat, fish and fur processing.

Sabetta Factoria will be used to accommodate project construction personnel and will no longer be available to herders. This constitutes a clear inconvenience for the herders, but cannot be claimed to adversely affect traditional land use since the Sabetta Factoria is not an original nomadic trading post, but is located on a site first used for oil and gas exploration activities during the Soviet period.

The project license area includes grazing fields for seasonal migration of reindeer herds predominantly from the municipal reindeer farm Yamalskoye, with a total stock of more than 60,000 head. In addition, about 190 nomadic families migrate in the project area, with a stock of reindeer above 25,000 head. Within the license area (2,031 square kilometers), there will be physical impacts from well pads, gathering pipelines, roads, port facilities, airport and waste management facilities. Thus, to the extent these areas are used for reindeer grazing, this area will be lost for the nomadic tribes. Yamal LNG has carried out negotiations with the local "Ilebts" or communes that used the Sabetta Factoria to find a suitable relocation site, which has reportedly been found at a site located 35 kilometers northwest of the original site.[6]

Table 8 summarizes the findings of the Yamal LNG "Environmental and Social Scoping Report" on impacted stakeholders and their related impacts from the development of Yamal LNG.

5 The information in this section is, unless otherwise specified, from Yamal LNG's "Environmental and Social Scoping Report" and/or "Stakeholder Engagement Plan" (Yamal LNG, 2013).
6 The Sabetta Factoria developed in the early 1990s on the basis of a geologists' exploration camp (which is presently the Sabetta workers' camp) because the then-camp facility provided all necessary utilities. Unlike Tambey Factoria, Sabetta was not a traditional trading post.

TABLE 8. YAMAL LNG'S STAKEHOLDER OVERVIEW AND RELATED IMPACTS

Stakeholder Groups	Impacts
Nomadic families and the reindeer breeding communities that have used the Sabetta Factoria trading station	Loss of access to Sabetta Factoria Loss of access to pasture land primarily applicable to the reindeer herding, pastures and traditional migration routes Noise and light disturbance to herders and reindeer Exposure to risks from construction activities
The local indigenous population (reindeer breeders/ herders, as well as fishermen and hunters) and local communities	Change in traditional land-use practices, primarily reindeer herding and access to pastures and traditional migration routes Noise and light disturbance to herders and reindeer
Population in Tambey Factoria trading station	Change in the mode of operation and a range of services provided at Tambey Factoria Upgrade of the infrastructure and housing at Tambey Factoria Change in traditional land use practices, primarily reindeer herding and access to pastures and migration routes Disturbance of reindeer from noise/light impacts
Reindeer breeding enterprises (MRBE Yamalskoye, «Ilebts», «Yarokhoj», «Tusyada», «Northern Reindeer Breeding Enterprise Yamal») whose migration routes fall within the project license area or may traverse other project associated infrastructure	Change in traditional land use practices, primarily reindeer herding and access to related pastures and migration routes Noise and light disturbance to herders and reindeer
Residents in the village of Seyakha	Employment and educational opportunities Construction and upgrade of social infrastructure and housing Impacts associated with housing construction activities
Residents of other rural settlements within the Yamalsky District (Yar-Sale, the transport hub of Mys (Cape) Kamenniy, villages of Novyi Port, Panayevsk, Salemal)	Employment and training opportunities Long-term improvement of the District's and regional social and transport infrastructure
Local and district level entities involved in traditional activities such as reindeer meat processing, e.g., the processing enterprise «Yamalskiye Oleni» based in Yar-Sale	Potential positive change in business productivity
Business owners and providers of services, goods and materials within the Yamalo-Nenets Autonomous Okrug and other parts of Russia	Employment and generation of additional job opportunities / opportunities for cooperation

Source: Yamal-LNG (2013).

Environmental Costs

On October 8, 2013, Yamal LNG received a positive state expert review conclusion issued by Russia's Glavgosexpertiza, including state environmental approval for the construction of the liquefaction plant on the Yamal LNG plant. In addition, the Subsurface Management Department of the Yamalo-Nenets Autonomous Region (YAMALNEDRA) issued a construction permit for the LNG plant (Novatek, 2013). There are only two publicly available corporate sources of information on the applications for these approvals, namely the "Environmental and Social Scoping Report" and the "Stakeholder Engagement Analysis."

Arctic habitats are in general vulnerable to disturbance, and regeneration typically occurs much more slowly than in more temperate regions. The fish fauna in the area counts about 60 species, including Red Book (endangered) species such as Ob sturgeon, white salmon and trout. The ornithofauna (birds) comprises about 80 species, including yellow-billed loon, red-breasted goose, Bewick's swan, scoter, duck hawk, white-tailed eagle, gyrfalcon, and snowy owl, which are in the Red Book of the Russian Federation and the Yamalo-Nenets Autonomous Okrug. There are about eight marine mammal species in the region, of which the Atlantic walrus, white whale, and polar bear are listed in the Red Book. The region also hosts the world's largest wild reindeer herd, which is also listed in the Red Book. The closest nature reserve is Yamalsky, 136 kilometers to the north of the project site.

Yamal LNG highlights the following potential harmful impacts of project activities:

- Atmospheric emissions (CO, NOx, SO2, benz(a)pyrene, lead compounds, dioxins and soot/particulate matter)
- Noise and vibration
- Impacts on surface water bodies
- Impact on soils and the geological environment
- Impacts on biodiversity in terrestrial, freshwater and marine ecosystems
- Impacts through waste management and dredging activities

The potential harmful impacts will be described in the forthcoming international Environmental Social Impact Assessment (ESIA), which will be disclosed for public discussions. However, two main concerns are already highlighted by a wider community and deserve specific attention: dredging activities and greenhouse gas emissions.

Dredging

The planned dredging of a seaway access channel in the Ob Bay constitutes a massive intervention into nature. The channel will be a four meters deep, 340 meters wide and about 50 kilometers long cutout in the Ob's natural ridge (Knizhnikov, 2014). According to (Knizhnikov, 2014), the natural ridge creates a 14 meter-high underwater barrier for salt water to enter the Bay of Ob. Dredging the seaway channel will therefore potentially impact the level of salt water in the Bay of Ob, which could negatively impact the marine ecosystem of the area, including Red Book fish species. The authors refer to the deepening of the "Yana" river delta, which caused the salt wedge to move 60 kilometers to the next ridge formation, but in the Bay of Ob, there is no natural ridge further up in the bay. Special harm may be caused if salt water should extend to the Tazov Bay, where no salt-water intrusion has ever been recorded. In addition, the authors claim that the impact assessment of storing dredged materials on the seabed has not been adequately performed and the data used has been of poor quality.

Efimov (2013) claims the Bay of Ob is the most important habitat for freshwater white fish in the world, and that construction of the sea channel will decrease their chances of survival. He further notes that after dredging in the Mississippi Delta, the saltwater went upstream 240 kilometers and the main difference between Mississippi and Ob rivers is that the former has a much stronger stream, which works against the intrusion of salt water.

In its "Environmental and Scoping Report," Yamal LNG notes that the overall impact of the dredging activities will depend on where soil dumping occurs, and impacts will be manifested by "increasing salinity levels within the Gulf of Ob due to removal/alteration of sand bars, smothering of the seabed, elevated water turbidity levels and change in the water chemical composition that, in turn, may affect benthos (seabed organisms), ichthyofauna (fish life in a region) and other aquatic organisms" (p. 84). Dredged material will be stored in an area with a diameter of 18 kilometers located 24 kilometers from Sabetta and later be used for the development of Yamal LNG facilities (Minprirody, 2012). According to Russian Law 89, "On waste after production and consumption," this temporary storage is not allowed for more than six months.

In addition, Yamal LNG reports that there may be "potential impacts" on marine biodiversity through the construction of berths in coastal zone areas, as a consequence of increased water turbidity, physical impact, discharges from vessels, elevated noise levels, potential oil spills as well as unavoidable alteration of marine organism habitats from piling and dredging.

In June 2012, the Legislative Assembly of Yamalo-Nenets Autonomous Okrug decreased the environmental requirements for dredging activities (Greenpeace, 2013). But as compensation for the harmful impacts of dredging activities, a payment of RUB 480 million (US$16 million) has been agreed. However, this is predominantly to be paid by budget funds. In fact, out of a total payment of RUB 748 million (US$25 million) for harmful impacts of the construction of the production facilities, only RUB 9 million (1.2 per cent) is to be paid by Yamal LNG. In addition, Yamal LNG must pay RUB 2.3 million on a year-by-year basis (Minprirody, 2012). This environmental cost of project specific infrastructure investments will add to the project's costs, since the government pays most of the environmental fees for work that benefits Yamal LNG, these funds are included as government support.

Greenhouse Gas (GHG) Emissions

The license owners warn that local air quality will be impacted by atmospheric pollutants such as carbon monoxide (CO), nitrogen oxides (NOx), sulphur dioxide (SO2), benz(a)pyrene, lead compounds, dioxins (associated with incinerator emissions) and soot/particulate matter (PM).

The main atmospheric emission sources from Yamal LNG will be: the gas turbine power plant, the flare system and gas-turbine generator at the LNG plant, a boiler house and an incinerator in the accommodation camp, the airport (aircraft plus the facilities) as well as the seaport. Yamal LNG has not published expected emissions but envisages measures to reduce GHG emissions through "good housekeeping", a "flaring strategy" to reduce emissions from flaring and "on-going quantification of GHG emissions."

The world's only operative LNG plant above the Arctic Circle, Snøhvit in Norway, illustrates the magnitude of GHG emissions from LNG plants. In addition, since Snøhvit has to pay a fee of NOK 0.98 per cubic meter of CO_2, the absence of such fees in Russia could also be argued to subsidize hydrocarbon development. In 2012, Snøhvit emitted 975,000 tonnes of CO_2 (Miljodirektoratet, 2013). With a production of 4.3 BCM of gas, this implies some 227,000 tonnes per BCM. Thus, a yearly production of 25.2 BCM corresponds to yearly emissions of 5.7 million tonnes CO_2.

TABLE 9. TOTAL CO2 EMISSIONS FROM PRODUCTION - EXAMPLE

Classification Standard	Production BCM	CO_2 emissions (million tonnes)
U.S. SEC	481	109
Petroleum Resources Management System (PRMS)	907	206
Russian ABC1 Resource Classification System	1,256	285

Source: Sigra Group.

In 2008, the Snøhvit plant in Norway applied for a permit for emitting 2,200 tonnes of soot (black carbon), a much more potent source of carbon emissions. According to Global Warming Potential (GWP), the methodology applied in the Kyoto Protocol, 1 tonne of soot is comparable to 1.6 million tonnes of CO_2 emissions (Ertzeid, 2011). Thus, using the production level of 4.3 BCM compared to its capacity of 5.7 BCM yielding a utilization factor of 75 per cent, this implies Snøhvit emitted 1,650 tonnes of soot in 2012, comparable to 2.6 million tonnes of CO_2 or 600,000 tonnes CO_2 equivalents per BCM.

In other words, the soot emissions from Yamal LNG should be expected to be more than two times as potent as the ordinary CO_2 emissions.

4.6 COMPARISON OF SOCIAL BENEFITS AND COSTS

The main direct social benefit of the Yamal LNG is tax revenues, expected to be around US$15-16 billion based on the assumptions applied in this report. In addition, according to Total and Novatek, a social development program worth €76 million (US$97 million, RUB 3 billion) is planned to be completed by 2015.

At the peak of project development, a total of 7,000 workers will be employed by Yamal LNG, with the majority probably originating from Russia. In addition, at least two large Russian sub-contractors, Technopromexport and MRTS, have been chosen.

There is, however, little reason to expect positive local ripple effects for the existing local economy since the project is located in a remote location with limited population save for nomadic reindeer herders who most likely not will be eligible for employment at Yamal LNG. The closest permanent settlements, Tambey Factoria and Seyakha, have received vague promises of possibilities for "productivity change" and employment opportunities, but also investments in housing projects.

Regarding costs to society, there are two main concerns: government spending on infrastructure investments for a project that perhaps is not economically viable and associated environmental costs.

The government will pay for the seaway channel, the approach channel to Sabetta, ice protection facilities as well as port harbor facilities. This report estimates the costs to be around US$7.4 billion, but this figure is uncertain. Nevertheless, there is no doubt the costs are large and that the government is responsible for covering them. Government infrastructure investments bring project economics from unviable to viable and must therefore be counted as subsidies. Subtracting the infrastructure investments from expected tax revenues decreases the latter by a third on undiscounted terms and all but zeroes out tax revenues on discounted terms.

Perhaps more alarming is the low government share of revenue, just 24 per cent of project cash flow. World taxation literature and practice show that there is ample opportunity to construct a tax system that incentivizes development of projects while securing a government share that is far higher than 24 per cent. In Norway, for

example, the marginal tax rate is 78 per cent and in some production-sharing agreement regimes the efficient tax rate approaches 90 per cent. This is confirmed by calculations of the marginally economically feasible Norwegian field Goliat, which secures a total tax take of roughly 72 per cent in Norway and just 28 per cent in Russia under comparable taxation terms to Yamal LNG (Lunden, 2014). The construction of the Russian tax system in effect shifts a portion of the resource rent from the government to the investor and should be of great concern to Russian citizens.

The main environmental concern is the dredging activities connected with the construction of the seaway channel. Environmentalists, and to some extent the authors of Yamal LNG's "Environmental and Social Scoping Report," worry that the channel will alter the water composition in the Bay of Ob by extending the reach of salt water to areas which previously were sheltered by a natural ridge at the seabed. This could adversely affect the marine biology in the area with consequences for Red Book fish species. As a consequence, the Ministry of Natural Resources and Ecology of the Russian Federation has issued a decree mandating a compensation payment for the adverse ecological effects. Total one-off payments are RUB 480 million (US$16 million), but these are paid from the government to the government rather than from the Yamal LNG project, which pays less than 2 per cent of the compensation amount.

The Yamal LNG project seems marginal from an economical point of view, i.e., the project shows small positive economic returns pre-tax, and marginally negative economics pre-tax if the project would have to pay all infrastructure investments. By paying for a large share of infrastructure investments, the government has granted the owners of Yamal LNG a considerable subsidy.

In the meantime, proponents of Yamal LNG would claim there are strategic reasons for developing this project. Yamal LNG will be Russia's first LNG project for west and east-facing markets as well as Russia's first non-Gazprom gas export project. Moreover, it will generate traffic for the Northern Sea Route and pay for and utilize icebreaker services. In addition, Yamal LNG will contribute to the development of the Arctic region, which some regard as a benefit *per se*.

The government also grants Yamal LNG the right to export natural gas, which previously was a Gazprom monopoly. This substantially increases Novatek's exposure to international markets and hints at the owners' political clout since amendments to federal laws for a single project are rare. Considering in addition the substantial infrastructure support and tax breaks, it seems fair to say that Novatek has been successful in convincing the government that developing Yamal LNG is a clever move.

However, combining the subsidies with the fact that the Russian government will receive a small share of the project's cash flow as tax receipts, there is considerable uncertainty on the rationale for developing Yamal LNG, and it would be interesting to see an independent review of project economics for Russia's potential other field developments that have yet to secure necessary tax breaks.

The strategic rationale of developing the Arctic is also somewhat ambiguous. On one hand, contributing to a steady flow of cargo in the Northern Sea Route obviously lowers costs per voyage for icebreakers, search and rescue services and other infrastructure requirements. On the other hand, using government funds to develop an LNG field that will increase demand for government-owned icebreaker services is of dubious total economic benefit. Whether icebreaker services are built to service Yamal LNG or vice versa, additional activity must follow as a consequence from these government expenditures for this to be sound economic policy.

Combined with the considerable risk of effects on the ecosystem of dredging up the only ridge—formed by sedimentation over millions of years—that separates the Bay of Ob from the Kara Sea, there is reason to question whether developing Yamal LNG is the most rational choice for gas development projects in Russia.

5.0 OVERVIEW OF THE PRIRAZLOMNOE PROJECT

The Prirazlomnoe oil field was discovered in 1989 by the Murmansk-based exploration organization Arktikmorneftegazrazvedka. It is located south of Novaya Zemlya in the eastern part of the Pechora Sea some 60 km from the shore: sea depth at the site is about 20 meters (Gazprom Neft Shelf, 2014). Total recoverable reserves are 72 million tonnes, i.e., some 540 million barrels (Gazprom, 2014a). Crude oil will be shipped from the platform year-round with a peak-period production level of around 120,000 tonnes per day (Gazprom Neft Shelf, 2014).

The platform "Prirazlomnoe" used to develop the field is a so-called Offshore Ice-Resistant Fixed Platform and was placed at the site at 69°N already in September 2011. Production started more than two years later in December 2013 as the first Russian Arctic offshore oil producing field. The platform measures 126 by 126 meters and has an un-ballasted weight of 117,000 tonnes. A total of 40 wells are planned to be drilled from the platform, which has a storage capacity of 855,000 barrels of oil, i.e., just over six days during the peak production period (Gazprom Neft Shelf, 2014). Gazprom Neft Shelf owns and operates the field while the contractor for construction of the platform is Sevmash, a government-owned shipyard in Severodvinsk, which traditionally has constructed military vessels such as nuclear submarines.

Onshore infrastructure includes a base camp and helipad near the Varandey oil terminal on the Pechora sea shore, an office and amenity compound in Usinsk as well as an offshore supply base in Murmansk.

The Prirazlomnaya platform is reportedly designed to be able to serve other fields in the area such as Dolginskoye and Gulyaevskoye. Prirazlomnaya would thus serve as a production hub for the area and consequently provide economic ripple effects for other fields.

Project and Ownership History

In May 1992, Closed Joint Stock Company (CJSC) Rosshelf was created to capitalize on Russian defense industry capabilities to develop offshore oil and gas fields in the Russian Arctic. Among the 19 founders of Rosshelf were major defense enterprises located in the North of Russia such as Sevmash and Rubin, R & D centers such as Kurchatov Institute and Severstal, a big metallurgical company. In March 1993, Rosshelf was granted a 25-year developing and producing license for both the Prirazlomnoe and the Shtokman fields. An overview of key events in the Prirazlomnoe project history is provided in Table 10.

TABLE 10. PROJECT HISTORY

Year	Events	Partners
1989	Discovery	
1992	Rosshelf established	Consortium of 19 partners
1993	Rosshelf granted a production license	
1994	Sevmash chosen as construction contractor. Engineering commences by Morneftegazproekt, Rubin and Corral.	Rosshelf signs a joint venture (JV) agreement with Gazprom. Australian BHP Petroleum enters into development cooperation with Rosshelf.
1995	Ceremony at Sevmash, platform construction launched. Completion time estimated at three years.	
1998		BHP Petroleum withdraws from the project.
2000		Wintershall enters project as Gazprom's partner.
2001		Sevmash, Rubin and other supply industry shareholders leave Rosshelf.
2002	Fifteen per cent of platform completed. New development concept launched involving utilization of topside from Hutton platform. Hutton topside dismantled from hull in Murmansk. First oil expected in 2005.	Wintershall leaves project after having spent US$45 million. Sevmorneftegaz established as 50-50 JV between Gazprom and Rosneft-Purneftegaz.
2003	Topside delayed in Murmansk due to complicated commissioning of equipment with nuclear isotopes.	
2004	Sevmash delayed on caisson block-construction. Topside refurbishment delayed from mid to end 2004.	
2005	Sevmash completes 3rd caisson block. Total investment reported at US$380 million. Gazprom claims financial difficulties due to US$19 billion debt burden.	Rosneft leaves Prirazlomnoe and Sevmorneftegaz.
2006	Prirazlomnoe receives a five-year environmental approval. Topside mated to completed caisson.	Sevmorneftegaz becomes a 100% Gazprom subsidiary.
2007	In February Sevmash announces plans to finish construction of the platform by year-end. In April the plan is to finish in 2008. In June Gazprom announces delay to 2009. Total investment by end 2007 estimated at US$1.4 billion. Living module contract transferred to the yards in Vyborg.	
2008	Contract with Sevmash redefined to engineering, procurement and construction (EPC) contract. Delay of production launch to 2010 announced in February. Delay to 2011 announced in April.	
2009	Living module mounted to platform.	Sevmorneftegaz renamed to Gazprom Neft Shelf.
2010	Platform towed to Murmansk for ballasting.	
2011	Platform towed from Murmansk on August 15. Platform arrives on site in Pechora Sea in September.	
2012	Environmental approval expires. Production delayed to December 2012 / January 2013 in May. Production drilling later postponed to October 2013.	
2013	Production commences in December 2013.	
2014	First oil shipped from Prirazlomnoe in April.	

Source: Sigra Group

All foreign partners that have been involved in the project have left before production commenced. Faced with severe technical and economic problems, BHP Petroleum withdrew from the project in 1998. The construction was delayed due to both technical problems as well as numerous design changes and it was also difficult to attract sufficient financial sources (Moe, 2008). In 2000 a new foreign partner, Wintershall, joined Gazprom in developing the Prirazlomnoe field (Pervyj-Kanal, 2000). However, only two years later they, too, left the project deeming it "too risky" (Butnin, 2002) after having spent at least 100 million Deutschmarks (roughly US$45 million) (Vlasova, 2000).

In early 2002, the platform's readiness was at only 15 per cent and four years had passed since the initial planned commencement date. With the establishment of Sevmorneftegaz in 2002 and Rosneft entering the project, new dynamics were brought to the project including a new construction concept. The new plan, involving a Norwegian broker, was to buy the Hutton platform, which was being decommissioned after 30 years of service on the UK's continental shelf (Rubin, 2011). The topside was to be removed, modified and placed on the caisson that had been under construction at Sevmash's yard since 1995. Kellogg Brown & Root performed the feasibility study, while Rubin and Coral were responsible for the design. Sevmash was chosen to construct the caisson and to integrate the topside onto it. Initially, the idea was to utilize 70 per cent of Hutton's in-place equipment.

The Hutton platform was towed to Murmansk in 2002 where the topside was to be dismantled from the hull because the waters around Sevmash were too shallow. The dismantled deck was to be towed to Severodvinsk in 2003. 200,000 tonnes of sediment had to be removed from the seabed around Severodvinsk in order to move the platform out of the bay after completed construction.

In 2003, it was estimated that platform construction would cost US$800 million while total expected capital expenditure amounted to US$1.116 billion (Intsok, 2012). Sevmorneftegaz spent some US$180 million on platform construction during 2003 with Rosneft providing the bulk of this sum (Intsok, 2012). At the time, Rosneft attempted to attract US$700 million in loans from Russian and foreign banks to complete platform construction and purchase two tankers and one icebreaker.

In addition to problems with attracting enough funds, the project ran into delays caused by "technical difficulties." The topside was held back in Murmansk due to complicated Russian procedures commissioning equipment with nuclear isotopes (Intsok, 2012). And in December 2003 it became clear that Sevmash was not on schedule constructing the last two caisson blocks, and that the yard intended to subcontract one of the remaining blocks. The plan at the time was still to tow the platform to the site by mid-2005 (Intsok, 2012).

But further delays occurred. For example, topside refurbishment was delayed from mid-2004 to end of 2004 (Intsok, 2012). The topside's poor condition and non-compatibility with field development requirements rendered the original plan obsolete and warranted a new round of designs (Oil&Gas, 2011). By early 2004 the estimated start of production was 2006. However, some experts compared real progress achievement in platform fabrication and duration of procurement processes against the initial time schedule and concluded that production would rather commence in 2007. An explanation brought forward was that the official plan was based more on practical politics than on common sense (Intsok, 2012).

In 2005, Rosneft left the Prirazlomnoe project and a year later Sevmorneftegaz became a 100 per cent subsidiary of Gazprom, ending the multistakeholder ownership structure of the project. In 2009, Sevmorneftegaz was reorganized into Gazprom Neft Shelf limited liability company (LLC).

In 2005, planned investments of US$380 million for platform construction coincided with Gazprom being plagued by a heavy debt burden of US$19 billion. Nonetheless, the project inched forward, and the same year the topside was mated to the finished caisson in a technically demanding, but successful, operation (Intsok, 2012).

In 2007, a range of news regarding the project's timeframe was published. In February, Sevmash announced its plans to finish the platform by the end of the year, but in April platform completion was rescheduled to 2008. In June, Gazprom officially announced a further delay until 2009. Independent experts were skeptical about Gazprom's statements, claiming that the delay announcements were too optimistic (Intsok, 2012).

Substantial cost overruns were revealed and the Hutton acquisition was pinpointed as the main cost-driving factor: it turned out only 10 per cent of the equipment and steel frameworks purchased could be reused (Intsok, 2012). In September 2008 it become clear that total investment incurred by end of 2007 amounted to US$1.4 billion, with two years of construction time still remaining (Intsok, 2012). Sevmorneftegaz was seriously concerned by the delays at the Sevmash yard and planned to transfer design and fabrication of the living module to the Vyborg shipyard in order to assemble the living quarters by the end of 2008.

In 2008, the contract for constructing the platform was changed into an EPC (engineering, procurement and construction) contract, which transferred more responsibility to the contractor. Importantly, financial responsibility was shifted from Sevmorneftegaz/Gazprom to Sevmash. In February 2008, a new delay from 2009 to 2010 was announced, only to be extended to 2011 two months later (Intsok, 2012). To speed up construction, Sevmorneftegaz required Sevmash to increase the number of workers on the yard. Nevertheless, the lack of manpower was still estimated at some 1,500 workers. Morneftegazproekt, the company responsible for project documentation, was also given a reprimand for its slow process in engineering drawings. At the end of 2008, total cost of platform construction had increased to US$3 billion, roughly double the estimate from 2003 (Intsok, 2012).

During the summer of 2009, the total amount of workers reached 2,500, and the living module was installed. However, the operation required a unique foreign crane and Sevmash had to lobby for a special government decree in order for it to gain access to the military yard.

Construction of the first stage of the platform was completed in 2010 and the platform was towed to Shipyard 35 in Murmansk in November for ballasting, which was completed in August 2011. Although it was not completely finished, the platform left Shipyard 35 on August 15, 2011 and towed to the site in the Pechora Sea. In September 2011, the platform had arrived on site and the protective berm around the platform had been installed.

The platform was claimed to start production in 2011, but as many times before, the date was postponed several times. In May 2012, a statement from Gazprom said that production would start between December 2012 and January 2013. In October 2012, signals were sent that production drilling would not start until October 2013 (Sotnikova, 2012). Installation of new, foreign equipment for the drilling campaign and lack of environmental approval, which expired in 2011, were brought forward as explanations for the delay. Moreover, technical documents had to be rewritten as equipment not included in the original plan had been purchased. According to Greenpeace Russia, the oil spill response plan had not been handed over to the authorities for approval and it was not clear when this would be done (Starinskaya, 2012a).

In 2011, the General Director of Gazprom Neft Shelf stated that some US$4 billion had been invested in the project, almost three times the expected figure back in 2003. Production finally commenced in December 2013, with the first oil shipped from the field in April 2014.

5.1 GOVERNMENT SUPPORT TO PRIRAZLOMNOE

Tax Breaks and the Quest for the "Optimal" IRR

Prirazlomnoe has been the subject of lobbying to improve fiscal terms for many years. In 2003, Sevmorneftegaz seemed to have secured a production-sharing agreement (PSA) with the government, which was sent to the Duma for approval (Intsok, 2012). However, four years later the agreement was still not signed and Sevmorneftegaz gave up on the idea of a PSA for developing Prirazlomnoe. Generally, the failure to secure a PSA stoked concerns about the project's economic viability (Intsok, 2012).

In 2012, however, a rebate on the export duty was finally secured. Prirazlomnoe oil received a reduced export duty at "around" 50 per cent of the normal rate (Masneva, 2012). Other sources put the export duty at 45 per cent of the underlying rate (RBKa, 2012). According to the official budget plans for 2014 and 2015, Prirazlomnoe will be taxed at a level of US$155.3 per tonne compared to US$348 per tonne, implying an effective rate of 44.6 per cent (Duma, 2013). However, in April 2014, the rate will be increased to US$190.8 per tonne compared to US$387 per tonne, which implies a rate of 49.3 per cent. This shows that the export duty for Prirazlomnoe changes every month as the underlying export duty changes, and not necessarily proportionally (Pronedra, 2014). On April 23, 2014, Prime Minister Medvedev signed a government decree where the volume of oil levied at lowered export duties was increased from 68.5 thousand to 27.7 million tonnes (Medvedev, 2014). Government Decree 846 of 26 September 2013 capped Prirazlomnoe's IRR at 16.3 per cent.

Moreover, in October 2012 Alexey Miller, CEO of Gazprom, asked the government to include Prirazlomnoe in Category 3 of the new tax code for offshore projects. Category 3 implies 10 per cent mineral extraction tax for 10 years rather than 15 per cent for 7 years, which applies for Category 2, and could help Prirazlomnoe save about US$2.4 billion in taxes (Starinskaya, 2012b). This should reportedly improve project economics to reach an IRR of 17.5 per cent (from a claimed profitability of 13 per cent) (Itar-Tass, 2013). If export duties tax breaks were also to be applied according to Law 268, "membership" in Category 3 would imply zero export duties for 10 years (Staranskaya, 2012b). However, when Law 268 was passed in September 2013, Prirazlomnoe was included in Category 2 and granted 7 years of zero mineral extraction tax for up to 35 million tonnes of oil starting from January 1, 2015. This followed extensive lobbying campaigns, where, for example vice-president of Gazprom Neft Shelf, N. Limonov, claimed additional tax breaks were needed to increase project IRR from 15.4 per cent to 16 to 17 per cent (Melnikov, 2013).

In addition, by being included in Category 2 of Law 268, the Prirazlomnoe project has been exempted from property taxes, normally levied at 2.2 per cent of "the yearly value of the object." This was a blow to the regional authorities in the Nenets Autonomous Okrug, where the platform is registered, since the regional authorities expected that Prirazlomnoe would contribute RUB 500-700 million per year and become the region's number one taxpayer (Ria-Novosti_b, 2012). However, with the adoption of Law 268, the Okrug's 2014 budget is running a deficit of 30 per cent (Info83, 2013).

Throughout the lobby campaign for tax breaks, the timing and potential approval of tax breaks did not influence the commencement of production at Prirazlomnoe (Stroganova, 2013). This violates the rationale behind tax breaks, namely the objective to incentivize activity that otherwise would not be conducted. In the case of Prirazlomnoe, the tax breaks were granted after most of the investments had already been made. A gentlemen's agreement promising tax breaks could of course have existed between the parties, but granting tax breaks after construction resembles a gift more than adequate measures to accommodate flaws in the underlying tax system.

This somewhat peculiar approach to granting tax breaks is likely to continue since Gazprom is continuing to request tax breaks in order to improve the project's IRR. On March 18, 2014, Gazprom Neft Shelf, Rosneft, Surgutneftegas and other companies applied for additional tax breaks for export duties (Finmarket, 2014).

Infrastructure Development

In contrast to the Yamal LNG project, infrastructure development support for Prirazlomnoe has not been provided. On the contrary, early platform construction work was reportedly performed against the will of Gazprom who had to bankroll operations to keep military yards alive with non-military orders. Thus, the subsidy was granted to shipyards rather than to the operating company. Even though support to the yards helped to get Prirazlomnoe onstream, it cannot be counted as government support as defined in this paper since the main beneficiary were the yards rather than the owners of the license for the Prirazlomnoe field.

Table 11 below provides summarizes government support to the Prirazlomnoe project since 2002 using GSI's typology.

TABLE 11. GOVERNMENT SUPPORT TO PRIRAZLOMNOE SINCE 2002 – GSI TYPOLOGY

Direct and indirect transfer of funds and liabilities	Direct spending	Not identified
	State ownership on conditions more favourable than private ownership	Government-owned companies had different shares in the project over its lifetime, and since 2006 the project is 100% owned by Gazprom through its subsidiary Gazprom Neft Shelf. The Russian government holds 50.002% of Gazprom's shares.
	Credit support	No information, but project development has been financed through Gazprom budgets.
	Insurance and indemnification	No information.
	Occupational health & accidents	No information.
	Environmental costs	Not identified.
Government revenue foregone	Tax breaks	Federal tax breaks: • **Federal Law 268-FZ, September 30, 2013:** mineral extraction tax: 0 ruble per tonne for up to 35 mmt within 7 years from January 1, 2015. • **Federal Law 268-FZ, September 30, 2013:** exemption from property tax of 2.2%. • **Government Instructions (Распоряжение) on Export Duties:** the absolute level of export duties and their corresponding monthly "rebates" are determined as explained above.
	Accelerated Depreciation	Federal legislation on accelerated depreciation: Tax Code of the Russian Federation (Articles 258-259.3) • Immediate depreciation allowance for up to 30% for fixed assets • Accelerated depreciation schedule (up to twice as fast) for fixed assets employed in an aggressive environment (e.g., north of the Arctic Circle)
Provision of goods or services below market value	Government-owned oil and gas resources	Not identified.
	Government-owned infrastructure	Prirazlomnaya platform was built at government-owned shipyards.
	Government procurement	No information.
	Government-provided goods or services	Prirazlomnaya platform was built at government-owned shipyards.
Income or price support	Market price support and legislation	Not identified.

5.2 DISCOUNTED CASH FLOW ANALYSIS

Since no government support for infrastructure development is identified, the following analysis first valuates the effects of government support through tax breaks on Prirazlomnoe. Second, the effects of accelerated depreciation are analyzed.

Project-level Evaluation

The Net Present Value (NPV) analysis presented below rests on a number of assumptions and simplifications. The main assumptions are summarized in Table 12. General assumptions on oil price, discount rates and currency exchange rates have been laid out in Section 3.2 on data and approach.

TABLE 12. DISCOUNTED CASH FLOW ASSUMPTIONS

Variable	Assumption
Field Reserves	540 million barrels
CAPEX	US$5.7 billion (RUB 200 billion)
OPEX	US$171 million/year*
Oil Price	US$100/bbl **
MET Oil	US$20.4/bbl @ oil price US$100/bbl
Export Duty Condensate	US$49.3/bbl @ oil price US$100/bbl
Discount Rate	12% **
Depreciation Schedule	8 years average (due to no information on equipment classification)
Exchange rate RUB to US$	30 to 1 **

* Further explanation below ** As explained in Section 3.2. on Data and Approach

Production and Cost Profiles

Calculations are based on reserve estimates by the operator and production profiles approximated based on the shape of Figure 9, which shows gross revenue based on an oil price of US$100 per barrel. Plateau production of 120,000 barrels per day is reached five years after production commences and is maintained for four years before it starts to decline. Figure 9 assumes production start in 2011, but since actual production started in 2013, the production profile in the calculations is moved forward two years in line with actual events. No changes in the CAPEX profile are assumed.

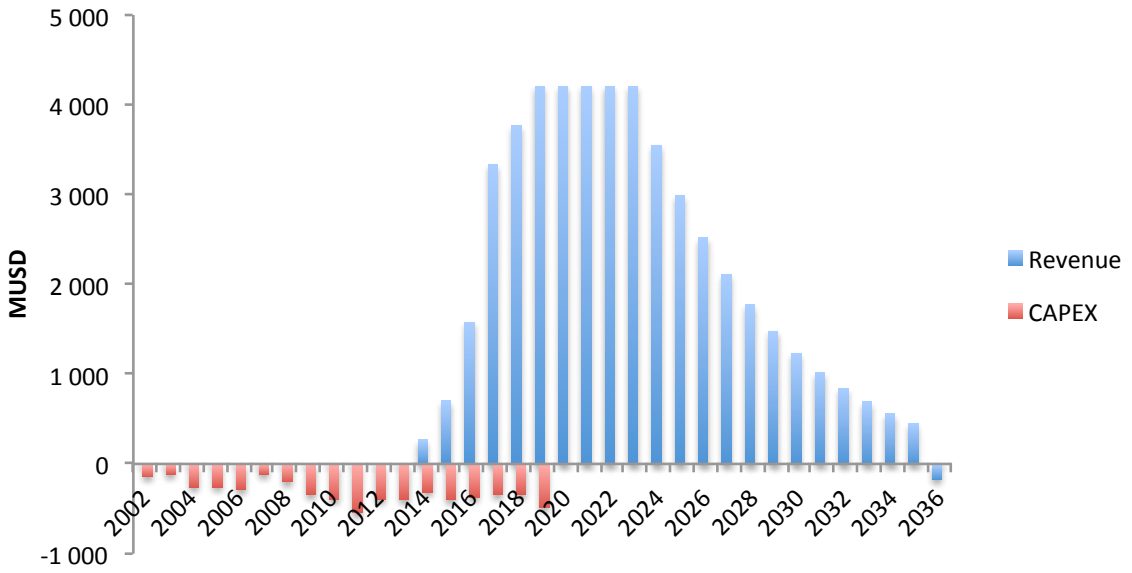

FIGURE 9. REVENUE AND CAPEX PROFILES

Source: Presentation of the Prirazlomnoe project, N. Glukhova, Murmansk, November 2012

No official information has been found for operational expenditures for Prirazlomnoe. Therefore, a level of 3 per cent of total capital expenditure has been chosen, based on a general industry rule of thumb (White, 2012).

Taxation Assumptions

Gazprom Neft Shelf enjoys several tax breaks as outlined in Table 11 above, but to analyze the effect of these potential subsidies, one has to establish the level of taxation the Prirazlomnoe project would have without tax breaks. Tax conditions under both scenarios are summarized below in Table 13. The estimated budget receipts of RUB 600 million per year for the Nenets Autonomous Okrug are used due to no information on the total value of facilities that are subject to property taxes.

TABLE 13. TAXATION ASSUMPTIONS

Tax	Normal Taxation Scenario	Tax Break Scenario
Export duty	US$49.3/bbl @ USD100/bbl oil price	45% of export duty, i.e., US$22.2/bbl
MET	Domestic formula, calculated to US$20.4/bbl	0 US$for 7 years and/or 35 million tonnes of oil from 2015
Profit tax	18% regional budget, 2% federal budget	No change
Property tax	2.2% (RUB 600 million per year)	0% (0 RUB per year)

Valuation Analysis Including Tax Breaks

The valuation of the Prirazlomnoe field depends crucially on the year from which the project is evaluated. The project *per se* should obviously be valued throughout the project lifecycle. In our example, we follow the schedule outlined in Figure 9 above with the project starting in 2002 (and previous costs are treated as sunk). The CAPEX profile in Figure 9 equals RUB 200 billion, which as seen above, has been quoted to be the total CAPEX amount for the project.

However, the valuation is somewhat different when it comes to evaluating the effect and level of government support. In this case it is necessary to ask to what extent the government support granted incentivizes further development of a project. This is in line with the discussion on subsidies above, where one important feature is that a subsidy is granted to make an economically unviable project viable. Since the subsidies were granted in 2013, this year is chosen for evaluation of the incentive-effects of the tax breaks.

Project Lifecycle Valuation: Starting year 2002

Based on the assumptions outlined above, the pre-tax NPV for Prirazlomnoe is US$2,766 million, with an IRR of 19.3 per cent. I.e., in a theoretical "tax-free" world, the Prirazlomnoe project shows positive economics.

TABLE 14. NPV PRIRAZLOMNOE, MILLION US$, 2002 VALUATION

	NPV at 12 % discount rate	IRR
Pre-Tax	2,766	19.3%
Excl. Tax Breaks	-1,345	4.5%
Incl. Tax Breaks	656	14.4%

Source: Sigra Group

Just like the Yamal LNG project, Prirazlomnoe shows negative project economics after taxes are introduced and an IRR of just 4.5 per cent. The tax breaks rectify this situation and increase the IRR to 14.4 per cent for a post-tax NPV of just over US$1 billion. These values are in line with what Gazprom has communicated.

Subsidy Effect: Starting year 2013

Looking at the project from the time when tax breaks were granted reveals a different picture. The project now shows very good economics with a large NPV and an IRR of 105.8 per cent. Repeating the exercise above, these metrics decrease substantially after taxes are introduced, but still remain favorable with an IRR of 27.8 per cent. After introducing tax breaks, the IRR increases to almost 80 per cent.

TABLE 15. NPV PRIRAZLOMNOE, MILLION US$, 2013 VALUATION

	NPV at 12 % discount rate	IRR
Pre-Tax	2,766	19.3%
Excl. Tax Breaks	-1,345	4.5%
Incl. Tax Breaks	656	14.4%

Source: Sigra Group

If the tax breaks had been agreed in 2002, they seem to be relatively fair, bringing the project's IRR from 4.5 to 14.4 per cent. However, if the question is whether the tax breaks are needed to continue developing the Prirazlomnoe project, the answer is clearly no. Thus, the granted tax breaks clearly violate the basic principles of tax breaks, namely to incentivize project development that otherwise would not occur. In its current form, the tax breaks resemble a generous gift or money transfer from the government to Gazprom. It is important to note, however, that the government could expect to regain some of its generous tax breaks through its majority ownership in Gazprom, for example as dividends.

Project cash flows are displayed in Figure 9 below. The after-tax cash flows are of course the same for both the 2002 and the 2013 valuation, where the only difference is which year valuation is performed from. The reason for the large NPV difference is twofold: first, in the 2013 scenario a large part of the project CAPEX is treated as sunk cost. Second, positive cash flows come closer to the NPV-date, thus profits are discounted over fewer years

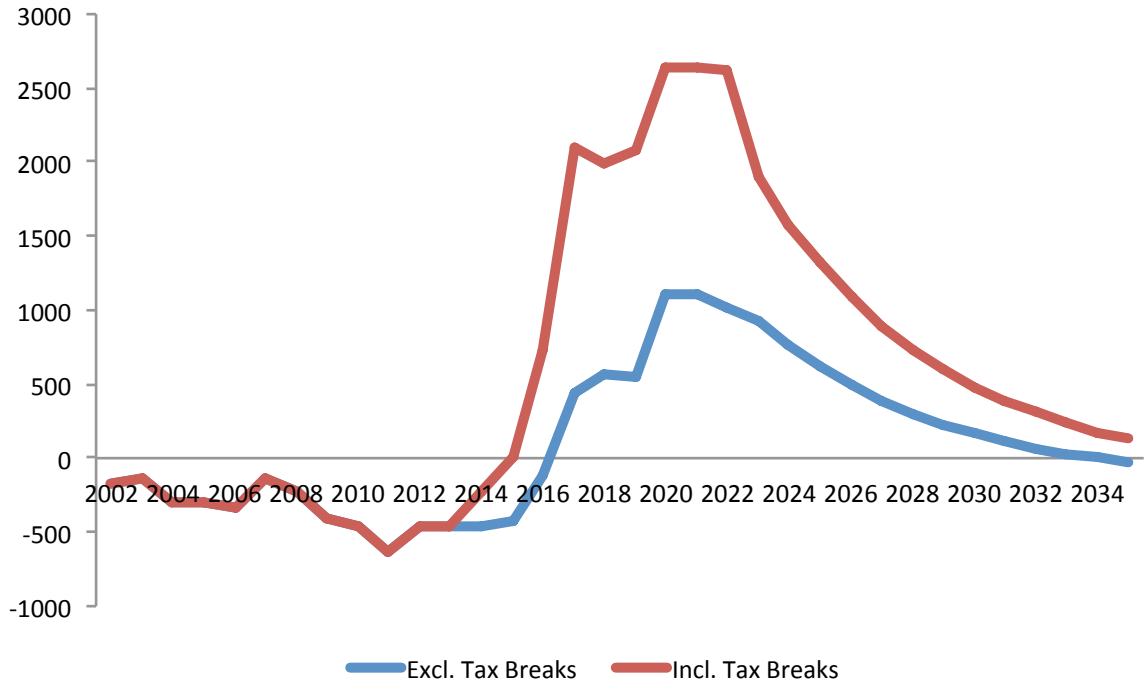

FIGURE 10. AFTER-TAX CASH FLOW EXCL./INCL. TAX BREAKS, 2002 VALUATION

Source: Sigra Group.

Sensitivity Analysis

Similarly to Yamal LNG, Prirazlomnoe is strongly influenced by the underlying assumptions from Table 12. Therefore, it is interesting to see how project economics change as assumptions are changed. For example, oil prices have historically fluctuated in a wide range and have a large impact on project economics.

Figure 10 shows a sensitivity analysis for the Prirazlomnoe field development. As can be seen, with a price increase of 30 per cent, project IRR increases to around 18 per cent, whereas a production increase of 25 per cent lifts IRR to 16 per cent. Conversely, an increase in CAPEX by 25 per cent would decrease IRR to 11 per cent.

If reduced export duties are not prolonged after the volume limit of 27 mmt from Decree 657 of April 23 2014, IRR will be reduced by roughly 1 per cent.

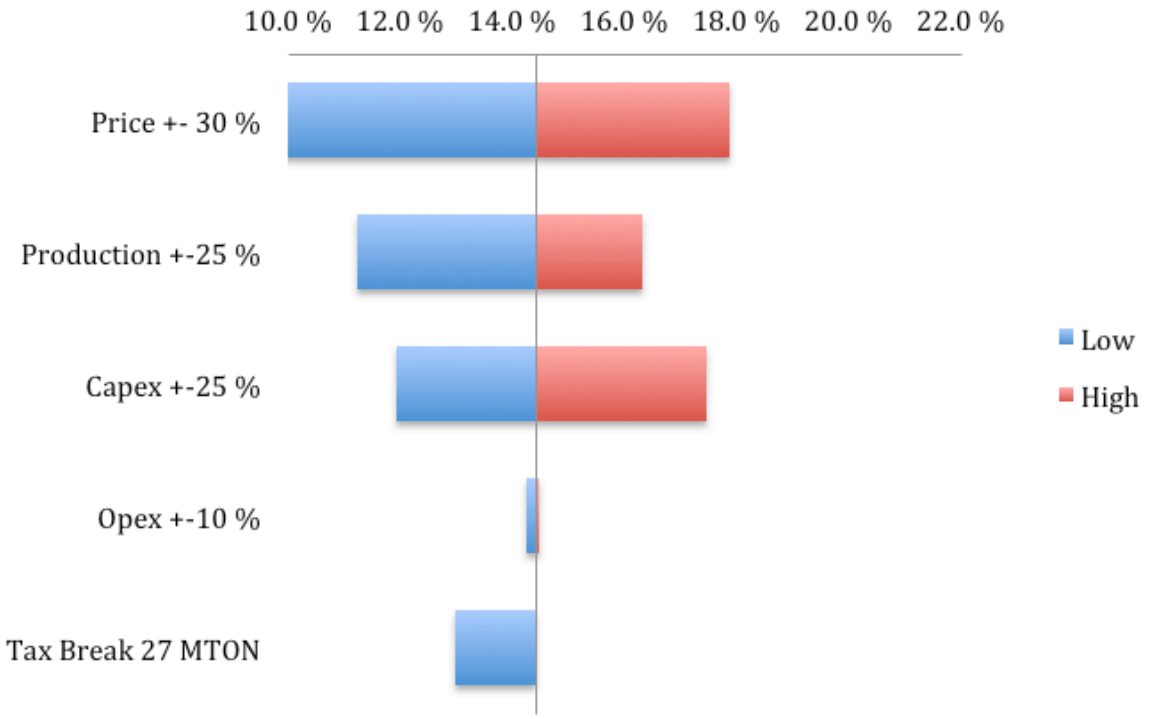

FIGURE 11. SENSITIVITY ANALYSIS IRR, PRIRAZLOMNOE

Source: Sigra Group.

5.3 DIRECT SOCIAL BENEFITS OF THE PRIRAZLOMNOE PROJECT

Direct benefits of the project to the society comprise tax revenues, job creation, tenders and contracts for Russian companies and corporate investments into social infrastructure.

Expected Tax Revenues

Expected tax revenues from the Prirazlomnoe project are displayed in Table 16. The first row shows expected tax revenues had there not been any tax breaks granted to the Prirazlomnoe project. In contrast to the Yamal LNG project, this is not a strictly hypothetical situation since the government could be certain that the project would have been developed without tax breaks. The calculations from 2013 above clearly show that the project had positive economics at the time the tax breaks were granted. Sunk costs need not be part of the calculations for granting tax breaks. To stimulate efficient resource use, the Russian government would have fared better by granting tax breaks in advance rather than ex post since that gives the company little incentive to save on capital expenditure.

By granting tax breaks, the government take from the project decreased from 92 per cent to 53 per cent and tax receipts decreased by US$16.5 billion dollars. In other words, by granting tax breaks to Prirazlomnoe in a situation where the tax breaks were not strictly necessary, the government shifted sizeable revenue to the company.

TABLE 16. EXPECTED TAX REVENUES FROM PRIRAZLOMNOE

	Government Take*	Tax Receipts, US$ million	NPV Tax Receipts,* US$ million	Gross Tax Share
Excl. Tax Breaks	92%	38,920	8,269	97%
Incl. Tax Breaks	53%	22,339	4,419	77%

*Government take defined as total tax receipts divided by total cash flow. NPV of tax receipts is calculated at an 8% discount rate.
Source: Sigra Group.

The argument above could be countered by claiming there existed a tacit agreement between the government and Gazprom that tax breaks would at some point be granted. That would explain why Gazprom has continued to develop a project that only showed 4.5 per cent IRR without tax breaks. However, the question still remains whether this is rational resource management. Considering the lengthy development of the project and sizeable cost overruns, one could question whether it would have been more beneficial to develop Prirazlomnoe under a tax system that would not be adjusted *ex-post* to accommodate cost development. In other words, since taxes decrease as costs increase, the operator has little incentive to curb costs, and there is a risk the project is developed less efficiently. The government, aiming to preserve a gross income-based tax system with low tax revenue risk, has thus succeeded in transferring the entire risk of project cost increases from the company to the government. Needless to say, a practice where cost increases are simply offset against lower tax payments sets a bad precedent for other future projects.

In fact, it seems that the tax breaks already granted could be subject to change should costs, prices and/or production profiles change. According to a "source in the Energy Ministry," there is no reason yet to discuss further tax breaks for Prirazlomnoe as its IRR is believed to be in the range of 15-16 per cent, a "absolutely normal" rate of return (Melnikov, 2013). In other words, should the IRR turn out to be "not-normal," there appear to be scope for further changes to taxation.

Job Creation

The impact of Prirazlomnoe on the job market of northwest Russia is somewhat unclear. In project presentations and interviews, project managers routinely point out that jobs will be created in the region (Mandel, 2012). However, no statistics showing the effect and number of new jobs created for local populations has been found. Since the project is located offshore and oil will be shipped to market directly from the platform, employment effects are limited, with the exception of some logistics services, predominantly routed via Murmansk. It is nevertheless clear that during the construction phase a large number of personnel were working on construction of the Prirazlomnaya platform, with the number peaking at 2,500 in 2009.

The Prirazlomnoe project will in operation be staffed with up to 200 personnel simultaneously, implying a higher total number since the workers will be on rotation (Gazprom Neft Shelf, 2014). However, there is no requirement these should come from the region or any particular place.

Tenders and Contracts

Sevmash has been the main contractor for developing Prirazlomnoe, with other Russian companies such as Vyborg Shipyard, Rubin and Coral also playing a major part. However, foreign contractors such as Kellogg, Brown and Root and a wide range of Norwegian supply companies have also performed much of the work. The Norwegian branch association INTSOK reckons that as much as 25 per cent of the equipment onboard the Prirazlomnaya platform is of Norwegian origin (Nortrade, 2007).

Corporate Investments in Social Infrastructure

There exists a range of realized and unrealized efforts in the sphere of social development support. In Murmansk, Gazprom Neft Shelf has promised to help realize the following projects in connection with the development of the Prirazlomnoe and Shtokman fields (Mandel, 2012):

- International partnerships for high-tech companies and engineering centres
- Gas supply to Murmansk Oblast and new energy-generating capacity
- Infrastructure for offshore developments
- Joint education programs with local education facilities
- Training centre including a training field

However, when the Shtokman development was put on hold indefinitely, the social development program quickly followed suit, and Murmansk has so far seen little development connected to the Prirazlomnoe project apart from Shipyard 35 offering some limited logistics services.

In Nenets Autonomous Okrug Gazprom has revealed plans to develop gas supply to the region and announced an investment of RUB 100 million (US$3.3 million) for that purpose in 2013 (GPN-Press-Relase, 2013). Moreover, Gazprom has financed a kindergarten in Ust-Kare (Fedpress, 2013). These efforts should be linked to all of Gazprom's activities in the region, but could also be seen as compensation for the property tax relief on Prirazlomnoe as explained below.

The most important regional impact of the Prirazlomnoe project, however, would be the property tax that should have been paid to regional authorities in NAO. Gazprom has previously highlighted that registering the platform in NAO would generate substantial income for the local authorities thanks to the property tax, and local authorities expected tax revenues in the range of RUB 500 million (US$16.6 million) per year (Slobodyanyuk, 2011). The revenue shortfall due to the generous tax breaks will obviously have consequences. For example, the planned road from Usinsk to Naryan-Mar may now be in jeopardy. The regional government has published a presentation in which budget deficits for 2014 and 2015 are expected to be RUB 2.5 billion and RUB 1.5 billion (US$83 and US$50 million), respectively (NAO, 2013).

5.4 SOCIAL AND ENVIRONMENTAL COSTS OF THE PRIRAZLOMNOE PROJECT

Gazprom has for years been battered by accusations of insufficient attention to the potential environmental consequences of the project. The main concern is an oil spill in an environmentally fragile area with cold water conditions amplifying the problem by making oil disperse more slowly than in warmer waters. That oil spills have disastrous and long-lasting effects on ecosystems has been exemplified by the 1989 Exxon Valdez spill in southern Alaska, whose repercussions are still visible in the region today. Prirazlomnoe's storage facilities are three times larger than the Exxon Valdez tanker (Zygar, 2013).

The project has been delayed several times, leading to increasing doubt about the platform's suitability for Arctic operations. Since 2004, seven delays have been announced, for example due to lack of environmental approval and deficiencies in drilling equipment (Sotnikova, 2012). Moreover, some experts have claimed that the icy conditions around Prirazlomnoe could seriously harm the platform and even topple it. Gazprom officials have retorted that the Prirazlomnaya platform could withstand a hit from a torpedo, and people drawing comparisons with the Macondo spill in the Gulf of Mexico have limited technical proficiency (Ramsdal, 2013).

The maximum size of possible oil spills from Prirazlomnoe are officially calculated to be 1,500 tonnes of oil for wells and 10,000 tonnes for oil tankers. This implies that the impacted area could reach 140,000 square kilometers (or four times the size of Lake Baikal) and also impact more than 3,000 kilometers of shoreline. Three nature preserves are within the area of potential impact: the national park "Nenetsky" as well as the nature reserves Vaigach and Nenetsky (Starinskaya, 2012a). A report commissioned by WWF and Greenpeace Russia in 2012 points out that with the equipment employed in the oil spill preparedness plan, only 20 per cent of an oil spill could be collected and no plan for saving the local fauna exists. Figure 12 shows the potential extent of pollution after an oil spill at Prirazlomnoe.

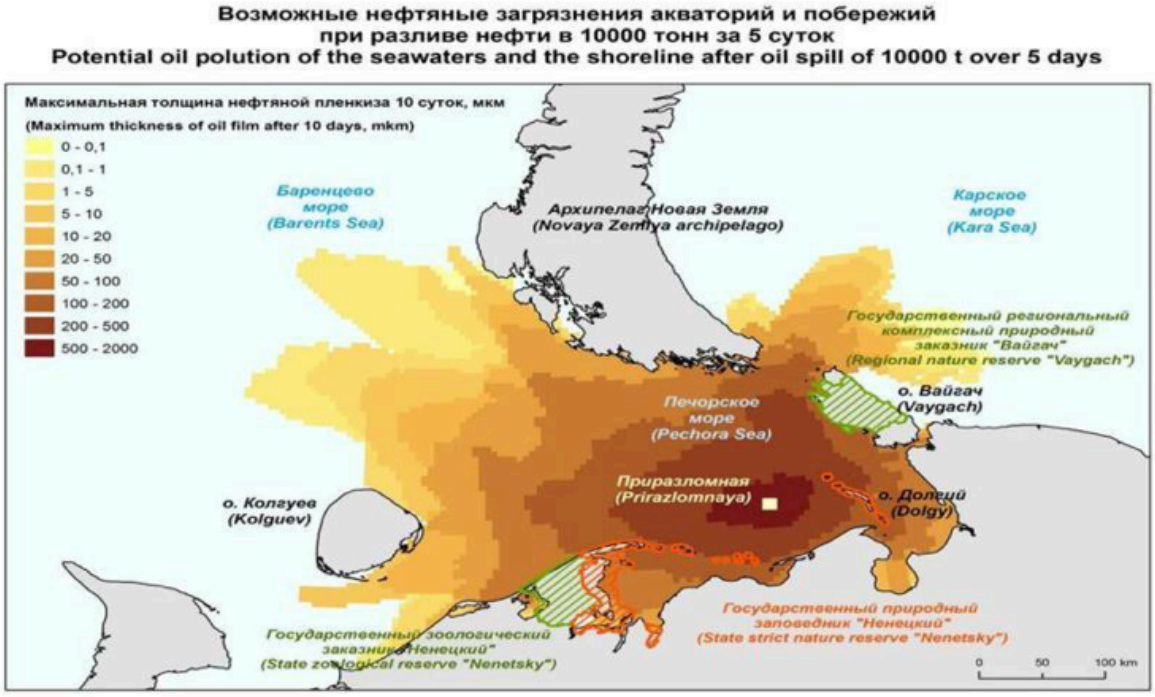

FIGURE 12. POTENTIAL OIL POLLUTION IN THE EVENT OF AN OIL SPILL

Source: Knizhnikov, (2013).

By the time production commenced at Prirazlomnoe, all relevant government bodies had approved the project's oil spill preparedness plan, a summary of which can be found on the homepage of Gazprom Neft Shelf (Gazprom Neft Shelf, 2013).

Greenpeace Action

The concerns mentioned above have caused civil action on an unprecedented scale for Arctic offshore oil and gas developments. Greenpeace has on two occasions attempted to board the Prirazlomnaya platform in order to draw attention to the potential risks of Arctic oil and gas exploration and extraction. As evidence of misconduct and rationale for its actions, Greenpeace has posted a compilation of Youtube videos by workers at Prirazlomnoe showing, for example, a staircase falling into the sea in a storm, a supply ship ramming the platform, and some footage of cables and other things lying around on the platform (Ayliffe, 2013). They also point out that Russia's poor record of preventing oil spills onshore should provide enough reason for limiting oil and gas developments in fragile offshore waters in the Arctic.

In the first Greenpeace action in August 2012, activists were hosed down and workers at Prirazlomnoe attempted to topple their boats (Ayliffe, 2013). In the second action in September 2013, the activists were charged with piracy (later changed to hooliganism) and detained in a Murmansk prison before being released prior to the Olympic games in Sochi after about three months in prison (BBC, 2013).

In the meantime, Gazprom officials claimed the Greenpeace activists threatened the lives of personnel at the platform and pointed out the action was not in accordance with Russian law (Ria-Novosti_c, 2013). It should also be mentioned that the Greenpeace action was not particularly popular among the Russian population. Over 42 per cent of people who had heard of the action thought it was a plot from foreign secret services; 27 per cent thought it was directed to attract additional funding, while only 20 per cent thought the activists were actually motivated by a true desire to protect the Arctic (Opalev, 2013). Conspiracy theories also extend to the upper echelons of the Russian elite, with a State Duma deputy asking rhetorically whether the activists were not there to plant a bomb and create an ecological catastrophe to prove their point (Anokhin, 2014).

Greenhouse Gas (GHG) Emissions

In addition to the environmental concerns caused by a potential oil spill, the Prirazlomnoe development will cause emissions of greenhouse gases. The platform will be self-sufficient in terms of power supply through a combination of diesel and gas generators. Gas will be utilized where possible to minimize flaring, but the platform will to some extent rely on diesel generation especially in the early and late phases of production when there is less production of associated gas. As much as 80 per cent of associated gas is expected to be utilized for power generation.

Illustrations on emissions for Prirazlomnoe is calculated in Table 17 below, using Prirazlomnoe's resource estimate and average world CO_2 emissions per tonne of oil equivalent as well as emissions statistics from Visund and Valhall, two offshore platforms in Norway of comparable size to Prirazlomnoe (Bertelsen, 2013). Depending on the technology benchmark used, the field will produce between 9.6 and 15.8 million tons of CO_2 emissions over its life cycle.

TABLE 17. TOTAL CO_2 EMISSIONS FROM PRODUCTION - EXAMPLE

Emission Coefficient	Emissions (kilos per tonne of oil)	Production at Prirazlomnoe over the life cycle (million tonnes)	Total CO2 emissions over the life cycle (million tonnes)
World average	133	72	9.6
Visund	219		15.8
Valhall	140		10.1

Source: Sigra Group.

5.5 COMPARISON OF SOCIAL BENEFITS AND COSTS

Expected tax revenues from the Prirazlomnoe project are large. Based on the assumptions listed above, our calculations show they could amount to around US$22 billion. However, even though the absolute number is high, the government take is only just above 50 per cent and, similarly to the case of the Yamal LNG project, there should have been scope for taxation procedures that would allow both economical development of the Prirazlomnoe project and a higher government share. Moreover, as argued above, since the investments were sunk by the time tax breaks were granted, the government could have avoided tax holidays without jeopardizing further development of the project. That would have secured US$39 billion in tax revenues, a difference of US$17 billion in comparison to the government take under current conditions.

In addition, the promised property taxes of RUB 500 million to NAO were revoked, even though these play a minor role in project economics and a major role for the regional budget. NAO received a kindergarten in Ust-Kare and promises of US$3.3 million in investments for gas supply to the region, which by any standard is a very modest compensation compared to the canceled property tax.

Prirazlomnoe has nevertheless been important to the Russian yard Sevmash, where up to 2,500 people were engaged in constructing the platform from 1994 to 2010. Other Russian companies have also been involved in construction and design of the platform and the platform is to be staffed with Russian employees during the operation phase.

The project per se is relatively profitable, with a pre-tax IRR of over 20 per cent, even including delays and cost overruns. Thus, the extent to which the project makes economic sense for the Russian government depends on the extent to which taxes are collected and on whether or not Prirazlomnoe is adequately equipped to limit the risk and combat the consequences of an oil spill. Above, we argue that tax collection could have been improved with a different design of the tax system, but still the government take of 50 per cent is comparable to projects in some other countries in the world.

The remaining concern is therefore the risk of oil spills. According to the company officials, this challenge is adequately addressed by the oil spill preparedness plan, whereas environmental organizations have voiced strong concern about the capabilities of Gazprom Neft Shelf to avoid and combat potential oil spills. The Prirazlomnoe project started production in December 2013 and the first cargo was offloaded to a shuttle tanker on April 18, 2014 (RBKb, 2014). It remains to be seen whether the platform will operate safely through its lifetime or not.

6.0 CONCLUSION

The analysis above has revealed that, based on the assumptions applied, the Yamal LNG and Prirazlomnoe projects are both dependent on tax breaks to show positive economics. Both projects, however, exhibit positive economics pre-tax if we do not consider infrastructure investments that are significant in the case of Yamal LNG. This exemplifies the unsuitability of the taxation system to incentivize economically feasible project developments. As can be seen in Table 18, IRR for Yamal LNG increases from 4.4 to 11.6 per cent when including tax breaks, whereas Prirazlomnoe's IRR increases from 4.5 to 14.4 per cent. For Yamal, however, IRR decreases by two percentage points if government funded infrastructure development are included in the project CAPEX.

TABLE 18. SUMMARY PROJECT ECONOMICS

Yamal LNG, Including Tax Breaks		
	NPV at 12 % discount rate, US$ million	**IRR**
Pre-Tax	1,813	13.0 %
Post-Tax, excl. Tax Breaks	- 10,962	4.4 %
Post-Tax, incl. Tax Breaks	- 585	11.6%
Yamal LNG, Including Tax Breaks and Investment Support		
Pre-Tax	-3,825	10.1 %
Post-Tax, excl. Tax Breaks	-16,312	2.1 %
Post-Tax, incl. Tax Breaks	-5,811	8.9 %
Prirazlomnoe, 2002 Valuation		
Pre-Tax	2,766	19.3 %
Post-Tax, excl. Tax Breaks	-1,345	4.5 %
Post-Tax, incl. Tax Breaks	656	14.4 %
Prirazlomnoe, 2013 Valuation		
Pre-Tax	16,265	105.8 %
Post-Tax, excl. Tax Breaks	1,903	27.8 %
Post-Tax, incl. Tax Breaks	8,863	79.6 %

At least for Yamal LNG—subject to the assumptions applied—tax breaks and infrastructure support have been necessary to ensure the project's development. The tax breaks, however, fail to turn the project's NPV positive. Thus, these support measures cannot be classified as subsidies according to Lund (2002) under the prevailing assumptions.

For Prirazlomnoe, the question of tax breaks is even more ambiguous since tax breaks were granted taking into account past capital expenditures. This contradicts basic economic theory, which treats past costs as sunk when making decisions for the future. Looking forward from the year when tax breaks were granted reveals very positive economics, an IRR of 27.8 per cent, for the Prirazlomnoe project without tax breaks. Arguments about Gazprom stopping the project in the absence of tax breaks therefore seem hollow. The granted tax breaks thus resemble rent transfer from the government to the company rather than investment-stimulating efforts.

In terms of the government take, it is 24 per cent for Yamal LNG and 53 per cent for Prirazlomnoe. The government take for Yamal LNG is comparatively low whereas that for Prirazlomnoe is comparable to rent-sharing mechanisms in some other oil-producing countries, Thus there are reasons to question the Russian government's rationale for providing both vast tax breaks and infrastructure development for the Yamal LNG project given the relatively low return.

In addition, some concerns exist for the projects' impact on the environment. To develop the Yamal LNG project, dredging in the Bay of Ob through the ridge separating it from the Kara Sea potentially may change the salinity levels in the freshwater eco-system. As for Prirazlomnoe, concerns have been expressed regarding the haphazard attitudes towards oil spill preparedness and response.

In conclusion, the two projects may be analyzed using the IISD-GSI analysis framework outlined in Figure 13.

High government revenue from project	**"GOVERNMENT CASH COW"** A project generates "fiscal space" for structural reforms, but no direct social benefits.	**"SUSTAINABLE STAR"** A project generates "fiscal space" for structural reforms as well as direct social benefits.
Low government revenue from project	**"BROWN ECONOMY BUSINESS"** A project generates no "fiscal space" for structural reforms and no significant social benefits.	**"SOCIAL BENEFIT MAKER"** A project generates no "fiscal space" for structural reforms, but creates direct social benefits.
	Negative or small net social and environmental benefits from project	Large net social and environmental benefits from project

FIGURE 13. FISCAL AND SOCIAL DIMENSIONS OF EXTRACTIVE INDUSTRY PROJECTS

Source: Cunningham, Gerasimchuk, Kitson, & Gerrard (in press).

The Yamal LNG project seems to belong to the "Brown Economy Business" category with low tax revenues and a potentially negative impact on the environment. Being an LNG project, it creates some new marketing opportunities for Russia by avoiding gas exports through its pipeline system, but there is reason to question whether there are not cheaper gas reserves to be developed elsewhere in Russia.

The Prirazlomnoe project is harder to classify. The project per se could have been at least a "Government Cash Cow" if the project had been developed on time and on budget within a sensible tax system. The pre-tax IRR of 21 per cent calculated with a 14-year period from the first capital expenditure to the first commercial oil production is evidence of that. However, since the government has essentially shifted all capital expenditure from the company to itself by granting tax breaks after investments are incurred, the cash-cow potential has been significantly curtailed. The project nevertheless provides some revenue, and also played a role in keeping the shipyards in Severodvinsk alive during the 1990ies. Thus, to some extent, Gazprom subsidized the shipyards and it is therefore perhaps fair that some tax breaks are granted not considering textbook economic theory. On the environmental side, time will tell who is right among those claiming large and those claiming negligible risks of oil spill-related damages.

Both projects have received substantial government support in return for dubious benefits for Russian society. Questions remain whether these two projects are the right choice for Russia, but continuing the cherry-picking of projects through ad hoc tax breaks rather than cost-efficient resource development will most likely lead to unnecessary revenue transfers from the government to companies also in the future.

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For more details please contact:

Ivetta Gerasimchuk at igerasimchuk@iisd.org

International Institute for Sustainable Development
Global Subsidies Initiative
International Environment House 2
9 chemin de Balexert, 1219 Châtelaine, Geneva, Switzerland
Tel: +41 22 917-8373 | Fax: +41 22 917-8054