



Confederation of Indian Industry

INDIA'S ENERGY SECURITY AND TRANSNATIONAL GAS PIPELINES



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India's Energy Security and Transnational Gas Pipelines



Confederation of Indian Industry

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Preface

Energy is a critical and strategic ingredient underpinning a nation's long-term economic growth and security. Secure, sustainable, available and affordable energy is fundamental to modern societies for the well-being of citizens as well as for competitiveness of industries. The Indian economy, third largest globally, is expected to witness a high growth rate in the coming years driven by urbanization and a growing population. High demand has put India's energy architecture under severe strain.

India is diverse in its energy endowments and requirements. As its development process increases the need for a clean and stable supply of energy at sustainable prices will rise accordingly. Declining oil reserves, uncertainties in future oil supply, fluctuations in oil prices in the global market and growing concern for climate change, however, complicate its prospects for development.

As a rapidly growing economy, India needs to gradually move towards effectively tapping and diversifying its fuel basket. In order to meet its energy demand, India needs to expand its overall energy security by procuring energy supplies from outside. Hence, arranging a long term and assured supply of natural gas at reasonable price through transnational pipelines will bring an ultimate transformation to India's energy basket.

It is with this background that CII has done a study on "India's Energy Security and Transnational Gas Pipelines". We have come out with some comprehensive recommendations in this study towards identifying the role of transnational gas pipelines that can contribute in providing a steady and reliable source of India's gas inflow, which we hope would be considered by all the important policy stakeholders.

Chandrajit Banerjee
Director General, CII





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List of abbreviations

| | |
|-----------|---|
| GDP | Gross Domestic Product |
| R/P ratio | Reserves-to-production ratio |
| GW | Giga Watts |
| MW | Mega Watts |
| MTOE | Million Tonnes of Oil Equivalent |
| RLNG | Re-gasified Liquefied Natural Gas |
| CAGR | Compound Annual Growth Rate |
| MMSCMD | Million Metric Standard Cubic Meter per Day |
| Mln CM | Million Cubic Metres |
| Mcfd | Thousand Cubic Feet of Gas per Day |

CHAPTER I

India's Energy Security

Energy is a critical and strategic ingredient underpinning a nation's long-term economic growth and security. Secure, sustainable, available, and affordable energy is fundamental to modern societies and to the well-being of citizens as well as for industry competitiveness. For a huge country like India, with one of the rapidly growing economies as well as expanding population, the demand for energy is bound to be high. The energy sector is facing tremendous changes and challenges even as it strives to improve the sustainability and security of supply. Moreover, rising energy demand, coupled with less-than expected improvements in the production of domestic crude oil, natural gas and coal, has led to a strong reliance on imports, which has put severe strain on our energy architecture.

India as a country, therefore, needs a large amount of energy to cater the need of fast growing economy. Strategically, India is not well endowed with natural energy resources as compared to its population, yet it supports around 17 percent of the world population but only has 0.3 percent of oil, 0.8 percent of natural gas and 6.8 percent of the world's, oil, and gas and coal reserves, respectively. In the light of the above, India has been striving hard to increase energy supply by exploiting all possible sources of conventional and non-conventional energy domestically as well as globally to cater the demand for energy for a sustainable economic growth.

India has limited gas reserves to meet its requirements. There is a pressing requirement to identify commercially viable, long term association and uninterrupted supplies. Iran has the largest gas reserves in the world with 1200 trillion cubic feet (TCF) followed by Russia (1152 TCF), Qatar (866 TCF), US (345 TCF), Saudi Arabia (288 TCF), Turkmenistan (617 TCF)





and UAE (215 TCF). Besides trading with Qatar and Saudi Arabia on a limited scale, India is exploring possibilities to tap gas from Iran and from Turkmenistan for which negotiations have been in progress for the last 20 years. Transnational projects such as the Iran-Pakistan-India (IPI) Gas Pipeline and Turkmenistan – Afghanistan – Pakistan – India (TAPI) Gas Pipeline, and Iran – India Gas Pipeline have been in the talks since quite some time. However, these projects remain stalled due to security, strategic, political and commercial reasons. The changed geo-political and strategic scenarios have, however, opened a window of opportunity. India's gas needs can be easily secured through transnational pipelines. The country's energy requirement is crucial in order to keeping pace with global economic growth. The share of gas in India's energy mix is currently, more than 12 percent and is expected to rise by 20 per cent by 2030. As natural gas is a clean fuel and will be increasingly used by power and fertilizer industries, the demand for natural gas is expected to rise in the country at present and in the future as well.

India's Energy Scenario - Energy Mix

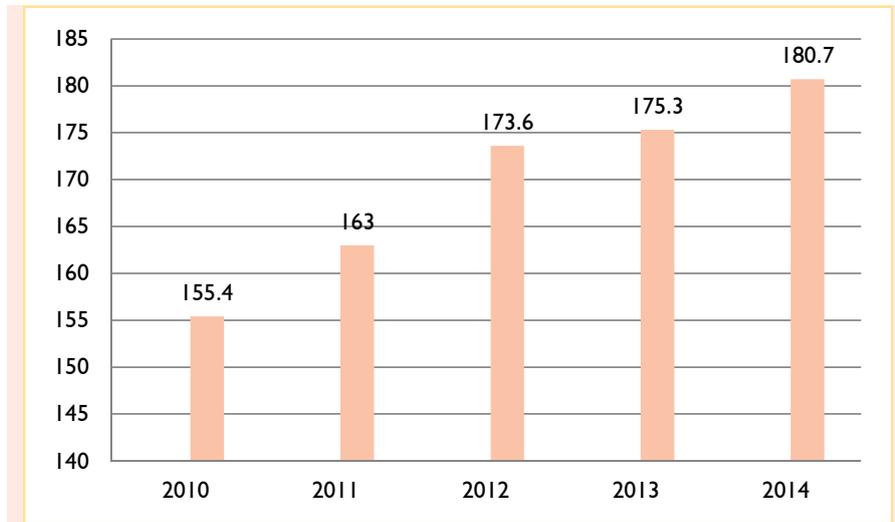
India has only 0.3 percent of the world's total oil reserves with an R/P ratio of 17.6 years. While it produces 41.2 million tonnes or 0.9% of the world's total, it consumes world's 4.5% or 195.5 million tonnes making India the fourth largest oil consumer. India's oil imports rise by 161% and account for 52% of the increase in imports.

Increasing Trend of India's Oil Consumption

| Crude Oil | 2011 | 2012 | 2013 | 2014 | 2015 |
|--|-------------|-------------|-------------|-------------|-------------|
| Production (Million tonnes) | 42.9 | 42.5 | 42.5 | 41.6 | 41.2 |
| Consumption (Million tonnes) | 163.0 | 173.6 | 175.3 | 180.7 | 195.5 |
| World's Total Consumption (Million tonnes) | 4085.4 | 4133.2 | 4179.1 | 4251.6 | 4331.3 |
| India's % Consumption of the world | 3.98 | 4.20 | 4.19 | 4.25 | 4.51 |

Source: BP Statistical Review of World Energy 2016

India's Oil Consumption (million tonnes)



India's total coal reserve is around 60,600 million tonnes. In 2015, total coal production was 283.9 million tonnes oil equivalent or 7.4% of the world's total, while consumption was 407.2 million tonnes of oil equivalent or 10.6% of the world's total, making it the world's third largest coal consumer. While coal remains the dominant fuel source in the country, its market share in the power sector drops from 77% in 2014 to 71% in 2035.

Increasing Trend of India's Coal Consumption

| Coal | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|-------|--------|--------|--------|--------|
| Production (Million tonnes oil equivalent) | 250.8 | 255 | 255.7 | 271 | 283.9 |
| Consumption (Million tonnes oil equivalent) | 300.4 | 330 | 355.6 | 388.7 | 407.2 |
| World's Total Consumption (Million tonnes oil equivalent) | 3800 | 3814.4 | 3890.7 | 3911.2 | 3839.9 |
| India's % Consumption of the world | 7.90 | 8.65 | 9.13 | 9.93 | 10.60 |

Source: BP Statistical Review of World Energy 2016

Natural Gas: Present Demand Scenario

At the current growth path India's energy consumption is expected to increase significantly going forward. This increase in consumption is expected to be supplemented by a change in the primary energy mix of India on account of the substitution of oil by natural gas. According to report on "Vision 2030" – Natural Gas Infrastructure in India commissioned by



the Petroleum and Natural Gas Regulatory Board (PNGRB), the share of natural gas in the energy mix of India is expected to increase to 20% in 2025 as compared to 11% in 2010. However, the government's initiatives for the expansion in natural gas supply in the country through setting up of nationwide transmission pipeline network and transnational pipeline projects are expected to materialize by 2025.

In recent years the demand for natural gas in India has increased significantly due to its higher availability and development of transmission and distribution infrastructure. Additionally, factors such as increased savings from usage of natural gas, environment friendly characteristics of natural gas as a fuel and the overall favourable economics of supplying gas at reasonable prices to end consumers, have contributed to the rise in its demand. Power and fertilizer sector remain the two biggest contributors of natural gas demand in India and continue to account for more than 55% of gas consumption. In future, the natural gas demand is all set to grow significantly at a CAGR (Compound Annual Growth Rate) of 6.8% from 242.6 MMSCMD in 2012-13 to 746 MMSCMD in 2029-30. Gas based power generation is expected to contribute the highest, in the range of 36% to 47%, to this demand in the projected period (2012-13 to 2029-30). The share of fertilizer sector in the overall gas consumption in the country is expected to go down from 25% in FY 2013 to 15% in FY 2030 owing to higher growth in other sectors.

As per the BP Statistical Review 2016, India's primary energy consumption rose by 5.2% and became the third largest energy consumer in the world with taking its share of global primary energy consumption to 5.3%.

Domestic Gas Production in India (MMSCMD)

| Company | Actual | | Projected | | | |
|------------------|---------|---------|-----------|---------|----------|-----------|
| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18* | 2018-19** |
| ONGC | 63.79 | 67.75 | 69.01 | 76.04 | 86.30 | 96.38 |
| OIL | 7.19 | 7.78 | 8.47 | 8.49 | 8.77 | 10.96 |
| PSC Regime | 26.02 | 24.62 | 22.39 | 28.41 | 38.02 | 39.53 |
| Total Production | 97.00 | 98.15 | 99.87 | 112.95 | 133.09 | 146.87 |

*Including ONGC NELP production of 4.66 MMSCMD ** Including ONGC NELP production of 12.05 MMSCMD. Source: Ministry of Oil and Natural Gas, Annual Report 2014-15

Growth Trend of India's Gas Consumption

| Gas | 2011 | 2012 | 2013 | 2014 | 2015 |
|--|--------|--------|--------|--------|--------|
| Production (Billion cubic metres) | 44.5 | 38.8 | 32.2 | 30.4 | 29.2 |
| Consumption (Billion cubic metres) | 61.9 | 57.5 | 50.4 | 50.6 | 50.6 |
| World's Total Consumption (Billion cubic metres) | 3249.2 | 3332.5 | 3392.9 | 3410.2 | 3468.6 |
| India's % Consumption of the world | 1.90 | 1.72 | 1.48 | 1.48 | 1.45 |

Source: BP Statistical Review of World Energy 2016

According to the Ministry of Petroleum and Natural Gas, average domestic gas production during 2015-16 HI (April 2015 to September 2016) was around 86.59 MMSCMD and supply was 70.52 MMSCMD. While the projection of demand as made by the working group on Petroleum & Natural Gas sector for the 12th five year plan (2012-17) is from 405 MMSCMD in 2015-15 to 523 MMSCMD in 2018-19. Even if non-conventional gas production materializes as presumed, India will be dependent on imported gas either in the form of LNG or through cross border pipelines such as the Turkmenistan-Afghanistan-Pakistan-India (TAPI) Gas Pipeline.

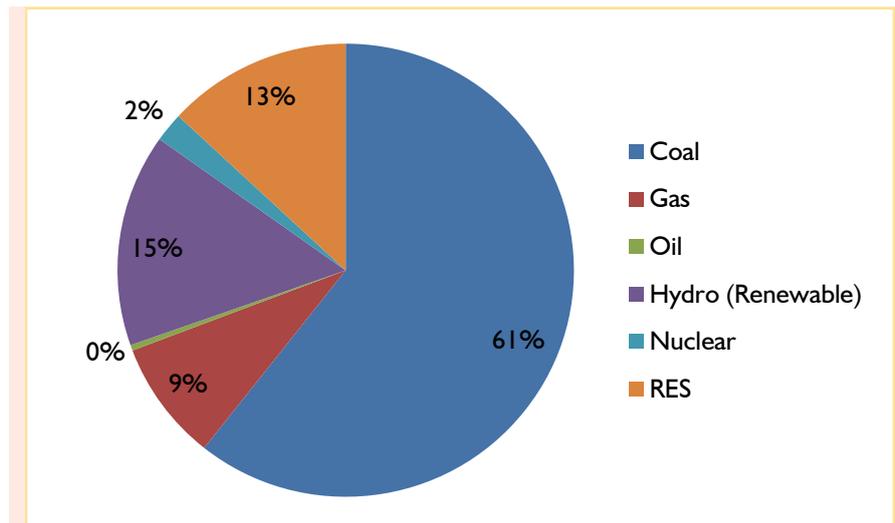
In order to enhance the availability of natural gas in the country, the Government of India has taken several steps, which include the following, among others:

1. Intensify Domestic Exploration (E&P) activities through New Exploration Licensing Policy (NELP)
2. Implement Shale Gas Policy Framework
3. Conduct Research and Development of gas hydrate resources
4. Import of Liquefied Natural Gas (LNG) from other countries
5. Plan and develop Transnational Gas Pipelines such as, Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline

As far as the power sector is concerned India's installed generation capacity is around 278 GW. The installed power generation capacity by mode is Coal-60.7 percent, Gas-8.65 percent, Oil-0.4 percent, Nuclear -2.1 percent, Hydro -15.2. Percent and other Renewable energy sources-13.1 percent. India's power supply demand gap has averaged 8-10 per cent over the

last 10 years where electricity access does exist and currently the country is facing a very significant peak hour power deficit to the tune of 13.3 per cent. Primary energy demand in India is expected to grow from 570 Mtoe to well over 1200 Mtoe by 2030.

India's Installed Power Capacity in percentage



Source: Ministry of Power, Government of India

CHAPTER 2

Transnational Gas Pipelines

India's natural gas market is expected to remain supply short over medium to long term and will hence significantly rely on imports. Natural gas imports from transnational pipelines can complement the LNG imports to increase the share of gas in India's fuel mix. Natural gas can also substitute higher cost liquid fuels and hence support in reducing the overall import bill and also will add to nation's list of actions to address climate change. India has limited gas reserves to meet its requirements and hence there is a pressing need to identify commercially viable, long term association and uninterrupted supplies for its energy security. Countries like Iran, Russia, Qatar, Saudi Arabia and Turkmenistan have some of the largest gas reserves in the world. Hence, it will be prudent for India to keep exploring possibilities to tap gas resources of these countries through transnational gas pipelines and should attach strategic importance to transnational gas pipelines. Negotiations between India, Iran and Turkmenistan have been in progress for the last 20 years for constructing three transnational pipelines such as, Turkmenistan – Afghanistan – Pakistan – India (TAPI); Iran – Pakistan – India (IPI); and Iran – India (II or MEIDP). However, these projects have been fraught with uncertainty due to several risks attached to them, including security, strategic, political and commercial reasons.

The Iran-Pakistan Pipeline (IP)

Origin, Route and Technical Specifications

The concept of Iran-Pakistan (IP) pipeline project, formerly known as Iran-Pakistan-India (IPI) (also called Peace Pipeline) pipeline originated in early 1989 and Iran-Pakistan working group was formed in 2003 to move the project forward. India joined the group in 2005 and subsequently in 2007, India and Pakistan provisionally agreed to pay Iran US\$ 4.93 per

mmbtu of natural gas. The pipeline was expected to carry 150 mmscmd natural gas to be shared equally between India and Pakistan. In 2009 India and Iran agreed to hold next joint working group meeting for discussion on IPI project which had not taken place, so far. The annual capacity of the gas pipeline will be 40 billion cubic metres.

Iran-Pakistan (IP) pipeline project was aimed at constructing a 1,724 miles (2775 kms) pipeline from Iran's South Pars fields in the Persian Gulf to Pakistan's major cities of Karachi and Multan and then further to Delhi, India. Considering that Iran has the world's largest gas reserves, it can be a convenient supplier of gas to both India and Pakistan. Iran had also offered to bear 60 percent of the construction cost of the pipeline. The project had been expected to greatly benefit India and Pakistan as both the countries do not have sufficient natural gas to meet their rapidly increasing domestic demand for energy.

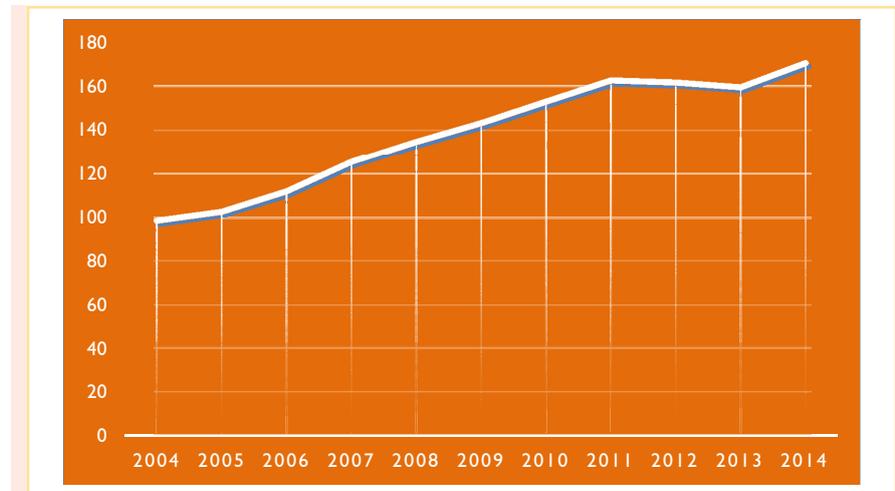
The pipeline can carry 110 million cubic meters (Mln cm) of gas/day out of which 50Mln cm meets domestic needs of Iran and the remaining 60Mln cm can be utilized by Pakistan. As per the agreement Iran will initially transfer 30Mln cm of gas per day to Pakistan, but will eventually increase the gas transfer to 60Mln cm per day.

Iran's Natural Gas Scenario

| Items | 2010 | 2011 | 2012 | 2013 | 2014 | Change 2014 over 2013 | 2014 of total world share |
|---|-------|-------|-------|-------|-------|-----------------------|---------------------------|
| Natural Gas Proved Reserves (trillion cubic meters) | 20.8 | 27.5 | 34.0 | 34.0 | – | 34.0 | 18.2% |
| Production (billion cubic meters) | 152.4 | 159.9 | 165.6 | 164.0 | 172.6 | 5.2% | 5% |
| Consumption (billion cubic meters) | 152.9 | 162.4 | 161.5 | 159.4 | 170.2 | 6.8% | 5.0% |

Source: BP Statistical Review of World Energy 2015

Iran's Natural Gas Consumption (Billion Cubic Metres)



Source: Ministry of Power, Government of India

Following discussions between the Iranian and Pakistani governments, a preliminary agreement was signed by both the parties in 1995. Construction of a pipeline from South Pars gas field to Karachi in Pakistan was expected out of the agreement. Subsequently, Iran had made a proposal to extend the pipeline from Pakistan into India, which led to the signing of a preliminary agreement in February 1999 between Iran and India. However, India withdrew from the project over pricing and security issues in 2009, and after signing a civilian nuclear deal with the United States in 2008. Though subsequently, in March 2010 India called on Pakistan and Iran for trilateral talks to be held in May 2010 in Tehran.

Benefits of IPI Pipeline

The geopolitical significance of the IPI pipeline is immense for all the partner countries. On the energy front, for Pakistan, the pipeline increases the government's prospects of tackling serious energy shortages. It could also reap an important geostrategic dividend by tying Pakistan and Iran into a relationship that benefits regional stability. If the pipeline materializes, it would also offer Pakistan an incentive to co-operate with India should New Delhi reverse its decision to leave the project in the late 2000s under US pressure. Apart from economic development, there are several other benefits that this pipeline can bring to Pakistan:

1. The IP gas pipeline will be a significant component of Pakistan's overall energy requirement as it will help Pakistan to overcome its energy crisis by filling the supply-demand gap. It will not only help minimize natural gas shortage of 1,000 to 1,500 mcf/d but will also meet the shortage of 5000 to 6000 MW electricity. In addition, gas reserves of Pakistan are

expected to deplete by 2020, hence, construction of the pipeline will help to preserve the depleting resources.

2. The imported gas from Iran can be a replacement of the expensive furnace oil that is used as fuel in power houses in Pakistan and can save up to one billion dollars per annum. Furthermore, gas supply to power sector has been diminishing. Power sector would be key beneficiary from IP Gas pipeline.
3. The Iran-Pakistan pipeline deal would have provided 30 million cubic meters of natural gas for Pakistan on a daily basis, starting in late 2014. The pipeline could eventually be extended to India, which was also a partner in the deal before. In such eventuality, not only Pakistan but also economically growing and energy-starved India will benefit, and, consequently, India-Pakistan peace will flourish and the whole of South Asia will see the sort of stability the United States and the rest of the international community aspires for the region.
4. Starting of this project with Iran will also open new avenues for cooperation. Iran has proposed that an electricity transmission network can be built next to pipeline, connecting electricity grid of Iran with that of Pakistan, India and China and offered to sell electricity at a subsidized rate.
5. The IPI pipeline would have not only provided plenty gas supplies for both India and Pakistan, it would have also set a huge political example of confidence-building between the two countries creating a fundamental transformation of diplomatic relations.

Hurdles in IPI Pipeline

1. **Pricing:** Basis of calculating gas prices remains unresolved. Iran had asked for higher prices \$8 per million BTU, while India would have agreed to \$4 per million BTU. The five million tonne per year LNG supply contract between NIOC (Iran) and GAIL/BPCL (India) had also been scrapped by Iran due to disagreement over pricing, though this may be linked to other factors.
2. **Trade and transit issues:** Physical security of the pipeline and compressor stations along the route has the potential of being compromised due to ongoing unrest in Baluchistan, where insurgency is a regular affair. Secondly, Pakistan being the transit country through which 1035km of the pipeline would run, could arbitrarily shut down the pipeline if a conflict or tension arises with India. Trade and transit relationship with Pakistan has always been volatile due to the persistent Kashmir issue. Additionally, Pakistan has still not accorded



India the most favoured nation (MFN) status, (which India extended to Pakistan in 1996, and which is normal trade relationship between countries), and rejects normalization of trade relations. Thus, there would be no legal recourse if Pakistan decides to shut down the pipeline.

3. **Security Situation in Baluchistan:** Third challenge IP Gas Pipeline does face is the security situation in Baluchistan. The major portion of pipeline's length will be passing through Baluchistan and thereby, if built, will face major security challenges, particularly when insurgency in the province has intensified unabated. In much of Baluchistan, a long-running ethnic-Baloch separatist insurgency results in regular attacks on government and security force interests as well as major infrastructure projects, while Islamist extremist groups have expanded their presence in the north and south, as well as the provincial capital Quetta. Additionally, the government's capacity to flex its muscles is limited because of its reliance on the US for funds and support within the IMF to avoid a balance of payments crisis. In any case, the pipeline offers only a partial solution to energy woes. Meanwhile, the pipeline will concern the army by increasing the Iranian and Chinese presence in the already sensitive province of Baluchistan.
4. **Sovereignty issue:** Due to the poor and volatile security situation in Baluchistan, India had suggested to send Indian forces to Baluchistan for safeguarding the pipeline. However, the suggestion was denied as Pakistan viewed it as an encroachment of its sovereignty.

Economic and Geo-Political Implications

Iran-Pakistan cooperation goes a long way to mitigating historical suspicions that have separated Shia Iran and predominantly Sunni Pakistan. The energy projects will not only alleviate Pakistan's crippling energy shortages but also produce hard currency for Iran's hard-pressed economy. Iran has already built its section of the pipeline to the Pakistan border. Pakistan will be building the remaining 80km of the pipeline from Gwadar to the Iranian border. Beijing is currently financing the construction of the gas pipeline from Nawabshah to Gwadar (both Pakistan), which would then be linked to nearby Iran through an 80km long pipeline that eventually would be extended through for China-Pakistan Economic Corridor (CPEC) to the northern Pakistani border near Kashgar in China. The former IPI (IP) pipeline, which could have included Chinese and Russian participation stalled under pressure from the US, which prodded India into working towards an alternative gas transport line from Turkmenistan via Afghanistan and Pakistan.



However, with the lifting of international economic sanctions, Iran has its door open to the international economy. The lifting of sanctions would mean increased flow of money in the Iranian market, which would lead to an increased demand for energy equipment, most of which are manufactured in western countries. Iran will also increase its export of crude oil and natural gas following the removal of economic sanctions. Iranian production of natural gas is expected to increase over the next few years due to continuing discoveries in the North Pars and South Pars regions. However, Iran's domestic consumption is expected to go up at about 7% per year for the following decade. The Iranian government has also subsidized natural gas prices along with gasoline prices, and this is expected to sustain this high level of domestic consumption. In lieu of this increasing domestic demand, natural gas exports are expected to decrease in the following years.

The Turkmenistan-Afghanistan-Pakistan-India (TAPI) Gas Pipeline

Origin, Route and Technical Specifications

The proposed TAPI or Trans-Afghanistan Pipeline is a natural gas pipeline being developed by the Asian Development Bank (ADB). The Asian Development Bank (ADB) conducted a feasibility study and rendered the project possible in 2005. The proposed pipeline is expected to transport natural gas from the Caspian Sea in Turkmenistan through Afghanistan and Pakistan to India. Following an approval by the Indian cabinet, India became the fourth country to join the project in 2008. The TAPI project was originally expected to start in 2012 and come on stream by 2016. It envisaged constructing 1,680 km of pipeline with a total gas capacity of 90 mmscmd. As per the plan, 38 mmscmd will go to India and Pakistan each, while 14 mmscmd would be bought by Afghanistan. The government of Afghanistan is expected to gain around 8% of the revenue of the project. The original project started in 1995 following the signing of a Memorandum of Understanding (MoU) between the governments of Turkmenistan and Pakistan for a pipeline project. In August 1996, the Central Asia Gas Pipeline Ltd (CentGas) consortium for construction of a pipeline led by US oil company Unocal was formed.

Construction on the project started in Turkmenistan on 13 December 2015. The pipeline is expected to be operational by 2019. TAPI has been under discussion since 1995, and India was formerly admitted in 2010. It is designed to transport 33 billion cubic metres of gas annually to South Asia for a period of 30 years. Energy giants like Bridas, Unocal, Delta and Chevron, Exxon and BP has shown interest in the project but backed out due to several



security and financial concerns. Furthermore, reluctance of the Turkmenistan government to sign production rights for onshore blocks with foreign companies also led to the withdrawal of companies from the proposed project.

Hence, a consortium has been organized and Turkmengaz, the national gas company of Turkmenistan and the largest gas company in Central Asia, was made the consortium leader with a stake of 85% along with Gas Authority of India Limited (GAIL) as Indian partner, Inter State Gas Systems (Private) Limited (ISGS) of Pakistan and Afghan Gas Enterprise (AGE) with stakes of 5% each. While the strategic significance of the TAPI project is huge, it can also become a game changer in the regional economic integration. Approximately 1200km of the pipeline will pass through Turkmenistan, 735km through Afghanistan, 800km from Pakistan and will reach Fazilka in Punjab state of India. While the TAPI project has a significant potential for energy security of the country, issues relating to price, security and gas certification remain unresolved. The pipeline has the capacity to transport 90mmscmd of gas – 38mmscmd each for India and Pakistan, and the remaining 14mmscmd for Afghanistan. India currently is an energy hungry nation and has committed to the TAPI Pipeline – a project worth \$8.7 billion, and is expected to be completed by December 2019 and pump natural gas from Turkmenistan to South Asia.

Regarding the construction pace of the TAPI gas pipeline, six kilometres of the pipe has already been laid in the Turkmen section in accordance with the approved plan. While Turkmenistan, through this project, is successfully implementing an energy strategy aimed at increasing production volumes, oil and gas processing and export of Turkmen energy resources to the world markets. TAPI will make it possible to deliver gas from Turkmenistan, which ranks fourth in the world on biggest gas reserves to large and promising markets of south and Southeast Asia. The construction of the TAPI pipeline would have given a powerful impetus to the economic development of the region and also helped resolve social and humanitarian issues and establish peace and stability.

Benefits of TAPI Gas Pipeline

1. This project has great relevance for meeting India's energy needs. Moreover, as this international pipeline reaches India's territory, it will reduce the import cost. India's major gas firm, GAIL, will represent India in the project.
2. It will provide energy-hungry India gas to run its power plants. It will further diversify the fuel basket to the benefit of Indian economy and the gas would be used mainly in power,



fertilizer and city gas sectors. A share of about 15-25% of natural gas would mean large investments in manufacturing sector in Gujarat, Rajasthan, Punjab regions, hence growth of economy.

3. The pipeline will also bring India and its neighbours much needed energy at competitive pricing, and could easily supply a quarter of Pakistan's gas needs, about 15 per cent of India's projected needs, as well as Afghanistan's requirements, by the time it is completed.
4. The entry of Turkmenistan as an energy exporter in the South Asian market brings along significant dimension potentially benefitting the huge and growing Indian market.

Hurdles in TAPI Pipeline

Despite significant advantages of the TAPI gas pipeline, the project faces several security, infrastructural as well as geopolitical hurdles ahead of its completion:

1. **Security concerns:** Physical security of the installments, contractors and suppliers is one of the biggest hindrance in making this project a success. In Afghanistan, political and security instability pose as a significant challenge in laying the pipeline. Currently, the Afghan authorities are engaged in removal of landmines along the pipeline route. Secondly, the pipeline would also have to travel through Balochistan in Pakistan, where a separatist movement against the Pakistan government could complicate TAPI security. Anti-Indian groups in Pakistan could also see the upside of disrupting energy supplies to their southeastern enemy. Insurgency like conditions in Afghanistan and Pakistan (Taliban) involves risk of destroying the pipelines. The situation is particularly a concern given the growing IS spread in Afghanistan and parts of Pakistan post withdrawal of US troops.
2. **Pricing issue:** Despite its progress, the project faces certain commercial constraints that have the potential to stall the pipeline construction. The TAPI Pipeline Company Limited (TPCL) will have to decide on the capital cost of the project following which the tariff is expected to be decided. Commercial challenges mostly revolve around gas pricing concerns, primarily of India and Pakistan. Till date, several meetings have been held towards simplifying the pricing issue, royalty sharing, but still the picture is not clear and may lead to future disputes. For TPCL, upstream investment commitment will be needed, which in the low price environment could be challenging. Furthermore, the commercial terms agreed need to ensure that landed gas price in India, including gas price, transmission pipeline charges and transit fees, has to be competitive versus imported LNG without which it will be difficult to enter into long term commitments under Gas Sale and Purchase Agreements (GSPA).



3. Political settlements: The volatile relations between India and Pakistan is a constant matter of concern in developing the TAPI project. Previously, the IPI pipeline project had been stalled due to diplomatic tensions between both the countries. International relations play a major role behind the successful development and implementation of multi-lateral projects. Hence, considering the history of political tension between India and Pakistan, future disagreements or political stalemate between the two countries have the potential of stalling further development of the project. Furthermore, the north-western areas of Pakistan are also insurgency struck mostly due to the presence of the Baloch groups. While it is unlikely that the Pakistani authorities will strike a peaceful agreement with the group, if these groups become a shareholder, it may mean this turmoil can be down-held and hence pave the way to economic and political development.

Economic and Geo-Political Implications

Turkmenistan has the third largest gas reserves in the world supplying large volumes to Russia and since 2011 to China by interstate gas pipelines. It is the shortest pipeline of 1450km that Pakistan may have. About 650km of the pipeline would be through Afghanistan. TAPI is indeed a good project which would definitely help in building stronger in South Asia. With the launch of this project, all the countries involved, especially Pakistan and India, will gain economic benefits and eventually political stability will be achieved and this will improve the security in Afghanistan. However, geopolitical challenges leading to security concerns are the main deterrent on the pipeline. Additionally, attracting investment in a low oil and gas price environment from most international companies will be challenging. The high security risk beyond the Turkmenistan border, is likely to impact the ability to attract finance for this high cost project (approx \$ 10 billion). The situation is particularly a concern given the growing IS spread in Afghanistan and parts of Pakistan post withdrawal of US troops. However, recently we have seen some progress, TurkmenGaz has been selected as the TAPI pipeline consortium leader and the ground-breaking ceremony was held in Turkey in December 2015. In short, the four countries backing TAPI have at the very least made significant political progress, enough for them to come together and support a mutually beneficial infrastructure project. Even still, the groundbreaking ceremony was symbolic. The real proof of progress will come over the next few years as we wait and see if construction gets underway in earnest. TAPI Gas Pipeline Project is expected to help in economic integration of the region. The pipeline project has also raised hopes for fulfilling the energy needs of a large number of people of this region at the least possible cost. In addition to giving clean energy, it would provide huge revenue and employment opportunities for the people of the regions. However, the technical and commercial viability of the project has to be ensured for its ultimate success.





Proposed Middle East to India Deepwater Pipeline (MEIDP) by South Asia Gas Enterprise (SAGE)

Origin, Route and Technical Specifications

South Asia Gas Enterprise (SAGE), part of the Siddhomal Group, has proposed in building a series of subsea pipeline from the Middle East, to bring natural gas to Indian market (MEIDP). Feasibility study of the project to bring natural gas to India through subsea pipelines is under way. The 1400 km under-sea pipeline reaching a depth of 3400 meters will start from Iran (Chabahar Port), through Gulf Region (Oman Sea) to the Indian Coast at Gujarat, with a spur line to Mumbai later. As per the undersea pipeline proposal which is under discussion, SAGE will lay the 1,400 km pipeline bypassing the exclusive economic zone (EEZ) of Pakistan. It will carry 31.5 million cubic meter gas per day and will be built in two years after finalization. Currently, negotiations are underway between Iran and SAGE for the construction of the under-sea line.

Any company wanting to buy gas from Iran can rent the pipeline. While SAGE does not have any plans to buy gas from Iran, it will lead a Global Consortium of some of the most reputed companies in the field of Deepwater Pipelines, to create a Multi-Billion Dollar "Energy Corridor" that can transport gas from the Middle East to India, bypassing the land route through Pakistan.

According to SAGE, the Deep-Water route passing through the Arabian Sea is the shortest and secure distance between the Gas Rich Gulf region and the coast of Gujarat/Maharashtra, which is the industrial hub of India where the gas will be received. Linking the Middle East gas fields with India across the Arabian Sea for an offshore distance of 1300 kilometers and maximum water depth of 3400 meters, the SAGE gas transmission pipeline is expected to transport up to 1.1 BSCFD gas into the Indian energy markets, or 8TCF over the next 20 years.

Benefits of MEIDP

The natural gas brought by the SAGE Pipeline is expected to be affordable for the growth of several fast growing sectors in India such as Power Generation, Fertilizer Plants, and Petrochemical production since these industries are gradually shifting towards natural gas because of its many advantages.

1. According to SAGE, subsea pipelines do not face any such issues and with advancements

in technology the projects are very much viable nowadays. Geopolitically, the subsea pipeline would through Arabian Sea would be a much safer option than on-shore pipelines and would mean a much safer option for India to secure long term energy supply. Additionally, the landed price of natural gas would be lesser as compared to the landing price of LNG in the country and long term gas supplies come with the added advantage of price stability unlike LNG prices which are subjected to constant fluctuations due to continuous geopolitical instability in various regions in the Middle East.

2. The SAGE Deepwater Pipeline is completely independent of the Indian Government's Onshore Pipeline Initiatives and builds extensively on studies performed for the Oman-India Pipeline earlier in the mid 1990's. According to SAGE, the Deep-Sea Pipeline Route is technically possible and also commercially viable. Contrary to popular belief, Deepwater Pipelines are at times, more economical than onshore pipelines that pass through land, since no Transit Fee has to be paid to countries on the way. In addition, it can be laid faster than onshore pipelines passing through several countries.
3. Offshore pipeline projects there is an added advantage of not having to pay transit fee. Additionally, construction of the MEIDP for natural gas supply will be environment friendly fuel due to its low level of carbon emissions. Successful implementation of the pipeline can help in India's growth and energy security in a greener and environment friendly way.
4. India has remained interested in sourcing natural gas from countries like Turkmenistan, Iran and other middle-eastern countries for a long time to meet its own energy requirement. However, it has been considering over transnational gas pipelines over the past two decades. The SAGE Deep-water Pipeline will potentially strengthen and promote commercial and cultural ties between India and the Gulf Region.

Hurdles in MEIDP

1. **Technical challenge:** A preliminary geological and geo-hazard assessment for the proposed MEIDP has been conducted. While 94% of the pipeline route will be on an almost flat terrain, on the remaining 6% of the route some hazards have been identified. For example, shallow water and hazards of ship anchoring and ship grounding can be a risk to the undersea pipeline. Additionally, internal and external corrosion of the pipeline may also add on to the risks attached to the pipeline. Incomplete understanding of seismic activities and mitigation methods mudflows, fault lines & slope failures. Additionally, no qualified deep water pipeline repair system is available.
2. **Cost of Project:** Transnational gas pipeline can be an expensive affair. The cost of the



project is \$ 4.5 billion. But it may exceed in future.

- 3. Source/Supplier of Gas:** SAGE promotes that the MEIDP project is focused on building an undersea gas pipeline from Iran to India directly. While it claims that there is 2000 trillion cubic feet (TCF) of gas in India's neighbourhood especially Iran, Qatar, Iraq, Turkmenistan etc. will be eager to provide gas for supply, SAGE has not yet reached on an agreement on who will be supplying/providing gas for the pipeline. Therefore, it is important to finalize upon an assured supplier/exporter of gas before the pipeline is constructed.

Economic and Geo-Political Implications

India has remained interested in sourcing natural gas from countries like Turkmenistan, Iran and other middle-eastern countries for a long time to meet its own energy requirement. However, it has been considering over transnational gas pipelines over the past two decades. Other countries like China has gone ahead and implemented live projects within a decade, which has further consolidated their position in world markets as the preferred pipeline gas destination. In India, lack of availability of hydrocarbon resources has further created the urgent need for the country to establish linkages to secure long term gas supplies towards energy security of the country. Therefore, it would indeed be prudent for India not to close doors for any project and work towards fructification of the proposed MEIDP.

CHAPTER 3

Challenges of Transnational Gas Pipelines

Conflicts and impediments in transcontinental projects are more often the result of politics due to or in the absence of legal and regulatory regimes. There is no overarching legal regime that can be used to resolve differences between nations and regulate activities and contracts. The problems relating to terrain can be overcome but the geo-political situations across nations still pose a major hindrance in pipeline projects. Existence of well- defined, coherent /harmonious energy policies, enabling legal and regulatory framework are essential criterion for cross-border trade and investments. As such, there is an urgent need to put in place related mechanism that would not only facilitate but also encourage energy trade through transnational pipelines.

1. Geopolitical risks associated with the construction and operation of the pipeline:

The biggest challenge of transnational gas pipeline projects is around safety and security of the pipeline during both construction phase and operation phase given the geopolitical situation in host countries. Physical security of pipelines and compressor stations along the route has the potential of being compromised due to ongoing unrest in conflict prone areas, where insurgency is a regular affair. It takes an enormous amount of resources to establish such sites and all the operators have to rely on a sound cloak of security to prevent theft of equipment, extortion, sabotage and kidnapping of work force. For the key Infrastructures such as Oil and Gas, security is always a major concern as this sector world over has high probability and vulnerability from terrorist attacks and sabotage. Off-shore platforms are highly vulnerable, high risk installations having high probability of attacks of terrorists who may be equipped with some of the best technical capabilities.

2. Presence of multiple parties and selection of commercial consortium: In transnational projects the involvement of several sovereign, commercial and regulatory agencies with

divergent agenda and geopolitical interests lead to challenges in reaching alignment on issues. For example, the supplier country, procuring country, the transit country, probably an international oil company providing upstream technology expertise, the pipeline construction company (likely to be a consortium with midstream participants from participating countries) and banks / lending bodies like ADB/ World Bank). Geopolitical uncertainty and coordination issues among various sovereign, commercial as well as regulatory authorities often discourage participation of well-known and experienced players of international repute in such projects.

- 3. Pricing Issue:** Gas is not a liquid and not as well defined market like oil, hence pricing becomes a key aspect of negotiation which takes a long time to reach agreement on. The willingness of gas exporting state concern to price its gas in a manner which would ensure its cost competitiveness in countries where the gas is finally sold is essential for the project to take off. While the natural gas producing country may keep prices high as a net exporter of natural gas as its economy depends on such exports, the importing country is likely to bid towards purchasing gas at a lower price. Many user industries would find the gas unviable for their operations and may refrain from entering into long-term purchase agreements if the landed price of gas in the buyer country from the pipeline were to be high. Additionally, operations of gas-based power plants and fertilizer plants using gas from transnational pipelines, which is two-times higher than domestic gas price, would lead to high power tariffs and higher subsidy, respectively, which the purchasing government might not prefer.
- 4. Flexibility:** Unlike LNG where cargoes can be sourced from elsewhere / diverted to a different market; once the pipeline is laid, no flexibility exists; hence reaching a long term agreement on various commercial terms among all parties is a challenge. Pipelines are immobile, hence investors are likely to take more time in understanding the risks involved in the project.
- 5. Harmonious Conflict Resolution Mechanism:** There is no single rule/ governing framework under which all countries/ companies will fall under and hence limited ability exists to bring things back on track in case of any incident of non-adherence of contract terms. Grievance redressal mechanism is an important criteria to resolve disputes in international projects.
- 6. Lack of clarity in the custom duty regime in India** - Movement of gas through transnational pipelines across international borders typically attract duties at several transit points. Furthermore, federal and state levies in participating nations (GST/Local and Entry Taxes) under multiple tax laws also stand as a constraint in the building of



transnational projects. Lack of clarity on customs duty regime has been adding to the woes of investors. Taxes and fees, freedom of transit crossing different state borders, interpretation of contract terms, and unilateral termination of contract are main reasons for transnational pipeline disputes.

- 7. Funding of the pipeline** - Transnational pipeline projects are multi-billion dollar investments and given perceived high risks and uncertainty especially around safety of operations, projects face issues to access finance. Transit fee payable to each nation from where the pipeline passes and funding tie-ups for the project could hinder the prospects given the geo-political risks and the lack of off-take agreements involved in transnational gas pipelines. Financial closure for such projects would involve significant support from participating countries including equity participation and guarantees for the project debt. This is because the construction and operation of the pipeline, which will pass through difficult and conflict-affected geographies in partner countries, carry major credit risks.



CHAPTER 4

Recommendations

Large-scale, cross-border projects involve strategic and foreign relations between countries in addition to domestic tax, regulatory and subsidy policies or loan guarantees. Thus, government stability and sovereign risk are likely to be the critical measures of risk. While Indian Public Sector Undertakings (PSU) might be late entrants in the game of obtaining overseas resources, they have been successful in obtaining some high profile agreements, including the TAPI Project. However, the success rate is not up to the mark in respect of its growing economy and increasing energy consumption. A key challenge for Indian companies is the competition they face from other major foreign oil and gas majors and Chinese companies. Several other oil and gas majors have already developed a strong presence in the well-established oil and gas producing areas of the world, including the Middle East, making India's entry into these places difficult. India's recent attempts in Central Asian countries (such as IP Pipeline project) have been unsuccessful. Therefore, the Government should adopt certain value added strategies to develop core competency to make Indian companies more competitive in overseas energy acquisition.

- I. Proactive Government support to all projects:** Transnational pipelines can play a significant role in increasing the availability of natural gas and diversifying our supply base. The government should take concrete steps to revive and expedite creation of the proposed transnational pipeline projects like the Turkmenistan Afghanistan-Pakistan-India (TAPI) pipeline and the Iran-Pakistan-India (IPI) pipeline. The government should also explore sub-sea pipeline projects, to secure gas from Africa or the Middle East, which can effectively address our security concerns. In association with major oil PSU's and interested private players the government should engage in constructive dialogue with the concerned nations to resolve geo-political and strategic issues, review project structures and work towards accelerating the projects. Private initiatives like SAGE and others should also be

encouraged and supported. Roping in ministries such as, the infrastructure ministry might speed up processes of building transnational projects. Clear cut government policies and guidelines will help encourage transnational projects.

- 2. Government incentives to Domestic producers:** In order to encourage transnational gas projects the government should free the gas price and provide concessions to domestic gas producers. There are huge costs involved in transnational gas pipeline projects including infrastructure, drilling etc. In order to ease the burden on domestic producers it is important that the government provides concession in gas prices.
- 3. Creation of balance between supply of LNG and Gas:** Development of transnational projects also depend on the influence of international majors. It has been seen that western countries, particularly the US have played important role in influencing India's approach towards setting up transnational gas pipelines. Western major countries have consistently used transnational gas projects as an instrument of foreign policy agenda. For instance, India backed out from the IPI pipeline project due to significant pressure from US and related sanctions on Iran by the US. While India has an emerging power cannot possibly go against its allies, it should also not succumb to pressure from outside when it comes to ensuring its long-term energy security.

Similarly, the government believes that the petroleum and LNG sectors have an ability to pay and invests more into these sectors. Also, major LNG producers and suppliers play a huge role in the market in influencing the price and market of natural gas. Successful implementation of transnational gas pipeline projects can only be witnessed once there is absolutely no influence from major LNG players in the market.

- 4. Creating awareness on transnational gas pipelines:** Pipelines are the cheapest and the most environment friendly mode of transport. Yet, India as a country is yet to realize the importance of transnational gas pipelines in guaranteeing its energy security. There is a lack of awareness and it is necessary to educate that pipelines are crucial in driving the economic growth of the country.
- 5. To have diplomats in the boards of all Oil and Gas companies:** There is a lack of diplomats in the managing boards of major oil and gas companies. Energy diplomats or specialists should be positioned in major oil and gas companies. These diplomats will serve as outposts of India with the objective of furthering the agenda of ensuring energy security for the country and should closely coordinate of the partner companies. The energy diplomats should be part of the MEA (Ministry of External Affairs), which can provide the required institutional support.



- 6. Energy Diplomacy:** India's basic approach towards acquiring energy assets and overall energy security should be to develop as many potential supply arrangements with as many potential suppliers as it possibly can, and try to neutralize its potential competitors. India should engage itself at a larger scale in almost all regions that are rich in oil and gas reserves, including the Gulf, Central Asia, South America and Africa. Energy diplomacy also functions as an important boost for adopting the going out strategy, which is an important part of national development strategy such a way to create favourable international operating environment for energy enterprises and to strongly encourage other enterprises to develop international markets, undertaking engineering projects and promote advancement of technology.
- 7. Harmonious Conflict Resolution Mechanism:** The structure of transnational pipeline projects appear to be very complex and would probably require extensive coordination and a conflict resolution mechanism. There may be some disputes regarding regulatory and infrastructural issues between partner countries that require harmonious and amicable settlement of the issues involved. Transnational gas pipelines generate specific types of conflict and involve actors who are physically linked to one another through the infrastructure of the pipeline. Therefore the focus should be on developing an institution that establishes principles and mechanisms specific to this conflict and these actors. On the conflict resolution side we may have segregation in terms of what kind of conflicts are there, what kind of forums we can create.
- 8. Risk bearing and go out strategy:** Recognizing the domination of international oil and gas companies India should take initiatives where competition is minimal even if that means a high risk. The risk factor may be managed by soliciting strategic support from the government of the host countries. The government in turn should be insured by financial assistance and investments.



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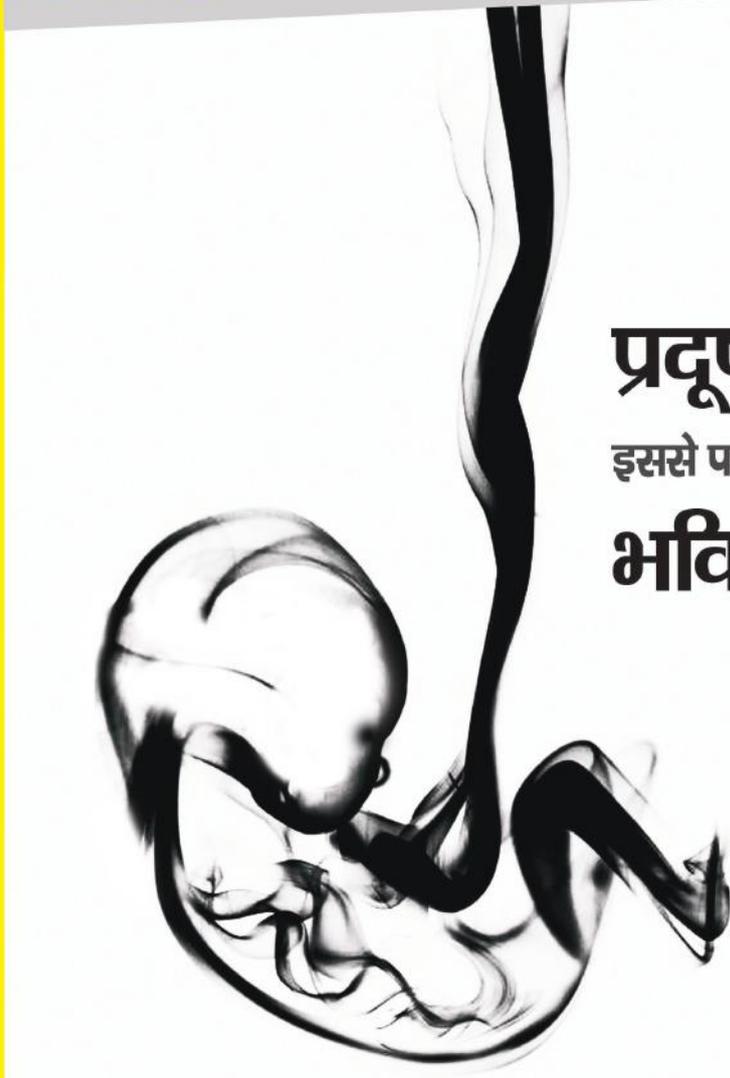
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