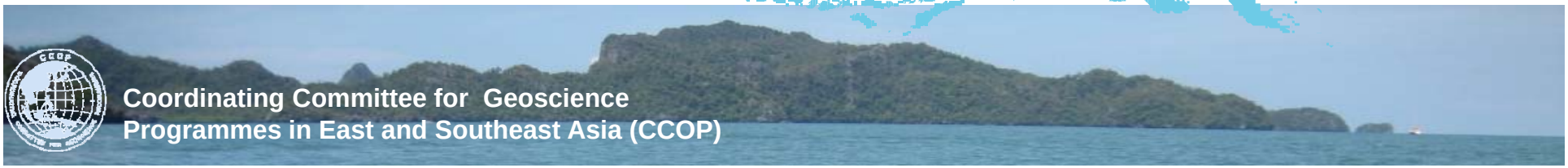
EPPM Launching Seminar,Bangkok, 9-10 October 2008

CCOP Geo-Resources Sector:
OUR PARTNERSHIP WITH THE EARTH

Nguyen Hong Minh,
CCOP Technical Secretariat



Content

- About CCOP
- Sector highlights
  - Mineral programme
  - Groundwater programme
  - Energy programme
- Thoughts for the future

Picture: US Department of Energy

About CCOP

- Coordinating Committee for Geoscience Programmes in East and Southeast Asia
  - Established 1966 under UN ESCAP
  - 1987 became Intergovernmental Organization (UN funding continued)
  - 1991 full IGO
  - Close link maintained with UN through ESCAP

A UN in miniature

Life for NPD staff posted to Thailand centres not only on geology, resource mapping and oil taxation, but also on forging friendship between former enemies - and providing help for self-help.

The project coordinated by NPD geologist Gunnar V Søiland from an office on the 24th floor of the Thai CC Tower in Bangkok is rather unusual in the world of Norwegian development assistance.

While Norway provides most of its aid on bilateral terms, with one donor and one recipient, the Coordinating Committee for Geoscience Programmes in East and South-East Asia (CCOP) is an international organisation with 11 member nations.

The NPD has been assisting this body on behalf of Norad through several programme periods since the early 1990s.

Policy

Mr Søiland is now coordinating a petroleum policy and management (PPM) project, which will run over four years with NOK 19.6 million in funding from Norad.

The principal aim is to build expertise among civil servants so that they can establish good frame conditions and tax systems for petroleum resources in their home countries. This will give each nation a better financial return from their assets while attracting investors and international know-how from the oil industry.

Four petroleum basins at various stages of maturity have been selected by the project to serve as case studies, and the PPM participants must evaluate their resource potential.

In addition, they have to assess development opportunities, calculate the expected return and propose sensible levels of petroleum taxation.

Nine of the CCOP's members are taking part in the NPD-led scheme, with China, Cambodia, Indonesia and the Philippines providing the cases.

The project is pursued through workshops, and uses real data.

Extract from NORWEGIAN PETROLEUM DIARY, No 4/2003

11 Member Countries:

- Cambodia, China, Indonesia, Japan, Malaysia, Papua New Guinea, the Philippines, Republic of Korea, Singapore, Thailand and Vietnam

Supported by:

- 15 Developed Nations (Cooperating Countries)
- 13 International Cooperating Organizations:

  ASCOPE, CIFEG, CPC, EuroGeoSurveys, GETECH, UN-IOC, IOMAC, UN-ESCAP, IUGS, PETRAD, UNEP, UNESCO, WB

CCOP ORGANIZATIONAL CHART

MEMBER COUNTRIES
Cambodia, China, Indonesia, Japan, Korea, Malaysia, Papua New Guinea, Philippines, Singapore, Thailand and Vietnam

COOPERATING COUNTRIES
Australia, Belgium, Canada, Denmark, France, Germany, Japan, Netherlands, Norway, Russian Federation, Sweden, Switzerland, United Kingdom and United States of America

Corresponding Organizations

Cooperating Organizations

STEERING COMMITTEE
Permanent Representatives of Member Countries
Chairperson
Vice-Chairperson
Director

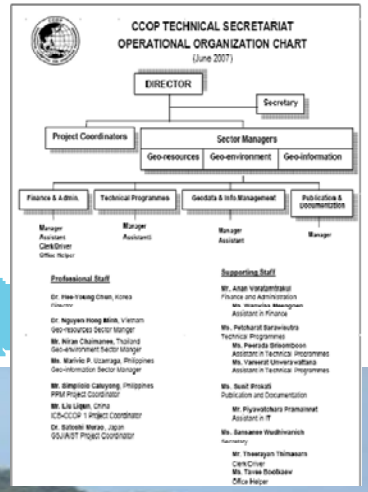
ADVISORY GROUP
Representatives of Cooperating Countries, Cooperating and Corresponding Organizations
Chairperson
Vice-Chairperson
Honorary Advisers

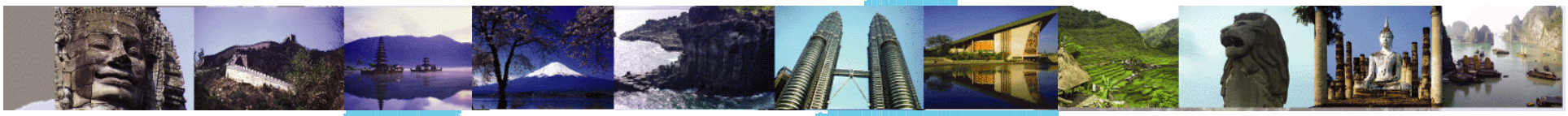
Technical Secretariat

SC Chair: Dato' Yunus Abdul Razak, Director-General, Minerals and Geoscience Department, Malaysia

Technical Secretariat has

Professional staff: 6
Support staff: 10





VISION

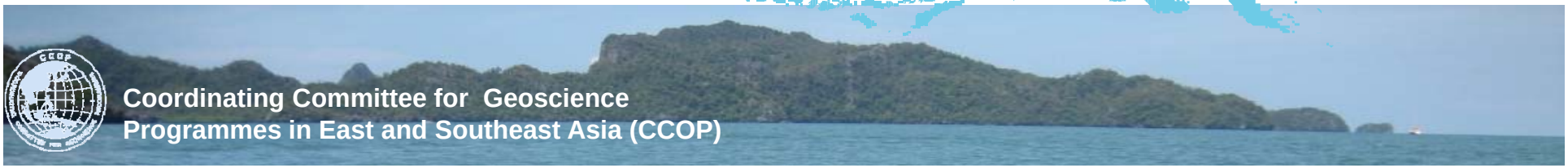
Geoscience for a Sustainable Future

MANDATE

Promote and coordinate
joint applied geoscience programmes for
sustainable development in East and Southeast
Asian countries

Strategic focus

- **Enhanced coordination** of the geoscience programmes of the national geoscientific institutions of the CCOP Member Countries in order to promote cooperation and to maximise the benefits of programmes of regional significance.
- **Continued human resource development and institutional capacity building** in accord with national priorities in order to achieve greater regional self-sufficiency in providing the geoscience inputs to sustainable economic development, sound environmental management and improvement of the welfare of the people of the region.
- **A greater flow of technical information** between the Member Countries, Cooperating Countries and Cooperating Organizations of CCOP in order to share such information for their mutual benefit, to learn from each others experience and to identify further opportunities for cooperation in capacity building.



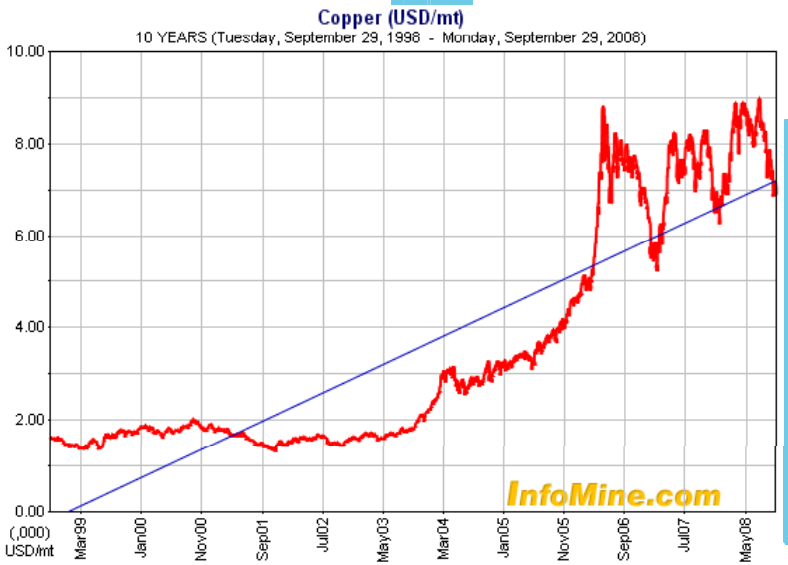
Sectors & Programmes

SECTORS						
GEO-RESOURCES			GEO-ENVIRONMENT			GEO-INFORMATION
PROGRAMMES						
MINERAL	ENERGY	GROUNDWATER	COASTAL ZONE	GEOHAZARD	ENVIRONMENTAL GEOLOGY	GEO-DATA & INFORMATIN MANAGEMENT

Overall objective of the Sector

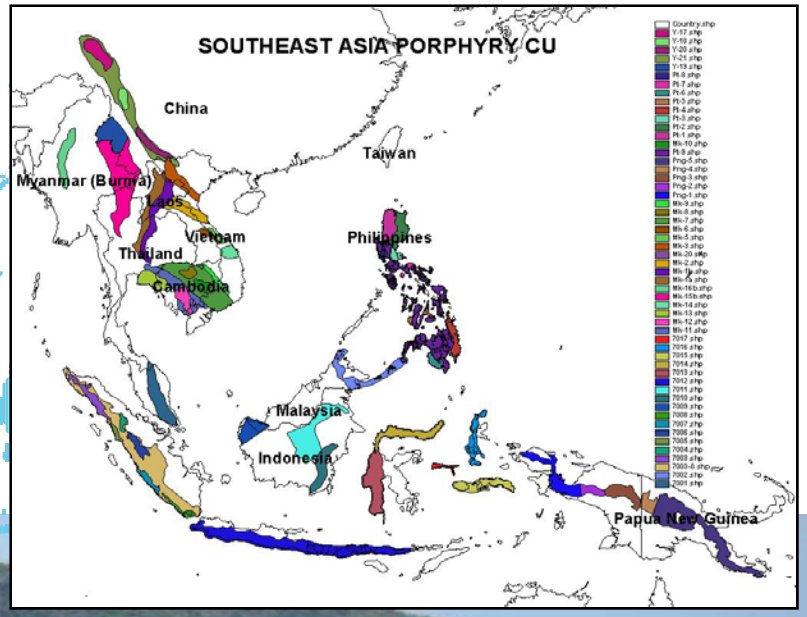
- “to strengthen the Member Countries technical capabilities in establishing the developmental potential of their mineral, energy and groundwater resources and promoting their socially responsible and environmentally sustainable exploration, conservation and development”

Mineral programme

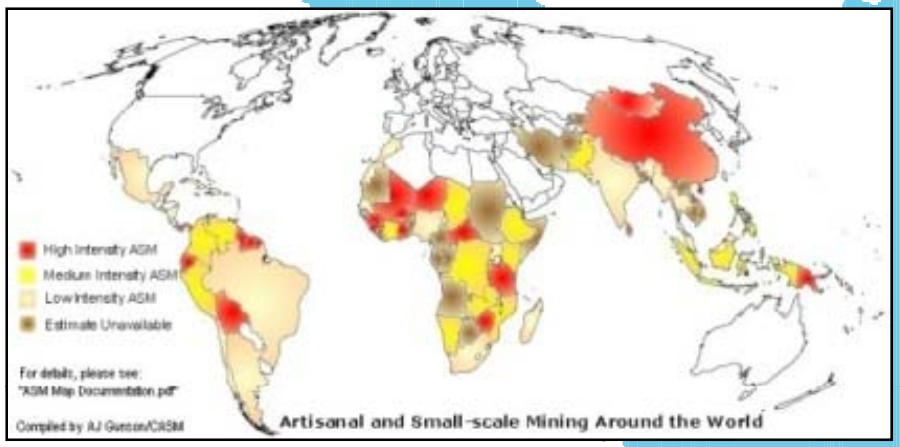


Global Mineral Resources Assessment Project (GMRAP)

- USGS's global exercise to assess identified and undiscovered non-fuel mineral resources
- 3 workshops conducted for CCOP Member Countries, in 2003, 2004 & 2005
- assessment for porphyry and sediment hosted copper completed and draft final report prepared
- publication of report including NE and SEA planned



Mineral programme (cont.)



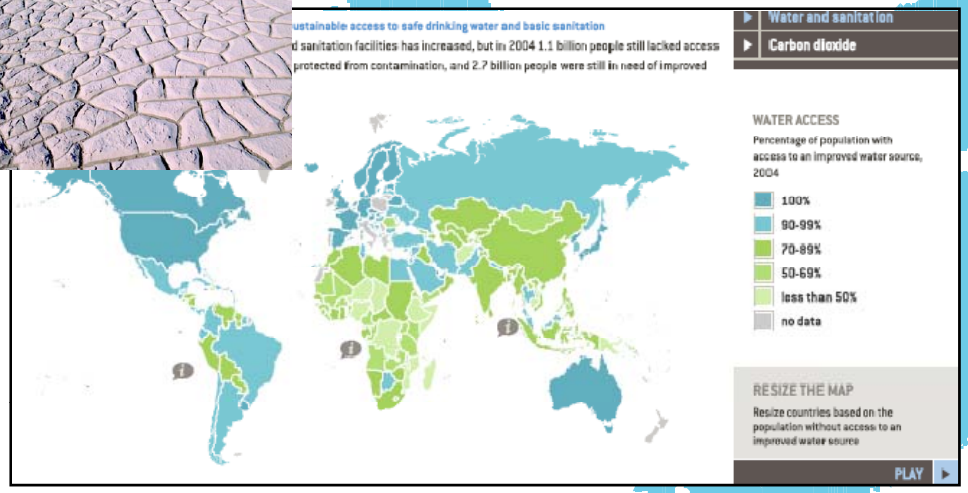
Intensity of ASM around the world (www.artisanalmining.com)

- 13-20 million people in some 50 countries with a further 100 million people depend on ASM
- CCOP: around 6 millions of these total number of ASM workers
- Challenges of MDGs: health, environment, gender, education, child labor, and poverty eradication

Community and Small Scale Mining (CASM-Asia)

- Supported by WB in cooperation with GSJ
- Functions as hub for ASM activities, build network and bridge gap of ASM's and stakeholders, communities, science & technologies
- Two workshops: Artisanal/Small-Scale Mining Social Issues workshop, 16-18 Aug 2006; Hanoi, Vietnam, and Workshop on State-of-the-Art of Science and Technology to Protect the Environment and People, 27-29 Nov 2006, Bandung, Indonesia

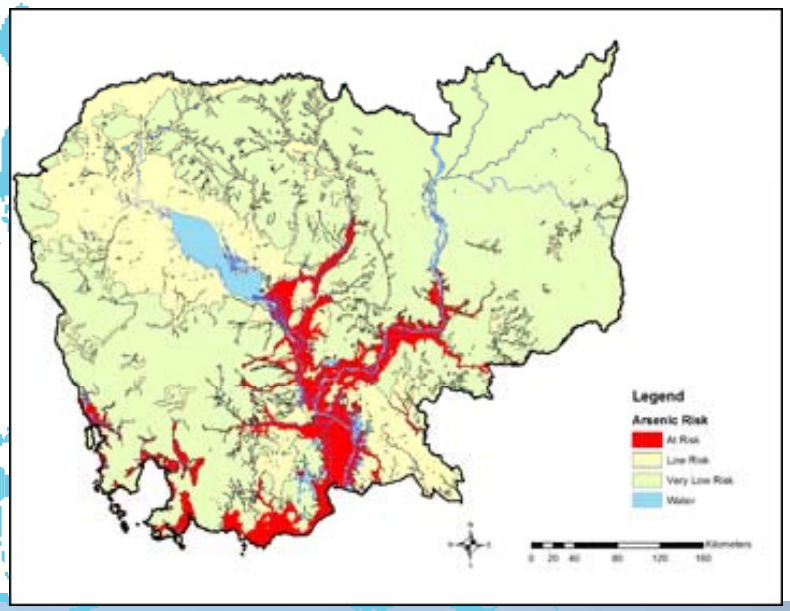
Groundwater Programme



Access to an improved water source (Online Atlas of the MDGs, http://devdata.worldbank.org/atlas-mdg/)

- One of the targets of MDGs is to increase sustainable access to safe drinking water.
- There are still around 400 million people in CCOP Member Countries who have no access to an improved water source

- Some 1,000-1,200 million people in Asia are dependent on groundwater
- Both quantity and quality challenges
- Examples: arsenic contamination, groundwater pollution, salt intrusion, over-exploitation, inadequate or the lack of sustainable management etc.



Arsenic risk map of groundwater in Cambodia
Sources: Atlas of Cambodia (Aruna Technology Ltd)

Groundwater Programme (cont.)

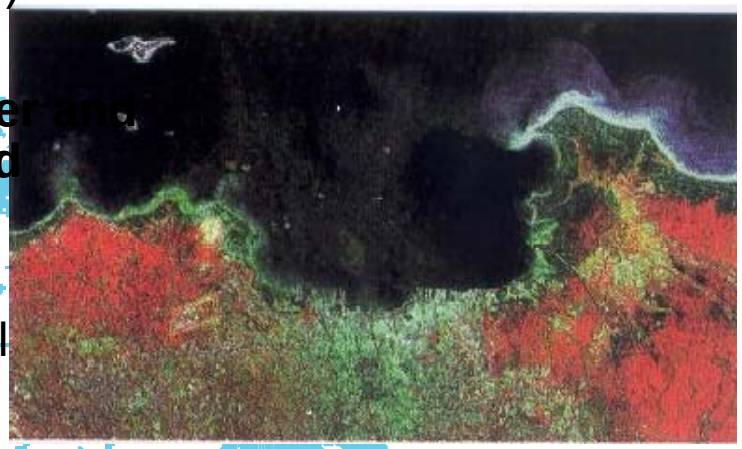
COASTLAN Project (**1995 to 1999)**

- Supported by Nertheland
- Aimed at promoting Integrated Coastal Zone Management (ICZM), particularly the contribution of Geosciences to ICZM
- Seminars and case study of Jakarta Bay in Indonesia, Yellow River Delta in China and Lae City in Papua New Guinea

Digital Compilation of Geoscientific Maps (DCGM) Phase III Project (1998-2001)

DCGM IV Project – Compilation of Groundwater and Geothermal Resource Database in East and Southeast Asia

- Supported by Japan
- Technology transfer and construction of digital maps/databases



Groundwater Programme (cont.)

Groundwater Assessment and Control in the CCOP Region

- 3-Year project from 2004 supported by GSJ/AIST
- 3 sub-projects
  - GW environment and management in the urban coastal area (led by Japan)
  - GW and land subsidence monitoring (led by China)
  - GW evaluation using monitoring system (led by Korea)
- 3 Training Courses/Workshops in 2005, 2006 and 2007
- Continued with the next phase to be started in January 2009

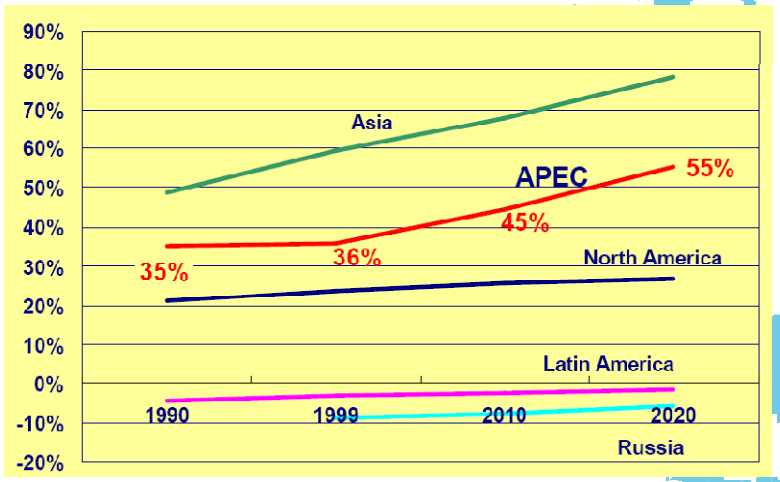
Qingcheng He, 2007

Energy programme

Rising Oil Import Dependency across the Region

	APEC	Northeast Asia	Southeast Asia	North America	Oceania	China
2002	36%	100%	19%	55%	26%	22%
2005	37%	100%	27%	53%	29%	34%
2010	38%	100%	35%	49%	42%	44%
2015	41%	100%	44%	51%	50%	46%
2020	44%	100%	56%	50%	55%	57%
2025	50%	100%	63%	53%	59%	65%
2030	52%	100%	69%	56%	62%	70%

(Source) Asia Pacific Energy Research Centre (2006), "APEC Energy Demand and Supply Outlook"

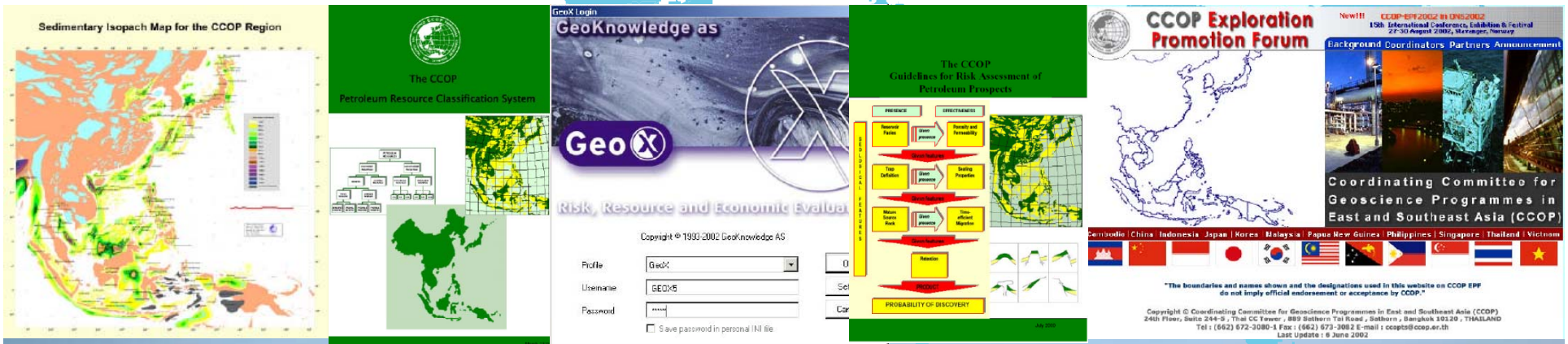


- Higher oil and gas import dependency as economy grows
- Higher oil and gas prices
- Need more and diversified sources of energy
- More energy produced more CO2 emissions: CDM, CO2 capture and storage
- Need in expertise and experience sharing, capacity building, human resources development

Energy programme (cont.)

Outstanding recent projects/activities:

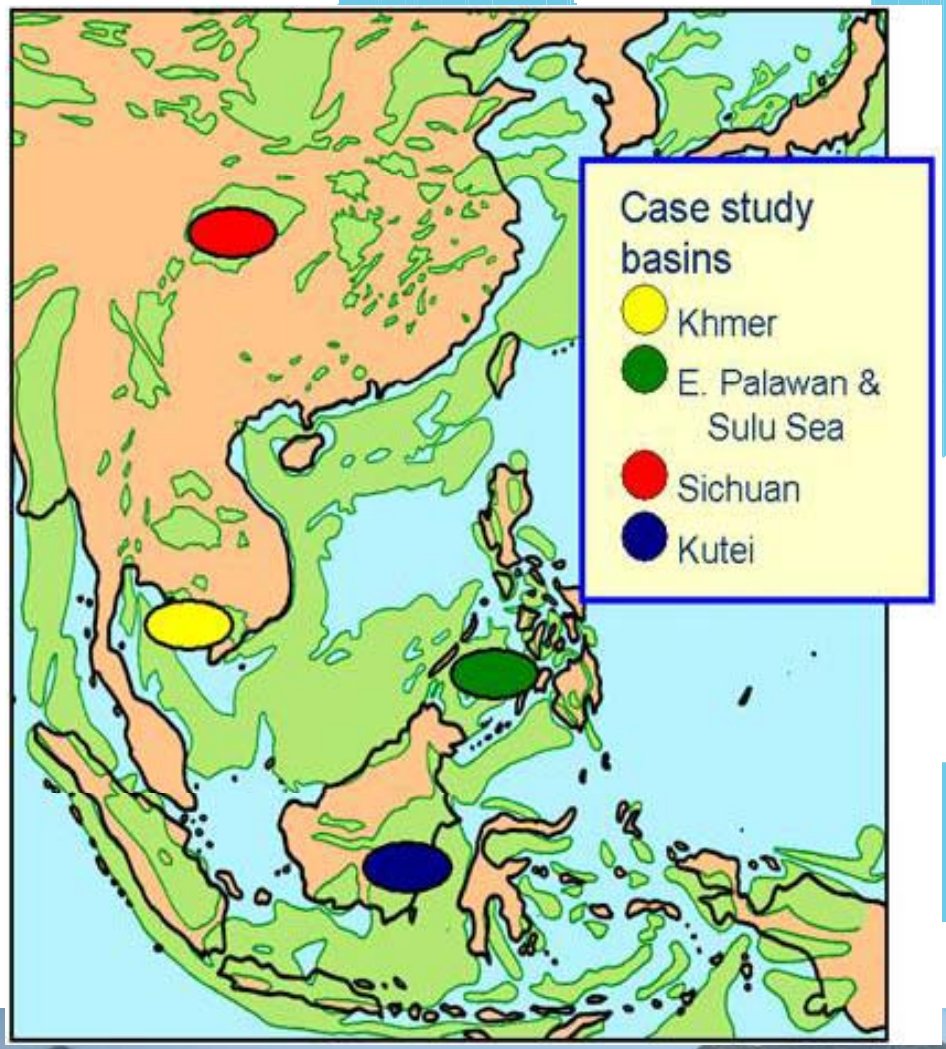
- 1987 - present: CCOP-PETRAD Seminars
- 1992-1994: Oil and Gas Resources Management (OGRM)
- 1995-1999: Resource Evaluation and Planning (REP-I and REP II)
- 2002-2006: Petroleum Policy Management Project (PPM)
- 2003-2007: Institutional Capacity Building Project (ICB-CCOP1)
- 2008-2012: Enhancing Public Petroleum Management Program (EPPM)



CCOP-PETRAD Seminars

- CCOP-EPPM-PETRAD Workshop on Gas Hydrates Awareness, 3-6 June 2008, Hanoi, Vietnam
- PETRONAS-PETRAD Visit to Petronas University and Research Centre, 14-15 January, Bengi and Ipoh, Malaysia
- PETRONAS-PETRAD Stragetic E&P R&D Forum,16-18 January, Kota Kinabalu, Malaysia
- PETROVIETNAM-PETRAD-CCOP Seminar on Enhanced Oil and Gas Recovery, 3-5 March, Vung Tau, Vietnam
- BPMIGAS-NORAD-PETRAD-INTSOK-CCOP Seminar on Mature Field Rejuvenation, 31 March-2 April, Bali, Indonesia
- ASCOPE-PETRAD-CCOP Workshop on Regional Guidelines for Decommissioning and Removal of Platforms, 23 April, Denpasar, Indonesia
- ASCOPE-PETRAD-CCOP E&P HSE Operatorship, 23-25 June, Singapore
- CCOP-PETRAD-MLR-CNPC-CGS Seminar on High Pressure& High Temperature (HPHT) Development & Drilling Technology, 24-27 September, Xian, China

PPM: accomplishments



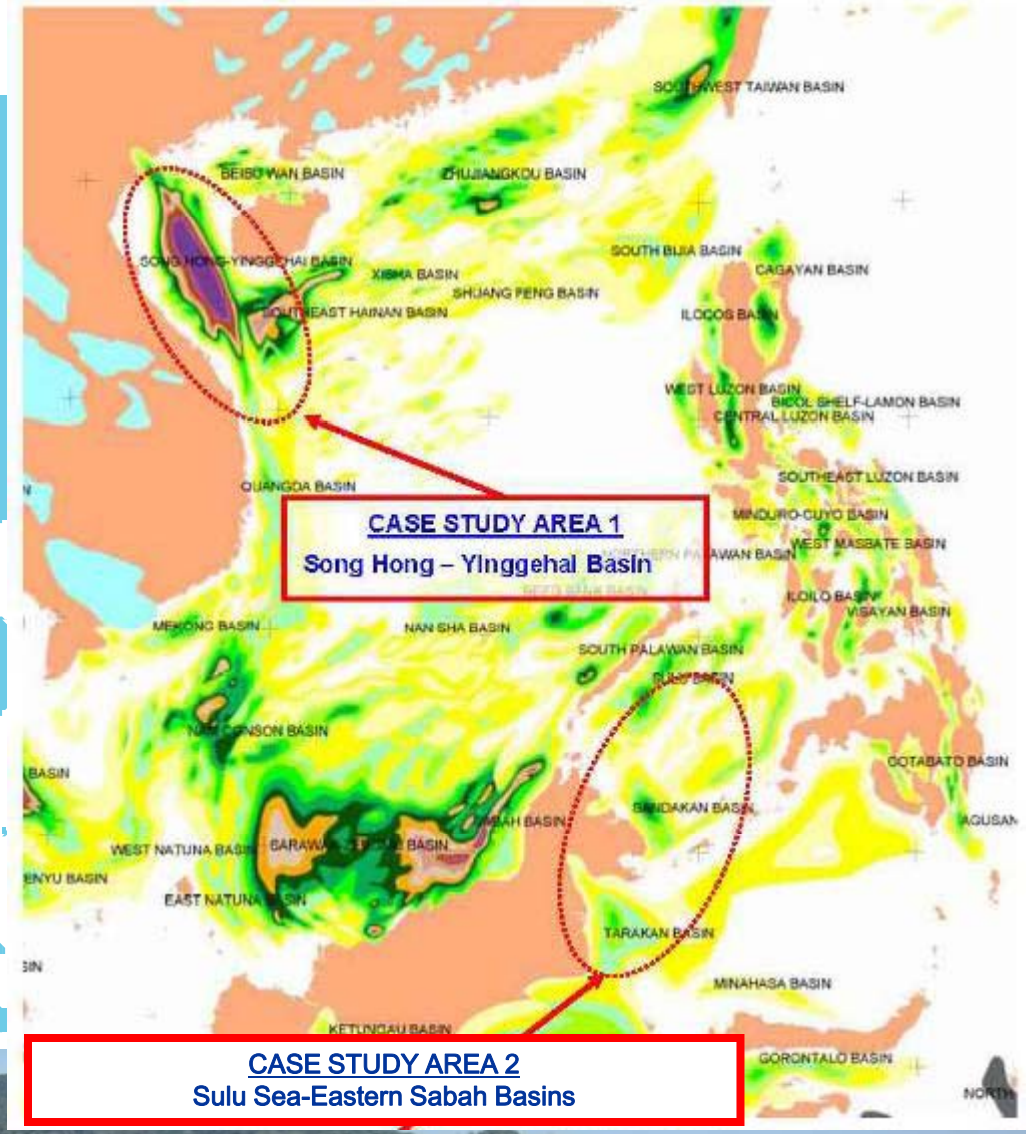
Supported by Norway:

- 4 case studies
- 19 workshops
- 19 expert visits
- 9 seminars
- IT maintenance
- IT equipment and training for Cambodia
- Planning and annual report meetings
- Post-PPM Bridging Activities

ICB-CCOP1: accomplishments

Supported by Denmark:

- 4 working meetings
- 3 Field Study Trips
- 4 Workshops
- 5 IES Basin Modeling Software Licenses
- 5 Postgraduate Grants
- 4 Training Courses + Expert Visits
- 2 Thematic Seminars
- 5 dissemination seminars



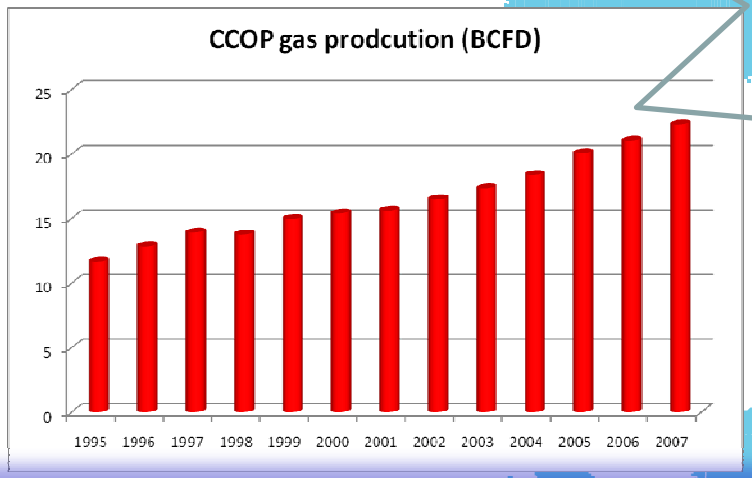
EPPM

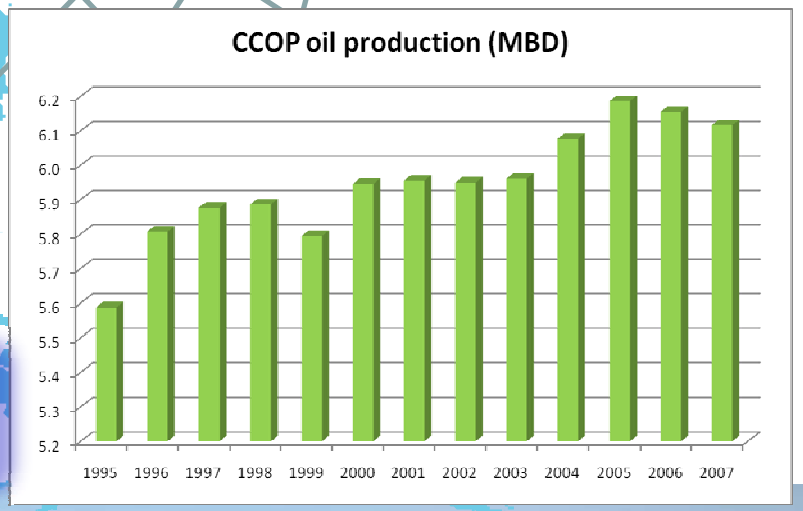
- 4-years programme supported by Norway (7/2008-6/2012)
- Aims to create the highest possible value for society from petroleum resources
- Among others main outputs of the project are expected to be more knowledgeable professionals staff in MCs; improved natural gas database; website for knowledge sharing and preservation; potential oil and gas CDM projects; map of potential reservoir in the CCOP region for CCS

1995-2007: more than USD 6 million of development assistance went to the capacity building activities in petroleum sector of the CCOP Member Countries

(For comparison: CCOP MCs received 6 billion of ODA in 2006, according to UNESCAP)

1997-2007: CCOP conducted more than **400** regional seminars/workshops related to geo-resources sector with more than **6,400** participants from CCOP MCs





1997-2007: CCOP MC's total oil reserves increase 707 mil bbl; gas reserves increase 62 TCF (BP Statistics 2008)

Oil and gas sector development of the CCOP region

- **Fortune Global 500:**
  - SINOPEC (China) had increased its ranking from 53 in 2004 to 16 in 2008;
  - CNPC (China) also moved from 73 to 25;
  - Petronas (Malaysia) from 186 to 95;
  - PTT (Thailand) from 456 to 135, respectively; and
  - CNOOC (China) just enters the list in 2008 at the 409 position.

These CCOP "five sisters" together produce total revenue of 427 billion USD in the last year.

Thoughts for the future

How CCOP Geo-Resources Sector could contribute to the solution of global issues?

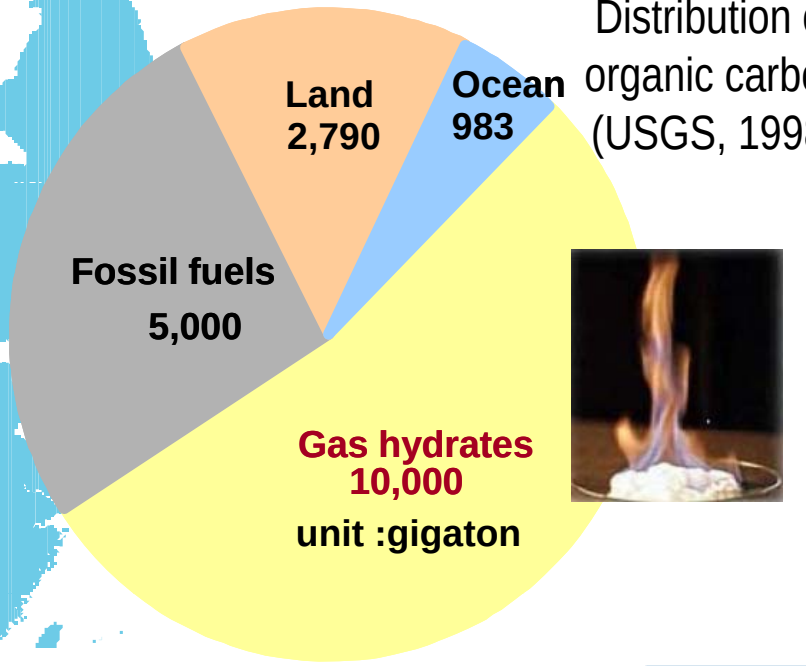
- Energy programme:
  - Gas hydrate
  - CO2 capture and storage
  - Coalbed methane
  - Geothermal

- Other programme but may relate to oil and gas
  - Deep groundwater
  - Deep sea minerals

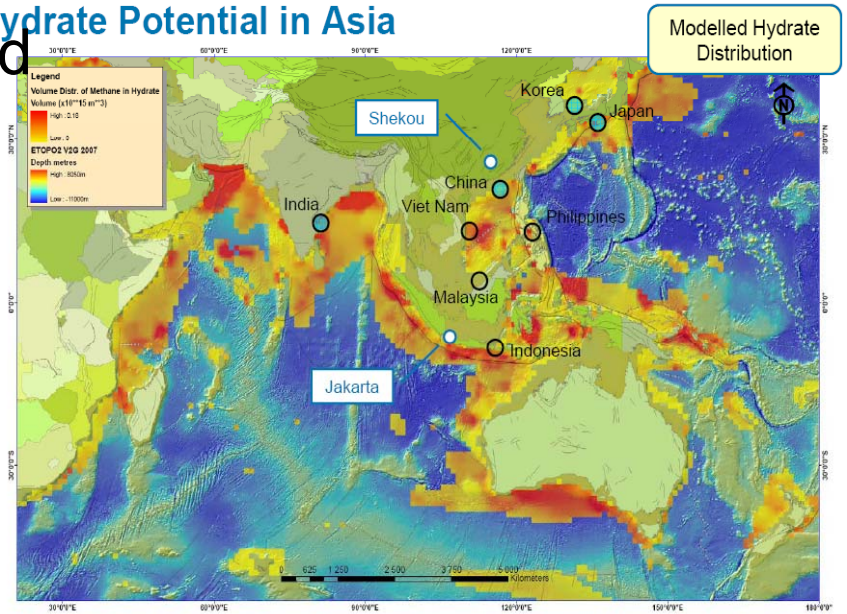
Gas hydrate project

- Project concept approved by SC, including 3 sub-projects:
  - GH exploration
  - GH production
  - Safety and environment issues
- China, Japan, Korea are invited to lead sub-projects; other CC,CO to provide resources speakers
- Seeking for funding
- Thanks to EPPM: 1 WS organized, another is planned)

Distribution of organic carbon (USGS, 1998)



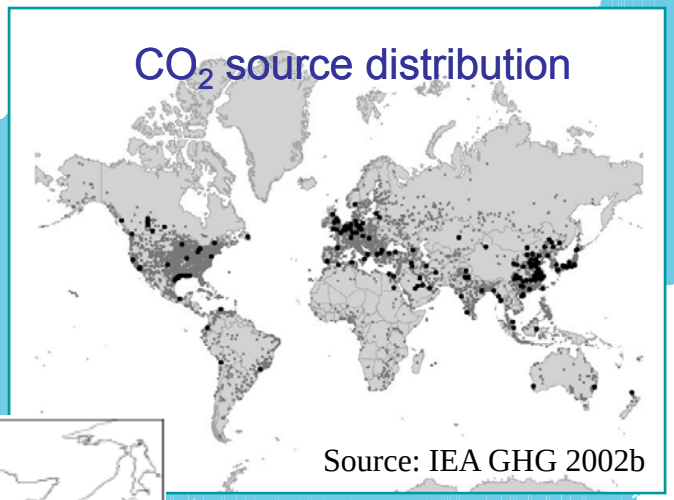
Hydrate Potential in Asia

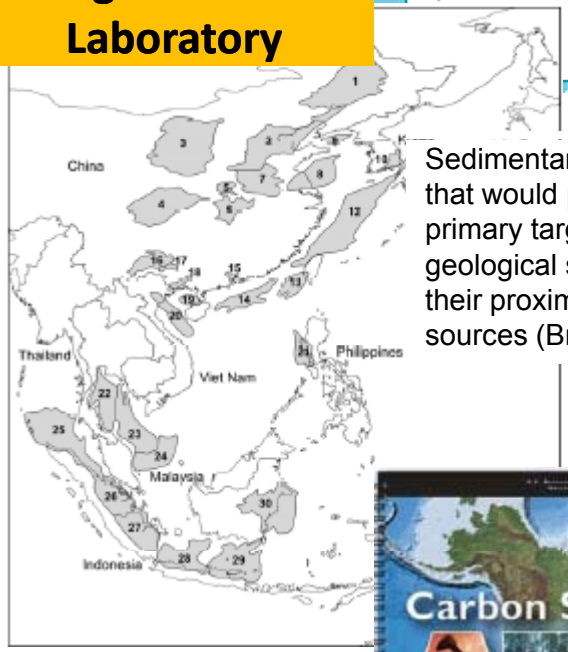


from Klauda and Sandler (2005)

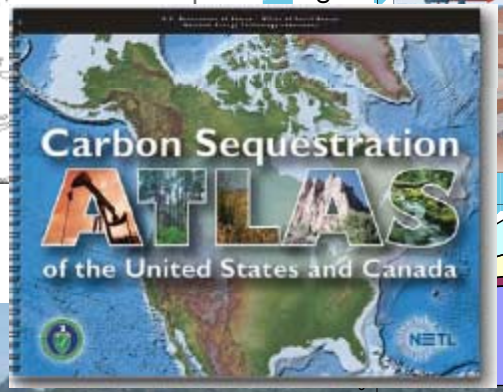
CO2 capture and storage (CCS)

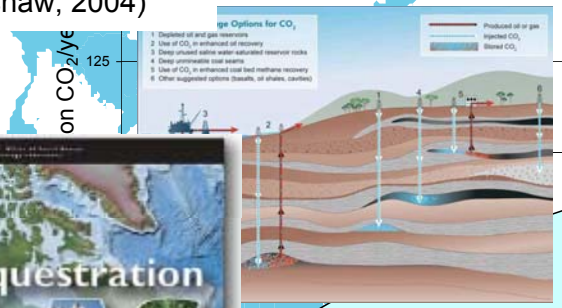
In 2004, CCOP MCs emit 2.1 billion metric ton of C from fossil-fuels (28% of the world), according to Oak Ridge National Laboratory





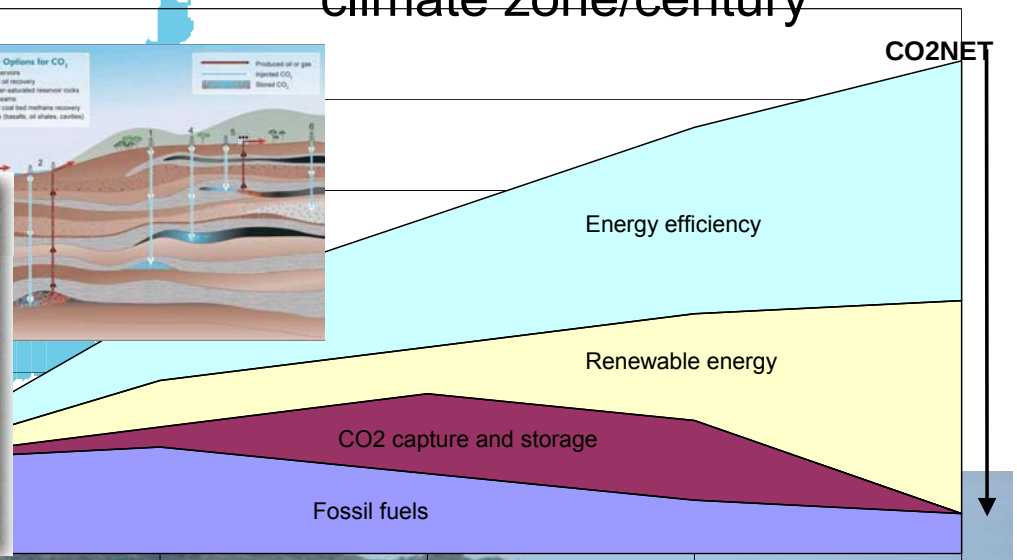
Sedimentary basins in E SEA that would potentially be primary targets for CO2 geological storage based on their proximity to major CO2 sources (Bradshaw, 2004)





Warming rate 1°C / century corresponds to:

- ± 20 cm sea level rise
- ± 100 km shift of climate zone / century
- ± 150 m upward shift alpine climate zone/century



EPPM is addressing this issue ->

Coalbed methane

Talkington, 2002: world CBM estimated reserves **3,000-9,000 TCF?**

CCOP:
13.5% of world coal reserves
43% of world coal production

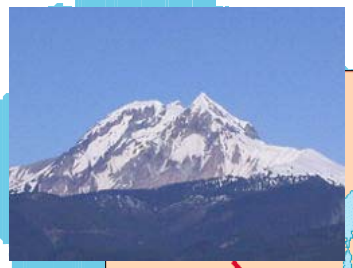
Coalbed Methane is under research and pilot production in China, Japan, Korea, Indonesia, Thailand, and Vietnam

Countries	Coal reserves (Millions T)	CBM Resources /Reserves (TCF)
China	114,500	1000-1200[a]
Indonesia	4,968	450[b]
Korea	1,450[1]	1.3[c]
Japan	359	
Malaysia	1,483[2]	
Philippines	236[3]	
Thailand	1,354	1.5[d]
Vietnam	150	

Sources: **Coal** **1 Park and Koh, 2006**
2 Wan Ramli Wan Daud, 2006
3 EIA, 2006
Remaining: BP Statistics 2007
CBM **a Purnomo, 2006**
b Talkington, 2002
c Park & Koh, 2006
d Wuttipong et al, 2006 (for project areas in Mae Tha and Mae Lamao basins only)

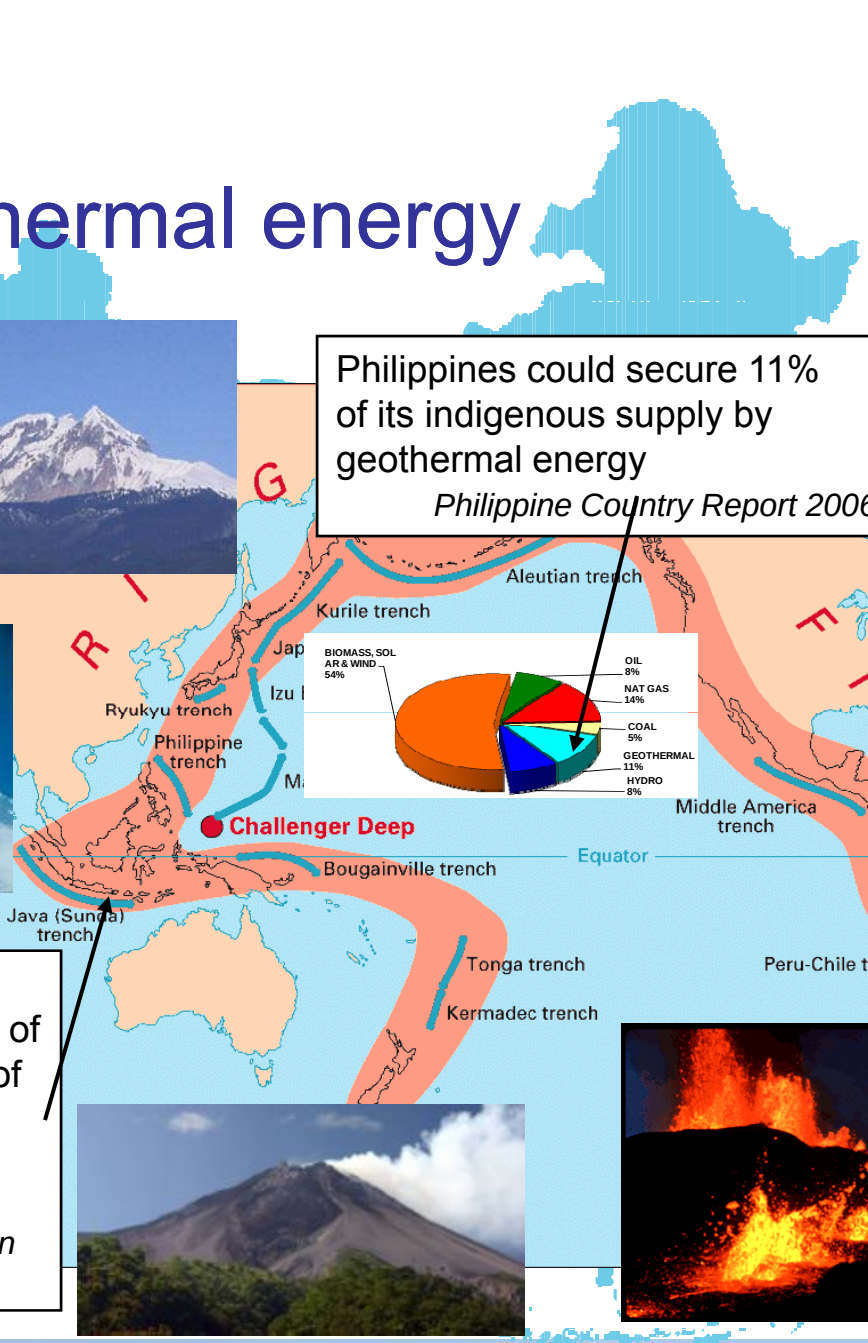
Coalbed methane has important role both as energy resources and concerns for mine safety and reduction of GHG emissions

Geothermal energy



Philippines could secure 11% of its indigenous supply by geothermal energy

Philippine Country Report 2006



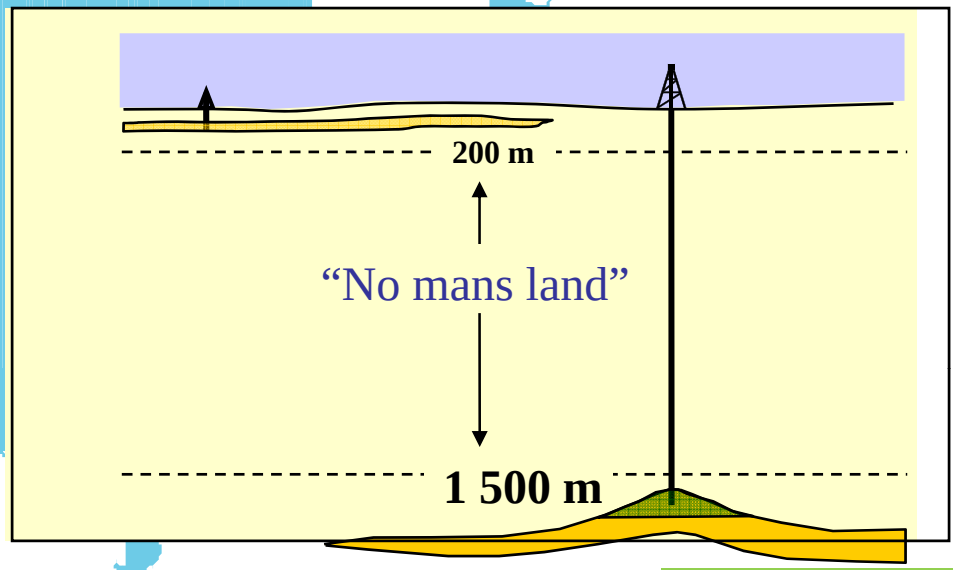
Only Indonesia: a potential of 20,000 MW of electricity - 40 percent of the world's total geothermal reserves

Eric Unmacht, The Christian Science Monitor

http://en.wikipedia.org/wiki/Pacific_Ring_of_Fire

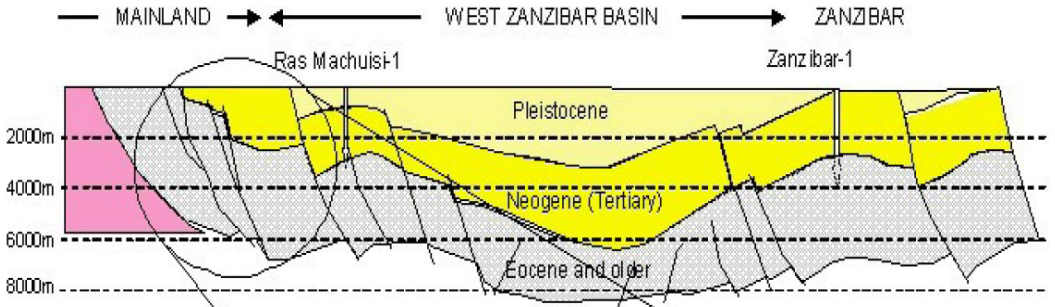
http://pubs.usgs.gov/gip/dynamic/fire.html

Deep groundwater



www.agwa.no

Moderate aquifer containing 500km3 of water if converted into oil equivalent (oil price of 100 USD/bbl, and 0.4 USD worth of energy to produce 1m3 of water), would be an oil field of 2.5 billion bbl reserves (Ruden, 2008)



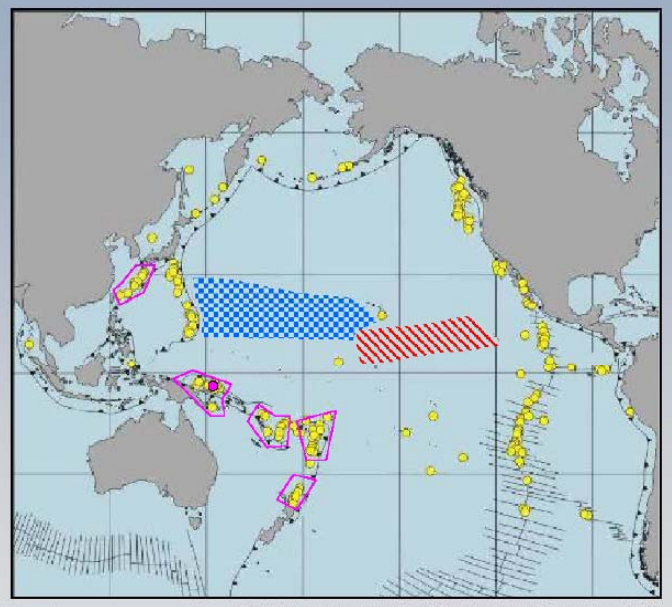
The aquifer down to 1,500 m of around 1,000 km3 of water found in sand deposits near the Zanzibar basin, Tanzania

Deep sea minerals

- Two prospects in the ocean in of SE PNG received attention recently; an epithermal Au and a VMS deposit
- Nautilus Mineral Ltd plans to explore the ocean under Solwara Project
- Germany studies since 1970s; contract with International Seabed Authority to start Mn nodule exploration in July 2006
- Possible issues:
  - Capacity building in exploration, mining
  - Environmental issues
  - Law of the Sea; International Seabed Authority
  - Oil and gas industry offshore technologies may help??

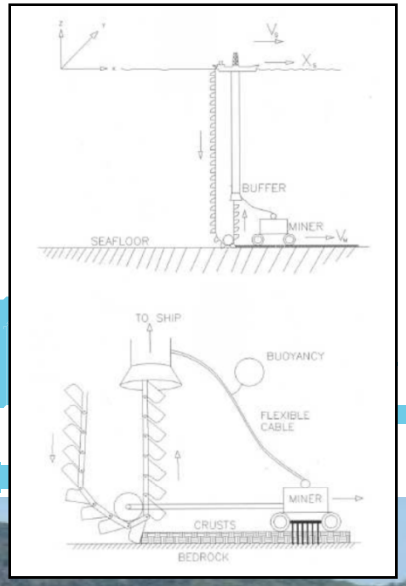
Types:

- **Manganese Nodules** (Clarion-Clipperton Zone)
- **Cobalt-rich Crusts** (big seamounts / old guyots)
- **Massive Sulfides** (W pacific mariginal seas; EEZ)



(Sulfide occurences after Hannington & Monecke, 2006)

Solwara • (gold bearing sulfides)
(production scheduled for 2010)



Kristi Birney et al, 2005

Picture from www.bgr.bund.de

Concluding remarks

Picture: UN Fact Sheet, 9/2007

- The goal of sustainable and environmental-friendly development of geo-resources in CCOP challenges many issues
- In most of these topics, oil and gas industry can play its role by sharing its knowledge, expertise, transfer of technology
- EPPM plans to address GH and CCS issues: thanks to Norwegian Government and the whole EPPM Team
- Comments/inputs/discussions/further collaboration regarding raised issues are welcome

We wish every success to the Enhancing Public Petroleum Management Team and its Partners

….谢谢! 有難うございました! Tusen takk!
Terima Kasih! Salamat Po! ขอบคุณ! Cám ơn!.....

And thank you for attention