



PROJECT DEVELOPMENT
INVESTMENT ADVISORY

TOV AREA CBM & OIL SHALE PROJECT ASSISTANCE PAPER

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ULAANBAATAR, MONGOLIA

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Ulaanbaatar

2019

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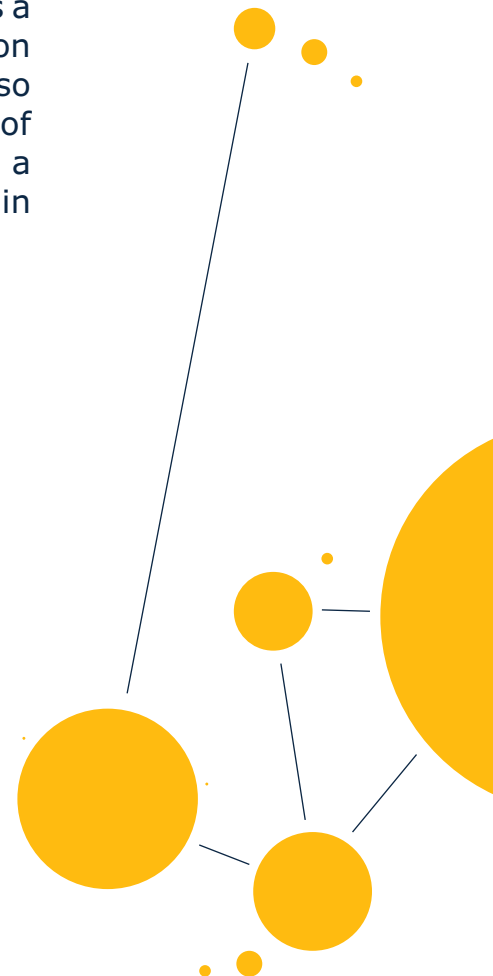
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EXECUTIVE SUMMARY

Energy security, climate change, and air pollution are major challenges to Mongolia, especially those with fossil fuel-based economies. Coal is abundant and is the only fossil fuel available in the Mongolia. Mongolia depends almost entirely on domestic coal production and imported oil for its energy supply. Energy security concerns are rising because of oil price volatility and its sharp increases in the past. Political instability in major oil-producing countries and the formidable difficulties of transporting oil in landlocked Mongolia have compounded these concerns. The consumption of petroleum products is growing rapidly in parallel with economic growth fueled by the country's mining sector. Every year, Mongolia spends a higher percentage of its foreign exchange reserves on oil imports, about 1.5 million tonnes. It also experiences frequent supply shortages because of vulnerabilities across the supply chain. This causes a ripple effect on mining and industry— its main economic sectors.



60%–90%

of the air pollution is caused by raw coal and wood combustion for heating and cooking in Ger District.

The World Health Organization study

200,000

households in the ger area burn coal in the stove for warmth.

The World Health Organization study

20%

of air pollution is caused by vehicles.

AIR POLLUTION

According to data from the World Bank, World Health Organization, and the 2013 National Population Center census, Ulaanbaatar's Ger population tend to growing rapidly during harsh winter, roughly 40,000 to 50,000 citizens move to the capital every year. Mongolian winter temperatures fall to negative 30 degrees Celsius, and the only option for ger district residents is to burn coal on iron stoves to keep warm and cooking, thus turning the blue sky dark, and transforming Ulaanbaatar into one of the world's most polluted cities. Severe air pollution of particulate matter is caused by coal combustion of three power plants, which provide electricity and hot water to the city. This has serious impact on human health. A frightening fact is that the human brain uses more oxygen than other body parts.

At the same time, Mongolia's capital faces one of the biggest housing shortages in the region, with 70% of the population living in the Ger District. In many cases, Ger residents have difficult access to water, sanitation and basic infrastructure. An average Mongolian household has five family members. Every single household living in the Ger districts in the city is burning coal.





Pregnant women who inhale coal smoke put their babies at increased risk of birth defects, and the odds of having malformations of the brain, and spinal neural tube defects are 60% higher for babies whose mothers inhaled coal smoke than for babies of unexposed mothers. World Health Organization estimated that 100% of rural households and the Ger district use coal and biomass fuel (such as wood, charcoal) for cooking and heating. While coal is relatively inexpensive compared to other energy sources, there are also known health risks associated with breathing coal smoke, including lung cancer and other respiratory diseases. The indoor air pollution caused by coal and biomass is a major public health concern, especially given the large numbers of households that rely on these fuels.

Coal smoke contains many chemicals known to cause health problems, including arsenic, carbon monoxide. 70% of Mongolian households rely on coal or biomass lead fuels, this has tripled in the past 20 years and it is increasing. Ulaanbaatar, where many residents use coal for cooking and heating has a rate of 10 to 20 cases of neural tube defects for every 1,000 births, and represents one of the highest in the world.



COMPANY DESCRIPTION

UGS LLC was established in 2011. UGS is a Mongolian based company, providing project development and investment advisory services. UGS is focusing on the discovery of CBM and Oil shale and the exploitation of Oil shale deposits. The company currently has one Oil shale deposit with 3 blocks located in Nalaikh and Tuv province area, Mongolia. Main goal of the project is to reduce air pollution of Ulaanbaatar, reduce Green House Gas emission and decrease dependence on oil imports.

OWNERSHIP

Baigal Yondonjamts owns all shares of the company. UGS LLC founded in 2011, obtained license to operate as Securities broker-dealer on the Mongolian Stock Exchange. Furthermore, the Financial Regulatory Commission has granted to UGS LLC a license of investment advisory service in 2012. At the beginning of 2014, UGS business field was extended to project investment advisory. In 2018, UGS has signed a prospecting agreement of CBM and Oil shale with Mineral Resources and Petroleum Authority of Mongolia.

BUSINESS OBJECTIVES

- To explore local energy resources of CBM (Coal Bed Methane) and Oil shale
- To provide the converting technology from oil shale to gas and oil
- To reduce air pollution (GHG emission)
- To replace traditional coal heating system to gas heating system
- To reduce the dependency on oil imports

MISSION AND VISION STATEMENT

MISSION:

1. To define local resources.
2. To convert natural resources to gas & oil in order to supply for heating and fuel demand of the country.

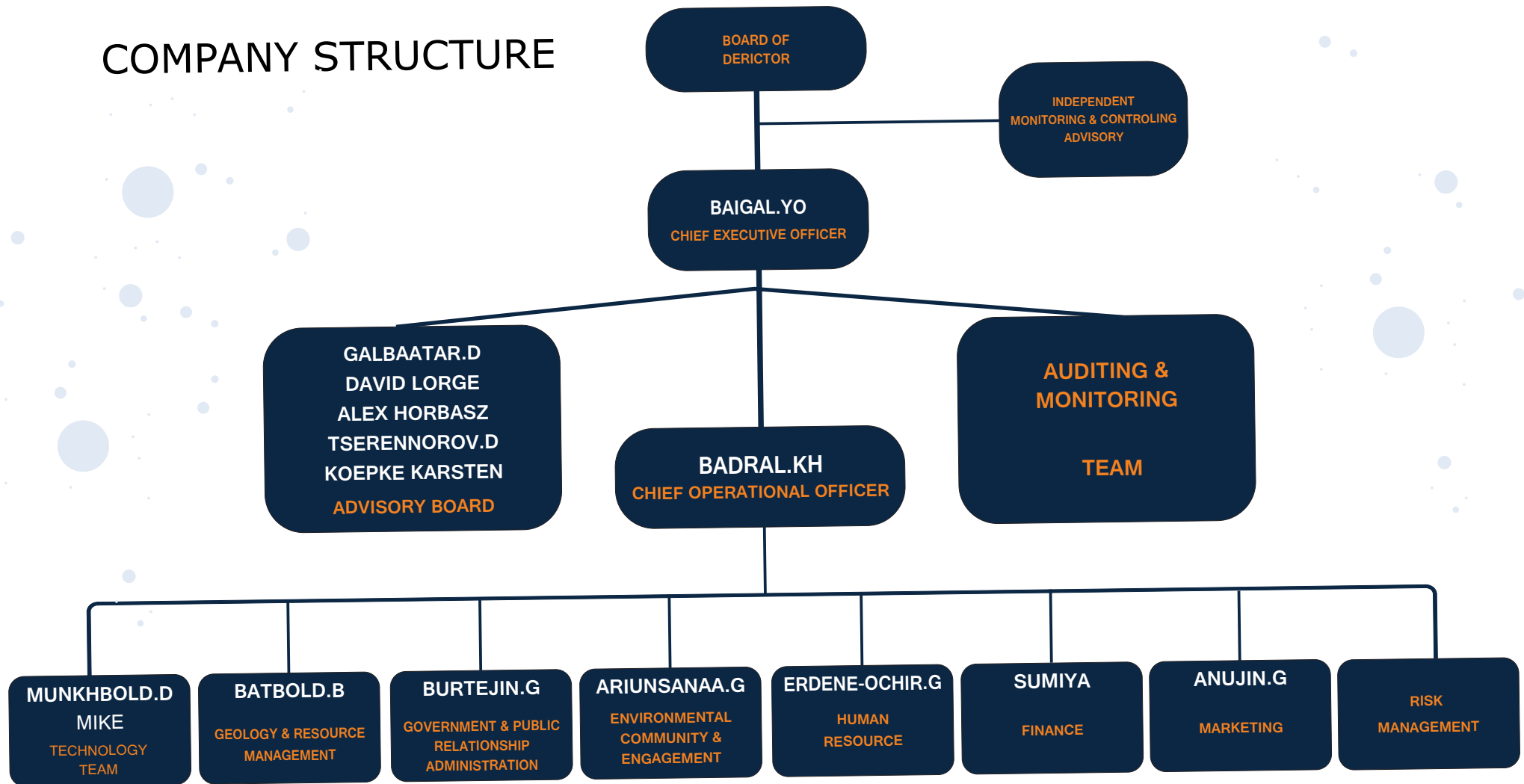
VISION:

To be the one of the domestic leading clean energy producer which is to reduce oil import and to replace traditional coal heating system of the country.

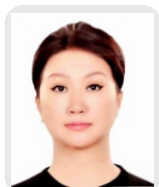
KEYS TO SUCCESS

- Provide continuous and reliable light crude oil to Mongolia refinery
- Process shale gas and shale oil in accordance with international management standards
- To establish pilot plant in order to demonstrate the efficiency of oil shale exploitation and utilization

COMPANY STRUCTURE



UGS TEAM



Baigal.Yo
Chief Executive Officer

Baigal has over 20 years of business experience in Mongolia. She was a former marketing director in Gobi & More Co.,Ltd in 1993-1999, former representative of Mongolian National Construction Association in Beijing during 2000-2010, Director for Choijin Temple LLC since 2016 , and Director of UGS LLC since 2011 . She has received Stock market & Investment advisory training from London Stock Exchange in 2012. She holds Marketing and Management training course by Carl Duisberg Centren, Germany in 1996-1997.

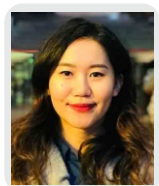
She has a strong industry reputation for driving operational excellence and developing greater in-house capability to deliver more value to clients.



Badral.kh
Chief Operational Officer

Badral has over 10 years project management experience in mining and energy industry in Mongolia. He holds Bachelor of Science degree in Power Engineering from the Mongolian University of Science and Technology. Master Degree in Business Administration from the Univeristy of Hohai in China and has completed an Advanced Executive Development courses as well.

Badral is a people oriented leader who is passionate about achieving best-practice technical energy industry outcomes through a highly-capable technical team.



Burtejin.G
Project communication manager

Burtejin is fluent in Mandarin and English. She has mostly worked as a project manager in the mining industry, specializing in the communication aspect and translations. She holds Master degree of Project Management in the University of Sydney and Bachelor degree in Public Relation from Communication University of China.

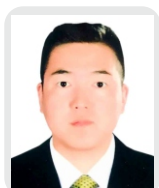
Her leadership style is flexible, engaging and interpersonal, dedicated to excellence through people.



Anujin.G
Marketing manager

Anujin has worked as research and contract specialist at Asian Development bank in Mongolia, investment analyst at Hydropower Plant project unit, equity market research assistant in Australian company.

She holds Bachelor degree of Law-Diplomacy from China Foreign Affairs University, also completed a Bachelor degree of Art in Business Management in London. Moreover, she completed her master's degree specializing in Finance from University of Sydney.



Erdene-Ochir.G
Human Resources Manager

Erdene-Ochir is a human resources manager with extensive experience in eco-tourism industry. He is passionate about green growth and sustainable development.

He holds Bachelor degree in Business Administration from University of Humanities.

CORPORATE GOVERNANCE OF UGS

Mission:

1. To define local resources to help to reduce air pollution and smog damaging effects.
2. To convert the natural resources to gas & oil in order to supply for heating and fuel demand of the country.

Vision:

To be the one of domestic leading clean energy producer which is to reduce oil import and to replace traditional coal heating system of the country.

Strategy:

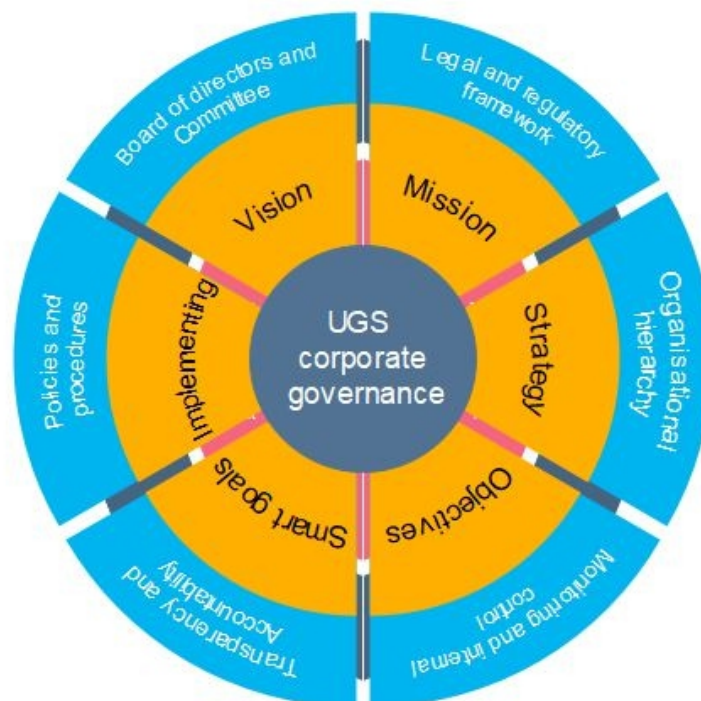
In order to reduce air pollution - > Replace Coal with Gas

Objectives:

Determine & define the local resources of oil shale

Smart goal:

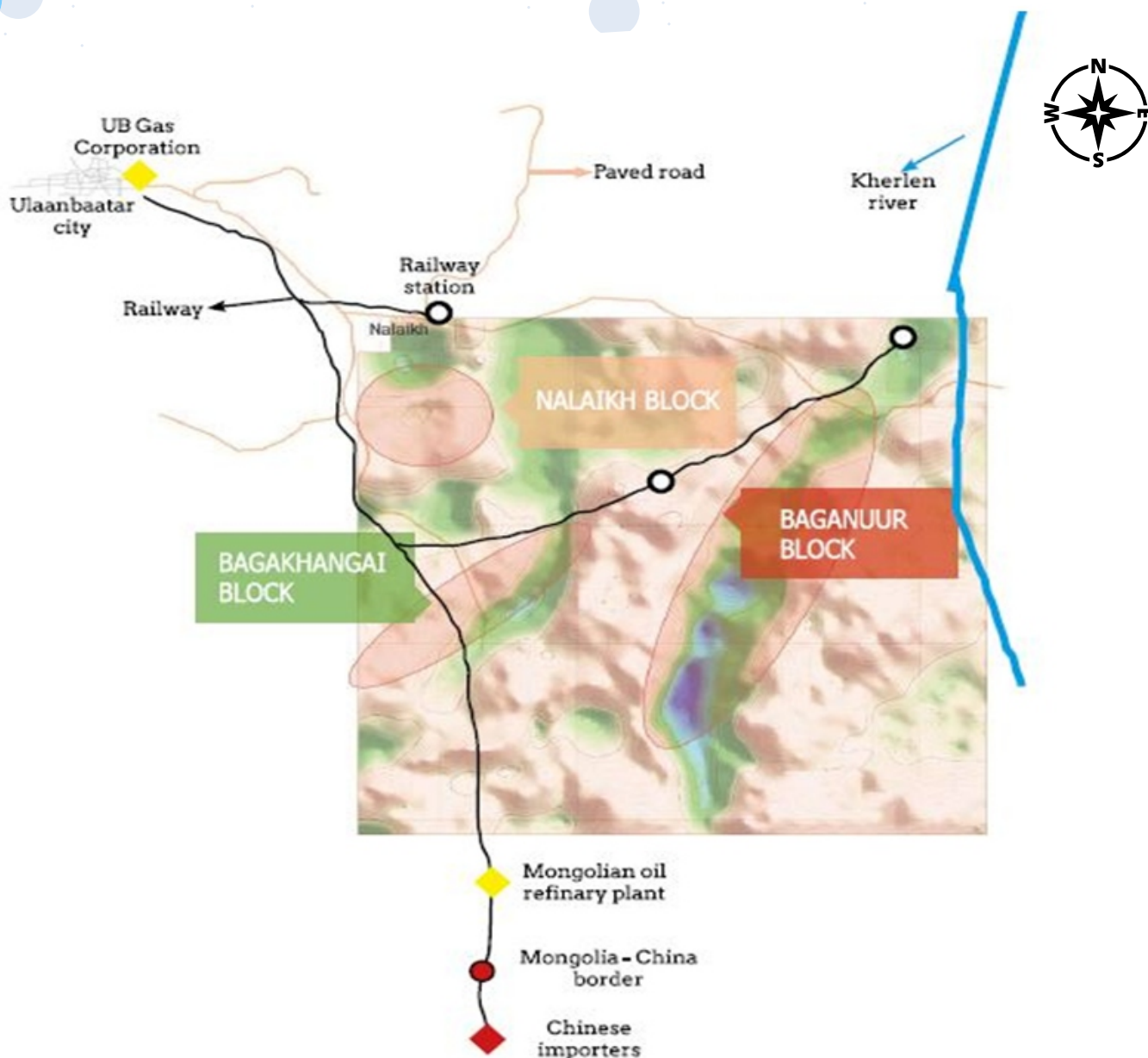
To select advanced technology for converting oil shale to Gas & Oil



OUR PROJECTS



PROJECT LOCATION



- Located approximately 45-100 km southeast of Ulaanbaatar
- Rich with high content of kerogen 10-32%.
- Tov area deposit consist of three blocks /Nalaikh, Bagakhangai, Baganuur/
- Near to Mongol Refinery Plant
- Close to electricity, paved road, international railway.

INDICATIONS OF A MAJOR DISCOVERY

DISCOVERY

Oil Shale
45km potentially Oil Shale and Gas bearing reservoir in Baganuur block.

DRILLING

1400 m in Baganuur block in 2012-2013.
3 holes, totaling 1000m in Nalaikh block in 2018

SUCCESS RATE

30m thick oil shale seam discovered in Nalaikh block
Approximately 100 m thick oil shale in Baganuur block

HIGH GRADE

15-35% of kerogen content of 20-30 m thick oil shale in Nalaikh block

SIZE POTENTIAL

Estimated 4 billion tons of oil shale resources in Baganuur block





Tov area CBM & Oil shale project is desired by in terms of following conditions:

1

IMPORTING GAS

- Price increasing
- Import increasing
- High demand
 - for electricity
 - for vehicles, buses
 - for heating

2

REPLACE COAL HEATING

- Air pollution
- Ger district 0.5 million tones
- Power plant 3 million tones
- Others

3

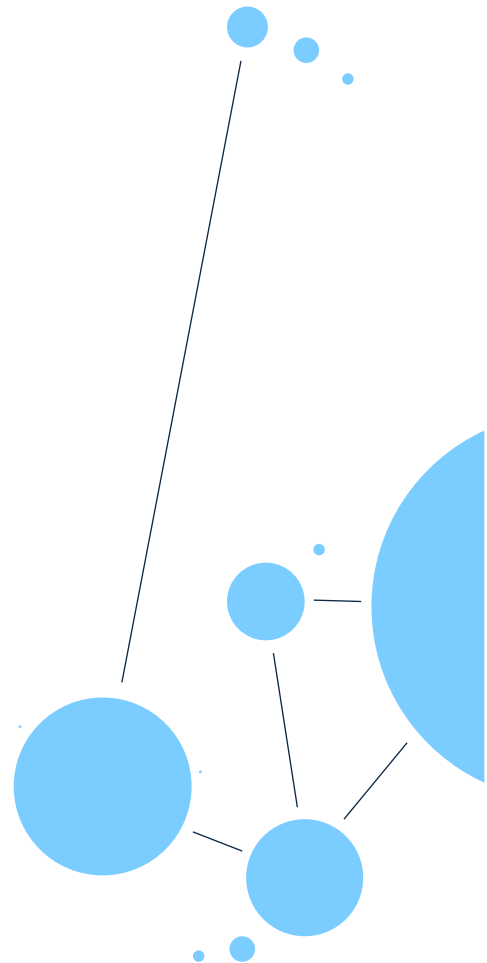
100% OIL IMPORTING INDEPENDENCE

- Petroleum product price
- Consumer price index
- Inflation
- Local currency weakness 1\$=2650₮
- 1.5 billion USD outflows, 10-15% of Mongolian GDP

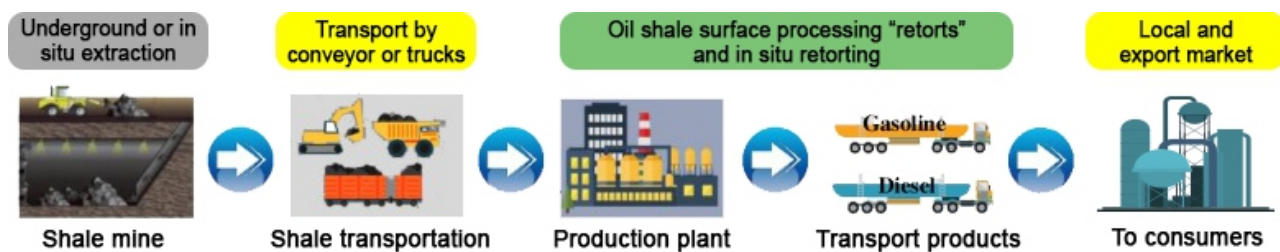
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OIL REFINERY PLANT DEMAND

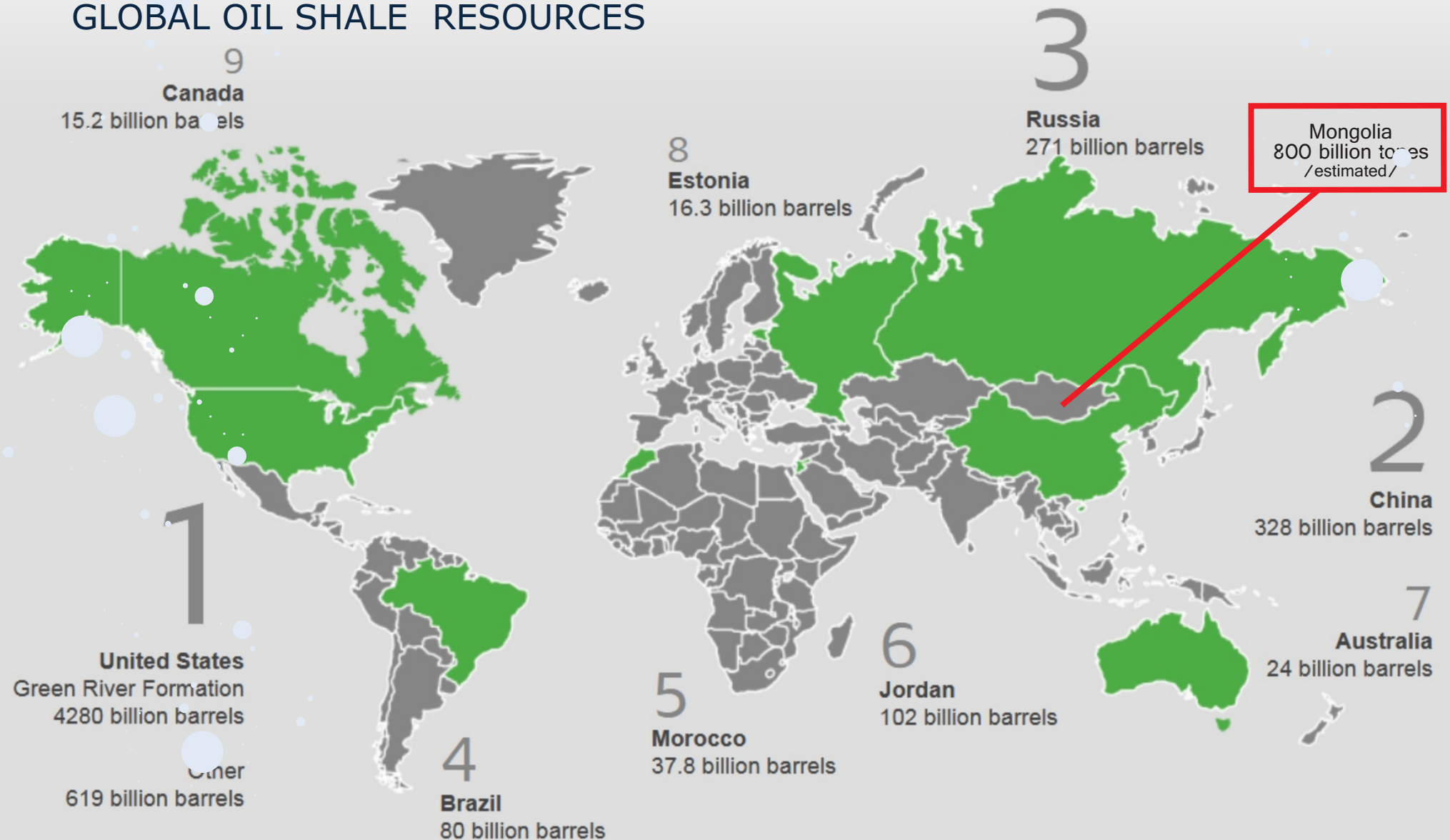
- 1 billion usd soft loan from Indian EXIM Bank
- Local crude oil exploitation 750 million tonnes annual
- Needed 500-600 million tonnes of crude oil



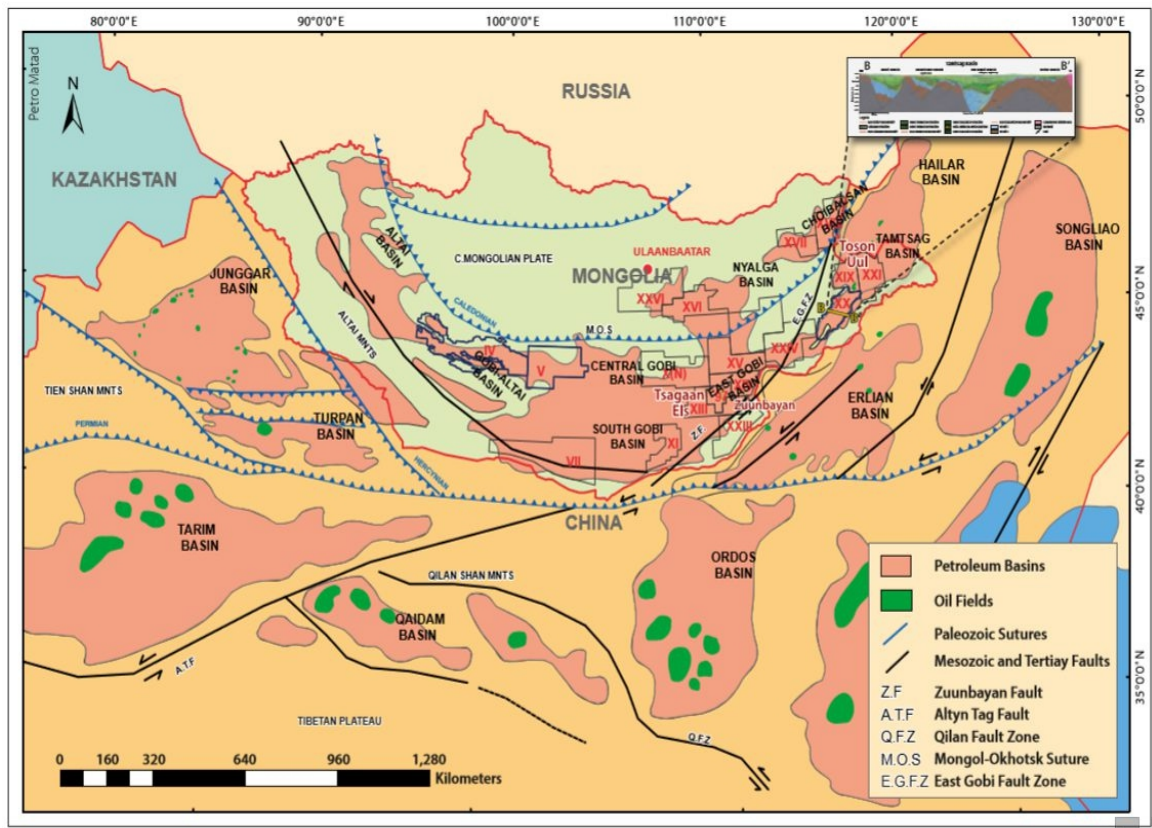
PRODUCTION LIFE CYCLE SCHEME



GLOBAL OIL SHALE RESOURCES



MONGOLIAN OIL SHALE RESERVES



Project's oil shale deposit is a major energy resource for Mongolia. It can contribute greatly to the future energy independence of Mongolia. Great progress has been made in oil shale research and development during the past few years.

Oil shale is on the brink of a technology renaissance similar to that being experienced in shale gas and tight oil development. UGS development team faces significant challenges hoping to build a commercial oil shale project in Mongolia.

Due to the lack of consistent unconventional petroleum policy for leasing and regulation, similar to what already exist for other minerals and oil and gas, is restraining long term investments in development.

Millions of tons of oil shale have been mined and millions of barrels of shale oil produced around the world. The experience gained from these projects gives developers an important tool to advance technology toward commercialization. Oil shale is said to be an alternative fuel source which provides a vast potential for profit to business and entrepreneurs. According to the Mineral Resources and Petroleum Authority of Mongolia, Mongolia's oil shale resource is 800 billion tons.

INDEPENDENT TECHNICAL ADVISORY



TECHNICAL ADVISORY

David Lorge

*CEO and President
RSC Mongolia LLC*

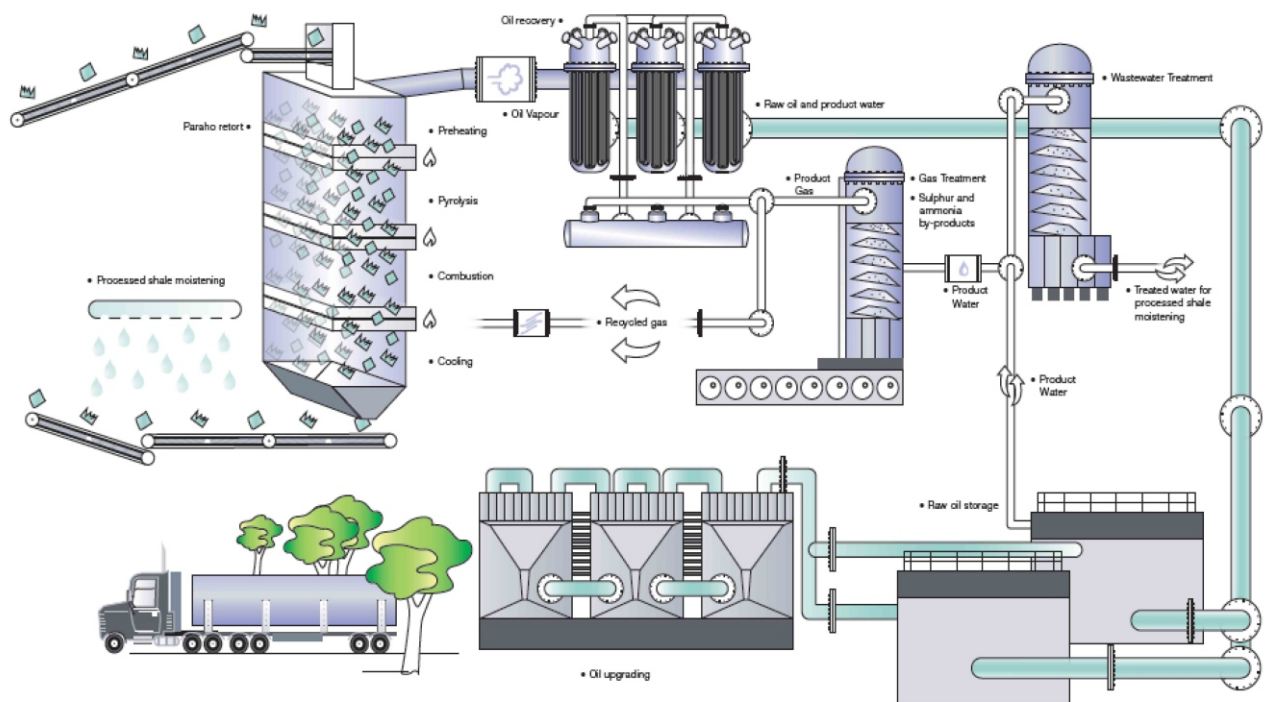
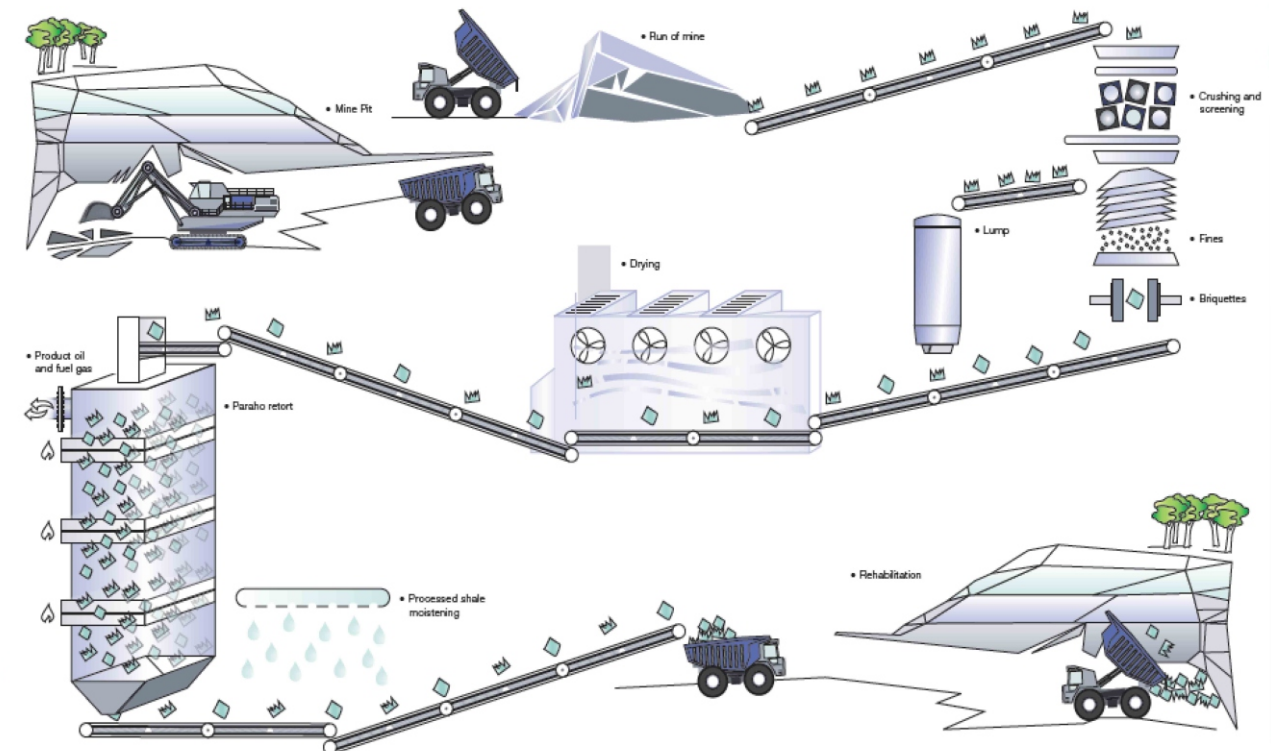
“The oil shale was used for medical and military purposes and the Mongols are reported to have tipped their arrows with flaming oil shale.”

Mr. Lorge came to Mongolia in September 2007. In the intervening years he has been an Exploration V.P., Exploration Manager, Drilling Program Manager, Country Manager, General Director, and Independent Geologic Consultant (geologist) for various companies and clients across the country.

Professional Experience in Major companies:

- Sout Gobi Sands LLC (Rio Tinto) (Coal) /Mgl/*
- QGX LLC (Kerry Mng Gp) (coal, oil-shale) /Mgl/*
- East Asia Minerals LLC (U and oil-shale)*
- Borax (Rio Tinto), Inc. (Borax)*
- Newmont Exploration, Ltd. (Au)*
- Santa Fe Pacific Mining, Inc. (Newmont) (Au)*
- Kennecott (Rio Tinto), Inc. (Ag+base metals)*

TECHNOLOGY OF PROCESSING



PROJECT CONSULTANTS



Geology & Technical
independent Consultant



Government support



Technology Consultant



HATCH

Engineering & Technical
consultant



Resource defining by
JORC



Finance & Auditing

SOCIAL RESPONSIBILITY

PROVIDE CLEAN ENERGY:

We aim to sell affordable gas to ger district in order to replace heating system.

CREATE JOBS FOR LOCALS:

Our company will create jobs for unemployed people in province, soums and districts that will be involved in exploration work with European companies.

We are also researching to build green house to solve heating and energy by green energy.



**LOCAL UNEMPLOYED
PEOPLE**



PROJECT PLANT

MARKET SIZE

Mongolia's annual oil product import demand is **1'500'000** tons in 2018, 1 ton a crude oil price is **\$520**, annual oil equity can be **\$780'000'000**

UGS can able to share **20%** of the market is **\$378'900'000.**

Ulaanbaatar annual gas demand is **725'000'000 m3**, **1m3** gas price is **\$0,37.**

Annual gas equity is **\$268'250'000.**
UGS can able to share up to **15%** of the market is **\$40'237'500**

Ulaanbaatar annual gas demand is **725'000'000 m3**, **1m3** gas price is **\$0,37**

Annual gas equity is **\$268'250'000**
UGS can able to share up to **15%** of the market is **\$40'237'500**

POTENTIAL BUYERS IN LOCAL MARKET



ULAANBAATAR NATURAL GAS CO.,Ltd

“Ulaanbaatar Natural Gas” LLC was established as a public-private partnership with the aim to penetrating natural gas to Mongolia. The purpose is to reduce air pollution by transferring the public petrol based fuel transportation to natural compressed gas fuels to generate fuel savings in public transport.



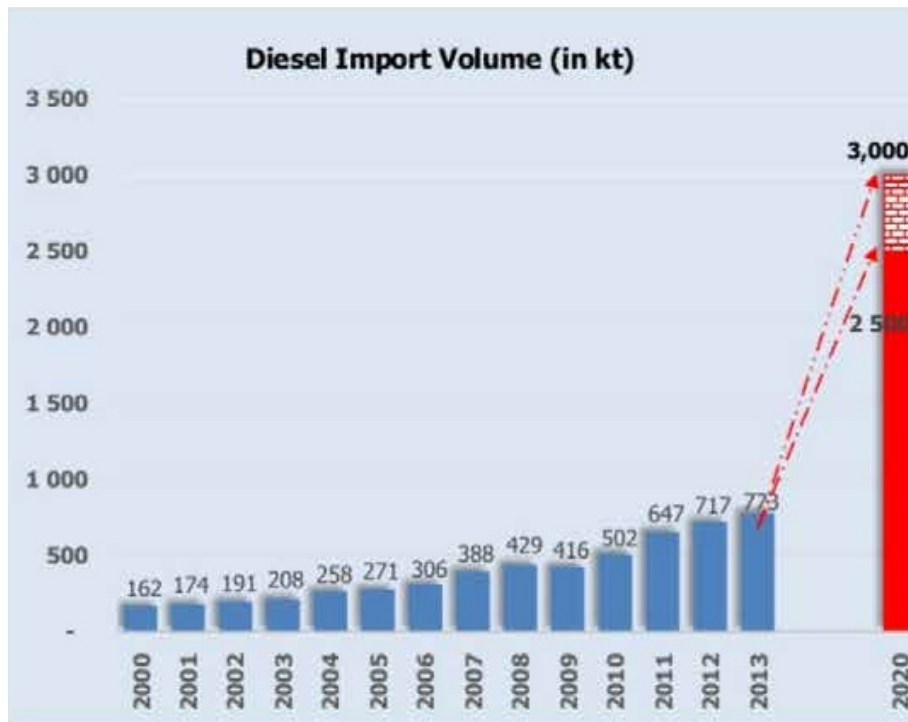
MONGOL REFINERY ONGOING PROJECT

The project aims to establish a petroleum refinery based on domestic raw materials to provide Mongolia with fuel, and to establish a foundation of the petrochemical industry, a major component of the industrial complex. They're planning to build a crude oil pipeline with capacity to process 1.5 million tons

LOCAL PETROLEUM DEMAND

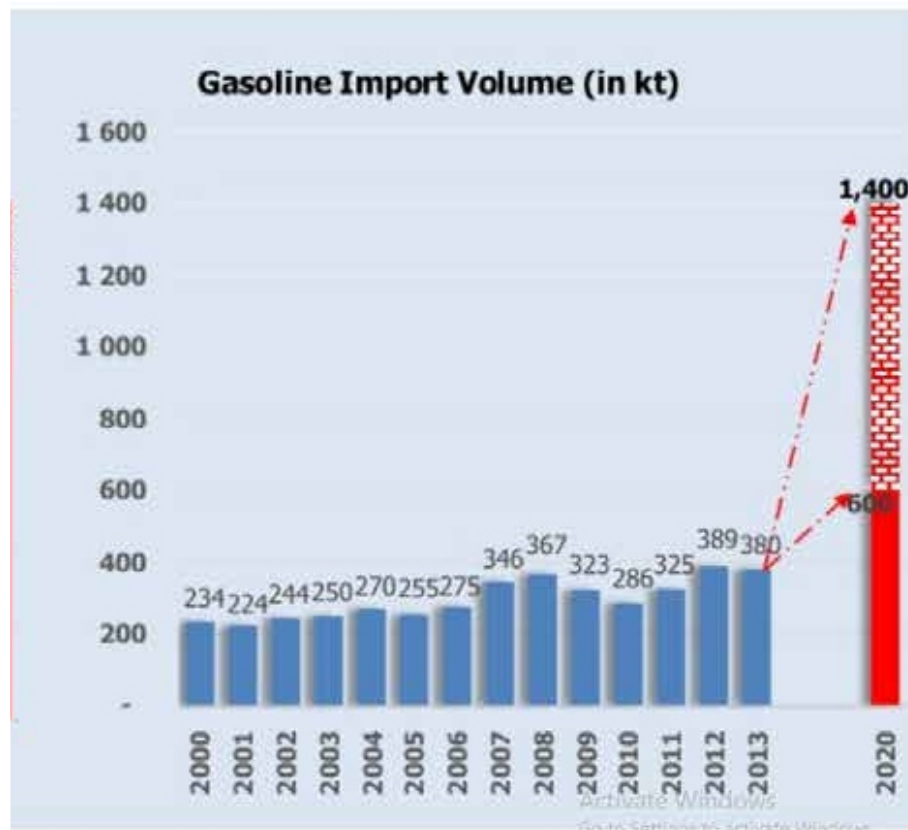
Real growth of Mongolian economy averaged 9%, in 2002-2013

- Diesel average annual growth was 12%
- Gasoline average annual growth was 5%



Estimated petroleum consumption in 2020:

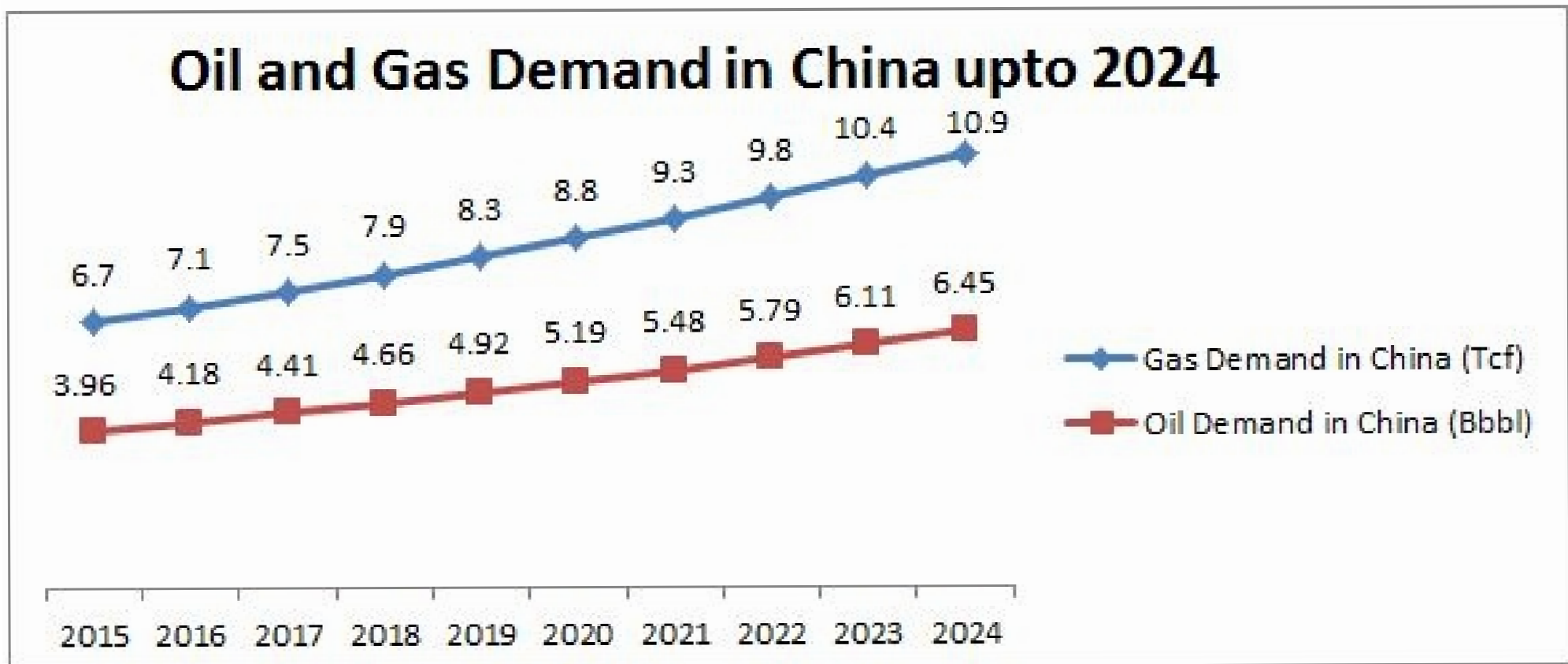
- Diesel: 2-3 mtpa
- Gasoline: 0.6-1.4 mtpa



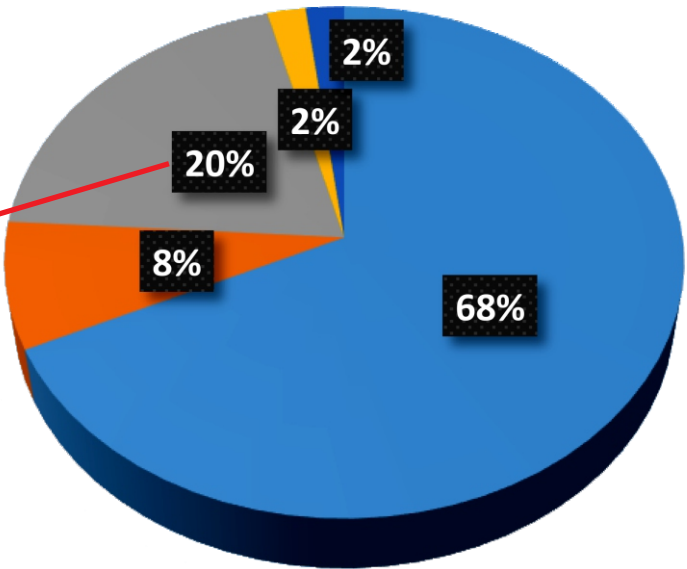
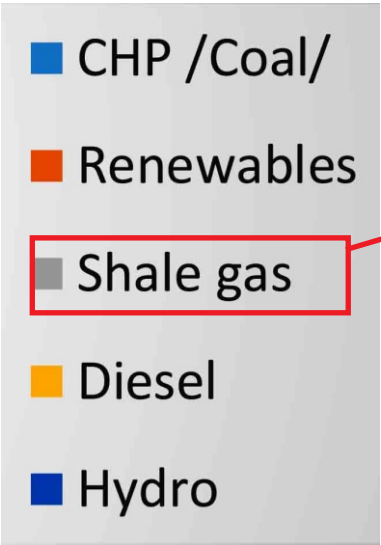
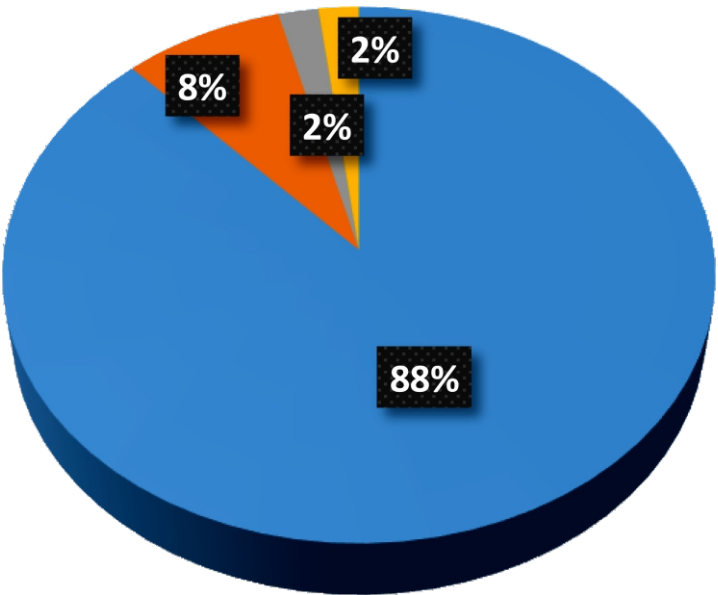
LOCAL MARKET DISTRIBUTION PLAN



CHINA PETROLEUM DEMAND



MONGOLIAN ENERGY SECTOR BY RESOURCES



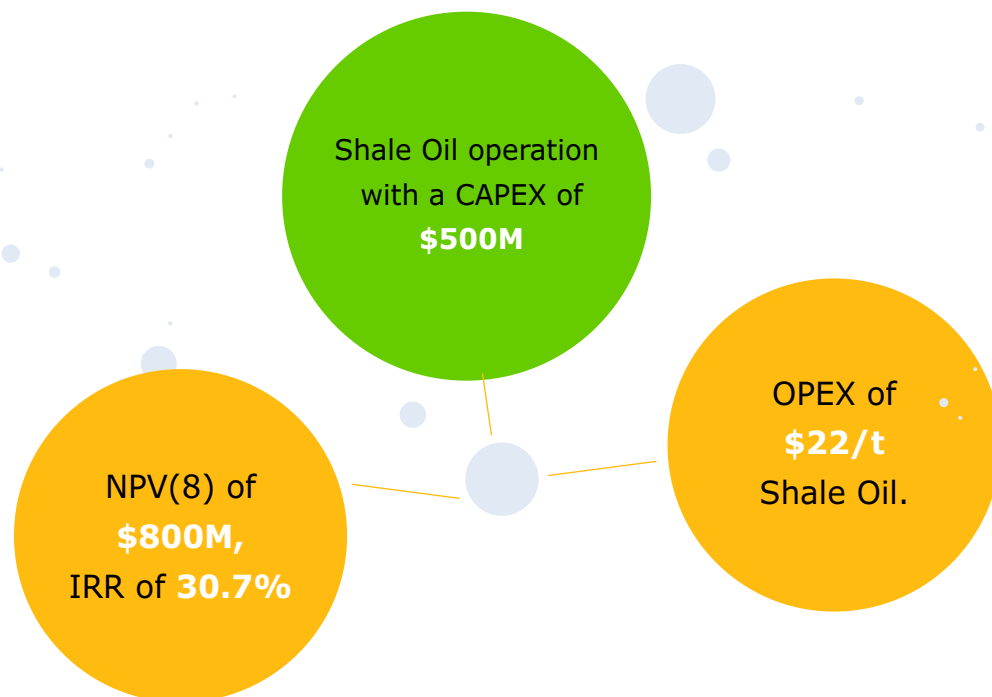


COST BENEFIT ANALYSIS OF THE PROJECT

1. Estimated resource of oil shale - 4 billion ton
2. 1st stage of project life cycle-15 years
3. Mining capacity 3 million ton oil shale per year

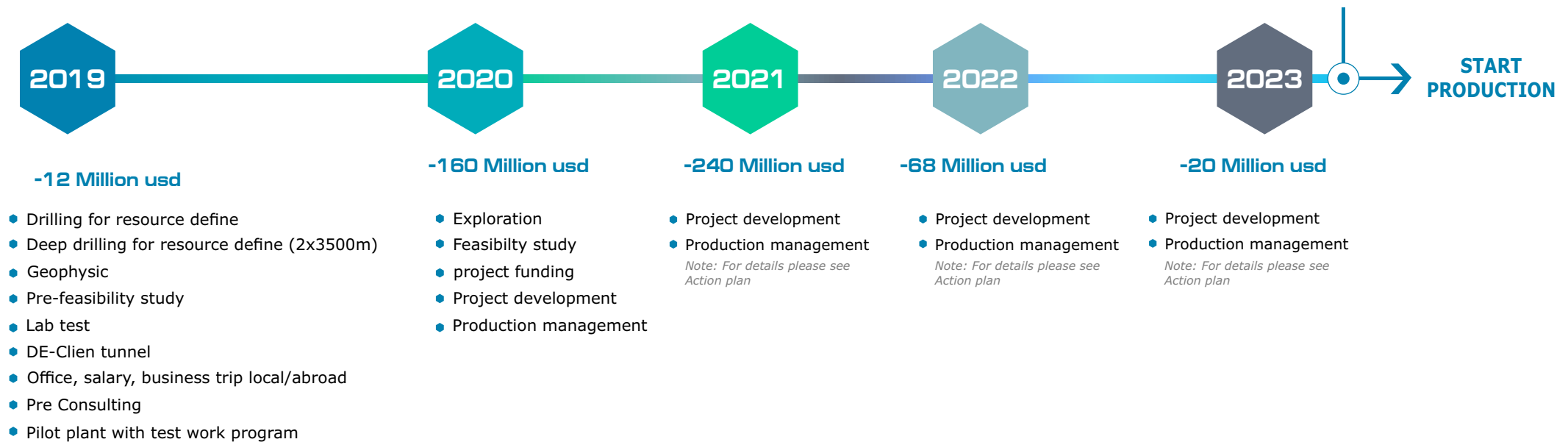
A recent Preliminary Economic Assessment indicates potentially robust economics for 1.000.000 ton/year

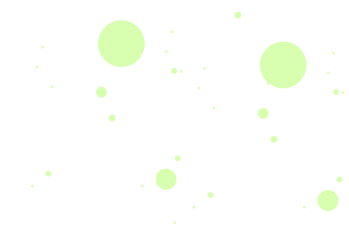
Payback period-8 years. A Feasibility Study on the project is in progress.



PROJECT FINANCIAL PLAN

Our estimated project total investment is **\$500,000,000**. The processing plant is totally **\$380,000,000**. We are planning to spend **\$12,000,000** for 2019. This is an initial cost estimate which is intended for defining resource , building a pilot plant and other related expenses.





Investment of 2018-2023 is contributing to the project preparation and development expenditures.
Between 2024-2026 is estimated project return investment period.

Estimated investment return period is 8 years

NPV(8) of **\$800M**

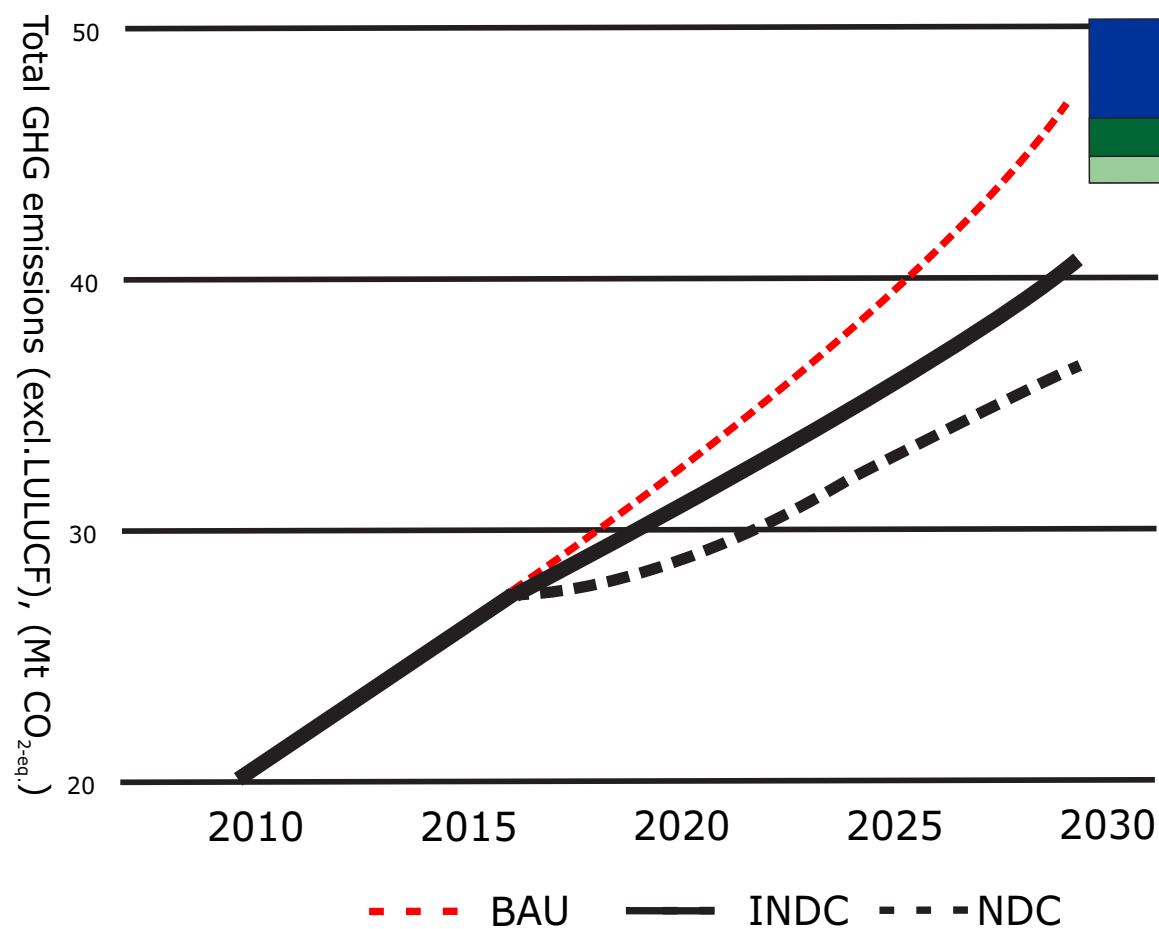
IRR of **30.7%**

2018Q1-2020Q3		2019Q2-2020Q1		2019Q3-2020Q1	2019Q4-2023Q1	2020Q2-2023Q1
EXPLORATION /USD/		FEASIBILITY STUDY /USD/		PROJECT FUNDING /USD/	PROJECT DEVELOPMENT /USD/	PRODUCTION MANAGEMENT /USD/
OIL SHALE	CBM	Pre F/S	F/S	Consulting of Technology, Financial, Audit, Insurance, Law firm	Permitting, construction work, field stock managent, raw material logistic, management, Labour management,	Working capital, storage tank, warehouse, infrastructure, logistic, mine reclamation and closure,
4.85mln+20 mln	14 mln	0.2 mln	0.5 mln			
Total : 22.85 mln	Total: 14 mln	Total : 0.7 mln		Total: 0.5 mln	Total : 194 mln	Total : 17.95 mln
						
RESOURCE ESTIMATION BY JORC				To be served by global professional firms in the industry		

ACTION PLAN

Action		Year	2018				2019				2020				2021				2022				2023			
		Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
EXPLORATION	Exploration management and strategy	Gate 1																								
	Identifying resource targets																									
	Geological consulting and modelling																									
	Resource define by JORC																									
PROJECT FEASIBILITY	Production test with technical and economical assessment	Gate 2																								
	Scoping study , Pre-feasibility, feasibility study																									
	Mine planning; Deposit Characterisation, Design, Scheduling; Fleet estimation, Economic Modelling																									
	Social and environmental assessment																									
	Bankable feasibility																									
	Bankable documents																									
PROJECT FUNDING	Independent expert and Technical Specialist report for investors	Gate 3																								
	Independent audit																									
	Fundrising options																									
	Permitting																									
PROJECT DEVELOPMENT	Land and infrastructural work	Gate 4																								
	Construction of production plant																									
	Field stock management																									
	Raw material management																									
	Logistic management																									
	Labour management																									
	Environment/Social Management																									
	Commission																									
PRODUCTION MANAGEMENT	Production cycle management	Gate 5																								
	Safety, Quality, Financial, Technical, Control and monitoring																									
	Project cost audits and analysis																									
	Economical review and report. /monthly and yearly/																									

Intended nationally determined contribution (INDC) of Mongolia



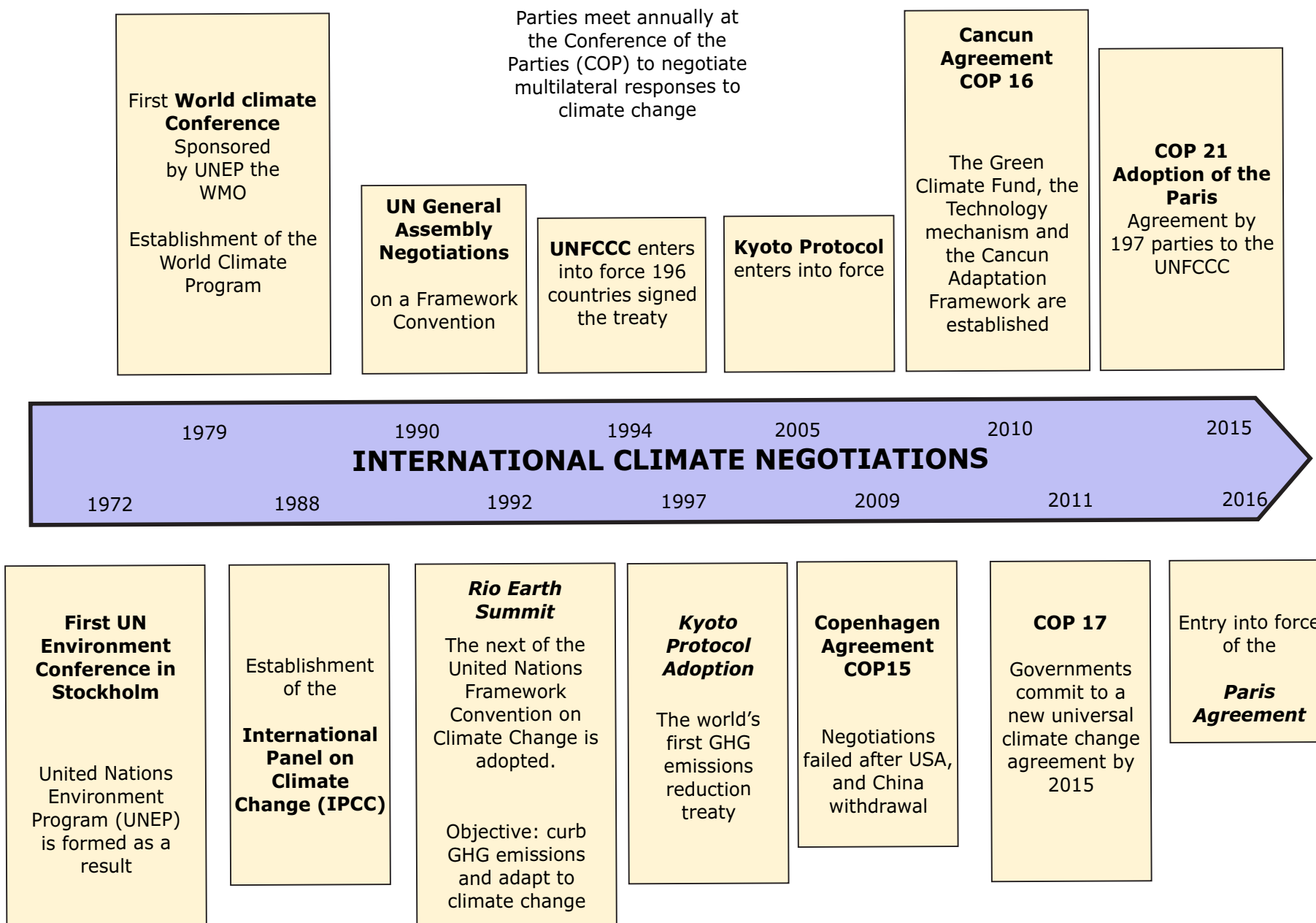
Total potential emission reductions of **14%**↑ in 2030

Potential reductions

Energy: power and heat
4.9 Mt CO₂-eq.↑

Energy: transport
1.7 Mt CO₂-eq.↑

Industry
0.7 Mt CO₂-eq.↑



Paris Agreement

COP 21, Paris 2015:



Keep warming "well below 2 C".
Continue all efforts to limit the rise
in temperatures 1.2 C

Developed countries must provide
100 billion dollars from 2020,
as a "floor"

Mongolia ratified the agreement
on 21 September 2016.

By today 180 Parties
have ratified of 197 Parties
to the Convention

Timeframe of core national development policies

