



# **Fugitive Methane Emissions from Coal Mining and Handling Activities and Oil and Natural Gas Systems in India**

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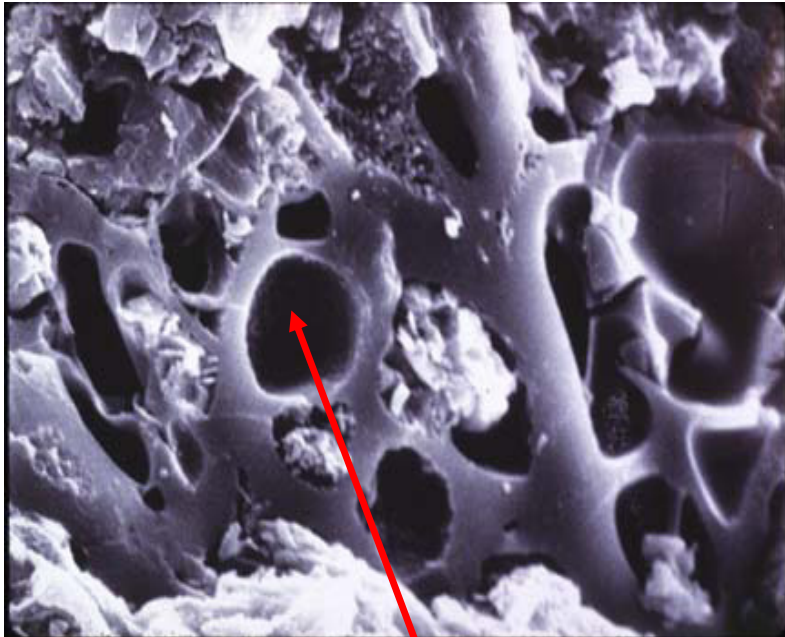
**INCCA Workshop on GHG Emissions**

**New Delhi**

**11 May 2010**



# Coal



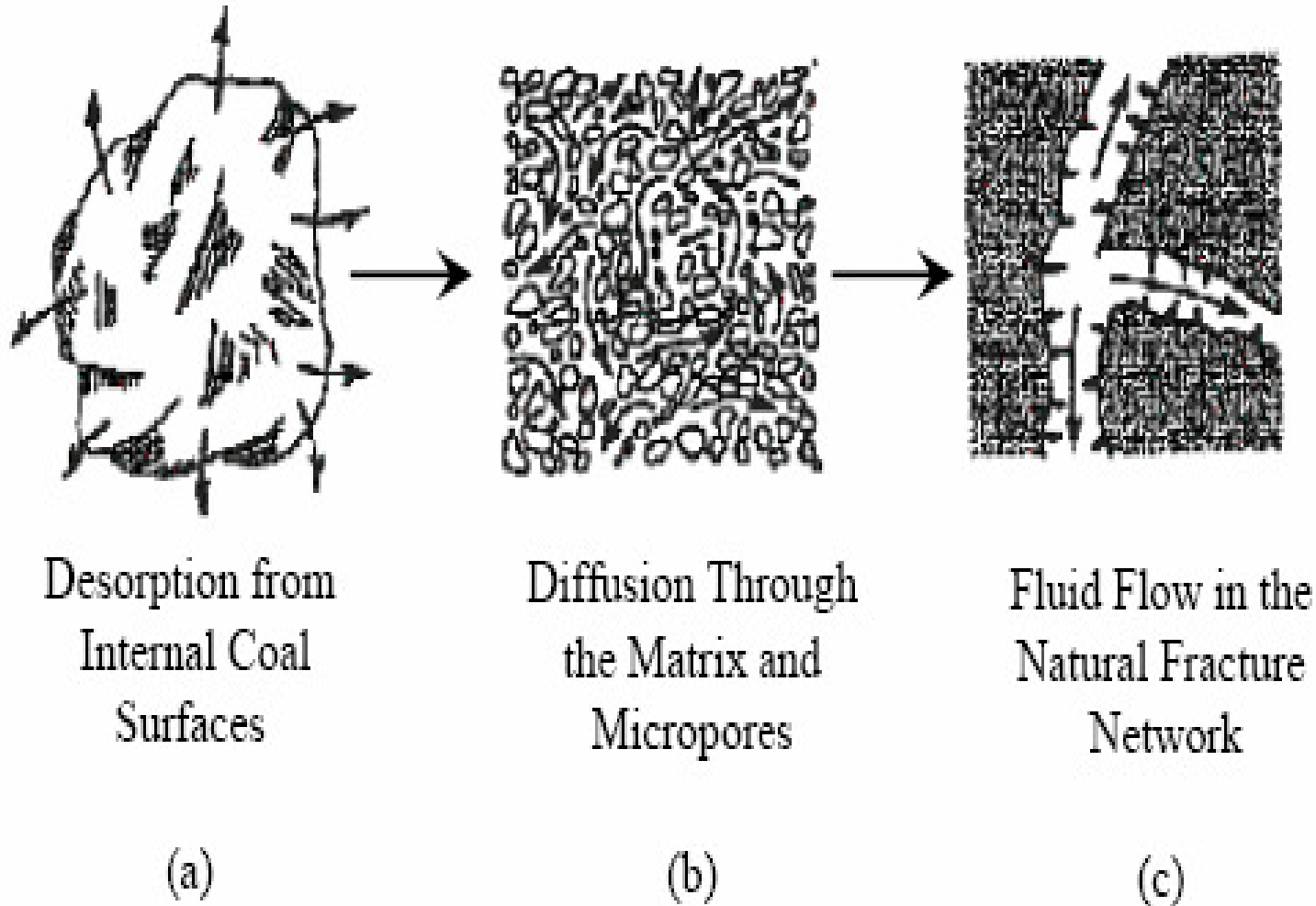
**Microscopic view of the Micropores structure of coal**



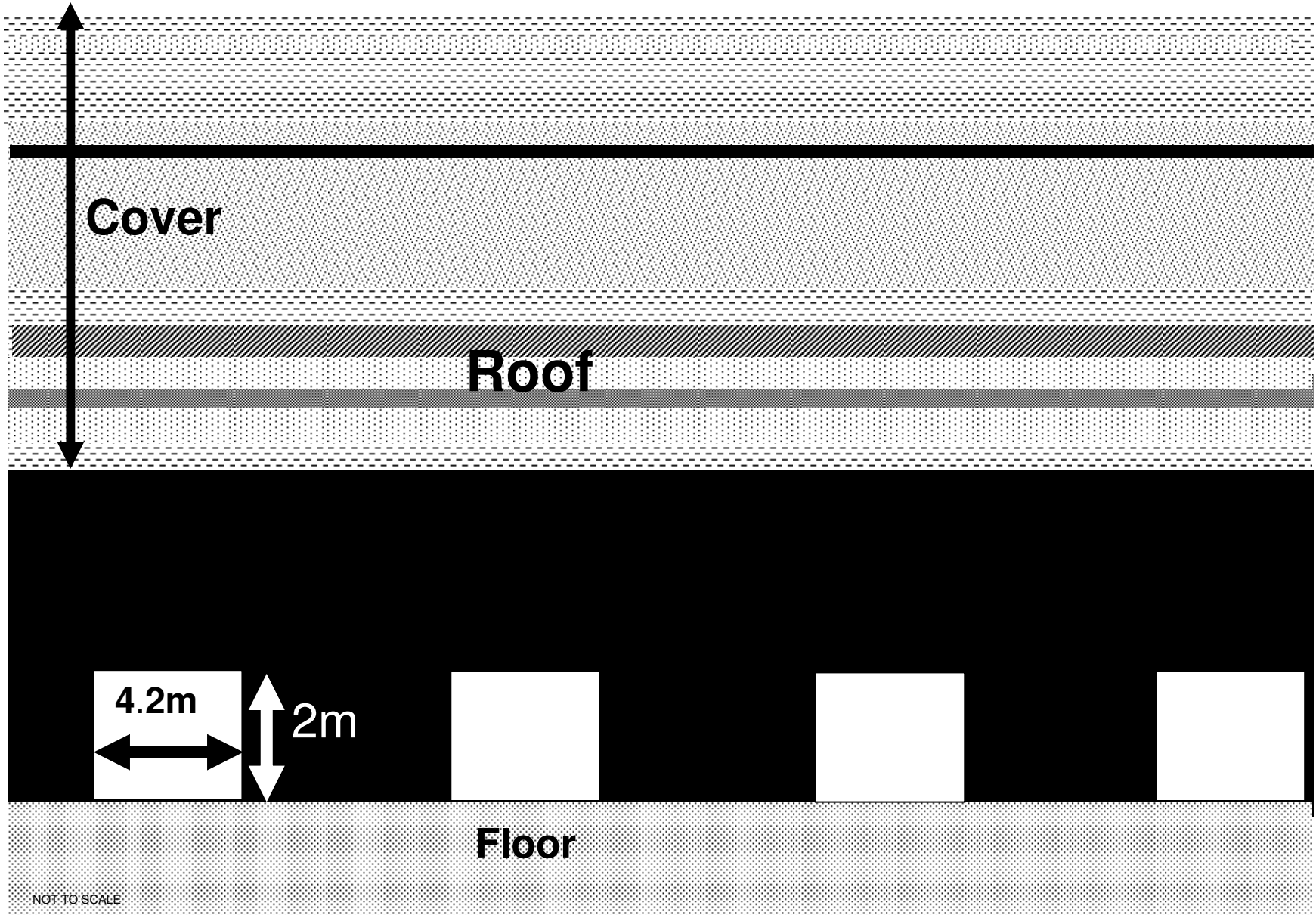
**Fracture system, cleats in coal**



# Transport of Gas in Coal



Increasing Size →





# What about surface mines???

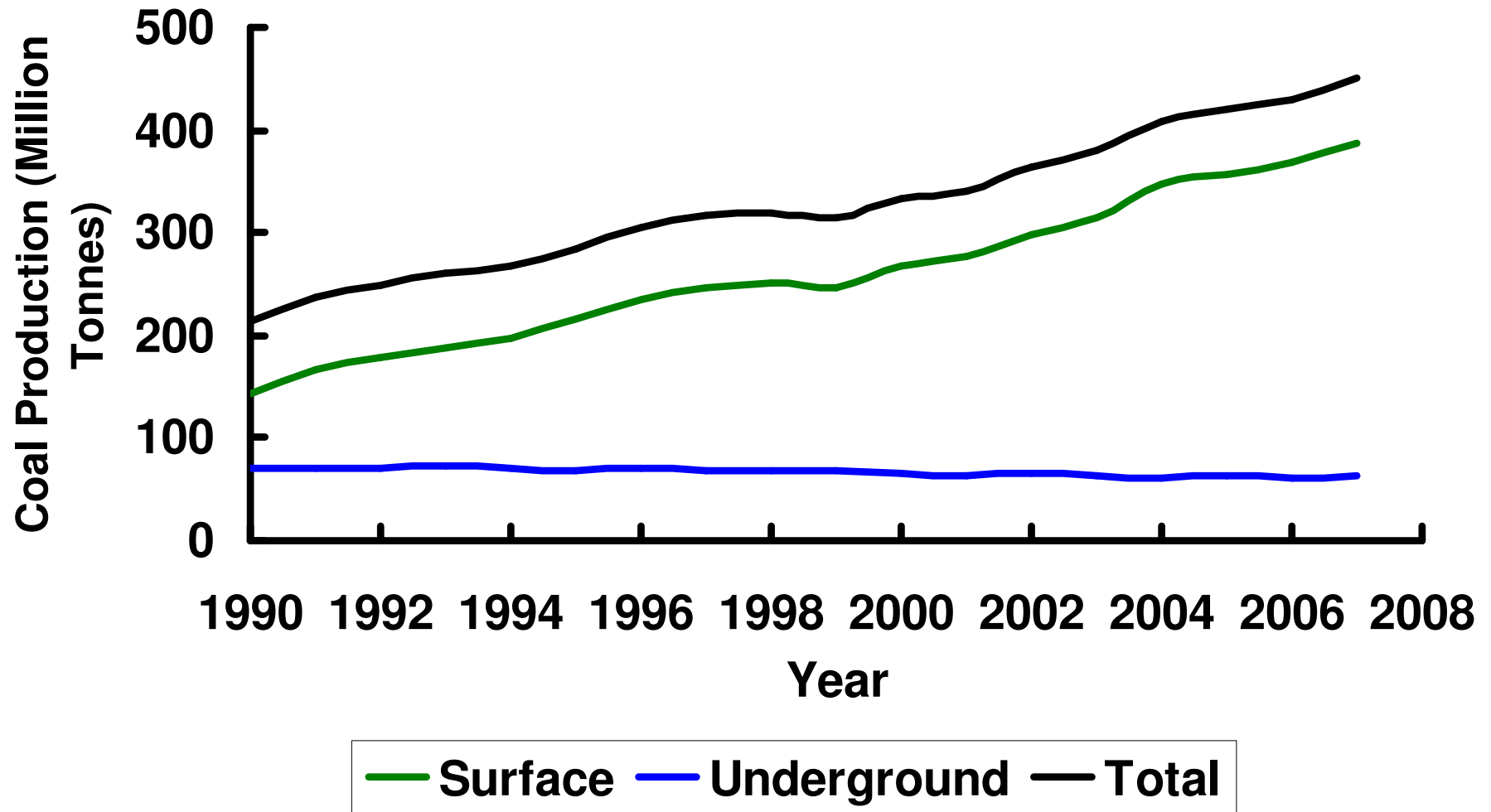




# **Fugitive Emission from Coal Mining and Handling Activities**



# Activity data



Coal Production

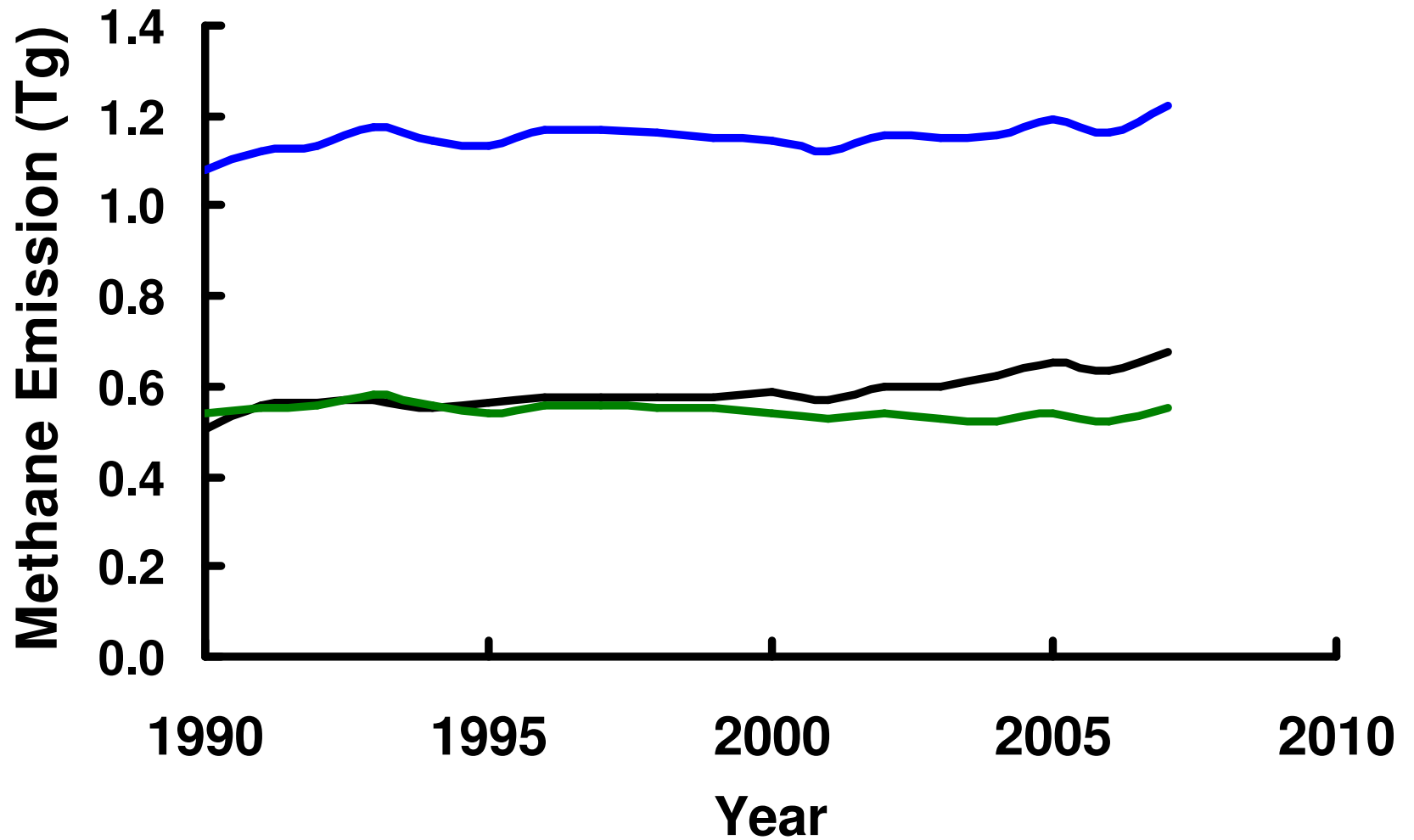


# New Emission factors

Operation	Methane Emission factor (m <sup>3</sup> /tonne)			
	Surface Mining	Underground Mining		
		Degree-I	Degree-II	Degree-III
<b>Mining</b>	<b>1.18</b>	<b>2.91</b>	<b>13.08</b>	<b>23.68</b>
<b>Post Mining (Handling)</b>	<b>0.15</b>	<b>0.98</b>	<b>2.15</b>	<b>3.12</b>



# Emission Estimates



Estimates

— CIMFR — IPCC Low — IPCC Av..



# **Fugitive Emission from Oil and Natural Gas Systems**



# Sources

<b>Petroleum Products</b>	<b>Process</b>	<b>Sources of Methane Emission</b>
<b>Oil</b>	<b>Exploration (for both oil &amp; gas)</b>	<b>Production testing</b> <b>- Gas Flared</b>
	<b>Crude oil Production</b>	<b>- Internal Floating tank</b> <b>- Fixed Roof Tank</b> <b>- Floating Tank</b>
<b>Natural Gas</b>	<b>Production and processing</b>	<b>Fugitive Emission</b>
<b>Venting and Flaring</b>	<b>Venting</b>	<b>Gas Venting</b>
	<b>Flaring</b>	<b>Flares</b>

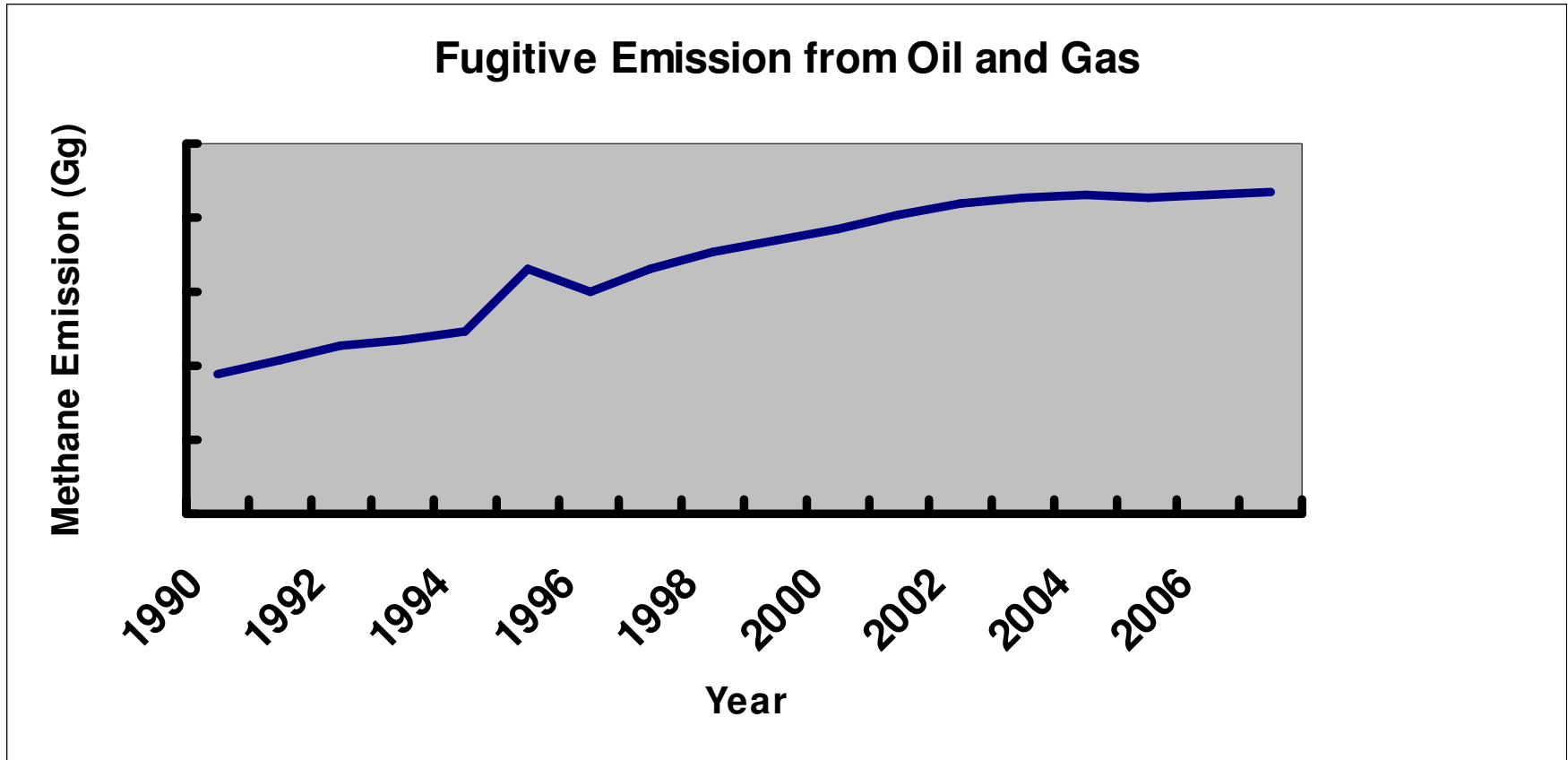


# Emission Factor

No. of Wells	0.003 (Gg/well)
Oil Production	0.000334242(Gg/1000 tonnes)
Refinery Throughput	$6.75904 \times 10^{-05}$ (Gg/MT)
Gas Production	0.003555802 (Gg/MMCM)
Gas Processing	0.010667405 (Gg/MMCM)
Gas distribution	0.010667405 (Gg/MMCM)
Leakage	0.00648193 (Gg/MMCM)
Flaring	0.000640877 (Gg/MMCM)



# Methane Emission Estimates



Emission



**Thanks**