

CHINESE INVESTMENTS

IN THE NATURAL GAS AND OIL SECTOR

OF CENTRAL ASIA

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This report provides a snapshot of natural gas use and shifting gas trade and import patterns in China and Eurasia and explores the opportunities for methane emissions.

A state-led activity

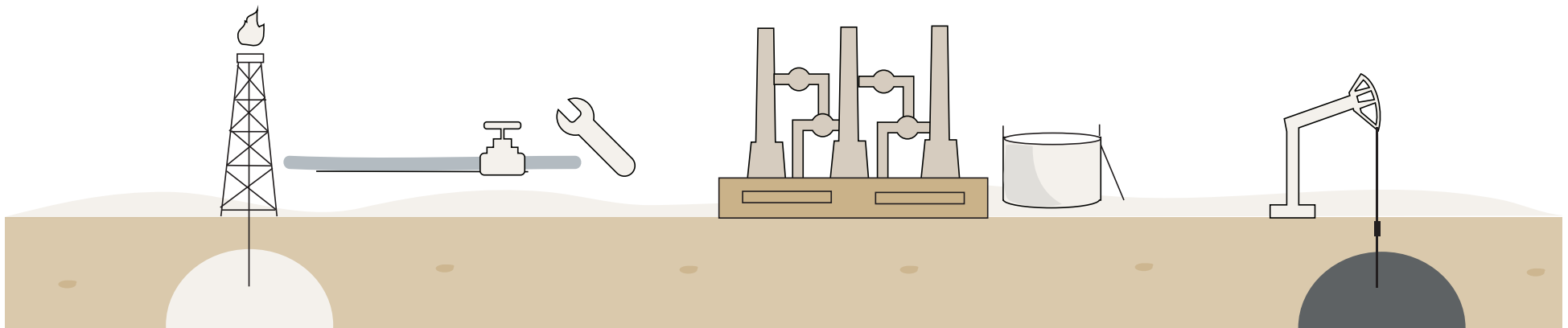
China made its first appearance in Central Asia's oil and gas sector through an acquisition of the Aktobe Oil and Gas JSC. In 1997, [China National Petroleum Cooperation \(CNPC\)](#), a [central state-owned enterprise \(SOE\)](#) of China, beat international oil and gas giants Exxon, Texaco (Chevron) and Amoco, and became the majority shareholder of the new [CNPC-AktobeMunaiGas JSC](#), one of the largest oil companies in Kazakhstan. CNPC's share of the company has grown from 60% to [over 85%](#).

Chinese companies participate in:

- oil and gas exploration; development and production;
- oilfield services; pipeline construction and operation;
- oil processing and oil product sales; engineering services;
- equipment supply.

CNPC is the main Chinese player in Central Asia's oil and gas sector. It is present in all five countries of the region and has developed an integrated supply chain that covers a wide range of oil and gas sector services through a dozen joint-stock companies (JSCs), Limited Liability Partnerships (LLPs) and wholly owned subsidiaries.

In terms of development finance, [China's Global Energy Finance database](#), managed by Boston University, has documented a cumulative US \$26 billion lending for gas projects and US \$2 billion lending for oil projects in [Turkmenistan](#), [Kazakhstan](#) and [Uzbekistan](#) from two Chinese state-owned policy banks — [China Development Bank](#) and the [Export-Import Bank of China](#) — in the past two decades. Borrowers are Chinese-owned companies, local governments or banks. Official Chinese statistics show the cumulative investment in the region totaled [US \\$40 billion](#) as of the end of 2020.



Chinese investments and joint ventures in Central Asia's oil and gas sector

Kazakhstan

- AktobeMunaiGas
- PetroKazakhstan (PK Project)
- MangistauMunaiGas (MMG Project)
- Kashagan Project
- KAM Project
- ADM Project
- North Buzachi Oilfield
- Shymkent Refinery
- Asian large-diameter steel pipe manufacturing project
- Kazakhstan-China Crude Oil Pipeline
- Kazakhstan section of the Central Asia-China Gas Pipeline (Line A/B/C)
- Beineu-Shymkent Gas Pipeline
- Kenkiyak-Atyrau Crude Oil Pipeline
- SINOIL

Kyrgyzstan

- Kyrgyzstan section of the Central Asia-China Gas Pipeline (Line D, planned)

Tajikistan

- Bokhtar Exploration Project
- Tajikistan section of the Central Asia-China Gas Pipeline (Line D, planned)

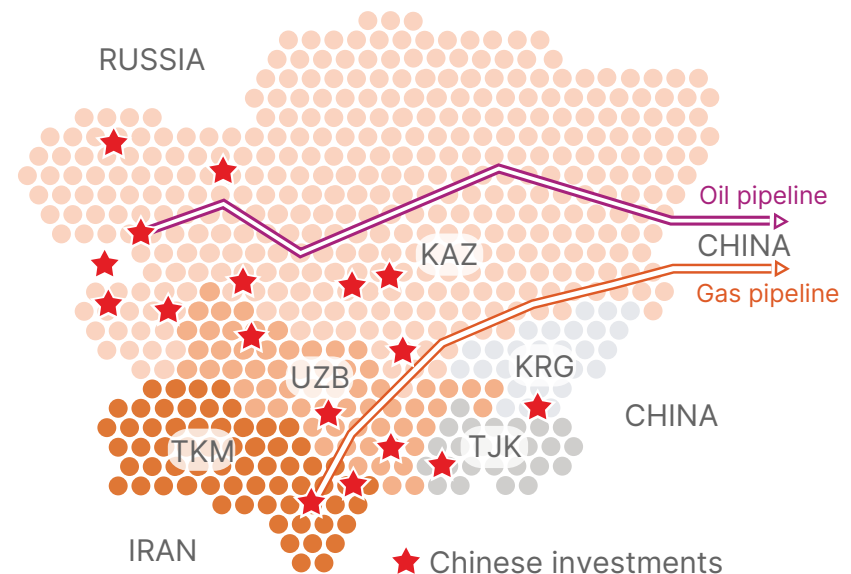
Turkmenistan

- Amu Darya Natural Gas Project
- Galkynysh, Garabil, and Bagaja gas fields
- Oilfield services
- Petroleum equipment

Uzbekistan

- Mingbulak Oilfield
- Uzbekistan section of the Central Asia-China Gas Pipeline (Line A/B/C)
- Silk Road Project ("New Silk Road Oil & Gas Company")

Chinese power plant construction companies are increasingly shifting their participation to gas-fired power plant development. For example, the China Energy Engineering Group (Energy China) is contracted for the construction work of the Syrdarya 1.5 GW gas-fired power plant in Uzbekistan.



China's thirst for gas

When diplomatic relations were established 30 years ago, oil and gas cooperation became the anchor of the bilateral relations between China and Central Asian countries. China views the region as a strategic supplier of oil and gas to meet its domestic energy demand and "optimize China's energy structure".

China's energy resources are rich in coal, and poor in oil and gas. Since CNPC's first Central Asia energy acquisition in 1997, China's gas consumption has grown substantially and in 2018 China became the world's largest gas importer. Today, it is the largest LNG importer and the second-largest pipeline gas importer after the European Union. Its dependency on imported gas has been staying above 40% in the past five years. In 2021, Central Asia's share reached nearly 80% of the pipeline gas imports to China or 11% of China's total gas consumption. In this context, gas imports from Central Asia are essential for China's energy security.

In 2021, natural gas made up 8.6% of China's total primary energy consumption and the country is expected to consume even more gas in the next decade. Projections indicate China's peak of gas consumption is around 2035 with annual consumption reaching 650 bcm. Gas consumption may peak 5 years behind the nationwide target for GHG emissions peak in 2030.

The soaring demand for natural gas can be explained by China's economic growth and clean air targets. As a "cleaner" fossil fuel (fewer carbon emissions and air pollutants compared to coal or oil), natural gas is treated as a "transitional fuel". In the past decade, China rolled out nationwide coal-to-gas fuel switch campaigns in urban and rural areas, replacing coal as a fuel for industrial boilers, power generation, heating and cooking.

To meet this soaring demand, China is likely continue increasing its gas imports, in particular, liquefied natural gas (LNG). In the past decade, while the amount imported pipeline gas has grown, its share in gas imports has actually shrunk from over 50% in the past years to 30% in 2020. Now China imports twice as much LNG as pipeline gas. The preference for LNG can be explained by China's concern about energy security: LNG allows China to diversify its gas suppliers to 27 countries, in comparison to only five countries through the land-based pipelines.

Role of Central Asia in gas supply to China

Today, China imports pipeline gas from three Central Asian states — Turkmenistan, Kazakhstan, and Uzbekistan. It also imports the pipeline gas from Russia and Myanmar. In 2021 Turkmenistan supplied about 40% of its total gas produce to China or about 60% of China's total pipeline gas imports.

Natural gas flows from Turkmenistan, Kazakhstan and Uzbekistan through the [Central Asia-China Gas Pipeline A/B/C](#). At Horgos, Xinjiang Uygur Autonomous Region, natural gas from Central Asia flows through the West-East Gas Pipeline Project (WEPP) Line-2 to reach central and eastern China.

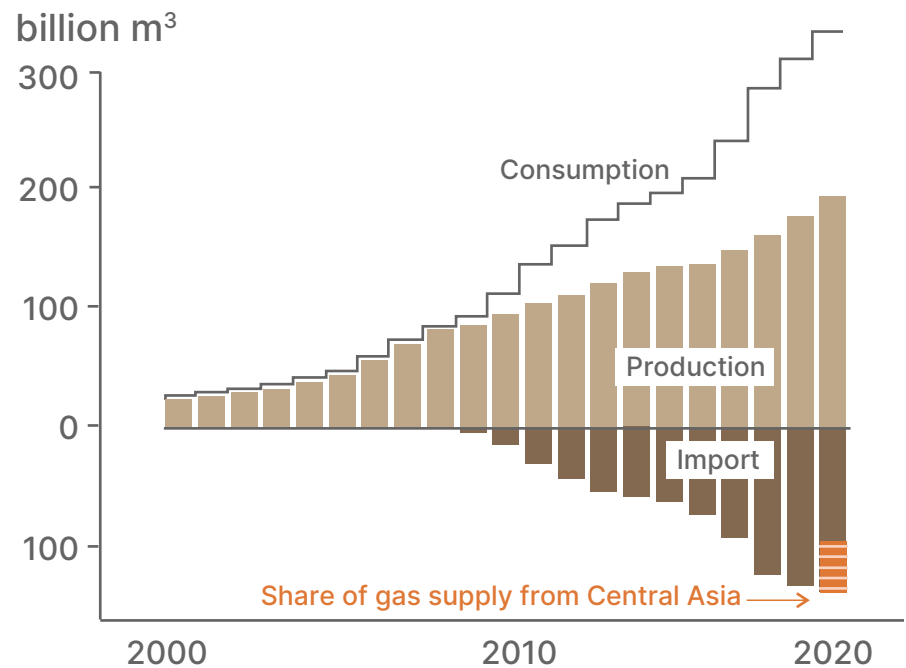
A new [Line D](#) is under development, starting from Turkmenistan to Uzbekistan, then continuing via high mountains Tajikistan and Kyrgyzstan and entering China at the Irkeshtam pass at Kyrgyz-Chinese border, where it will be connected with a proposed WEPP Line-V at Wuqia in Kashgar.

From the start of operations to the end of 2021, the Central Asia-China Gas Pipeline had cumulatively delivered [380 bcm](#) of natural gas from Turkmenistan, Kazakhstan and Uzbekistan to China, a volume similar to China's total gas consumption in 2021 ([372 bcm](#)).

Through the West-East Gas Pipeline Project, a major domestic gas transmission network, natural gas from Central Asia flows to central and eastern China, benefiting [more than 500 million](#) people. This gas is destined to meet the industrial, power generation and residential energy demand in the Beijing-Tianjin-Hebei economic zone, Pearl River Delta and the Yangtze River Delta regions.

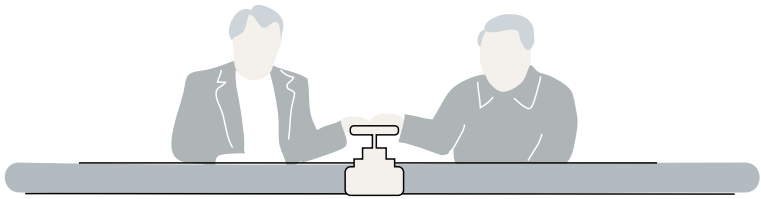
In addition to the gas pipelines, the [Kazakhstan-China Oil Pipeline](#) enters China through Xinjiang. This is China's first cross-border oil pipeline by land, and is important to China's oil security. By early 2022, it has cumulatively delivered nearly [155 million tonnes](#) of crude oil to China. To put that into perspective, that's about 30% of China's [annual crude oil import](#) for 2021.

China's natural gas balance



Oil & gas infrastructure: a component of the BRI

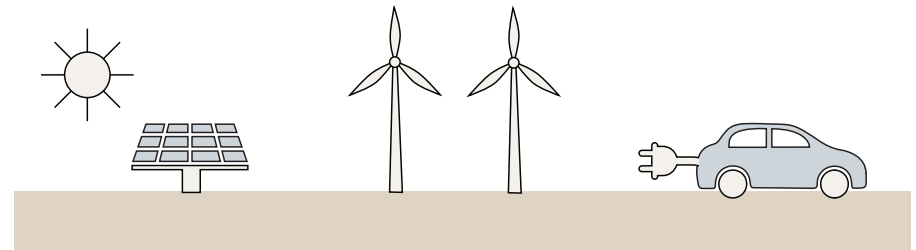
CNPC's activities in the upstream, midstream and downstream of the oil and gas sector in Central Asia, including the pipeline projects, are considered to be a crucial component of the Belt and Road Initiative (BRI). As of March 2022, China has signed cooperation documents with [149 countries](#) and 32 international organizations on the Belt and Road Initiative (BRI).



China is the birthplace of the BRI, and oil and gas cooperation is one of the components of BRI development. Line D of the Central Asia-China Gas Pipeline project was [the first large energy infrastructure project](#) after the introduction of the BRI, and its opening ceremony in 2014 was attended by China's President Xi Jinping and Tajik President Emomali Rahmon.

Not all the Chinese activities in the oil and gas sector in Central Asia are oriented to the Chinese export market. Chinese banks have been providing financing for power plants, grid and transmission lines and petrochemical projects that meet the local energy demand. For example, the [Shymkent oil refinery modernization project](#) led by PetroKazakhstan Oil, a joint venture between operators KazMunaiGas and CNPC, improved the quality of oil products and made Kazakhstan an exporter of refined oil products.

Central Asia countries, being the good neighbours of China, will likely remain reliable natural gas suppliers, and at the same time China will seek to promote a low-carbon transition in the energy sector at home and in Central Asia.



As China emphasizes a green BRI, clean energy cooperation is becoming a highlight of the bilateral cooperation with Central Asia states. A recent [analysis](#) by the Chinese Ministry of Commerce (MOFCOM) points out to solar and wind power generation and extraction of minerals for the manufacture of solar panels among priority areas of green growth cooperation.

New Energy Vehicles (NEVs) is also an emerging area for cooperation. In February 2022, BYD Auto Industry, the largest Chinese NEV manufacturer, and UZAVTOSANOAT (UzAuto), the largest car manufacturer in Uzbekistan and Central Asia, [signed](#) a Memorandum of Understanding (MOU) to develop, produce and popularize NEVs in Uzbekistan. Other potential area of collaboration is hydrogen. Turkmenistan has recently issued a Hydrogen Roadmap and created the Hydrogen Energy Center under the International University of Oil and Gas.

Energy geopolitics

As gas exporters, Central Asia countries are more dependent on the Chinese market than Russia is. In 2020, China was a marginal buyer of Russian gas, accounting for 4.5% of Russia's total gas exports. However, for the three gas exporting states of Central Asia, China represented 50-90% of their gas exports, making China the single largest buyer of the region's natural gas.

But gas and oil markets and destinations are changing. In 2021, China tripled its natural gas imports from Russia reaching the level of 10% of China's total gas imports, which made Russia the second-largest pipeline gas supplier to China after Turkmenistan, at 10% of total gas imports. The same year Russia's share in China's total oil imports reached 15%.

The increase of Russian gas imports to China in 2021 was a result of the new Power of Siberia pipeline, which is expected to reach 38 bcm annual capacity by 2025. Since Russia's invasion of Ukraine in early 2022, the European countries have been discussing an EU-wide embargo on Russian oil and gas. In the same period China's oil import from Russia increased more than 50% to record levels, displacing Saudi Arabia as the top supplier, as oil refiners and traders privileged discounted oil prices amid the U.S. and E.U. sanctions.

Even if China intends to increase gas imports from Russia, considering the recent geopolitical shifts, Russia still faces constraints to delivering a higher volume of gas to China, because many of China's LNG terminals are already running at full capacity and with the absence of pipelines and compressor stations, a sudden increase in gas imports is unlikely.

Eurasia natural gas flows

2021



2022



The European Union's commitment to phase out Russian fossil fuel imports has ramifications for both the European, Eurasian and global gas markets in both the short and long run. The International Energy Agency (IEA) considers the possibilities that Russian gas exports to Europe will drop by 55%–75% between 2021 and 2025: from 120 bcm to 60–30 bcm per year. This would reduce Russia's share of total EU gas demand from the previous levels of 30–45% to below 10% by 2025 and possibly to zero by 2027.

The EU's [REPowerEU Plan](#) includes provisions for gas supply diversification, including increasing the LNG infrastructure and supply, the more rapid adoption of renewables (45% share of renewables in power generation by 2030), and energy and gas savings. One of the effects of record high gas prices in Europe has been a surge in LNG demand that has made Europe a major LNG market that is now diverting LNG deliveries from other regions. Europe's LNG deliveries from the US, Canada and Norway will likely grow. The IEA forecast for global LNG trade for 2022–2025 calls for annual average growth at 4%, and about half of this growth is due to Europe's demand.

Europe is working on agreements with Egypt and Israel for gas supply and explores gas export potentials in sub-Saharan Africa. Energy cooperation with Azerbaijan is going to expand. Currently, Azerbaijan is supplying gas to Europe via the Trans Adriatic Pipeline, which forms a part of the Southern Gas Corridor (SGC) pipeline with capacity of 16 bcm, including 8 bcm deliveries to Europe. The main source of gas for the SGC is Azerbaijan's Shah Deniz offshore gas field in the Caspian Sea. In July 2022, a new MoU was signed on the expansion of SGC's capacity to 20 bcm by 2027.

The Caspian Summit held in June 2022 with participation of the four Caspian Sea states — Russia, Iran, Azerbaijan and Kazakhstan focused on environmental concerns, military presence and peace in the region. The Caspian Sea is rich in oil and gas reserves, but recently Kazakhstan faced constraints and uncertainties in transporting oil from its Caspian fields via Russia by the Caspian Pipeline Consortium (CPC). While technical and environmental reasons were stated among the factors behind the pipeline disruption, geopolitical considerations cannot be excluded. The president of Kazakhstan proposed to diversify oil and gas export destinations, which may imply increase in exports to the European and Mediterranean regions (via Azerbaijan and Turkey) and to Asia.

Underreported methane emissions and uncertain gas demand forecasts

Globally, International Energy Agency methane tracker ([IEA](#)) finds that methane emissions from the energy sector are 50–70% greater than the sum of estimates reported by governments to the UNFCCC. As more measured data becomes available, it becomes clear that almost all national inventories are underreporting methane emissions. For example, UNFCCC data from Russia and the Caspian Sea region indicates 12.2 million tonnes of methane emissions, while IEA's estimate for this region stands at 27.2 million tonnes. Methane leaks from oil and gas operations detected by satellites considered by IEA points to very significant methane emissions in Central Asia, especially Turkmenistan (4.8 million tonnes of methane).

According to IEA's methane tracker, China leads the top 10 global methane emitters with 58.4 million tonnes in 2021. IEA estimate methane emissions from China's energy sector at 28.3 million tonnes. For comparison, Chinese latest national GHG inventory to the UNFCCC reports 24.7 million tonnes of methane emissions from the energy sector in 2014, including 21 million tonnes from coal operations.

If all countries implemented policy and technical measures in the oil and gas sector, such as banning non-emergency flaring, imposing leak detection and repair programmes, and equipment standards, it would cut the global emissions of 80 million tonnes in the oil and gas sector in half.

The [IEA gas market report](#) (2022) notes that the Russian invasion of Ukraine changed the earlier expectations of growth in demand for natural gas, and that the resulting supply disruptions and record high prices are undermining the reliability and affordability of gas just as it was expected to play an important role in energy and climate goals. The IEA forecasts global natural gas consumption to grow modestly at an annual average rate of 0.8% in 2022–2025 (previous forecast for the same period was 1.7–2%). Global gas demand may decline by 0.5% in 2022, and then grow to reach 1.5% in 2025.

The industrial sector accounts for about 60% of this growth. In 2021, the power generation sector was the largest contributor to gas demand growth, but its contribution in 2022–2025 is likely to shrink due to high gas prices and expansion of renewables. Most of the forecasted growth in global demand for gas comes from two regions — Asia Pacific with about half, and the Middle East with one third.

The development of low-carbon alternative fuels offers the potential to ease the pressure on supply, reduce emissions, and enhance the resilience of energy markets. Biomethane, hydrogen and synthetic methane are all poised to scale up, and IEA forecasts the production of biomethane to double through 2025. Europe leads in the development of hydrogen and by 2025 it will contribute 55% of the world's hydrogen production capacity.

China steps up to curb methane emissions

At UNFCCC COP-26 Glasgow, China did not sign the [Global Methane Pledge](#) led by the US and the European Union, but it committed in the “[US-China Joint Glasgow Declaration on Enhancing Climate Action in the 2020s](#)”, expressing the intention to develop a national action plan on methane and to enhance the measurement and mitigation of methane in energy, waste and agriculture.

In China, like in many other countries, the lack of accurate emissions data is a significant barrier to developing effective strategies to tackle methane emissions. According to China’s latest [national greenhouse gas inventory](#) (BUR) published in 2018, China emitted 1160 million tonnes of methane in CO₂-equivalent in 2014, accounting for about [10%](#) of China’s total greenhouse gas emissions that year. About 45% of China’s methane emissions originate in the energy sector.

Despite a high [global warming potential](#), methane and other non-CO₂ greenhouse gases only recently started to emerge as an area of climate mitigation in China’s [five-year plans](#). China’s [Nationally Determined Contribution](#) (NDC) sets up a peak emission target for CO₂ “before 2030”, and no quantitative targets are given for China’s non-CO₂ GHGs in the country’s [Long-term Strategy](#) (LTS) or the “[1+N](#)” domestic climate action framework.

Due to China’s coal-dominant energy, coal mining is a significant source of methane, and most of technical and policy efforts focus on methane capture in coal mining and end-of-life coal mines.

Oil and gas production is another source of methane emissions in China, but emission intensity per unit of oil and gas production is relatively low. Turkmenistan emits 6 times more methane than China per unit of oil and gas produced.

According to a recent assessment published in Nature Communications, natural gas supplied to China through the Central Asia-China pipeline has the [highest greenhouse gas intensity](#) among all sources of pipeline gas and LNG produced inside or outside China. Natural gas from the Galkynysh and Bagtiyarlyk fields in Turkmenistan transmitted to China carries twice the average carbon footprint due to leakage at the wells and along the long-distance pipeline.

Several state-owned oil and gas companies have started regulating methane emissions as part of their environmental, social and governance strategy. In 2020, the China National Petroleum Corporation (CNPC) pledged to [halve](#) its methane emissions by 2025 compared to the 2019 level and continue to reduce their methane emissions by 20% by 2035 compared to the 2025 level.

In May 2021, seven Chinese oil and gas companies launched the “[China Oil and Gas Methane Alliance](#)”, an industry-led initiative to reduce methane intensity in natural gas production.

CHINA Methane emissions profile

Million tonnes of
CO₂-equivalent

