復旦大學

The Depth Distribution of Chinese Coal Resource

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Content

Introduction

- China is relatively abundant of coal, at the time-being, the depth of coal exploitation is about 400~500m, (in some special cases, it is 600m).
- Alongside with the increase of depth, exploitation cost, safety, etc. are very serious problems.
- Generally speaking, the coal seams with depth more than 1000~1500m are not suitable for exploitation. Because of the difference of absorb ability of CO_2 and CH_4, injection of CO_2 to replace CH_4 is a win-win strategy.
- From aspect of CO_2 sequestration, detailed survey, study and analysis of the deep unminable coal seams will be of significant importance.

Chinese Coal Resource

Total Resource Amount
5569.7 billion tons

Reserves Proved up
1017.6 billion tons

Possessed Reserves

1003.2 billion tons

Exploitable Reserves
114.5 billion tons

Forecasted Resource

4552.1 billion tons

The Depth Distribution of Chinese Coal Resource

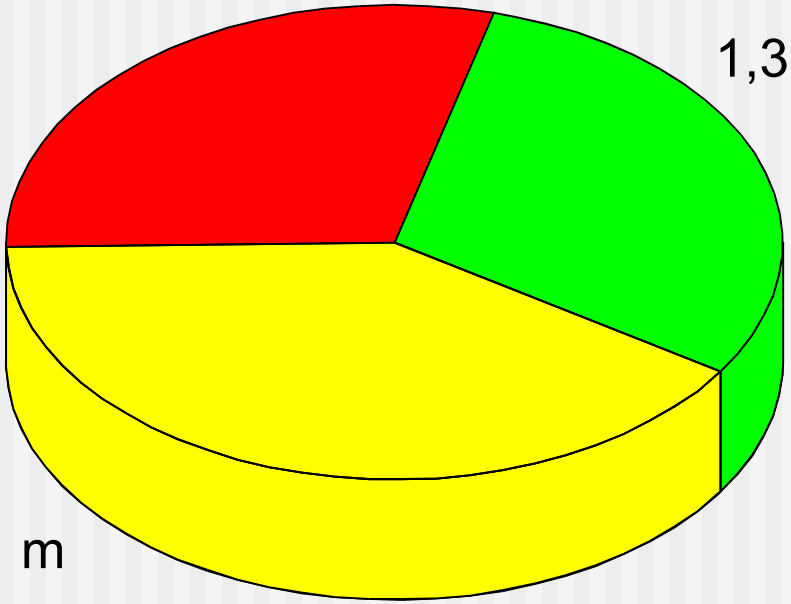
Depth 1000 -1500 m

1,340.38

Billion Tons

Depth 1500 -2000 m

1,367.68 **Billion Tons**



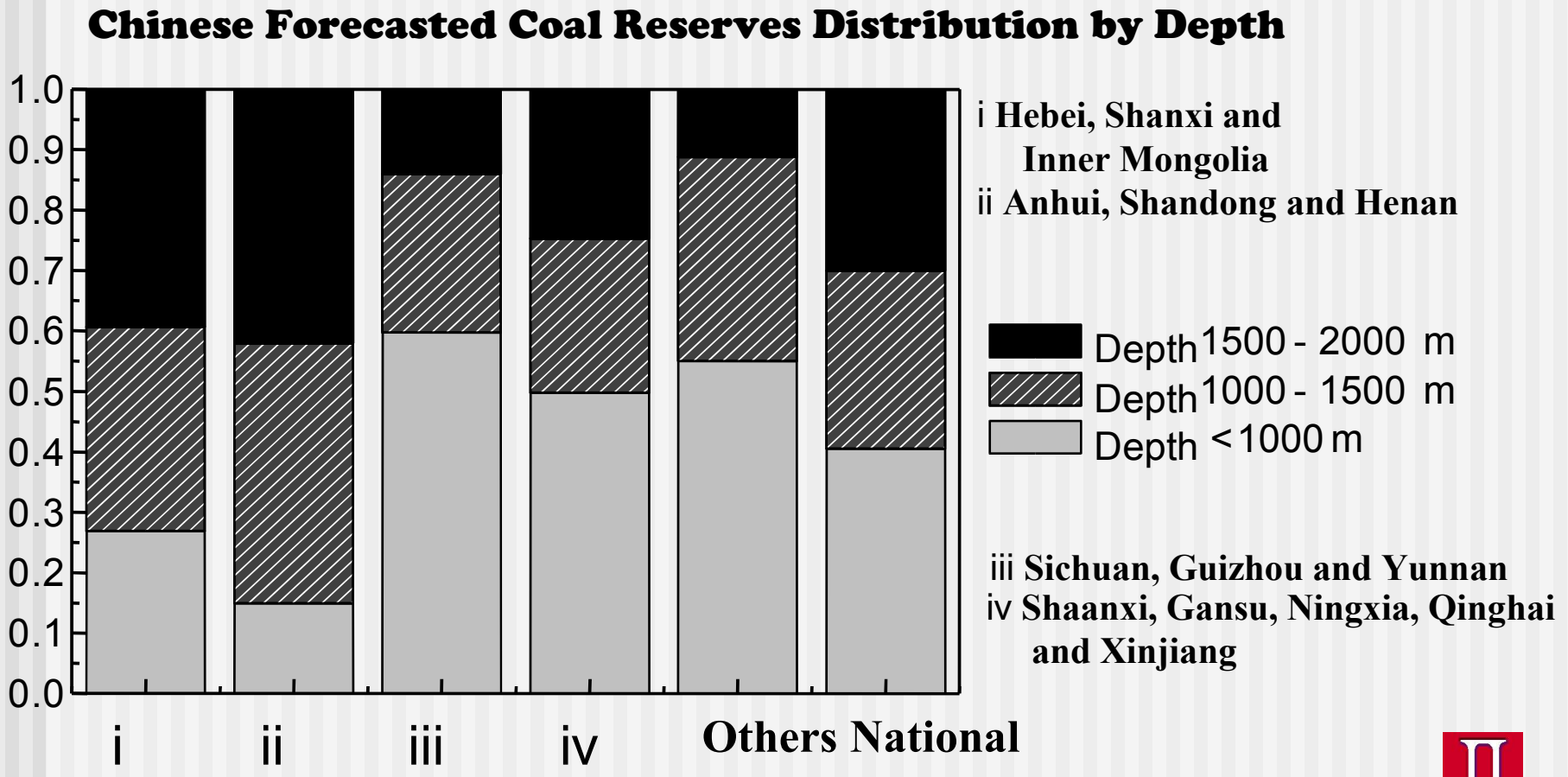
Depth < 1000 m

1,844.05 **Billion Tons**

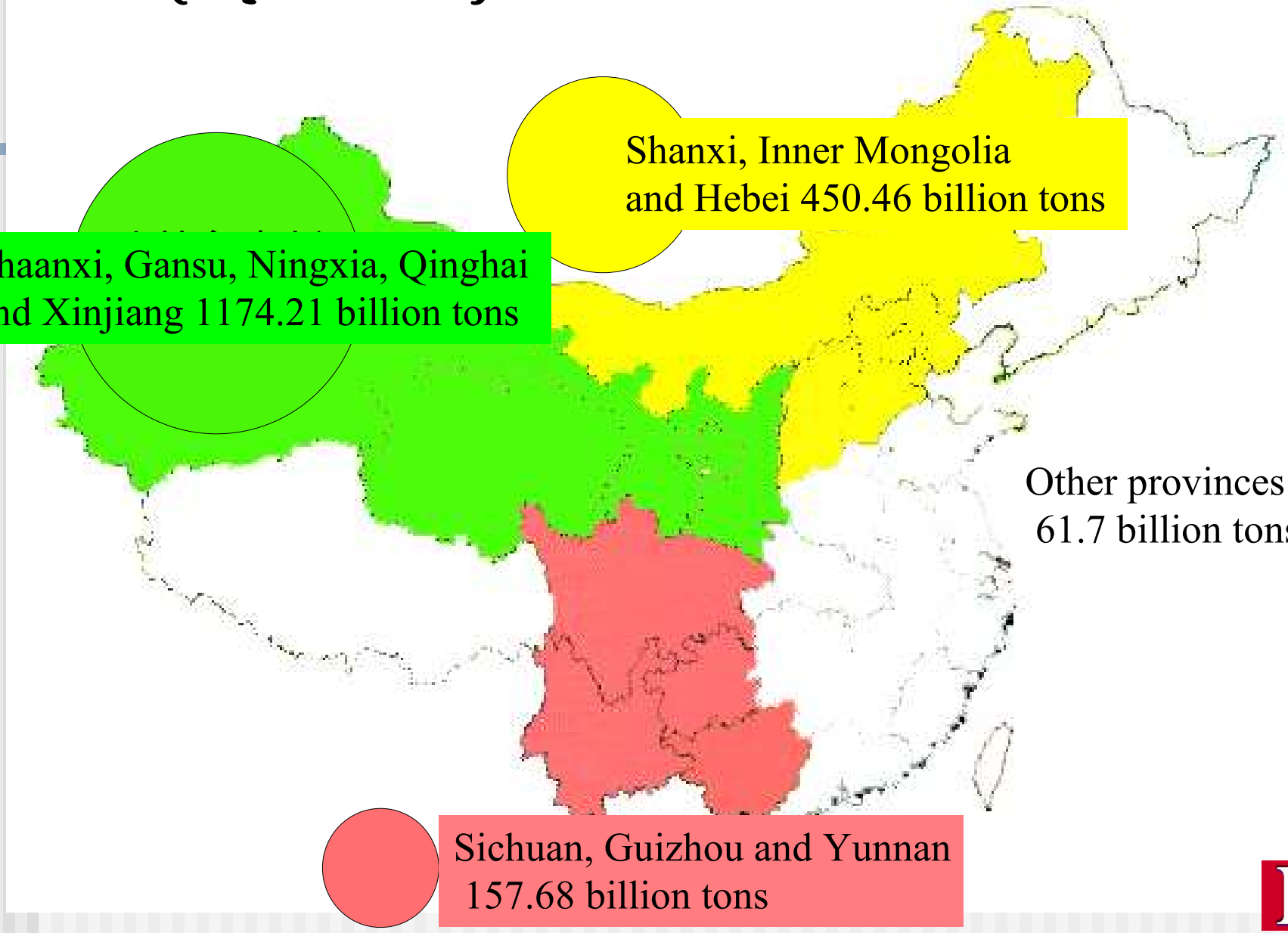
Chinese Forecasted Coal Reserves Distribution by Depth(4,552.1Billion Tons)

Chinese Forecasted Coal Reserves

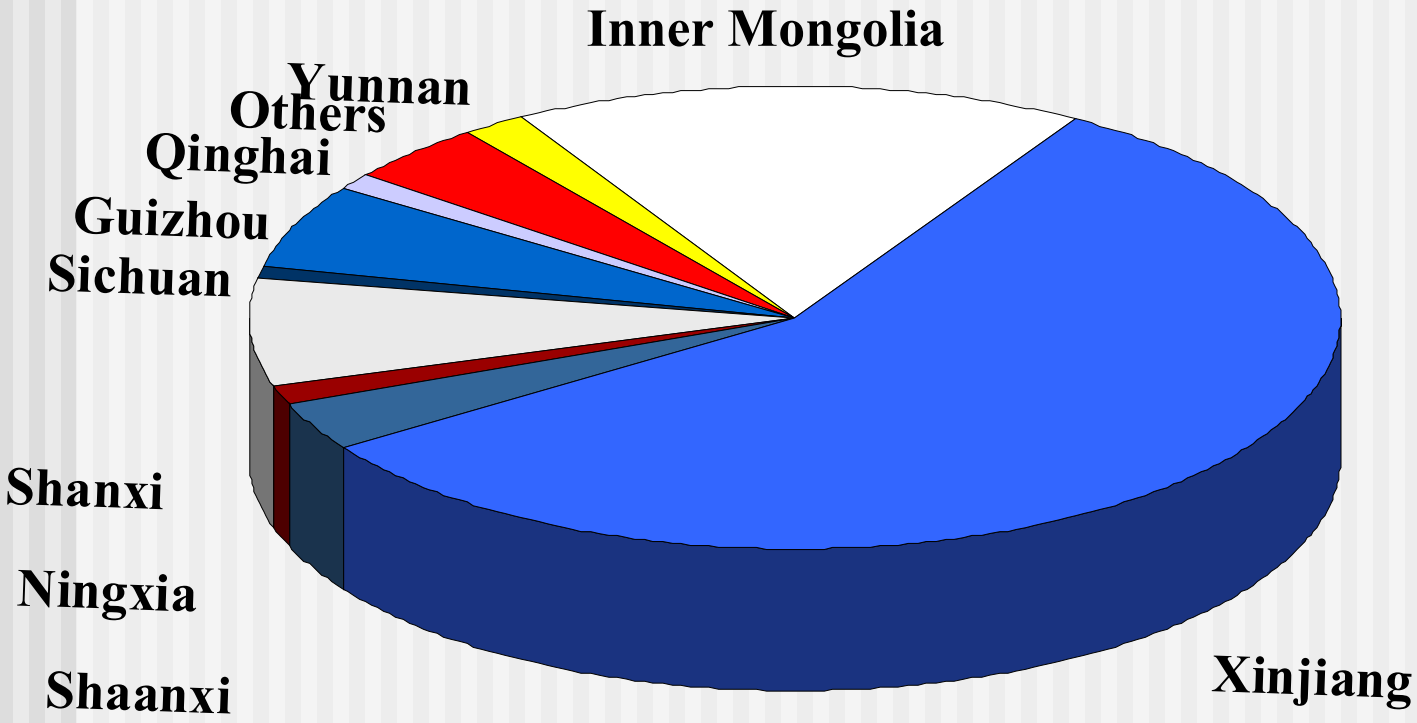
Chinese Forecasted Coal Reserves Distribution by Depth



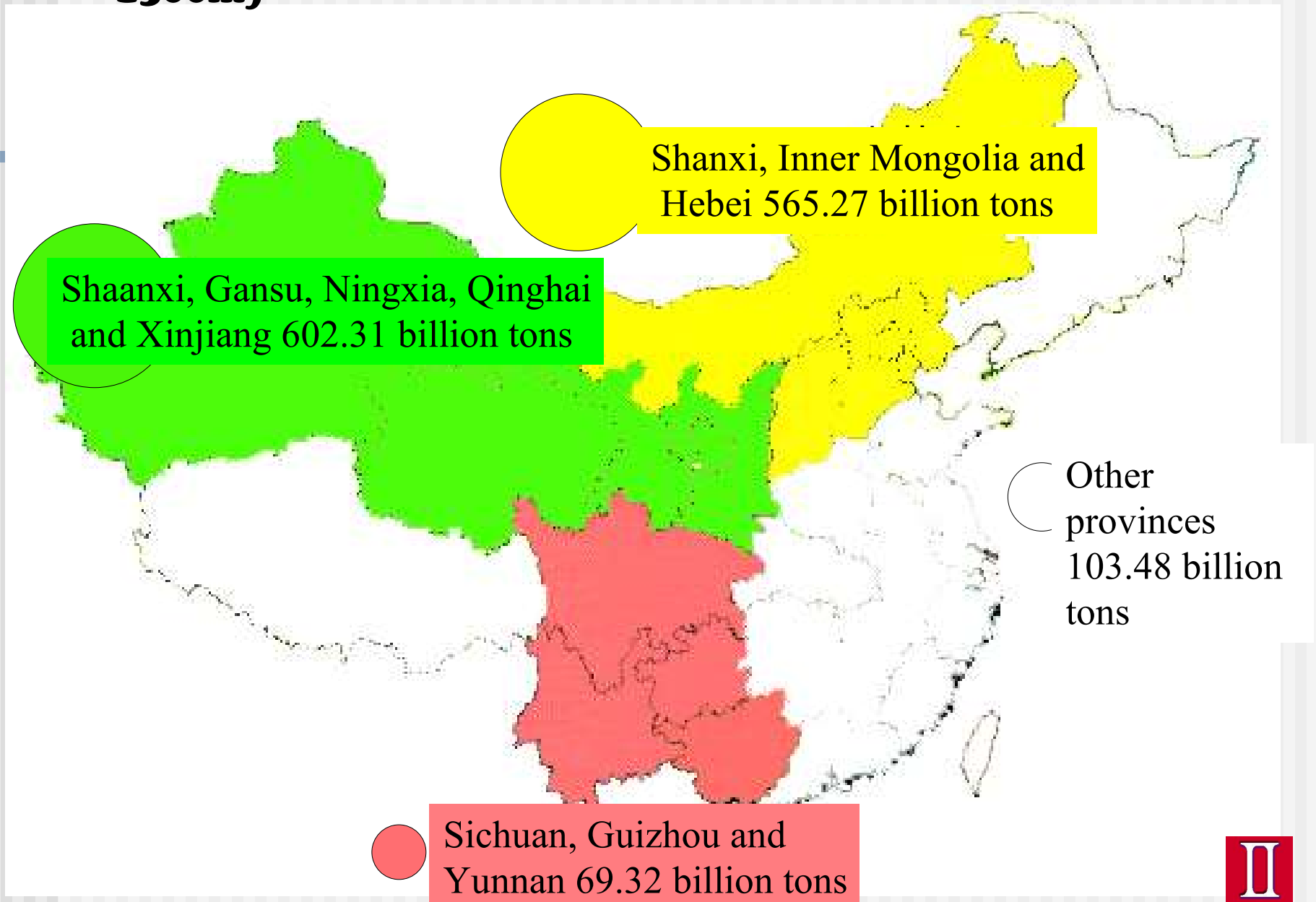
Chinese Forecasted Coal Reserves (Depth<1000m)



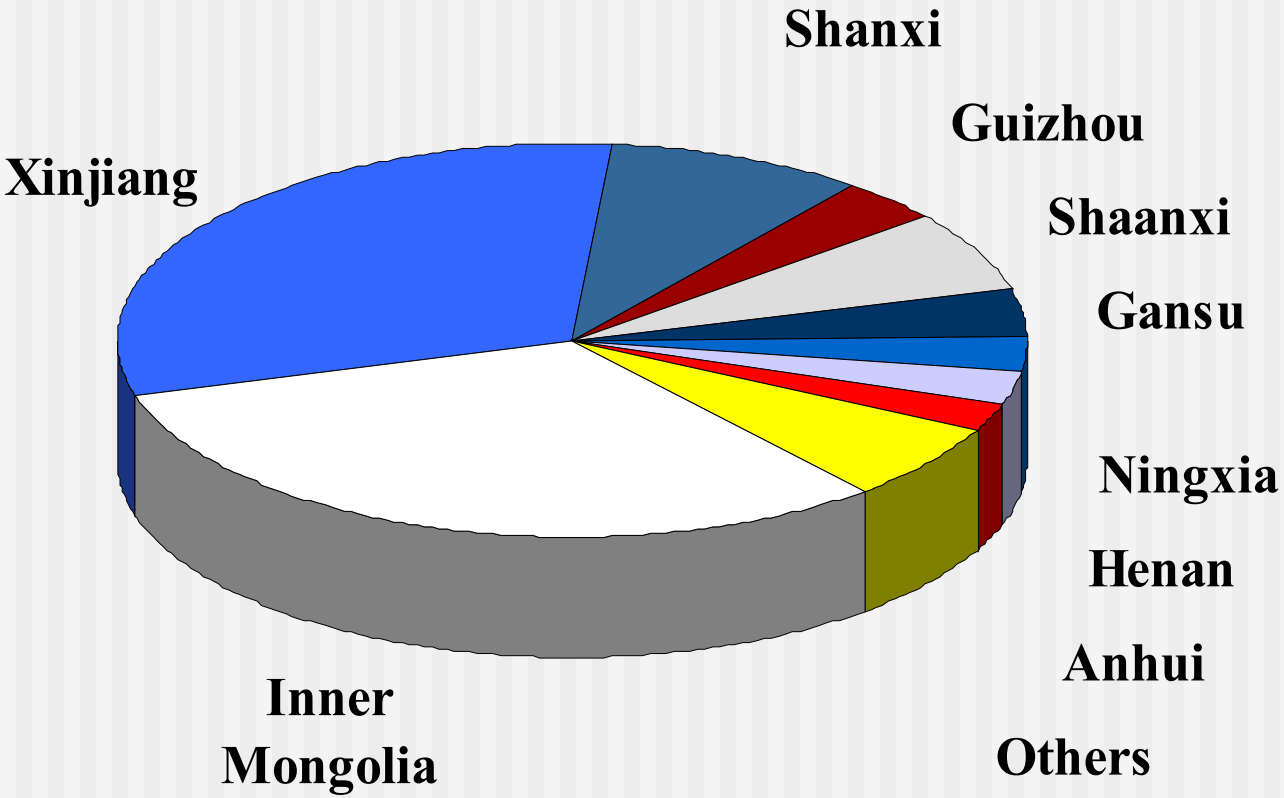
Chinese Forecasted Coal Reserves (Depth within 1000m)



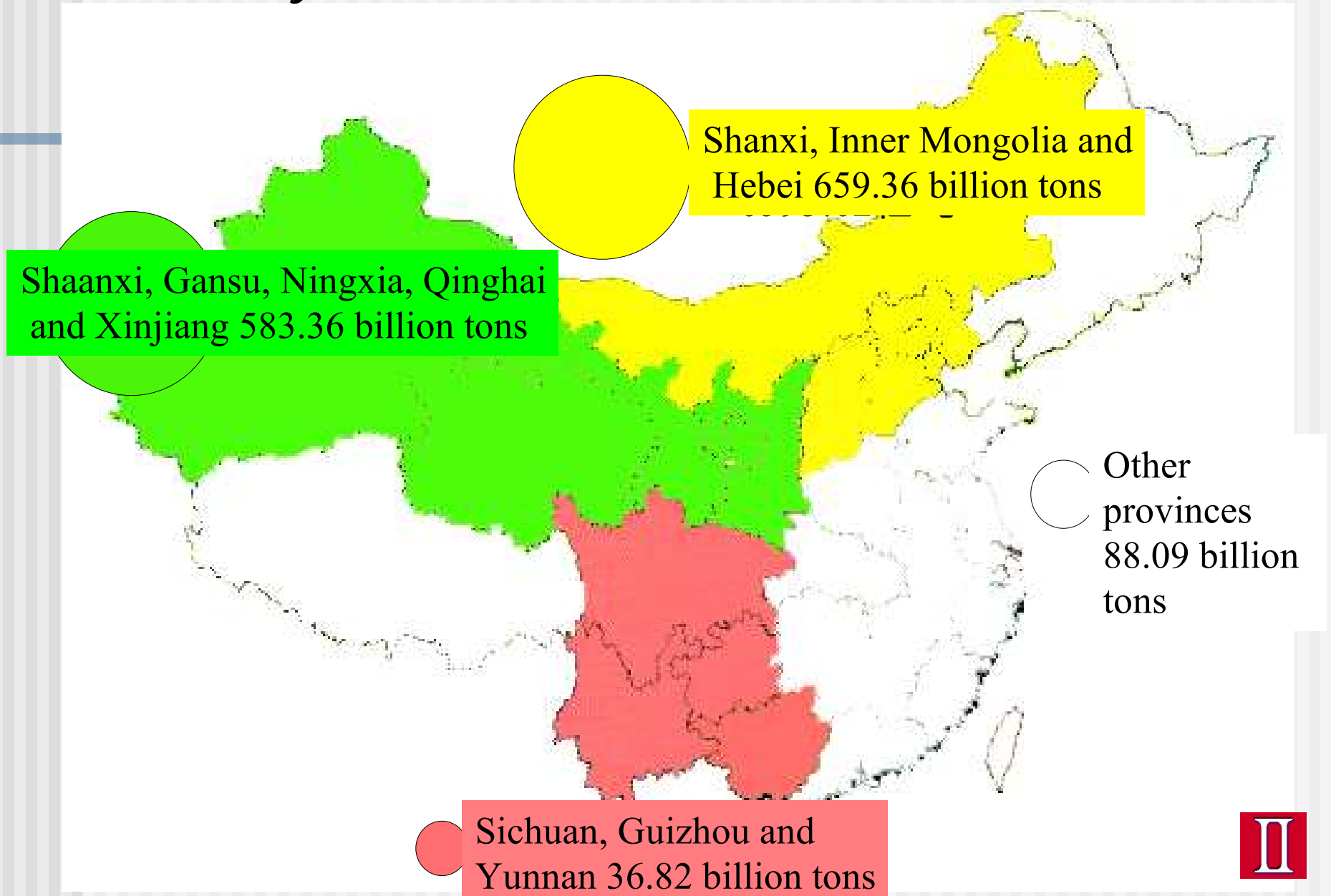
Chinese Forecasted Coal Reserves (Depth:1000-1500m)



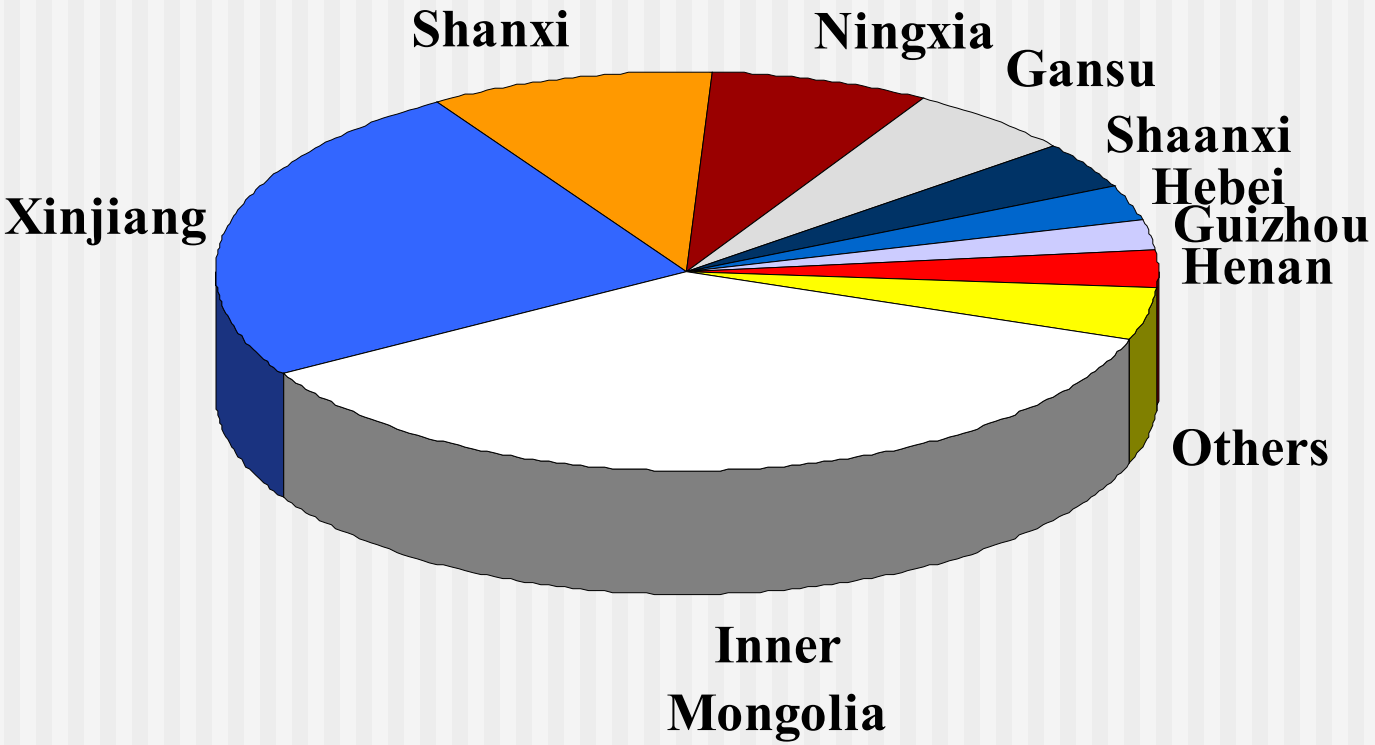
Chinese Forecasted Coal Reserves (Depth 1000 - 1500m)



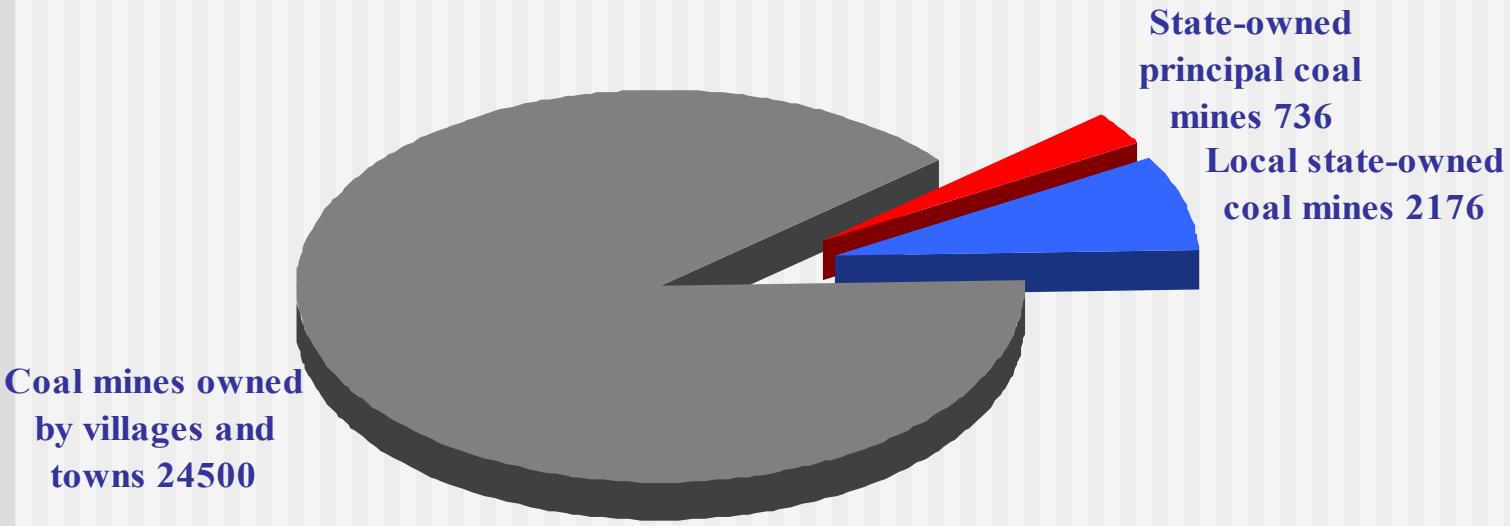
Chinese Forecasted Coal Reserves (Depth:1500-2000m)



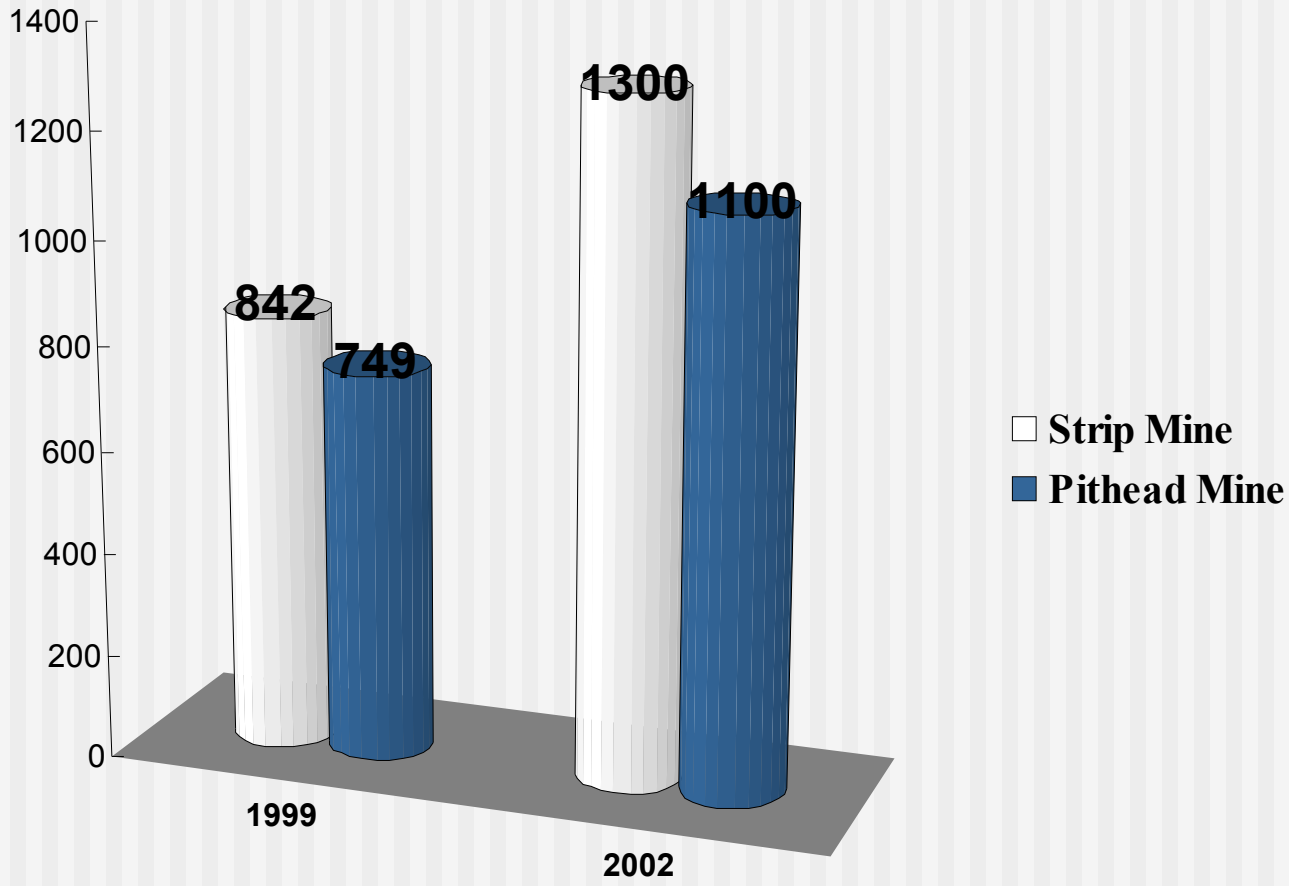
Chinese Forecasted Coal Reserves (Depth 1500-2000m)



Number of Chinese Coal Mines

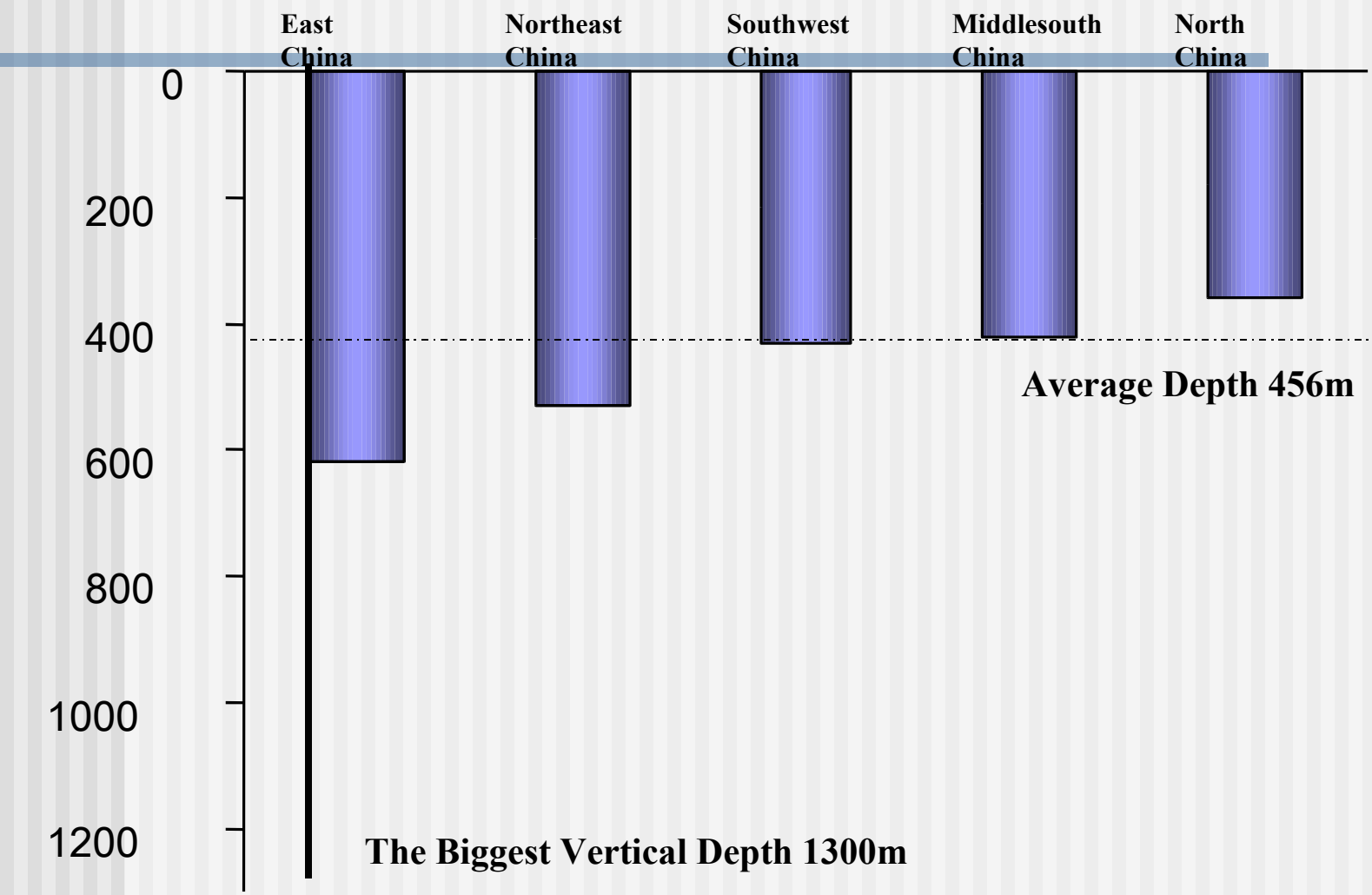


Number of American Strip Mines and Pithead Mines

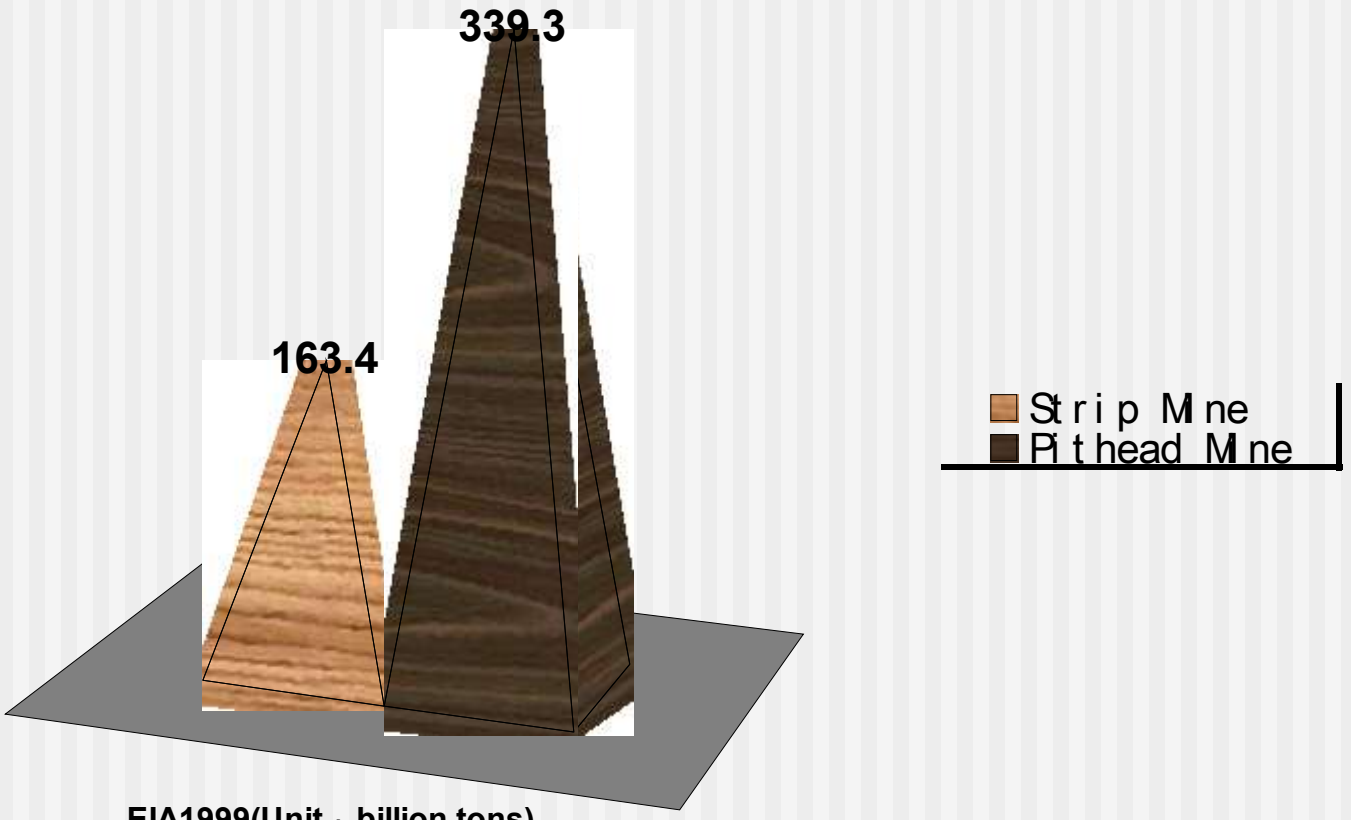


IV

Chinese Coal Mine Exploration Depth

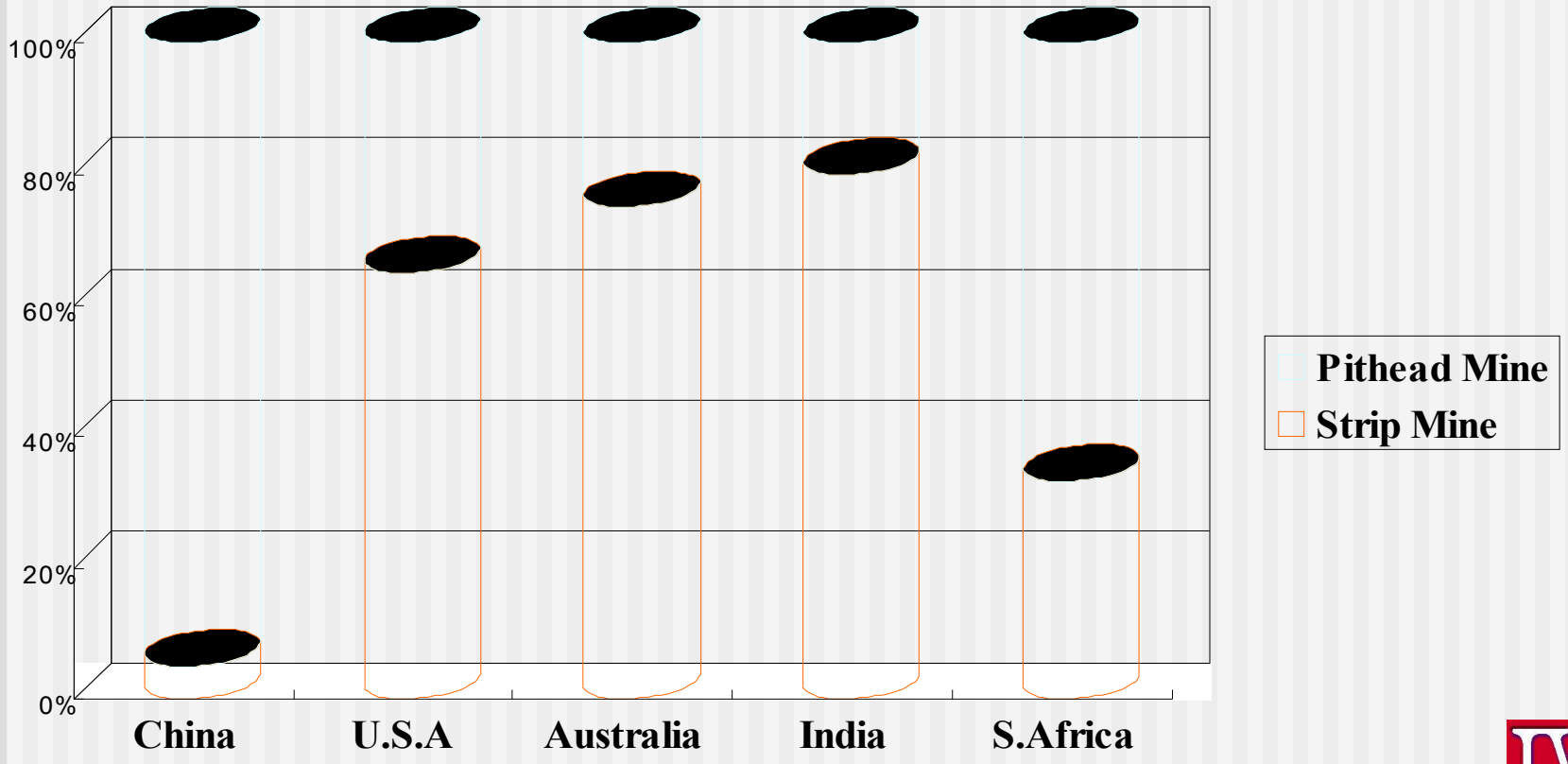


Reserves of American Strip Mines and Pithead Mines

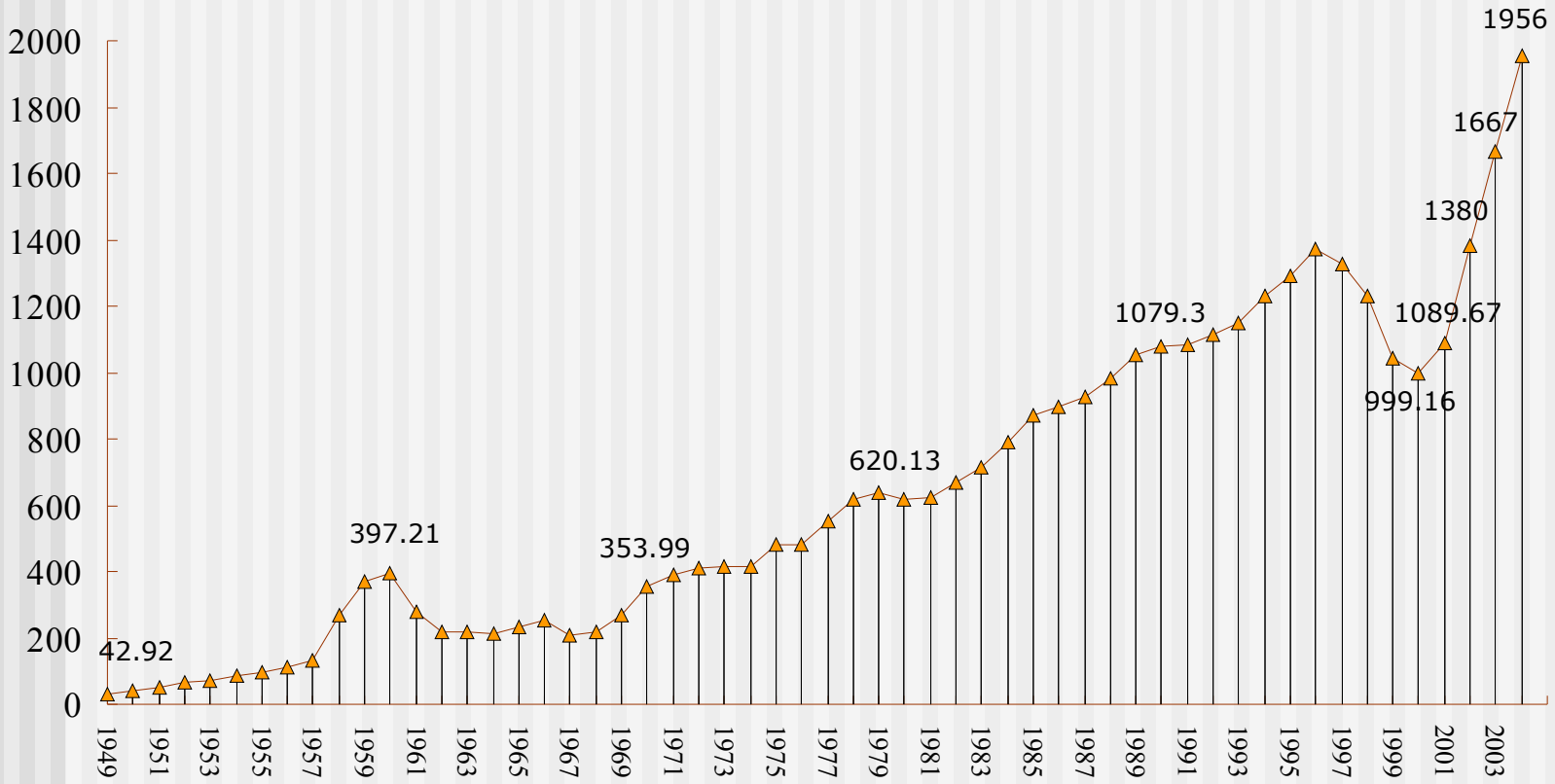


EIA1999(Unit：billion tons)

The Output of Main Coal Producers' (Strip Mine and Pithead Mine)

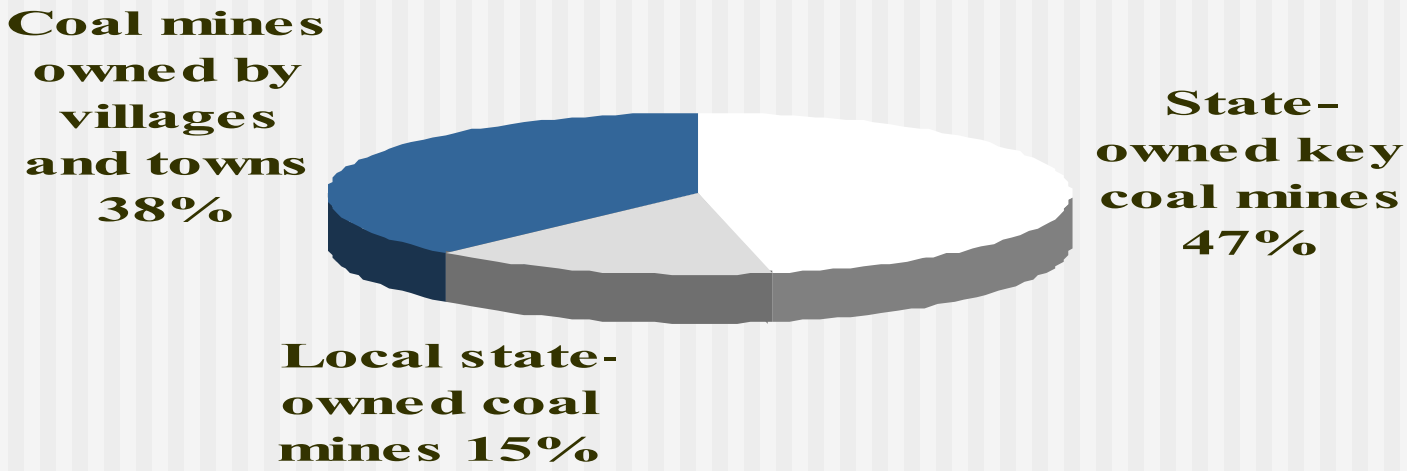


Chinese Coal Yield



Chinese Coal Yield

The composition of coal output of China in 2004



Conclusion Remarks

- Exploitation of the coal with depth more than 1500~2000m is very difficult ---- increase of cost, unsafety, disaster gas blast.
- Injection of CO_2 into unminable coal seams is a win-win strategy ---- exploitation of huge amount of CH_4 and a nature reservoir of CO_2 storage.
- The unminable deep coal reserves is about 30% of the total, in average, absorbed CH_4 in coal is 10~20m^3/t.
  - The amount of CH_4 in deep coal seams which could be obtained by CO_2 injection is 13Tm^3 (37% of the total estimated reserves in China).
  - Theoretically, 2mols of CO_2 could “squeeze” out 1mol of CH_4.
  - The amount of CO_2 which could be stored in unminable deep coal seams is 30Gt (10 times of the CO_2 emitted in China annually).

Conclusion Remarks

- The areas of abundant unminable coal reserves are coincide with the areas of abundant minable coal reserves (with depth less than 1000m). It is easy to be arranged:
  - ❖ On-site exploitation
  - ❖ On-site transformation (power, liquid fuels, chemical...) via Polygeneration
  - ❖ On-site capture (sequestration)
  - ❖ On-site injection and sequestration (enhancement of CBM production)

Further Works

- Detailed survey and analysis of reserves of deep unminable coal seams, their distribution, the physical and chemical characteristic of the coal (permeability, contents of CBM, etc.)
- The absorb ability and desorb ability of CH_4 and CO_2 for diverse coal, the basic mechanism, establishment of mathematical model, experimental and simulation study
- The flow pattern of underground injected CO_2 and desorbed CH_4, the requirement of well-drilling and distribution, modeling and simulation
- Strengthen the international cooperation (Alberta Research Council, Canada and other institutions)

Thanks You