

# **Agenda for Global Coal Market Development**

-What is needed for promotion of appropriate investment?-

**September 7, 2010  
Tokyo**

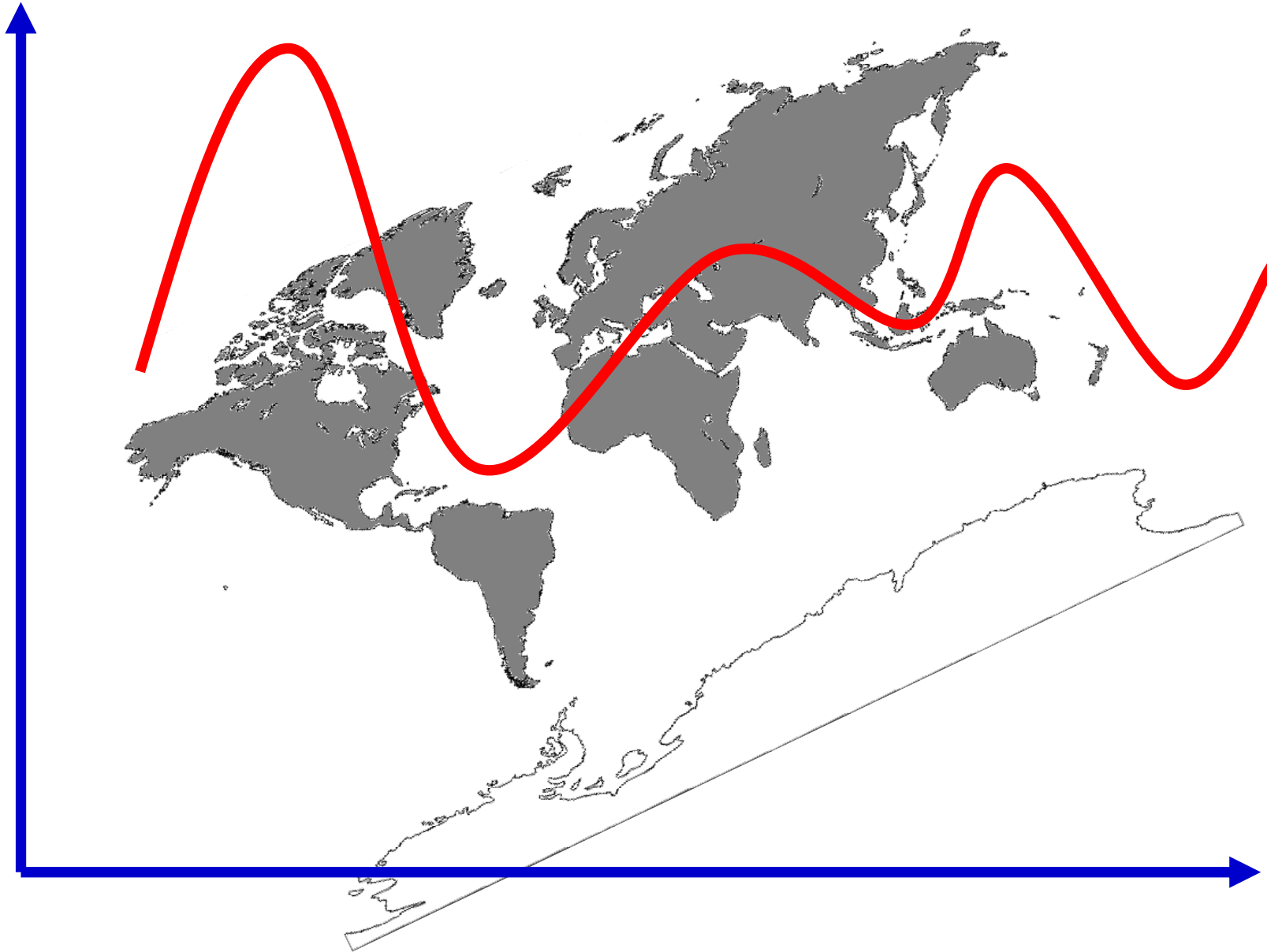
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Electric Power Development Co., Ltd. (J-POWER)**

**-What is needed for promotion of appropriate investment?-**

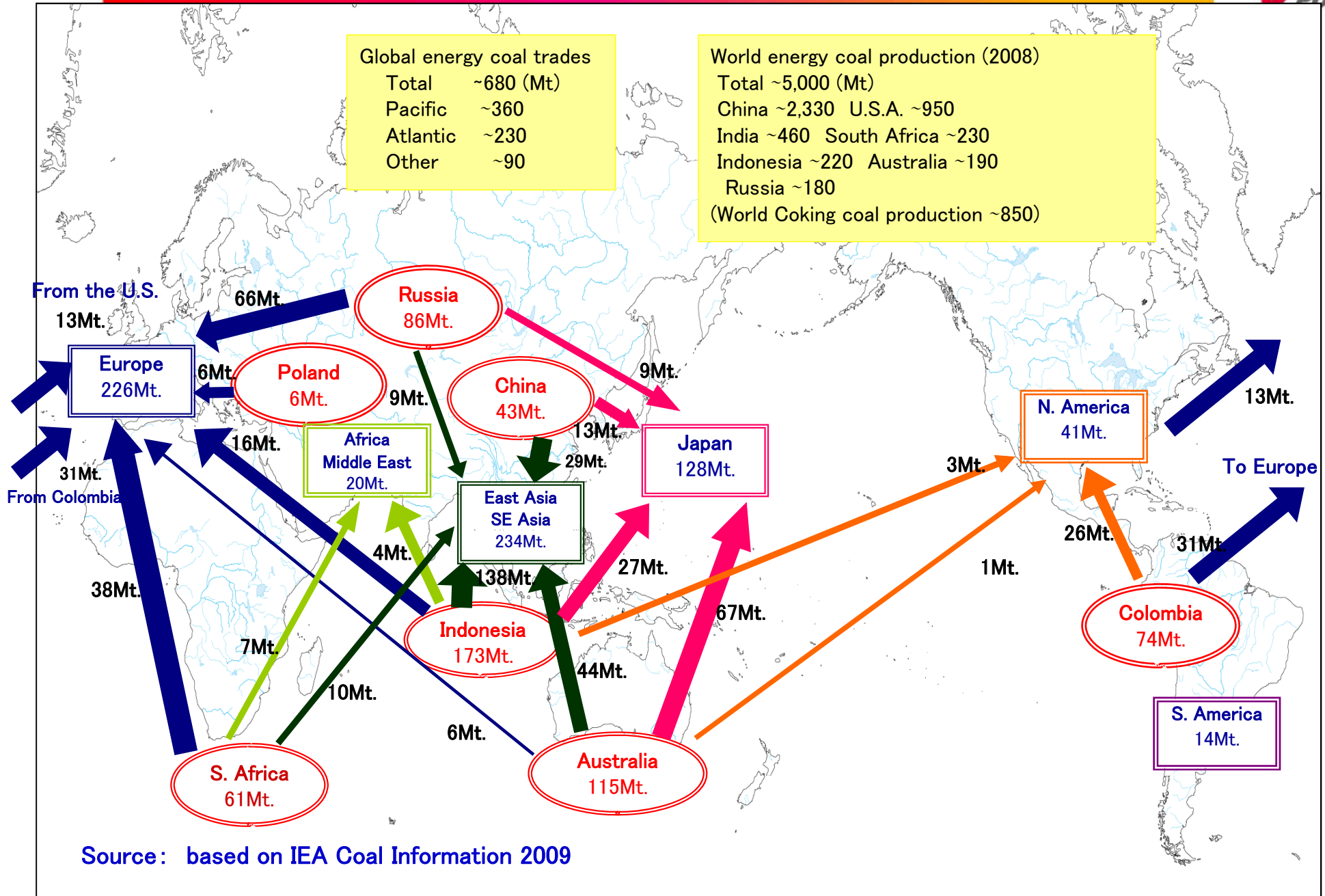
- 1. Recent trends in the global energy coal market**
- 2. Agenda for market development**

# 1. Recent trends in the global energy coal market

# Rising volatility and More arbitrage

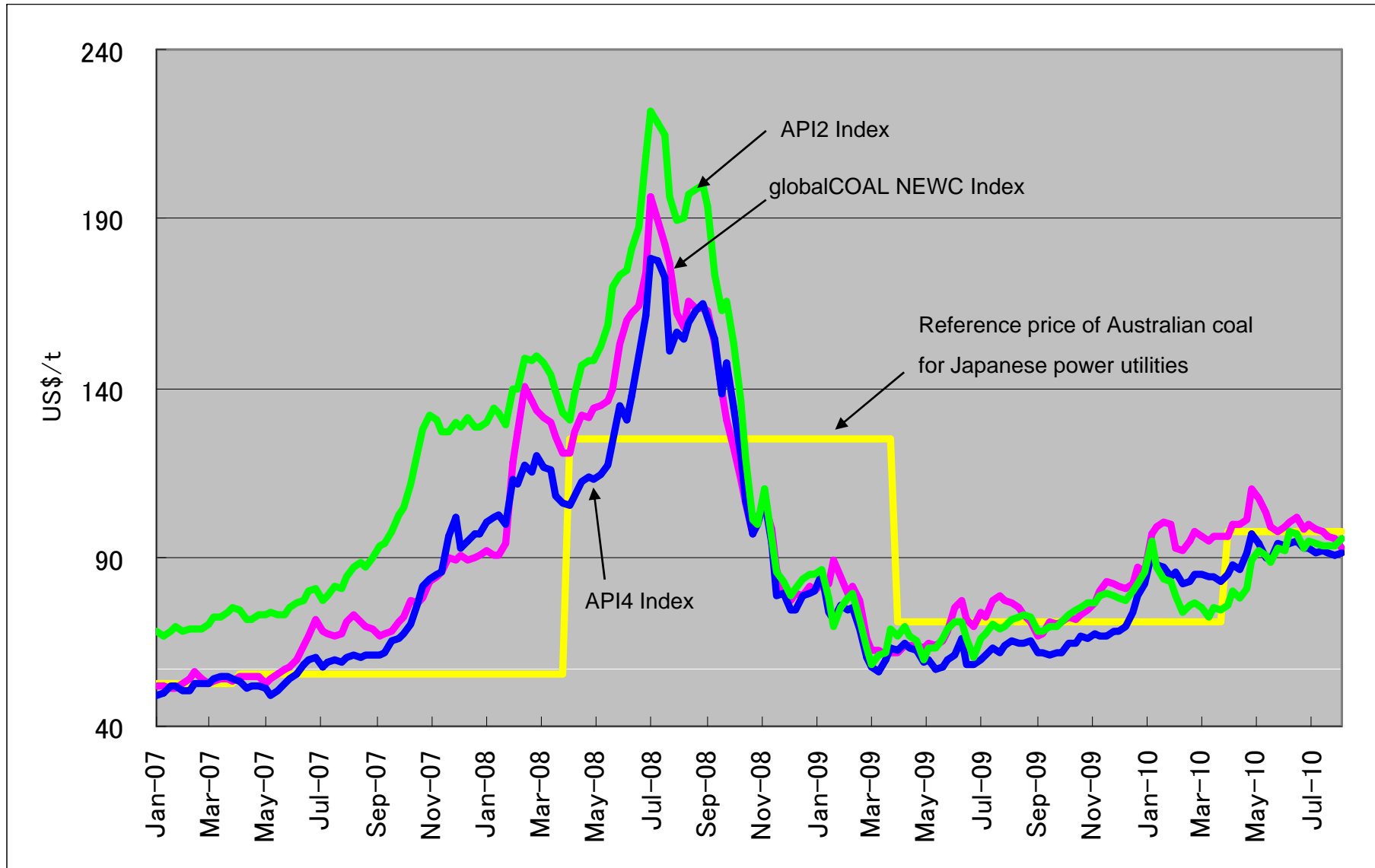


# Global energy coal trades (2008 estimates)



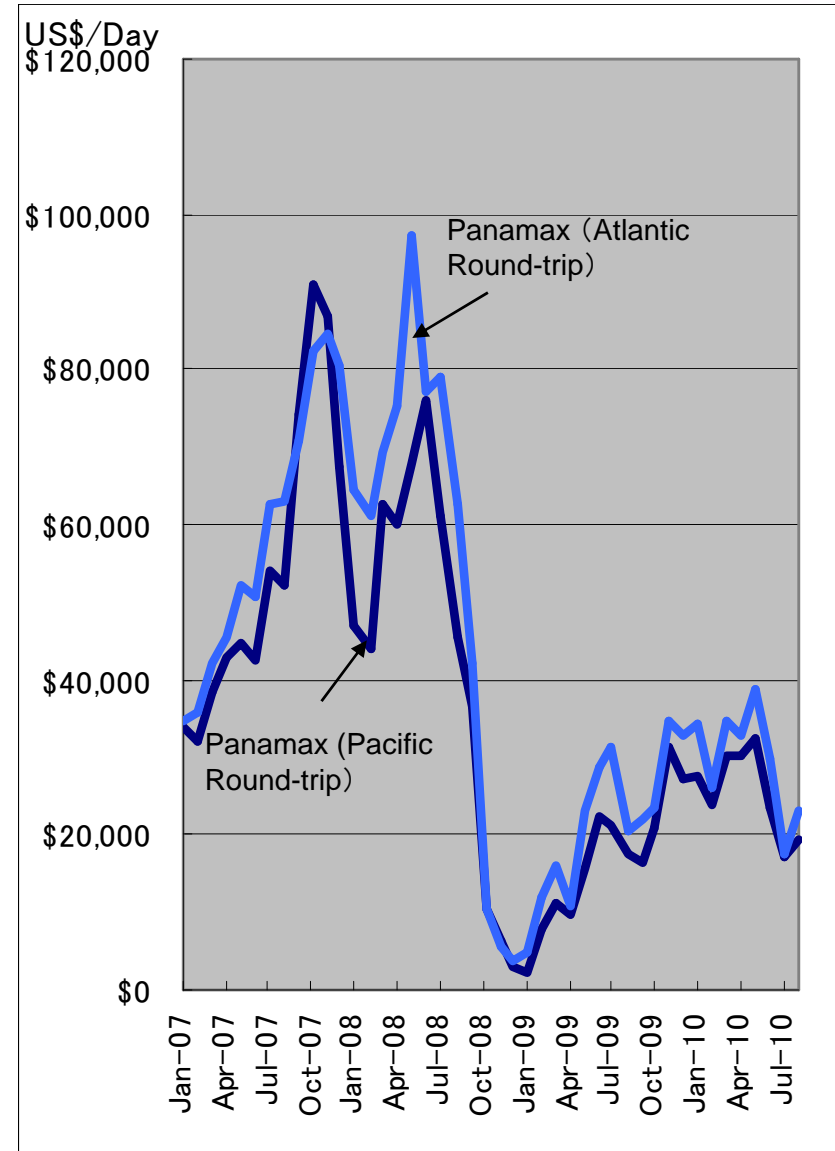
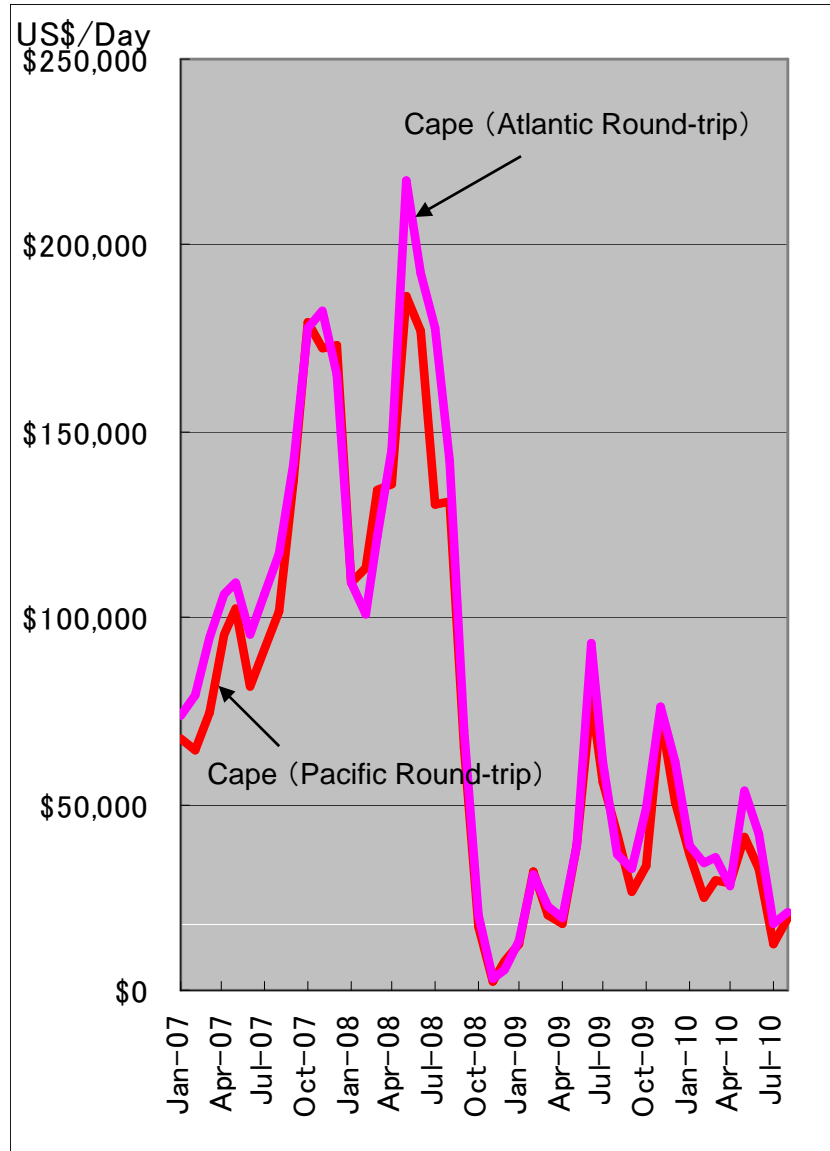
Source: based on IEA Coal Information 2009

# Energy coal prices



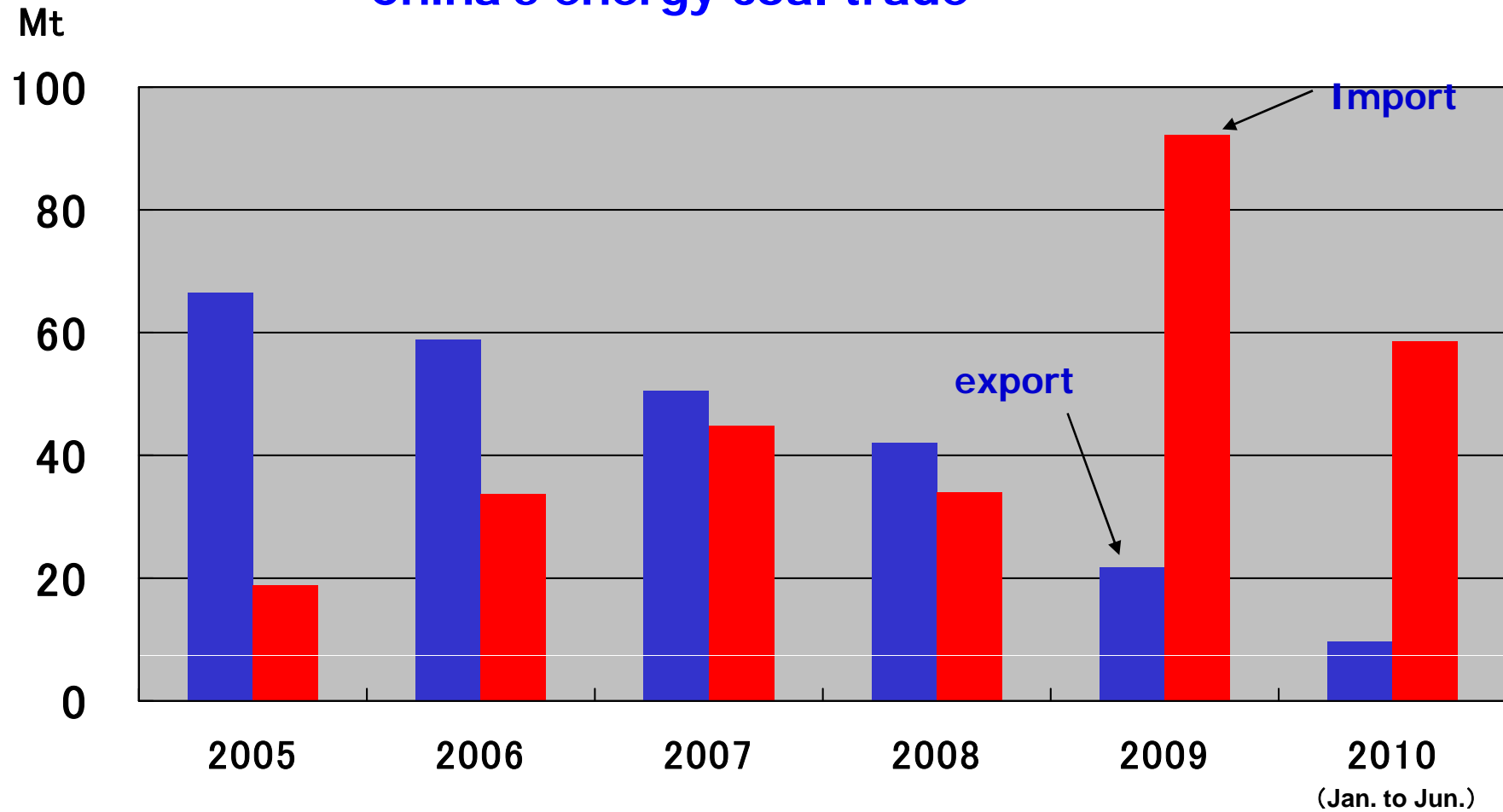
Source: globalCOAL, Argus

# Freight rates



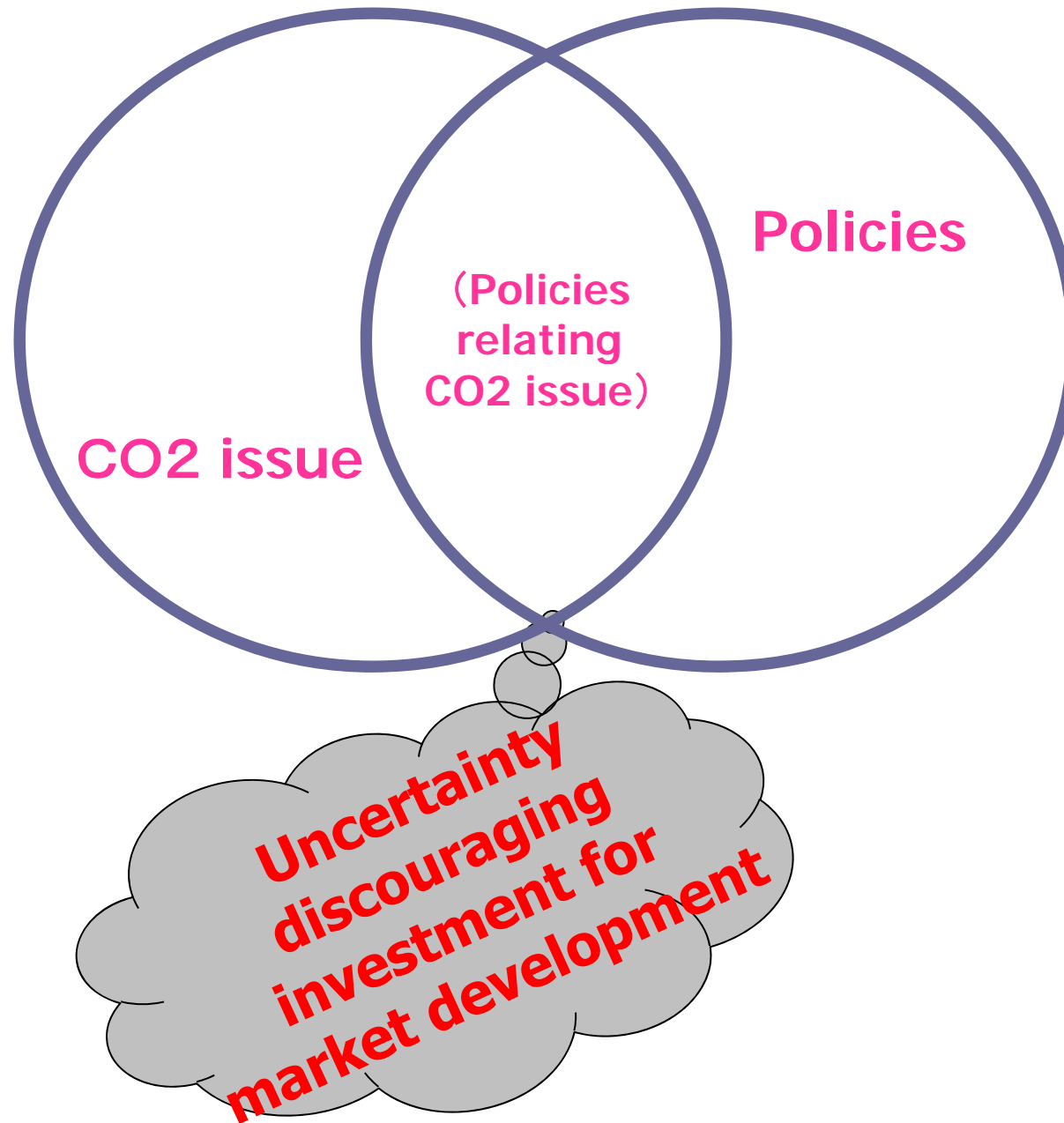
Source: TDS

## China's energy coal trade<sup>\*1</sup>



\*1: Including anthracite and other coal, excluding coking coal

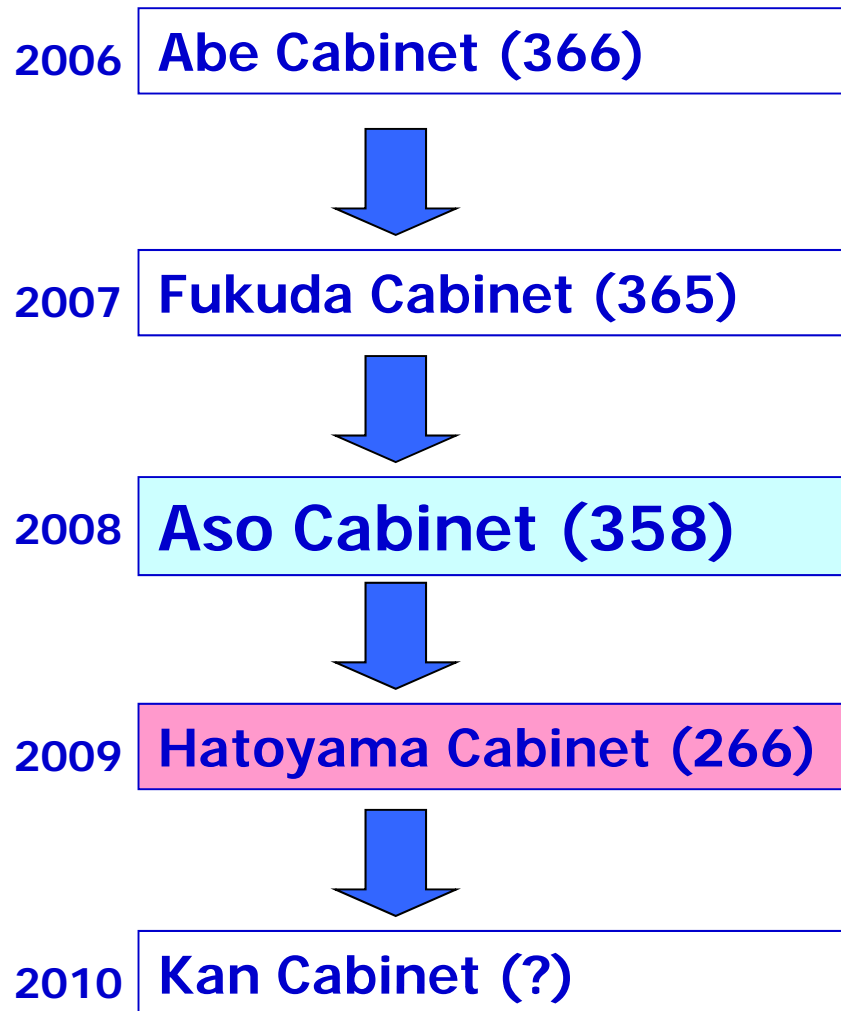
# Uncertainty surrounding global energy coal market



# Uncertainty of policies

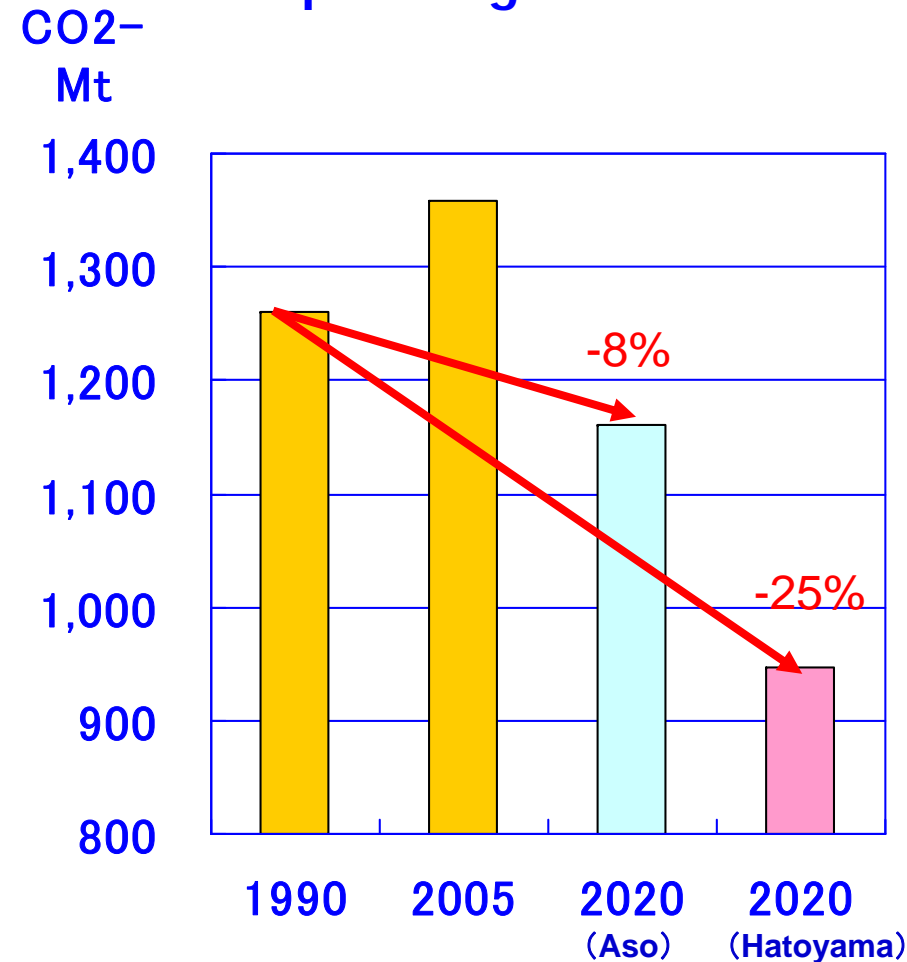


## Political instability in Japan



( ): days in office

## Greenhouse gas emission reduction targeted by Japanese government



# Factors impacting on the global energy coal market



## Global energy coal market

- **Rising volatility**
- **More arbitrage**

**Uncertainty**  
(CO2 issue, Policies)

## 2. Agenda for market development

# Principles of approach to risk-taking/return-taking



## Two principles

### ■ Commitment

- (eg) - Long-term contracts for purchasing coal
- Participation in development of coal mines by consumers

### ■ Liquidity

- (eg) - Expansion of physical and derivative trading based on indices, including globalCOAL-NEWC and API

# Commitment: J-POWER's example



- Development of coal mines with end-users' participation
  - investment in 4 coal mines in Australia

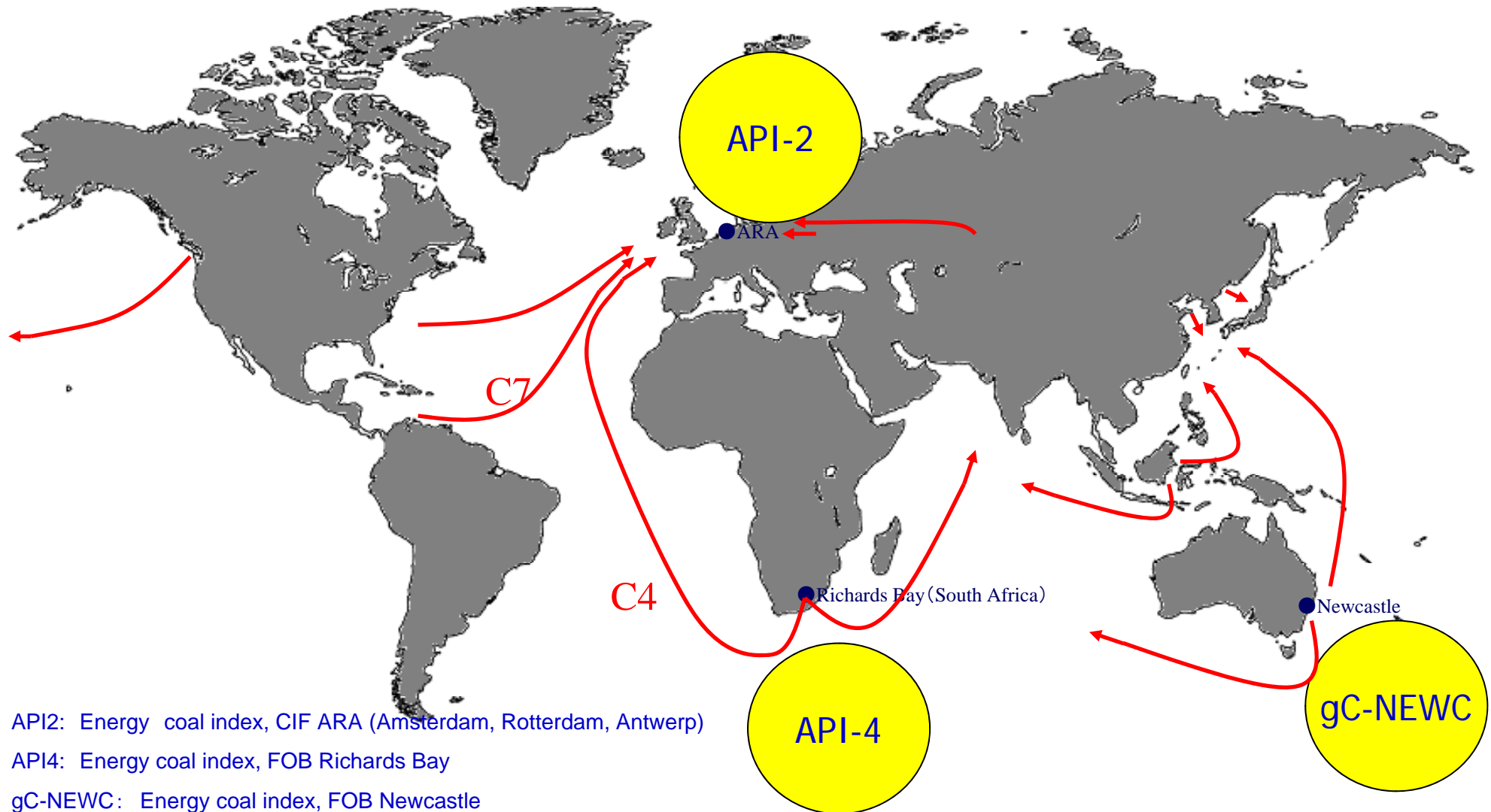


Blair Athol mine(photo: Rio Tinto)

Mine	Blair Athol	Ensham	Clermont	Narrabri
Participation year by J-POWER	1982	1997	2003	2008
Share of J-POWER (%)	approx 10	10	15	7.5
Partners (%)	Rio Tinto(approx 71) UniSuper (approx 15) JCD (approx 3)	Idemitsu Kosan(85) LG International(5)	Rio Tinto(50.1) Mitsubishi Development (31.4) JCD(3.5)	Whiteheaven(70) Upper Horn Investments(7.5) EDFT(7.5) Daewoo/KORES(7.5)
Production/year (Mt)	Maximum 12	8	Maximum 12	Maximum 6-7
Mining method	Open cut	Open cut	Open cut	Underground
Port	DBCT	Gladstone	DBCT	Newcastle (NCIG)
Note	mined out in a few years		start of production in 2010	start of production in 2010

# Liquidity

## Established reliable price indices

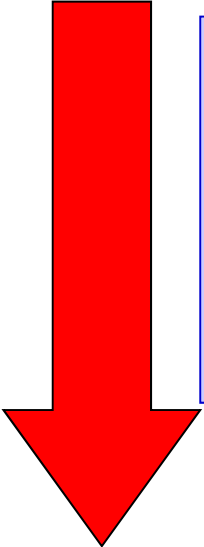


- API2: Energy coal index, CIF ARA (Amsterdam, Rotterdam, Antwerp)
- API4: Energy coal index, FOB Richards Bay
- gC-NEWC: Energy coal index, FOB Newcastle
- C4: Freight index, cape-size, Richards Bay - Rotterdam
- C7: Freight index, cape-size, Bolivar - Rotterdam

# Counter-measures to uncertainty: CO2 issue



## Steady and attainable measures

- 
- Replacement of old coal-fired units with Best Available Technology (BAT) ones
  - Development of new technologies
  - International dissemination of high-efficiency technologies

## Example of J-POWER tackling the CO2 issue (1)



### Replacement of old plant

<b>Plant</b>	Takehara Thermal Power Station (Takehara, Hiroshima) Unit-1, Unit-2	Takehara Thermal Power Station (Takehara, Hiroshima) New Unit-1
<b>Installed Capacity</b>	Unit-1: 250MW Unit-2: 350MW	New Unit-1: 600MW
<b>Boiler type</b>	Sub critical	USC (Ultra Super Critical) (CO2 emission intensity would be improved by approximately 15%.)
<b>Start of operation</b>	Unit-1: 1967 Unit-2: 1974	2020 (planned)



Takehara Thermal Power Station

- Japan has 80 coal-fired producing a total of approximately 38GW.
- These include about 40 inefficient, mid-sized units (7GW) which will approach operational lives of 40 years by the year 2020.
- Replacement of these units could reduce Japan's total CO2 emissions by 0.5% (approximately 6 CO2-Mt/y).

# Example of J-POWER tackling the CO2 issue (2)

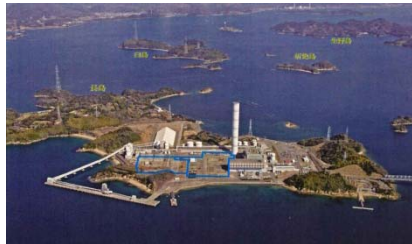
## Development of new technologies



Chugoku Electric Power and J-POWER promote a large-scale demonstration project toward commercial use of oxygen-blown coal gasification technology.



J-POWER Wakamatsu Research Institute (Kita-Kyushu City)



Osaki Power Station, Chugoku Electric Power (Hiroshima Prefecture)

**Large-scale demonstration project for power generation based on oxygen-blown coal gasification**  
Scale: 1,100 t of coal per day (170 MWe)  
Site: Osaki Power Station, Chugoku Electric Power Co., Ltd. (Osaki Kamijima, Hiroshima Prefecture)  
Start of operation: FY2016  
Demonstration: -- up-scaled EAGLE pilot plant with an IGCC power generation system  
-- CO2 capture technology



Use of the IGCC/CO2 capture plant

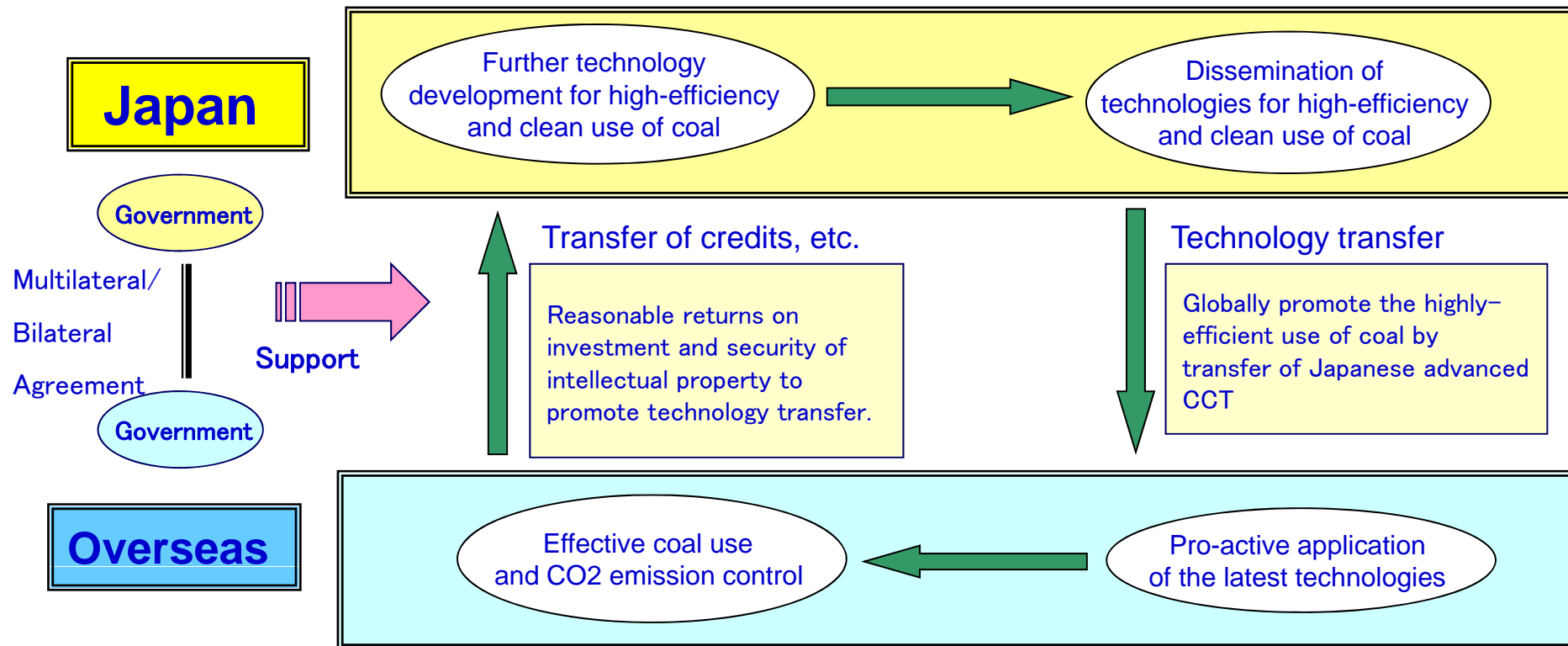


Use for multipurpose use (synthetic fuels, hydrogen, etc.)

# International dissemination of high-efficiency technologies (1)

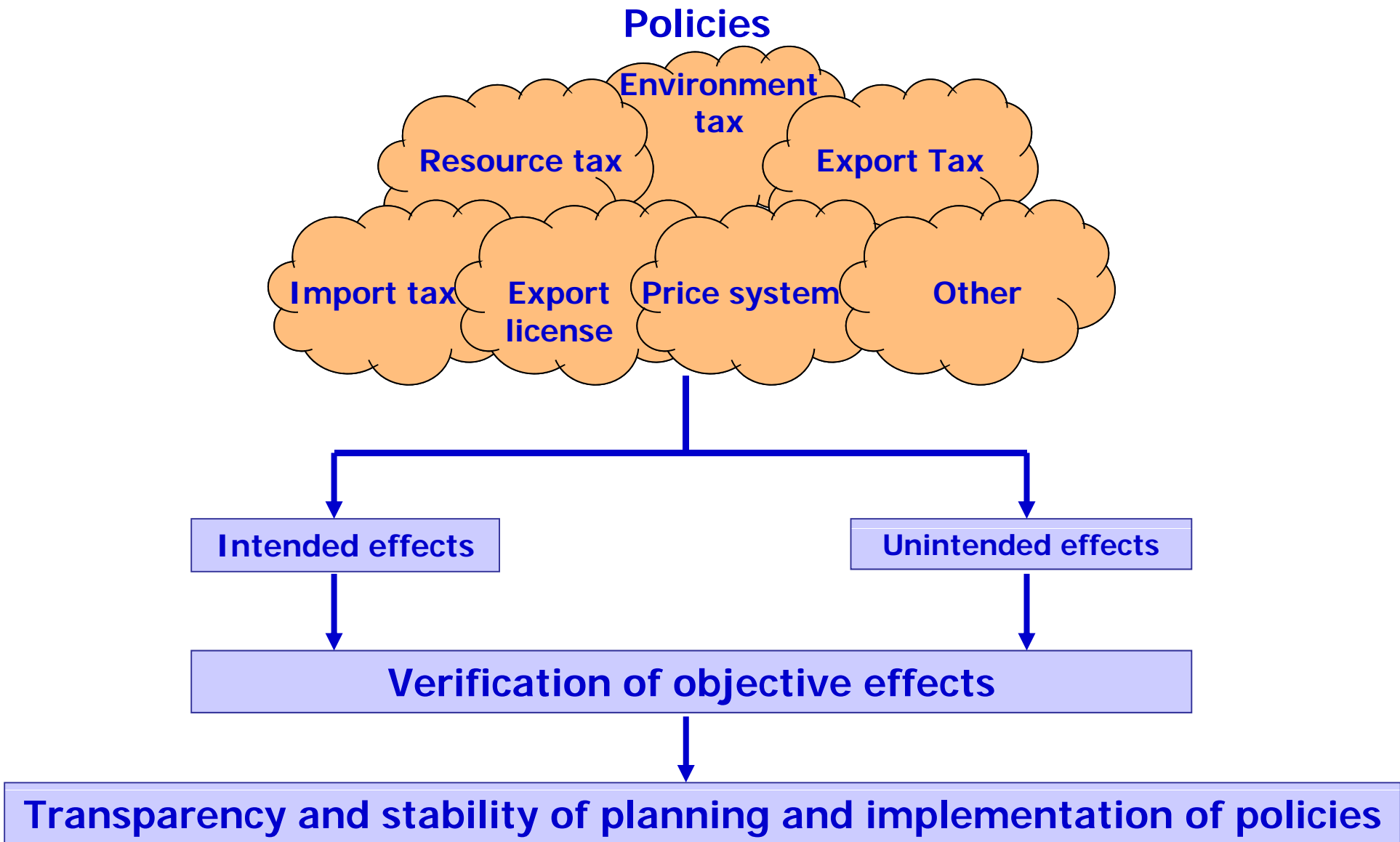


## dissemination cycle

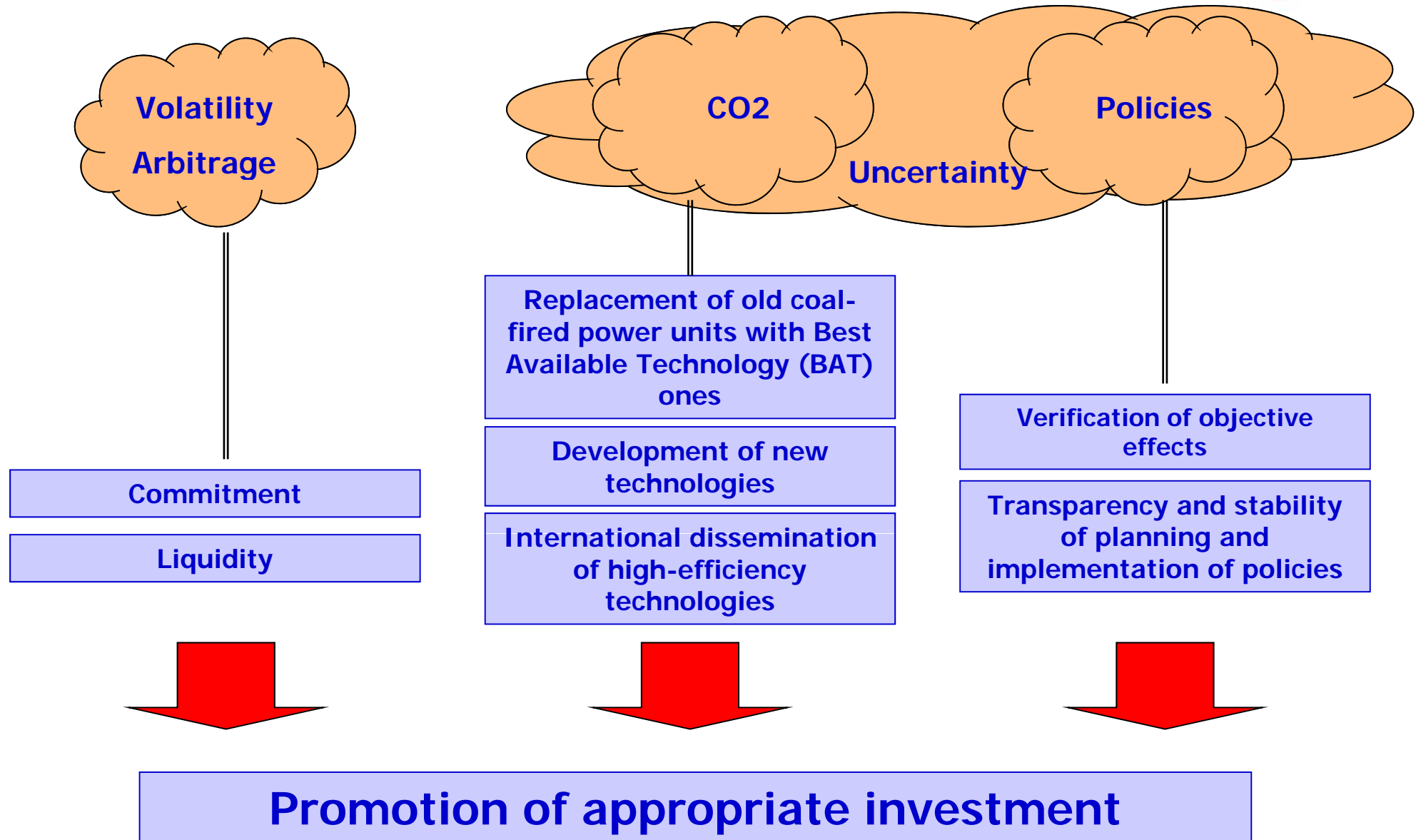




# Uncertainty surrounding policies



# Conclusions: for promotion of appropriate investment



**Thank you very much for your attention.**