



An economic evaluation of Iranian natural gas export to Europe through proposed pipelines



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ABSTRACT

Natural gas consumption is rising rapidly around the world. Europe is likely to be turning to new sources of natural gas, and Iran as the world's largest holder of gas reserves could be one of its suppliers. This article proposes three routes for the transfer of Iranian gas to Europe through pipelines. The study uses three common ways for investigating the feasibility of infrastructure projects, including the net present value (NPV), Internal Rate of Return (IRR) and Benefit–Cost Ratio. These criteria will be used for analyzing the economic feasibility of the transfer of Iranian natural gas to Europe via pipelines. With 5% discount rate and the average price of exported gas in all gas feedstock rate scenarios, different routes will be calculated on the basis of NPV and IRR. The results show that Turkey route has the highest Net Present Value and Internal Rate of Return, and Iraq and Armenia routes have the next priorities.

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1. Introduction

Global primary energy consumption is increasing at an unexpected rate. Natural gas has received vast consideration inside this remarkable development, since it is an impressively cleaner well-spring of hydrocarbon energy and the second biggest well-spring of energy for power era. Given the energy security delayed repercussions of the Fukushima Nuclear Disaster in Japan and the move in nuclear energy strategy around the globe, it is suitable to recommend that the significance of natural gas as an option well-spring of energy will keep on increasing later on [11].

Not just is natural gas a standout amongst the most critical wellsprings of option energy, additionally it is seemingly a standout amongst the most geopolitically and geostrategically complex natural assets because of the accompanying three reasons: (1) like oil, its conveyance is topographically uneven; (2) since by definition it exists as a gas it is hard to store; and (3) the foundation utilized for transportation (i.e., gas pipelines) are entirely particular to transporting natural gas, in this way adding to the geopolitical multifaceted nature by summoning established monetary issues, for example, the hold-up issue. Keeping in mind the end goal to alleviate the dangers brought about by these attributes of natural gas, different measures (e.g., long haul restricting contracts,

remuneration to travel nations by express travel charges or gas value discounts, universal consortiums, joint investment in pipelines) have been taken with a specific end goal to ensure dealing positions, sidestep struggle and eventually advantage from this geopolitically complex trade [11].

Europe, as the biggest importer of Russian gas, tries to discover a method for decreasing dependence on Russia by moving to condensed natural gas imports by tankers from Africa, the Middle East, and America. The advancement of shale gas in the USA has brought about a generous value differential between North American and European (and Asian) natural gas markets. This value differential makes a potential for Liquefied natural gas (LNG) sends out from the USA with the main U.S. LNG send out office anticipated that would be online in 2016 [12].

For various years, Russia has been the biggest provider of natural gas to the EU and naturally, the EU's reliance on Russian gas regularly has been the concentration of political and open level headed discussions. Worries about this reliance, and particularly about the security of the gas supply, have strengthened in the most recent five years as the EU confronted reshaped deficiencies, or even stoppages, of Russian gas. For instance, amid the 2006 gas emergency amongst Russia and Ukraine some Western European nations encountered a sizable diminishment in their gas supplies. Another Russia–Ukraine gas strife in January 2009 remaining South-eastern Europe totally without Russian gas for very nearly two weeks, and brought on extreme setbacks of gas in various other Western European nations. All the more as of late, in June 2010

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Belarus undermined to close down the energy course that goes to Europe. While the risk was actualized just towards Lithuania, with 40% of Russian gas supplies cut, EU Energy Commissioner Guenther Oettinger portrayed this diminishment as “an assault against the entire EU” [9].

In the course of the most recent two decades, Iran's dry natural gas production has quickly expanded, ascending from 39.7 Billion cubic meters in 1996 to 192.4 Billion cubic meters in 2015, and records for around 5.4% of the world's natural gas production.

Iran's natural gas utilization expands normal 9.2 every year percent from 1996 through 2015, Iran's assessed demonstrated natural gas reserves remained at 1201.4Tcf at end 2015, as per the Oil and Gas Journal, second just to Russia [2].

After Russia, Iran has the second-biggest demonstrated reserves of natural gas on the planet, and it has a solid potential to build up those assets at a speedier pace after the late lifting of nuclear-related sanctions. Iran has aimed to substantially increase its natural gas production in the future, to deal with rapidly developing domestic demand, and also to improve its export limit, majorly through pipeline. In the more extended term, Iran arrangements to construct LNG send out offices for worldwide shipments of natural gas [1].

The present study completed an economic evaluation of Iranian natural gas fare to Europe through proposed pipelines for the advantage of strategy producers and investors. The economic indices of net present value (NPV), benefit–cost ratio (BCR) and internal rate of return (IRR) were utilized. A novel part of this study is economic appraisal of Iranian natural gas transport to Europe through proposed pipelines.

Area 2 portrays European Natural gas. Segment 3 talks about the Iranian proposed gas pipeline. Segment 4 outlines the technique utilized. Segment 5 presents Result of the economic possibility think about. Area 6 displays the conclusions and arrangement suggestions drawn from the outcomes.

2. European natural gas

Given its constrained and diminishing reserves of natural gas, the EU is a net importer of gas. The expanding reliance on gas imports has postured challenges and expanded the dangers to security of supply. A dependable, straightforward and interconnected market can possibly moderate some of these risks [6].

Natural gas clients enlisted inside the EU lattice expanded 1.6% in the term of 2014–2015 achieving 894.10 Billion cubic meters toward the end of 2015(bp,2016).

Russian Federation, United Kingdom, Germany, Ukraine, Italy, France and the Netherlands are the real natural gas markets with impressively high normal measures of utilization in period 2005–2015 over 37 Billion cubic meters every year. The biggest demonstrated gas reserves in Europe, status of 2015, are situated in Norway (1.9 Trillion cubic meters), the Netherlands (0.7 Trillion cubic meters) and the UK (0.2 Trillion cubic meters). Gas assets of Norway are situated on the Norwegian Continental Shelf in the North Sea. Creation in 2015 added up to 117.2 Billion cubic meters [3]. Major delivering fields are the Troll and Sleipner fields, the Asgard field in the Halten/Norland territory and the Staffjord and Gulfaks fields in the Tampen range. In the Barents Sea, the primary European fare office for LNG (6.0 Billion cubic meters/yr) nourished by the Snøvit gas field is as of now under construction [13].

In 2015, the Netherlands gas generation has been accounted for to be 43.0 bcm [2]. Gas reserves have been assessed to be around 0.7 Trillion cubic meters toward the start of 2015 with the dominant part situated in the extensive coastal Groningen field [13].

Gas generation in the UK added up to in 39.7 Billion cubic meters 2015. British gas events, essentially situated in the North Sea,

have been evaluated to be 0.2 Trillion cubic meters toward the end of 2015. An exceptional increment in the gas utilization has been seen in the UK in the 1990s driven by a change from coal to gas in power era. This move was from one perspective activated by cost diminishes for consolidated cycle control plants and then again by the accessibility of modest related gas from oil creation as opposed to Norway and the Netherlands, the static lifetime of British gas reserves is with just 11 years essentially lower, so that the UK is relied upon to wind up distinctly a noteworthy importer of natural gas later on [13].

Despite the fact that Europe's gas assets are not adequate to cover its demand, substantial gas stores are situated in neighboring areas, to be specific, in the Former Soviet Union, Northern Africa and the Middle East [13].

The Russian Federation has with around 32.3 Trillion cubic meters the biggest demonstrated gas reserves on the planet. Assist striking demonstrated gas reserves are found in Kazakhstan 0.9 Trillion cubic meters, Turkmenistan 17.5 Trillion cubic meters, Uzbekistan 1.1 Trillion cubic meters and Azerbaijan 1.1 Trillion cubic meters. Russian gas creation was 573.3 Billion cubic meters (bcm) in 2015 [2].

With a Russian gas utilization of 391.5bcm in 2015, more than 66% of the delivered gas in Russia has been devoured to cover domestic needs. Because of low domestic gas taxes set by the state, natural gas is the most critical essential energy bearer in Russia [13].

In 2015, Turkmenistan delivered 72.4 bcm of natural gas, of which 27.7 bcm have been sent out to China and have been traded 3.1 through the Central-Asia-Center (CAC) pipeline to the Commonwealth of Independent States. A measure of 7.2 bcm has been sent out to Iran [2].

Gas demonstrated reserves are 14.1 Trillion cubic meters toward the end of 2015 in Africa, Algeria (4.5 Trillion cubic meters), Egypt (1.8 Trillion cubic meters), Libya (1.5 Trillion cubic meters) and Nigeria (5.1 Trillion cubic meters). Algeria is the biggest gas maker on the African landmass with a generation of 83.0 bcm in 2015, of which 20.7 bcm have been traded to Europe.

Algerian gas is either traded as is sent as LNG (liquefaction limit of 16.2bcm in 2015) to Europe.

With Iran and Qatar, the countries with the second (34.0 Trillion cubic meters) and third (24.5 Trillion cubic meters) biggest demonstrated gas reserves, separately, after Russia are found in the Middle East. Iran was with 192.5 bcm in 2015 likewise the biggest gas maker in the locale, yet its generation is almost altogether devoted for domestic utilization In 2015, Qatar sent out 106.4 bcm of LNG, mostly to Asia Pacific, Europe and Eurasia and Middle East countries.

3. Iranian proposed gas pipeline

The study considers Iran's three prospective pipelines. The first one is Nabucco gas pipeline; The length of this pipeline is about 4710 (km). This pipeline is a part of the overall ninth pipeline in Iran.

The original 3893-km (2419 mi) long pipeline was dragged from Ahiboz in Turkey via Bulgaria, Romania, and Hungary to Baumgarten an der March, a major natural gas hub in Austria.

The idea to make Armenia a transit country for the Iranian gas does seem quite attractive. Under such circumstances, the Iranian gas will be supplied to Europe by a gas pipeline to be constructed, passing through Armenia, Georgia, under the Black Sea to Ukraine and Poland. The length of this pipeline is about 5000(km). 1720 km of this route is from Assaluyeh to Iran's border with Armenia. The main countries in this pipeline are importing gas from Russia. Diameter of the gas export pipeline is 56 inches with a capacity of

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