

# FDI for Advanced Fossil Fuel Technologies in Central Asia

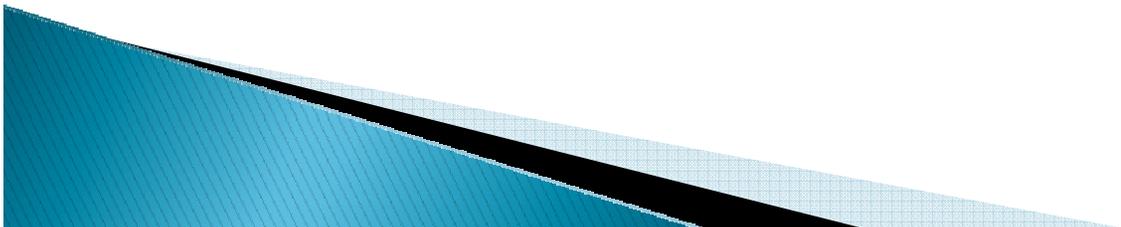
View from the outside investor

Dr. D. Thomas Gochenour  
Head of Research  
55 North Capital Partners

12 September 2011

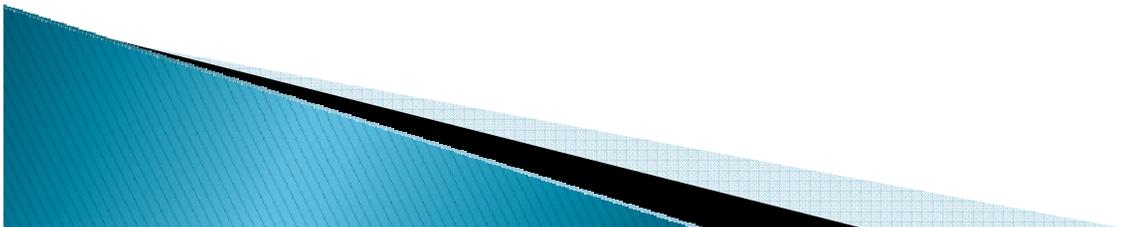
# Investments in Advanced Fossil Fuels

- ▶ Fuels which go into high efficiency, low carbon emitting power plants
  - Natural gas
  - Pulverized or liquefied coal gas
  - Syngas from underground coal gasification
- ▶ Technologies not reviewed
  - Carbon capture and storage
  - Shale gas
  - Gas to liquids or coal to liquids
  - Coal bed methane

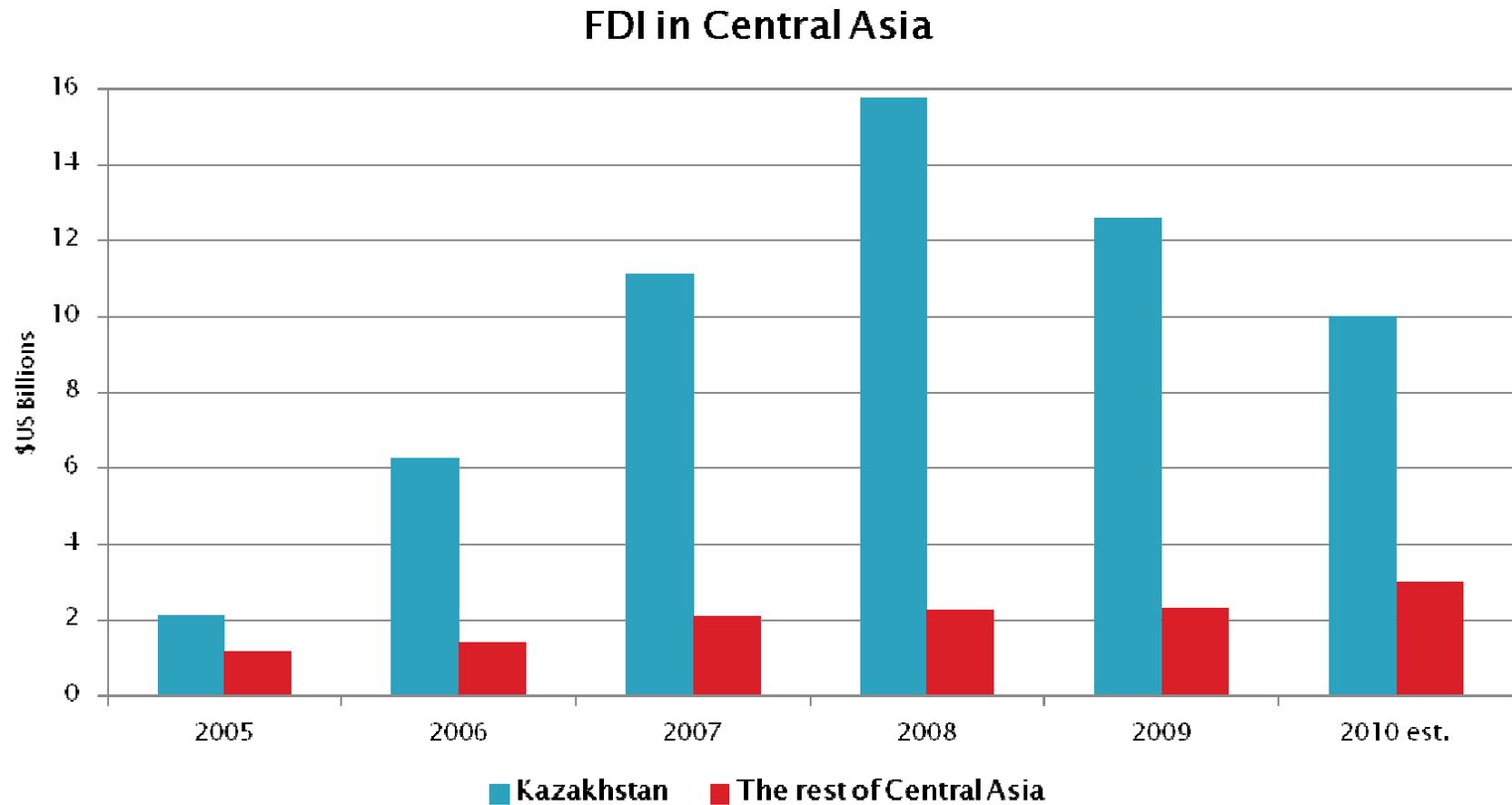


# Power plants technologies using Advanced Fossil Fuels

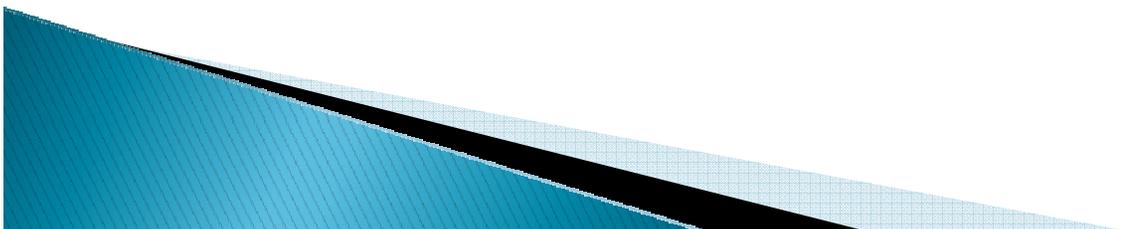
- ▶ Gas
  - Combined cycle gas turbines (CCGT)
  - Combined heat and power (CHP) using gas
- ▶ Coal
  - Integrated Gasification Combined Cycle (IGCC)
  - Supercritical pulverized coal (SCPC)
  - Ultra-supercritical pulverized coal (U-SCPC)



# FDI into Central Asia 2005–2010

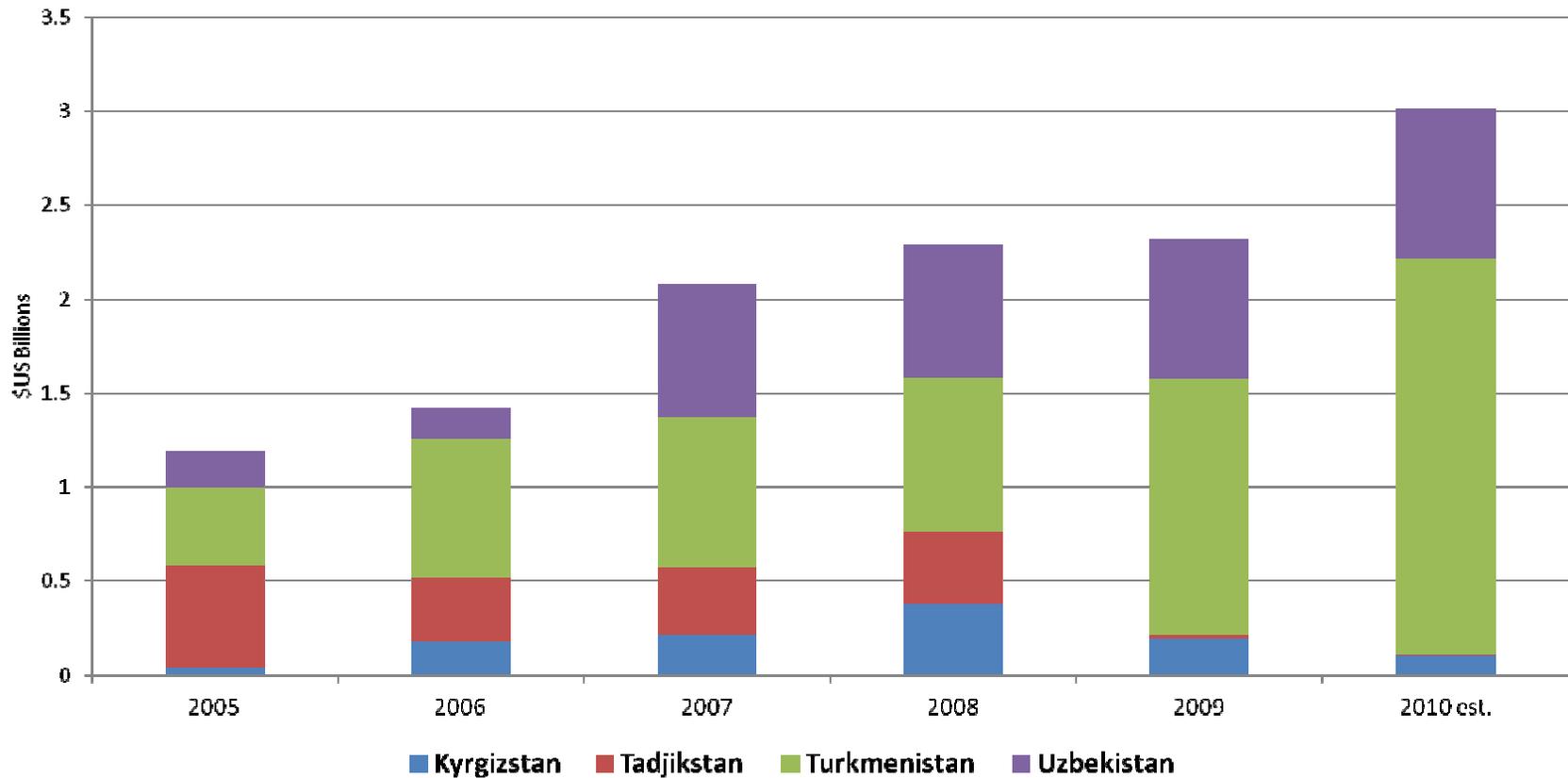


Source: World Bank, Silk Road Intelligencer



# FDI into Central Asia excl. Kazakhstan

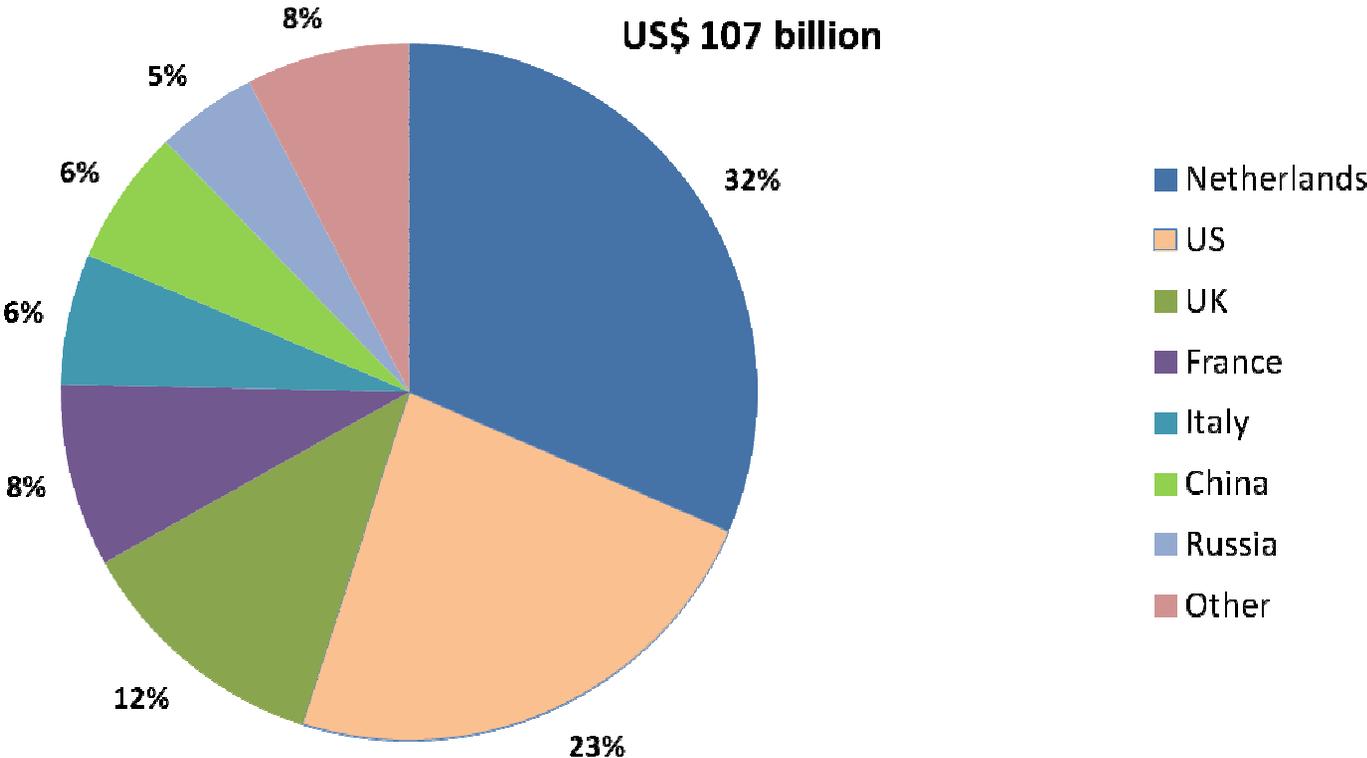
FDI in the rest of Central Asia



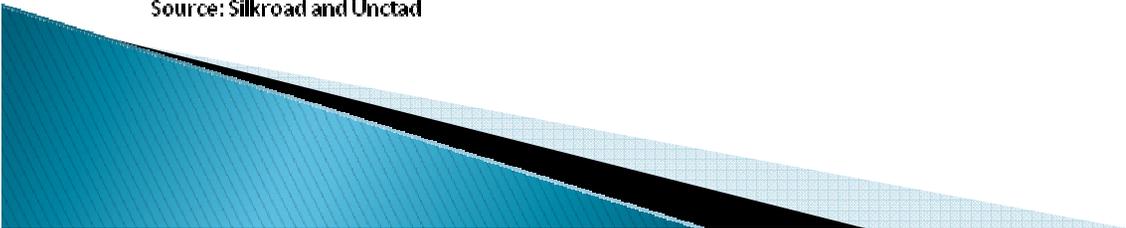
Source: World Bank, Silk Road Intelligencer

# Sources of FDI

Sources of FDI to Kazakhstan since 2002

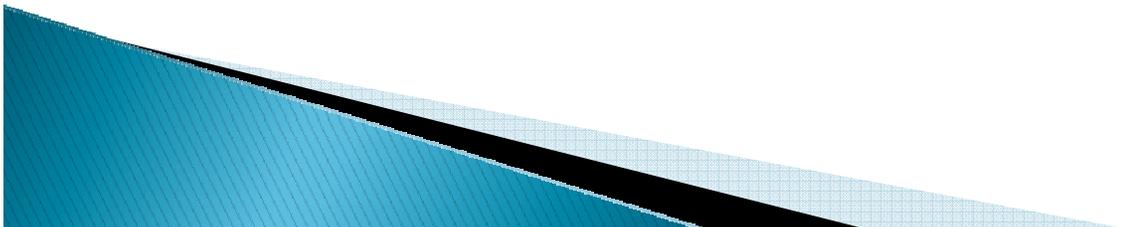


Source: Silkroad and Unctad



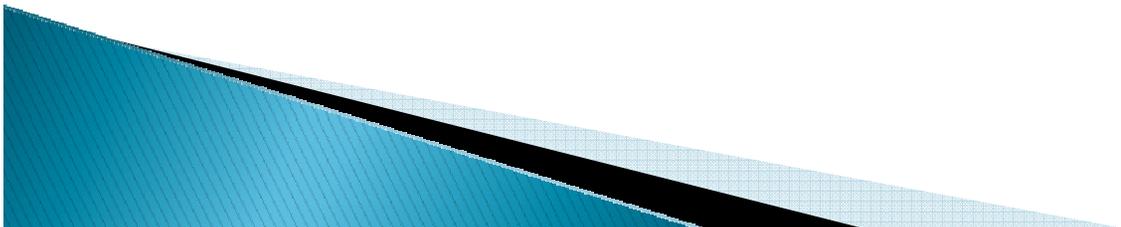
# FDI into Central Asia

- ▶ More than 75% of FDI into Kazakhstan and Turkmenistan goes into the extractive industries, mainly oil and gas, commodities for export
- ▶ More than two-thirds of historic FDI has come from the developed market countries
- ▶ Outside of Kazakhstan Russia and China are the largest investors. China and Korea are rising source of investments
- ▶ Very little in past decade has gone into electric power or advanced fossil fuels



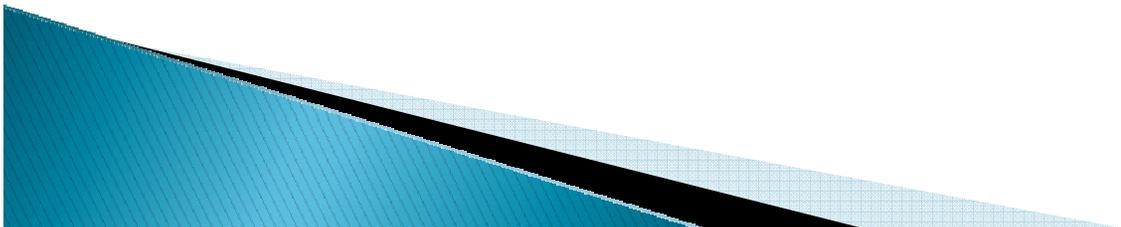
# What is the foreign investor looking for in energy investments?

- Predictable, rapid return on capital invested
- Security and low political risk
- Not too much exposure of his capital
- Access to markets for output
- Market prices
- Ability to repatriate profits



# Measuring the investment attractiveness of a country

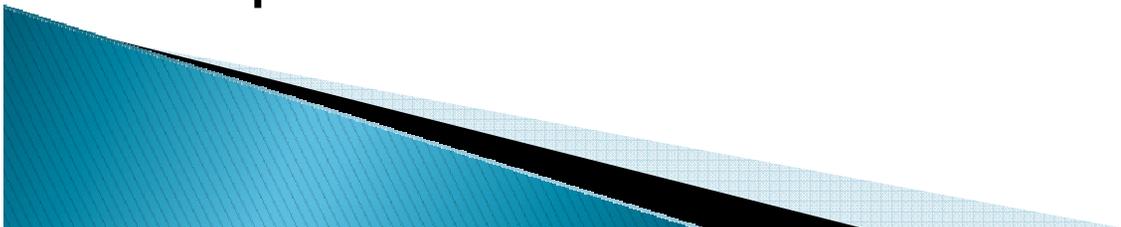
- ▶ Investors look carefully at the business and investment terms a country has to offer
- ▶ They seek to assess the level of risk that their investment does not return the level of profits desired
- ▶ Many organizations measure the conditions for investment and establish indices and rankings to compare the “investability”
- ▶ Two authoritative indices are the World Bank Ease of Doing Business index and Hermitage/WSJ Economic Freedom index



# Measures of investment attractiveness

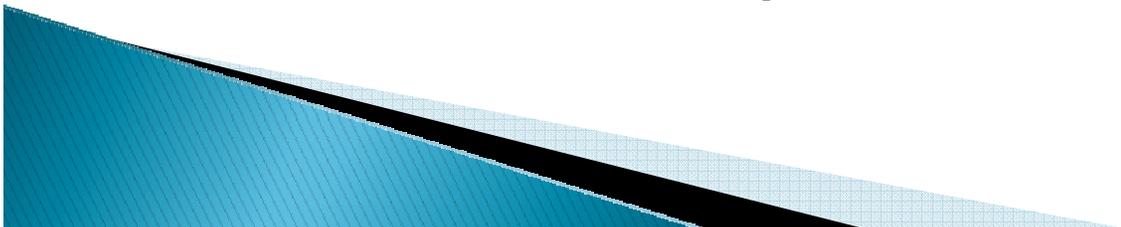
- ▶ These indices look annually at
  - Business conditions
  - Trade terms
  - Fiscal and financial terms and conditions
  - Actual experiences of current and past investments
  - Government dominance
  - Monetary, foreign exchange and capital control policies
  - Property rights, labor situation
  - Legal protections
  - Security and internal stability
  - Corruption

Then assign a value to a country's performance and make a weighted score

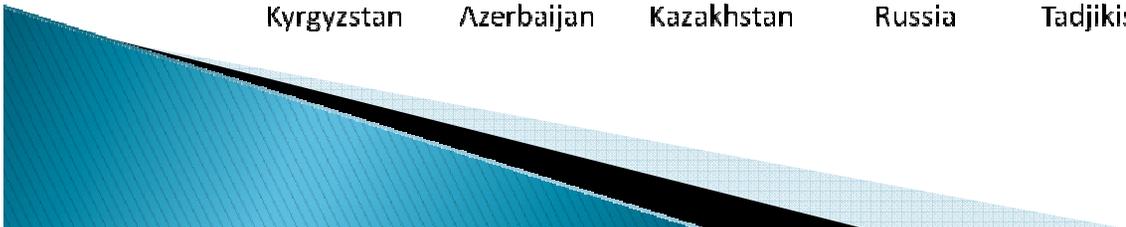
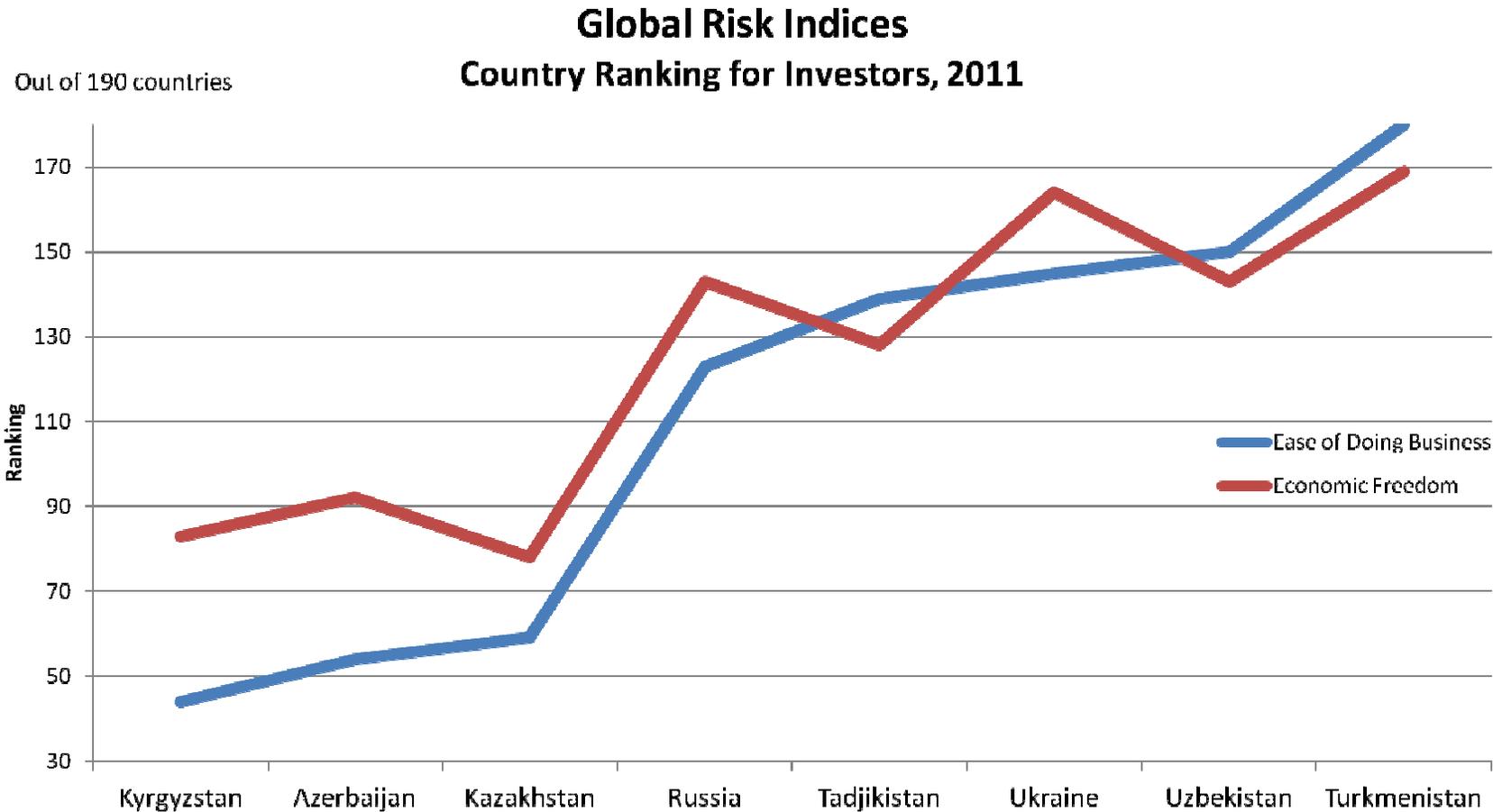


# Measures of investment attractiveness

- ▶ Many agencies and international organizations examine the comparative attractiveness or risk of investing.
  - Dun and Bradstreet
  - Transparency International
  - Credit Risk International
  - Institutional Investor
  - Credit rating agencies, i.e. Moody's, S&P
  - Beri S.A.
  - World Economic Forum Competitiveness Index
- ▶ **Investors spend great efforts in assessing their risk in a specific country and project**



# Rankings for Central Asia and CIS



# Central Asia a risky investment

- ▶ On the whole Central Asia is not an attractive investment destination
- ▶ Investors see that the region is deemed “high risk”
- ▶ Kazakhstan, unsurprisingly, is perceived by most agencies to be the “friendliest” investment destination in Central Asia
- ▶ High investment exposure in state of the art costly power plants is not acceptable to most investors
- ▶ Outside energy commodities and minerals extraction Central Asian countries attract little FDI
- ▶ Countries can and have changed their investment climate, but to improve they must perform as well



# High efficiency, low carbon, advanced power plants are expensive and still rare world wide

- ▶ SCPC plants operating worldwide
  - 7 in US
  - 4 in Germany
  - 2 in China
  - 2 in Netherlands
  - 2 in rest of EU
- ▶ USCPC plants operating worldwide
  - 1 each in US, EU, and China
- ▶ IGCC plants operating worldwide
  - 4 in US
  - 3 in EU
  - 1 in China
  - 1 in Japan
  - 4 in Italy using heavy crude oil

430 under construction or planned, many in China

IGCC units 15–50% costlier than SCPC plants

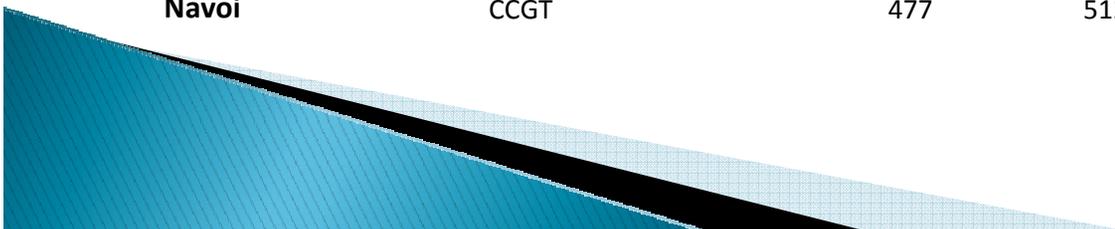
# FDI in power plants



# Power plant investment in Central Asia

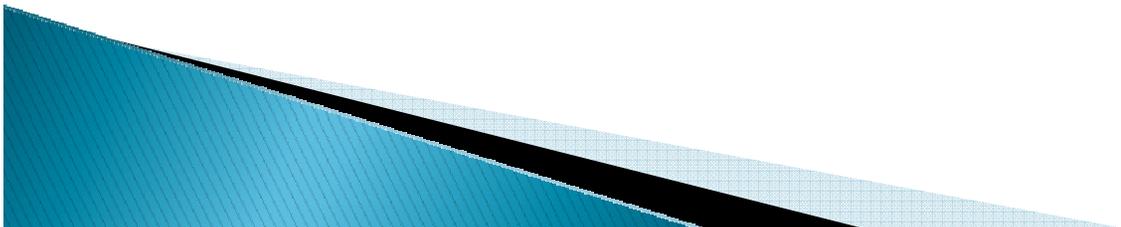
- ▶ Up to now , recent investments have been limited to subcritical pulverized coal plants in Kazakhstan and combined cycle gas plants
- ▶ Combined cycle plants using gas are cheaper than advanced coal technologies

Location	Plant	MWe	\$mm	Foreign Investor	Country
<b>Ekibastuz</b>	GRES-2 unit 3	500	600	Inter RAO UES	Russia
<b>Aksu</b>	Yermak GRES		265	ENRC	UK
<b>Balkhash</b>	coal	1,320	4,700	Samsung E&T	Korea
<b>Ahal</b>	CCGT	254	168	Calik Enerji	Turkey
<b>Navoi</b>	CCGT	477	512	Calik Enerji/Initec	Turkey,Spain



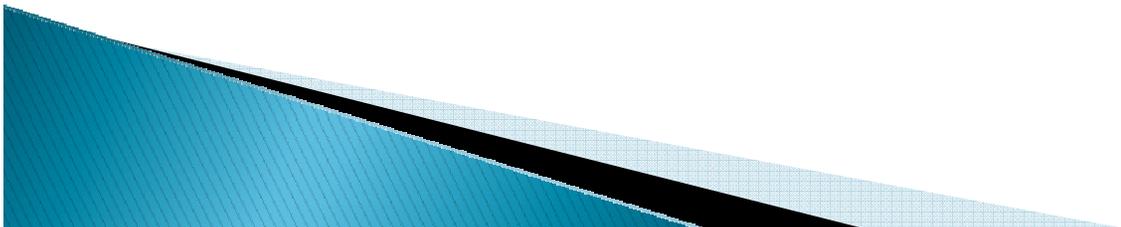
# FDI in power plants: the European view

- ▶ EU power investors view power plants as high risk, low return, long-term, and highly capital intensive
- ▶ They seek a friendly regulatory situation, investment friendly environment with ownership rights, no price caps, and a strong price signal for expected short and long term power prices, stable fuel prices
- ▶ Pre-Fukushima already projected needs in EU for 536 GW of new capacity (strong capital competition to outward direct investment)

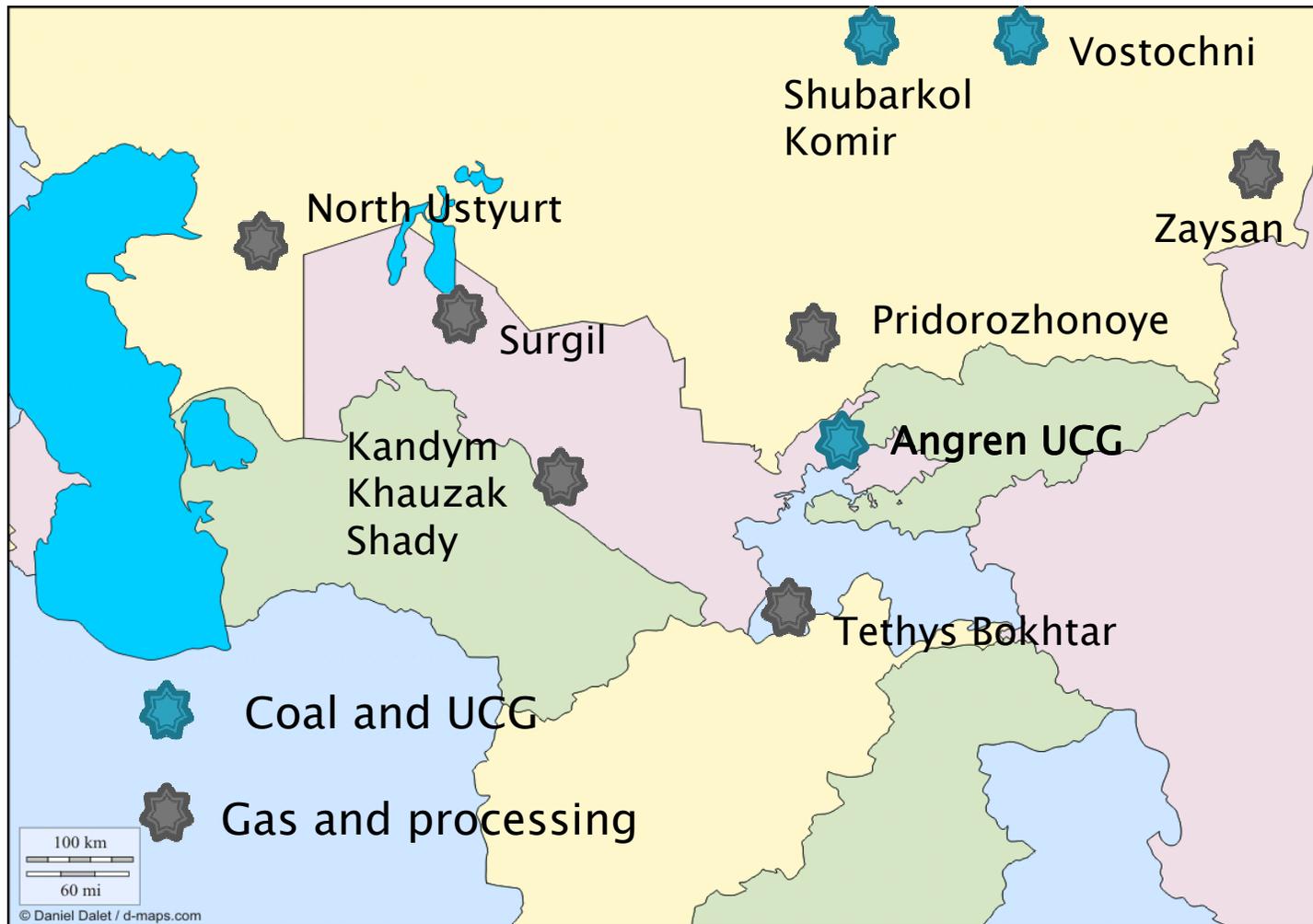


# Power plant investment should target gas fired combined cycle

- ▶ Central Asia's gas reserves are more than adequate to replace coal burning power plants. Gas fired CC or CHP plants are more environmentally friendly
- ▶ CCGTs are much cheaper than any of the advanced coal power plants. In 2007 a similar sized gas powered CCGT cost 600 Euro/kWe.
- ▶ In past four years Russia attracted more than US \$8.5 billion of FDI for new CCGT plants with 3,180 MWe capacity

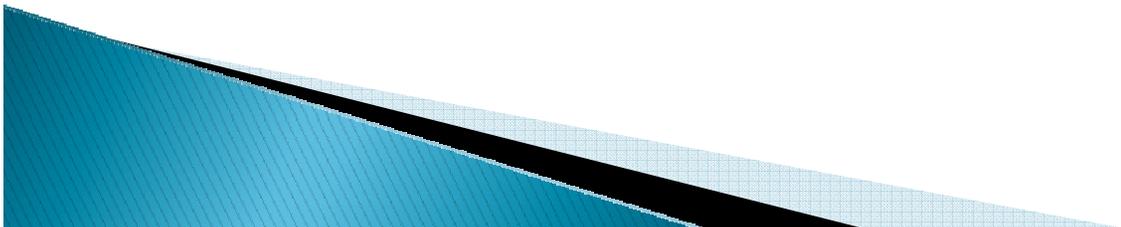


# Recent FDI into gas, coal and UCG



# Investment in advanced coal technologies

- ▶ With the greatest coal resources Kazakhstan plans on additional investments in possible coal-bed methane and UCG projects
- ▶ Although the Soviet Union was the innovation leader in UCG, only the Angren facility in Uzbekistan remains operational and it is the only site of FDI in Central Asia
- ▶ With the greatest coal reserves, Kazakhstan attracts the most FDI. It has focused its future energy development on coal based power plants.



# Recent FDI into new gas E&P

- ▶ While Turkmenistan has the largest gas reserves and production in Central Asia, there has been an effort to explore for and produce gas in Uzbekistan, Kazakhstan, and even Tadjikistan
- ▶ The Lukoil investment in Kandym Khauzak Shady fields makes it the largest foreign investor in Uzbekistan with expected investment of \$5.5 bn.
- ▶ Tethys Petroleum has begun exploring for gas in Tadjikistan and Kazakhstan.
- ▶ Much of new gas production will go to exports to China which is also a new foreign investor in gas.

