



CMM/CBM Development in Mongolia

presentation for coal mine methane meeting.

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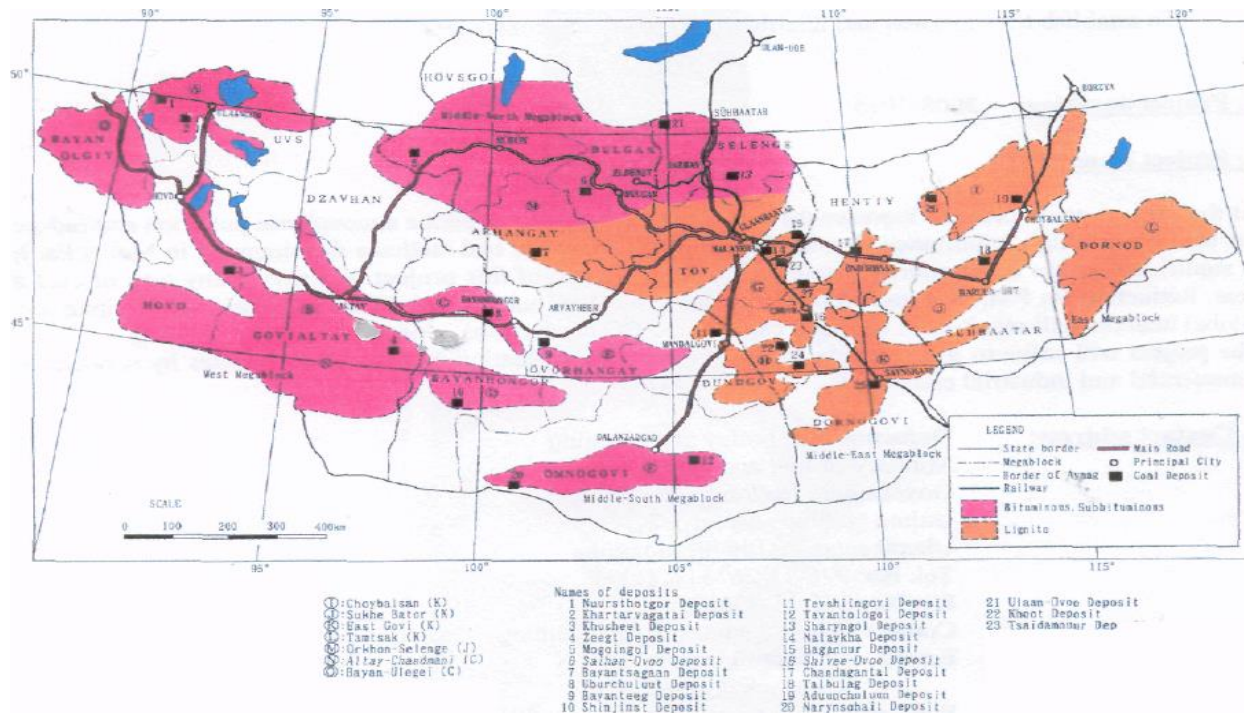
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Key points of the presentation:

- Coal resources in Mongolia
- The needs of CMM/CBM development in Mongolia
- CMM/CBM development Policy and its implementation
- CMM resources assessment of coal basins and some coal sites
- CMM emission factors for coal basin and coal rank
- Prospective prospecting areas for coal seam methane gas , petroleum and shale areas
- Activities of CMM/CBM planned in next years
- Conclusions

Background: Coal resource of Mongolia



• Coal resource is about 150 billion tons;

• Most of coals are **sub bituminous or lignite** in the East and **bituminous coal** in the West and South region.

The needs the CBM/CMM development in Mongolia

- 60 percent of total GHG emitted by energy sector
- Mongolia has rich CMM/CBM resources
- The utilization of CMM/CBM development and its use for electricity will contribute to implement the INDC (intended nationally determined contribution) of Mongolia that reduce the global impacts of climate change.
- CMM/CBM development is important to improve mining safety because the Government of Mongolia has task to use underground mining.
- We have relevant legislation for CBM/CMM in Mongolia

CBM/CMM policy development and it's implementation

- **Green development strategy/ program** developed and that approved by Parliament of Mongolia.
- **The law of Petroleum** regulates all aspects of petroleum exploration and exploitation within territory of Mongolia. The law of Petroleum covered all aspects of Natural bitumen, oil shale, gas-rich shale, gas sand including CBM\CMM.

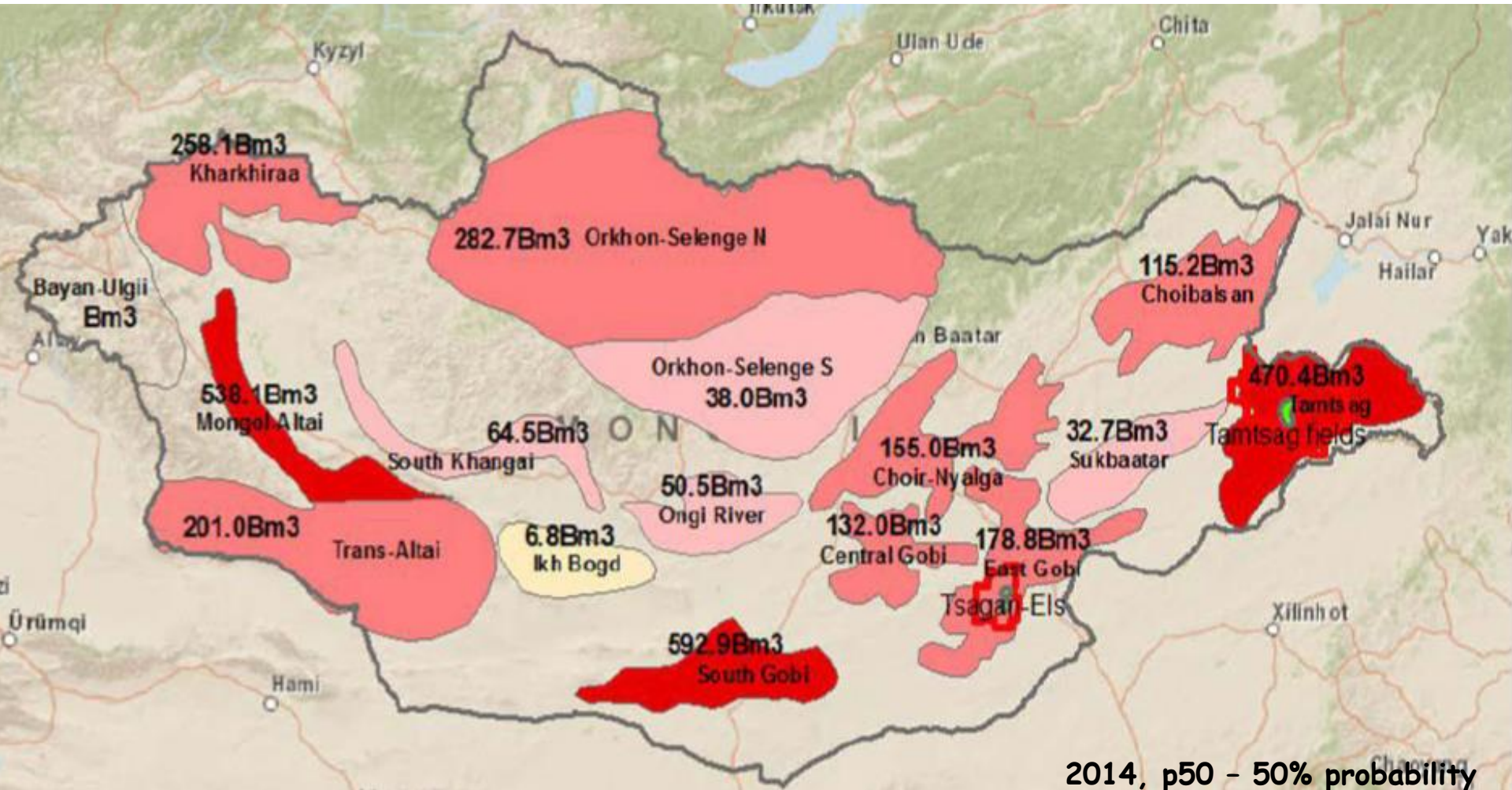
CMM ownership and it's solution

CMM Ownership	<ul style="list-style-type: none">• CMM resources will be government-owned• Different types of CMM are treated differently: Surface pre-mine drainage requires CBM license (administered as oil and gas).
Conflicts and Barriers	<ul style="list-style-type: none">• CBM / CMM licenses overlapped with mining licenses
Solutions	<ul style="list-style-type: none">• Government issued notice on overlapping licenses which instructs coal and gas operators to negotiate cooperation or production agreements
Policies and Incentives	<ul style="list-style-type: none">• CBM/CMM regulated by Petroleum Law• Subsidies for CMM utilization/CMM-generated power• Tax, fee, and royalty exemptions

CMM resources estimation at coal basins and and some coal sites

- The first CMM resources assessment and emission inventory experiment in Mongolia was done in 2012 by MNEC, Mongolia and Raven Ridge Resources, USA which financed by EPA, USA.
- **The project has three interrelated objectives:**
 - ✓ to estimate CMM resources at coal basins throughout Mongolia
 - ✓ Calculate CMM resources for three mine sites (NC, TT and Baganur mine)
 - ✓ to develop an accurate, high-quality CMM emissions inventory within Mongolia
- We have calculated CMM resources for three above coal deposits.
- **CMM resources of NC coal deposit**
 - ✓ :NC coal deposit has significant source of methane which can be converted to electricity
 - ✓ . NC coal deposit has Potential to produce 204.1 million cubic meters of gas that would be enough to fuel a 8.5 MW power generation facility to be used by the mine.
 - ✓ Carbon emissions would be reduced by 187,900 tons of CO₂ ..

CMM RESOURCE BY COAL BASIN



RESULT ESTIMATED CMM RESOURCES BY COAL BASIN AND DEPTH p50

Coal Basin	p50 CMM Resources 0 – 300 m (billion m ³)	p50 CMM Resources 300 – 600 m (billion m ³)	p50 CMM Resources 600 – 900 m (billion m ³)	p50 CMM Resources 900 – 1200 m (billion m ³)
Central Gobi	12.2	31.9	41.1	46.8
Choibalsan	11.8	26.9	35.5	41.0
Choir-Nyalga	14.1	36.7	48.4	55.8
East Gobi	15.7	42.5	56.0	64.6
Ikh Bogd	0.7	1.7	2.1	2.3
Kharkhiraa	30.8	63.7	77.8	85.8
Mongol-Altai	64.3	132.8	162.2	178.8
Ongi River	5.2	12.6	15.5	17.2
Orkhon-Selenge (North)	34.0	69.9	85.1	93.7
Orkhon-Selenge (South)	4.2	9.2	11.6	13.0
Southern Khangai	7.6	15.9	19.5	21.5
South Gobi	61.8	148.6	181.8	200.7
Sukhbaatar	2.9	7.8	10.2	11.8
Tamsag	52.5	113.8	143.3	160.8
Trans-Altai	20.9	50.5	61.6	68.0
TOTAL	338.7	764.5	951.8	1,061.9

The top three with the largest estimated CMM resources in descending order are the:

- **Mongol-Altai,**
- **South Gobi**
- **Tamsag basins.**

Each of these basins is estimated to contain greater than **50 billion cubic meters of CMM resources.**

CMM Emissions Inventory

- Inventory was done Mongolian team headed by Professor B. Nakhainyam, Technical university of Mongolia;
- **Emission factor** = (Net CMM resources of given depth interval) / (Coal resources of given depth interval)
- Emissions Factor Workflow Diagram



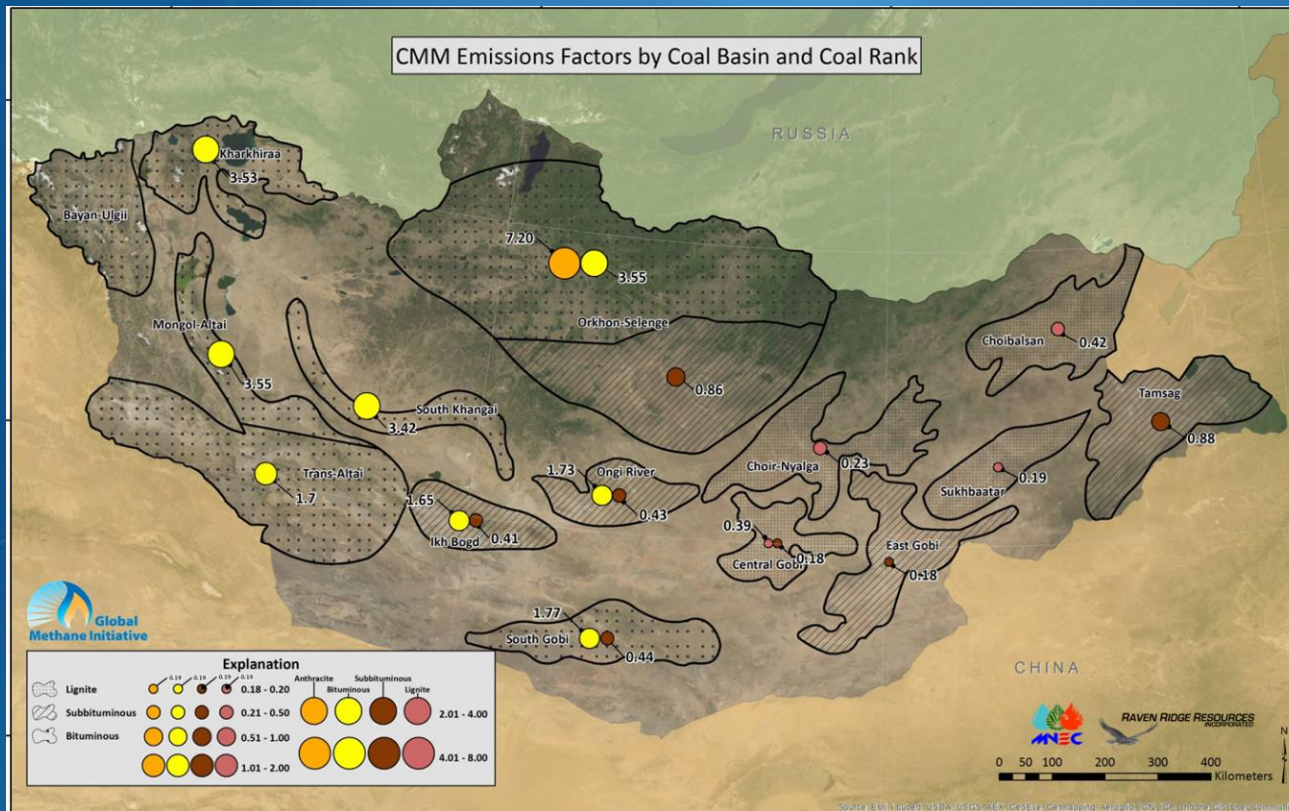
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CMM Emissions Inventory Improvement

- Results
- Emissions Factors by coal basin



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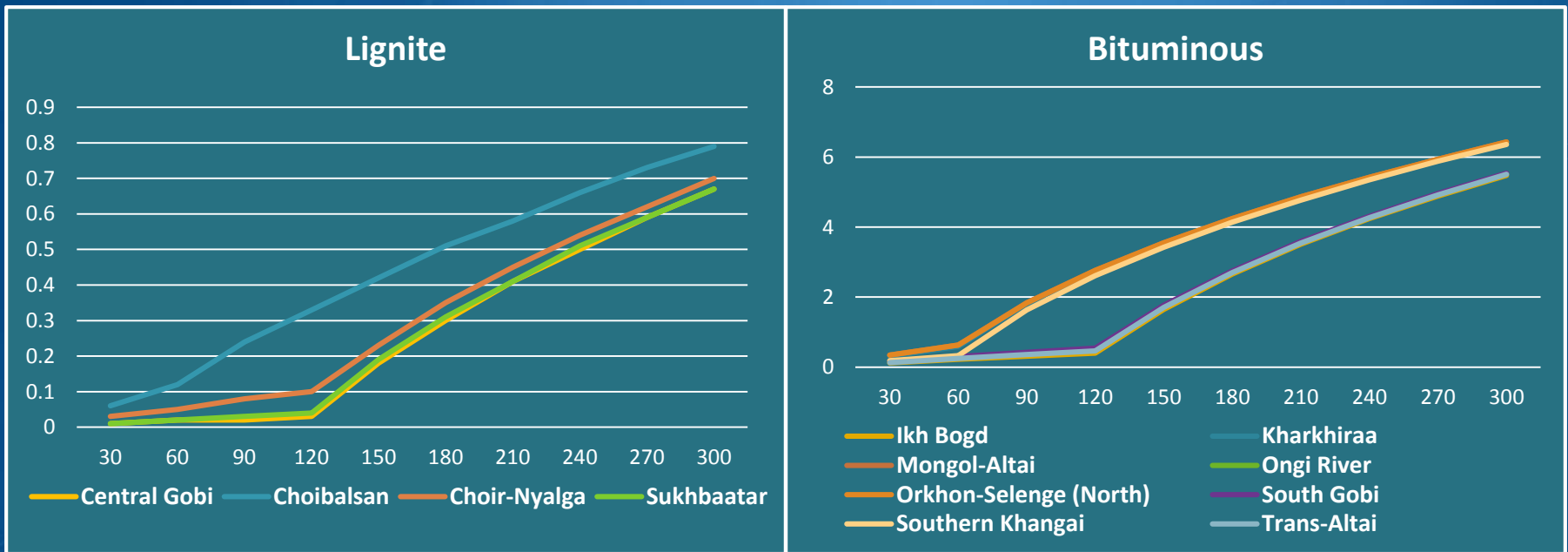
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CMM Emissions Inventory Improvement

Results

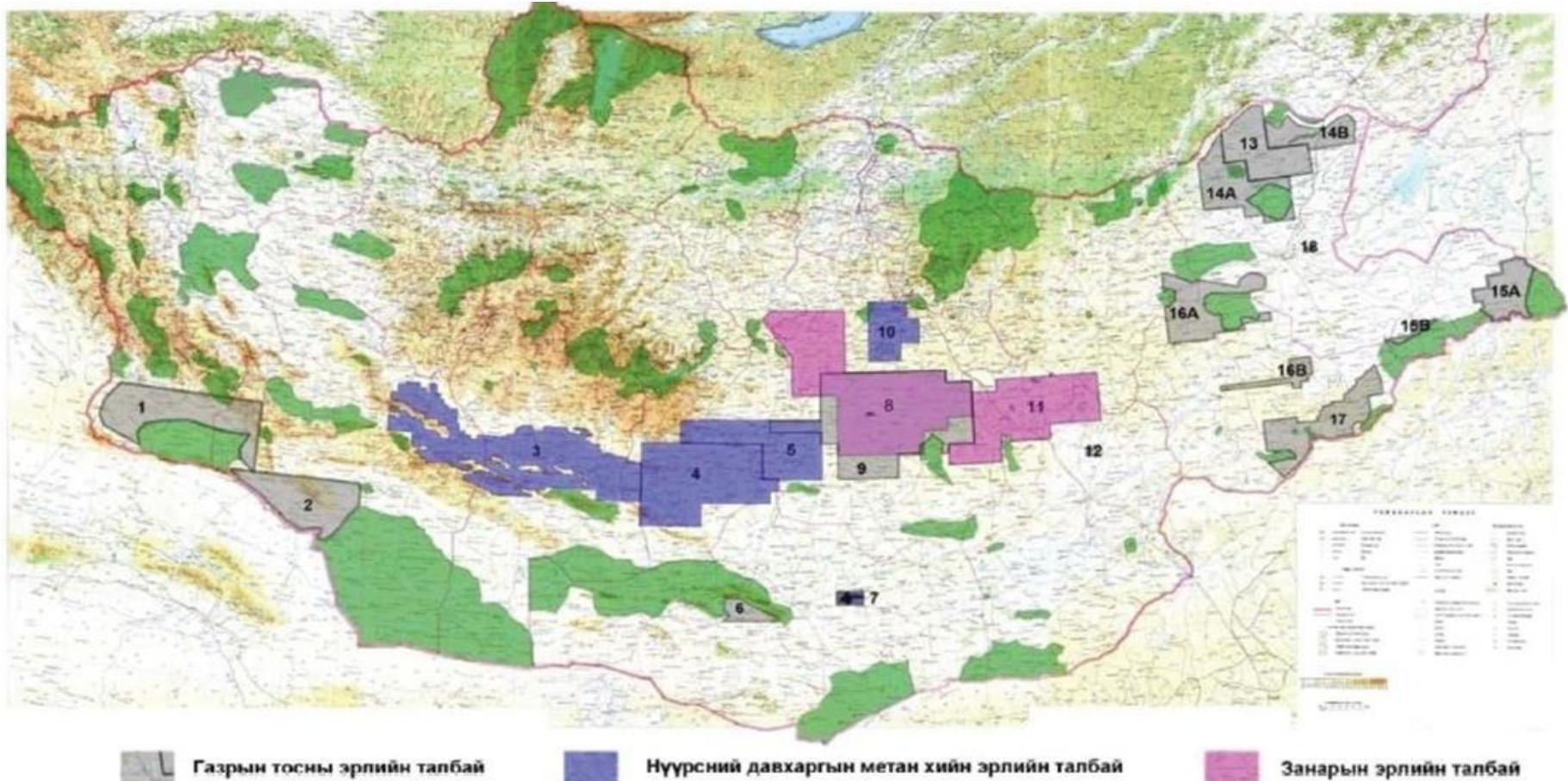
p50 Emission Factors by Depth



Prospective prospecting areas for coal seam methane gas , petroleum and shale areas

- Prospective prospecting areas for coal seam methane gas , petroleum and shale areas shown in picture 2.
- As of December 31, 2016, there are five petroleum mines, 5 coal seam methane and 3 oil shale contracts, and 18 exploration contracts.
- Erdenes Tavan Tolgoi JSC conducted methane extraction from Tavantolgoi coal deposit and methane gas geological reserves are estimated at 40 million tonnes.
- MAK conducted methane extraction from NS coal deposit and methane gas and discovered that 7 m³ methane per tonns coal.
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Prospective prospecting areas for coal seam methane gas , petroleum and shale areas (picture 2)



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What CMM activities planned for in near future

- **Mongolia continue the CMM/CBM resources assessment in mine deposits.**
- **Need more methane investigation in order to use underground mine.**
- **Petroleum resources company selected 5 sites for CMB prospecting. Prospecting will started in 2018 and completed on 2020**
- **Legal and regulatory frameworks governing CBM/CMM would be improved.**

Conclusions

- We believe there will be great opportunities for near term methane mitigation for climate change in Mongolia using existing technologies and practices.
- The initiatives of the global methane initiative (GMI) on CMM development offers an excellent opportunity to build on the success of Methane to Markets, to achieve real progress towards reducing climate change in the near term while improving the lives of people around the world

THANK YOU FOR YOUR ATTENTION

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