

AIM/Enduse Application to Pakistan and Myanmar

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Presentation scheme

- Overview of Pakistan & Myanmar's energy-economy
- Data estimation & Scenario assumptions
- Preliminary results
- Aggregate data estimation tool for AIM/Enduse

Social & Economic Indicators

Item	Pakistan	Myanmar
GDP	\$ 80.8 Billion	\$ 42.4 Billion
Population	165 Million	47 Million
GDP growth	4.0-5.0%	4.5-6.5% (1998-2002)
Agriculture	25% of GDP	47% of GDP
Commercial energy	Oil & Gas dominated	Gas & Oil dominated
Accessibility to elec.	50%	< 25%
Persons/vehicle	100	132

Energy Sources & Supply

Item	Pakistan	Myanmar
Nat.Gas reserves	26.4 Tcf	12.1 Tcf
Nat.Gas production	800 Bcf	216 Bcf
Oil reserves	310 Mill.bbl	200 Mill.bbl
Oil production	19 Mill.bbl	3.5 Mill.bbl
Oil imports	112 Mill.bbl	5.2 Mill.bbl
Coal reserves	2.5 Bt	0.26 Bt (India: 82 Bt)
Coal production	3.5 Mt	0.026 Mt (India: 360 Mt)
Electricity capacity	18 GW	1173 GW
Electricity mix	39%O, 30%H, 29%G	75%G, 23%H, 2%O

Energy ... (contd.)

Item	Pakistan	Myanmar
per capita comm.energy use	218 kgoe	95 kgoe (India: 317)
per capita C emission	0.22 tC	0.1 tC (India: 0.25)

Traditional energy scenario:

Biomass energy use	22 Mtoe	9 Mtoe (India: 163)
% of commercial energy use	60	200

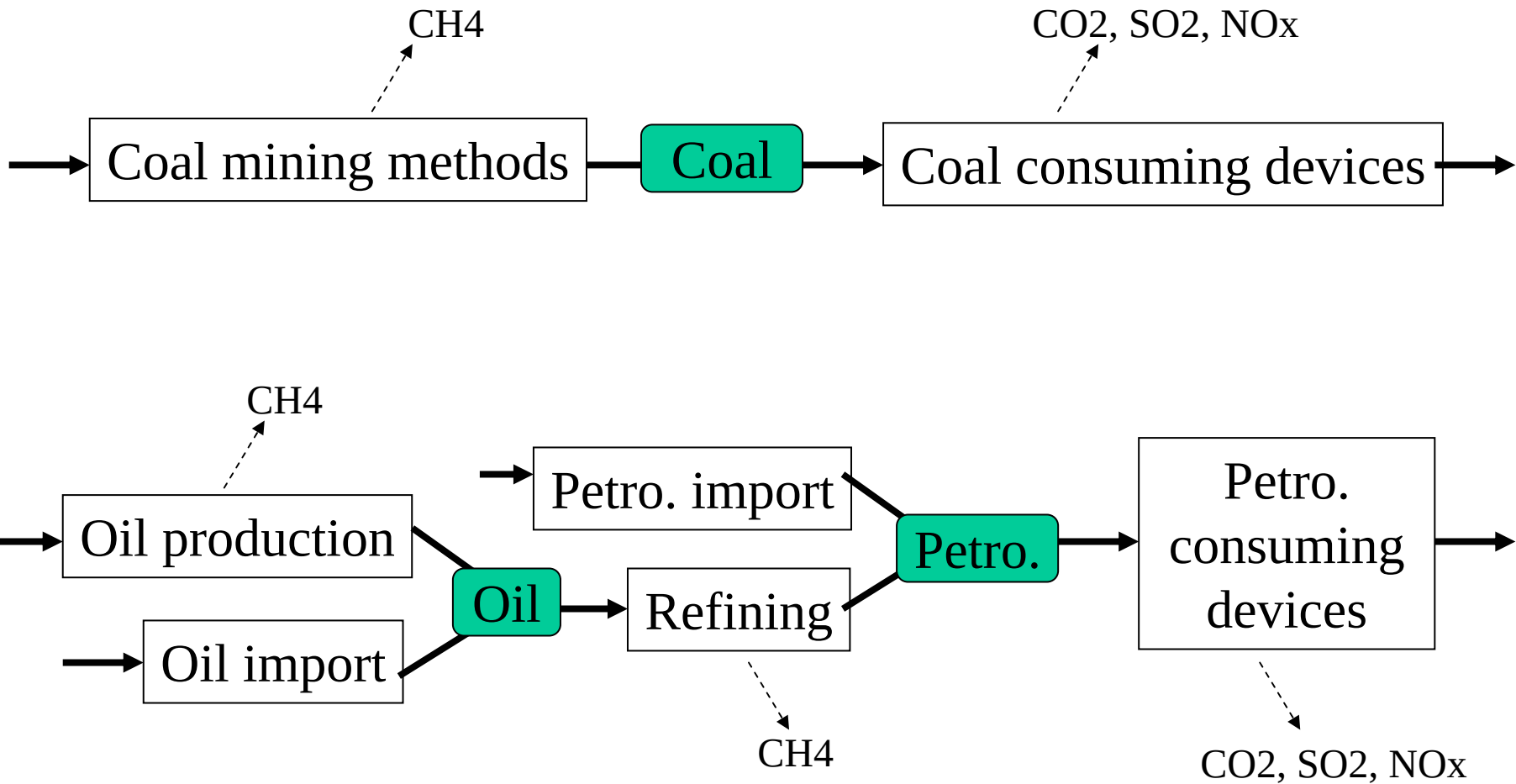
Data estimation

- Secondary sources:
 - International publications/databases (IEA, WDI, WRS, IISI, FAOSTAT, FAO-RWEDP, USDOE, etc)
 - National government/ministry websites
 - Country specific reports from internet
- Technology efficiency assumptions based on India and Bangladesh (if country specific factors are unavailable)
- Calibration of aggregate parameters with IEA Energy Balance Tables
- Interlinked Energy/CO₂ and Non-CO₂ databases

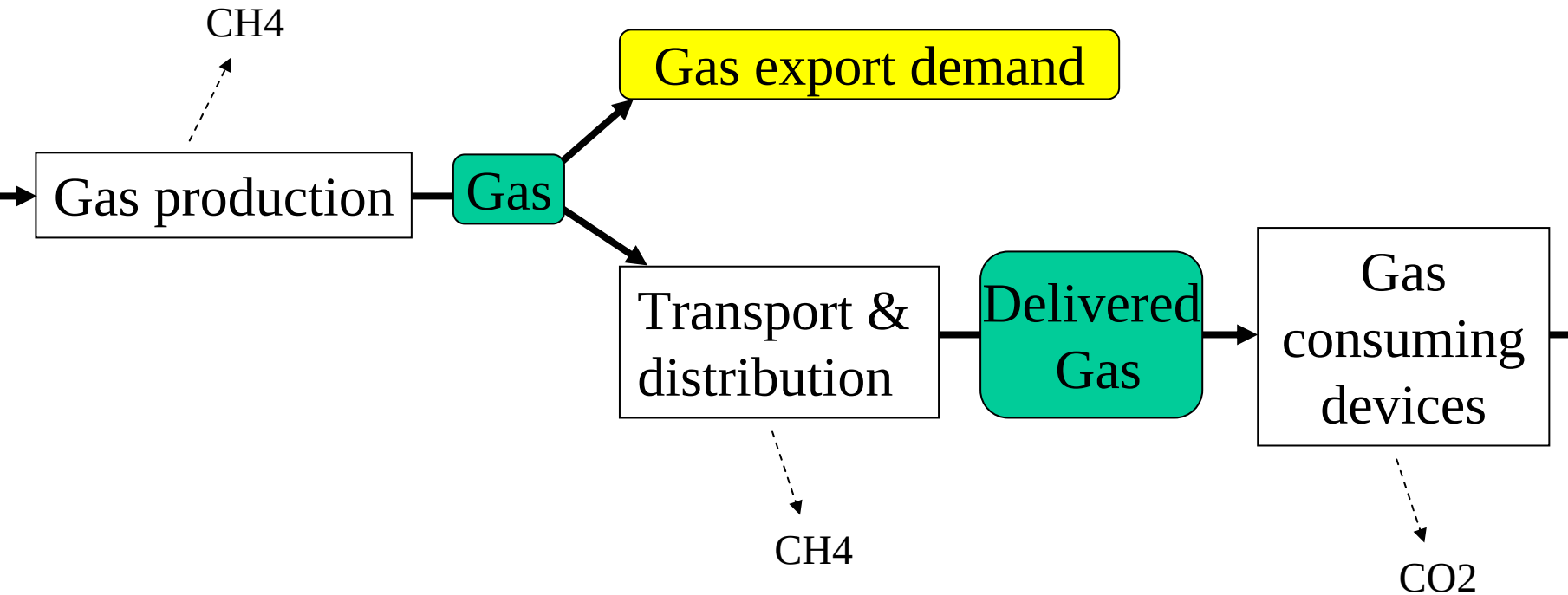
Data estimation: Sector classification

Pakistan	Myanmar
Agriculture	Agriculture
Commercial	Commercial
Industry: Brick, Cement, Fertilizer, Others	Industry: Steel, Others
Residential: Cooking & water heating, Lighting, Space heating, Fans, ACs, Refrigerators, TVs, Other appliances	Residential: Cooking, Other uses
Transport: Road, Rail passenger, Rail freight, Air passenger, Others	Transport: Road passenger, Others
Electricity generation	Electricity generation
Oil production	Oil production
Oil refining	Oil refining
Gas production	Gas production
Gas transport & distribution	Gas transport & distribution
Coal mining	Coal mining
Rice cultivation	Rice cultivation
Domestic livestock	Domestic livestock
Synthetic fertilizers	Synthetic fertilizers

CO₂ & Non-CO₂ linkage in AIM/Enduse



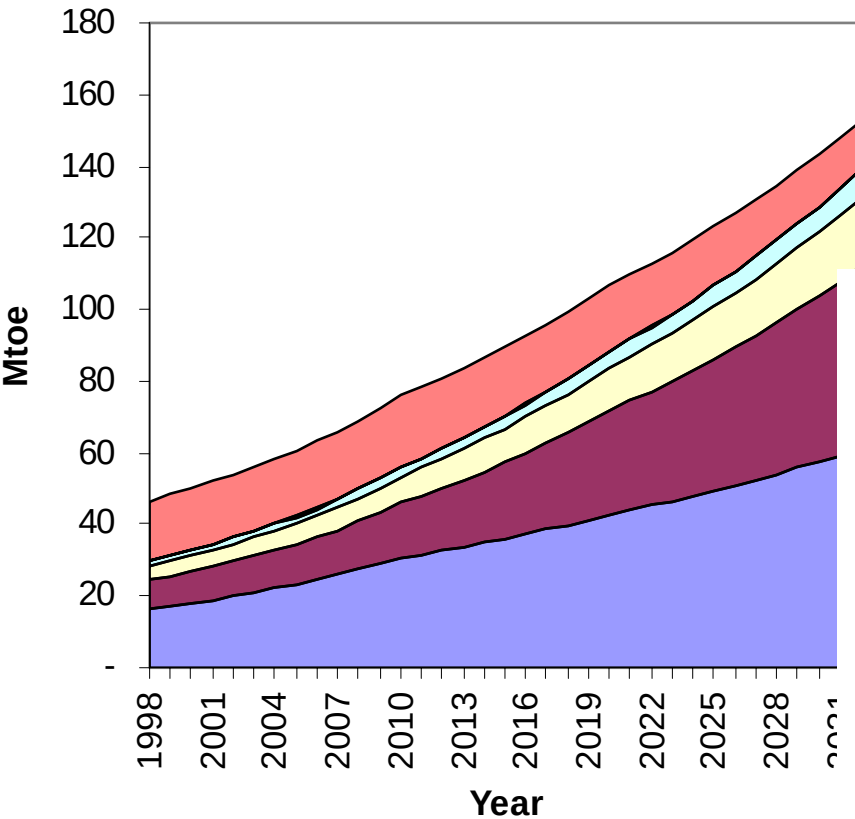
CO₂ & Non-CO₂ linkage in AIM/Enduse



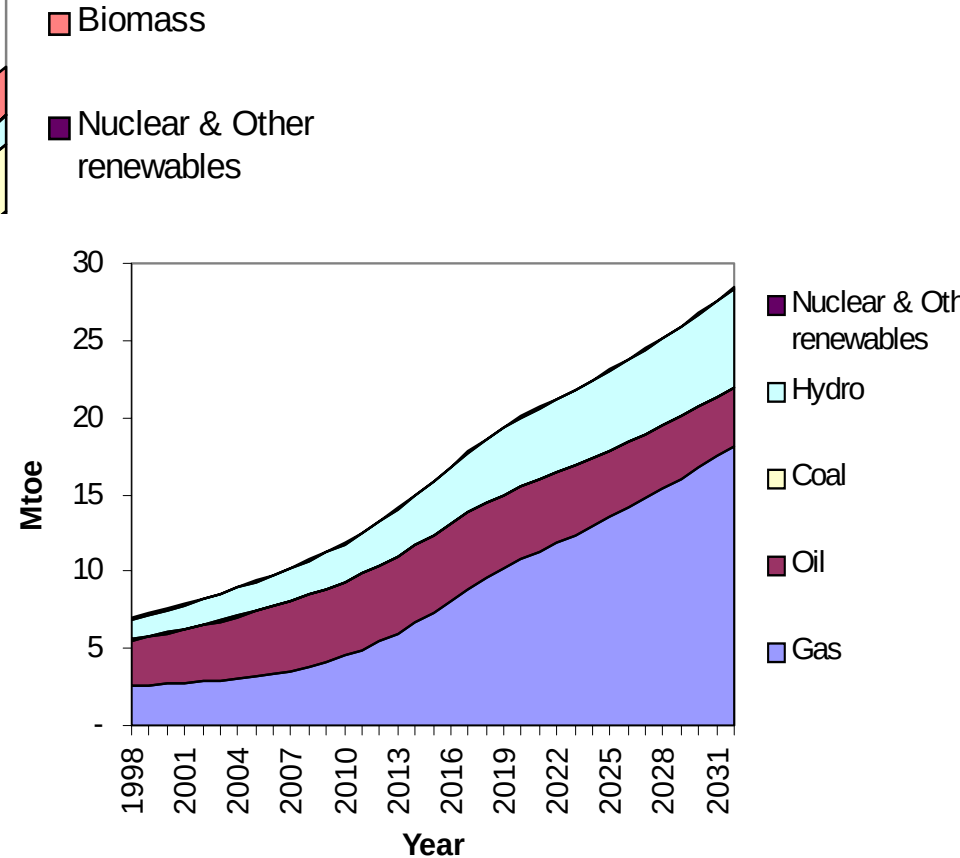
Scenarios

- BAU
 - Service projection drivers from AIM-Trend output (Reference scenario)
 - Moderate efficiency improvement assumptions
 - Declining share of biomass cookstoves
 - No Tax or Emissions constraint
- Tax: \$ 50 / tC
 - Constant tax from 2010 onwards
- Tax: \$ 100 / tC
 - Constant tax from 2010 onwards

AIM-Pakistan: BAU Results

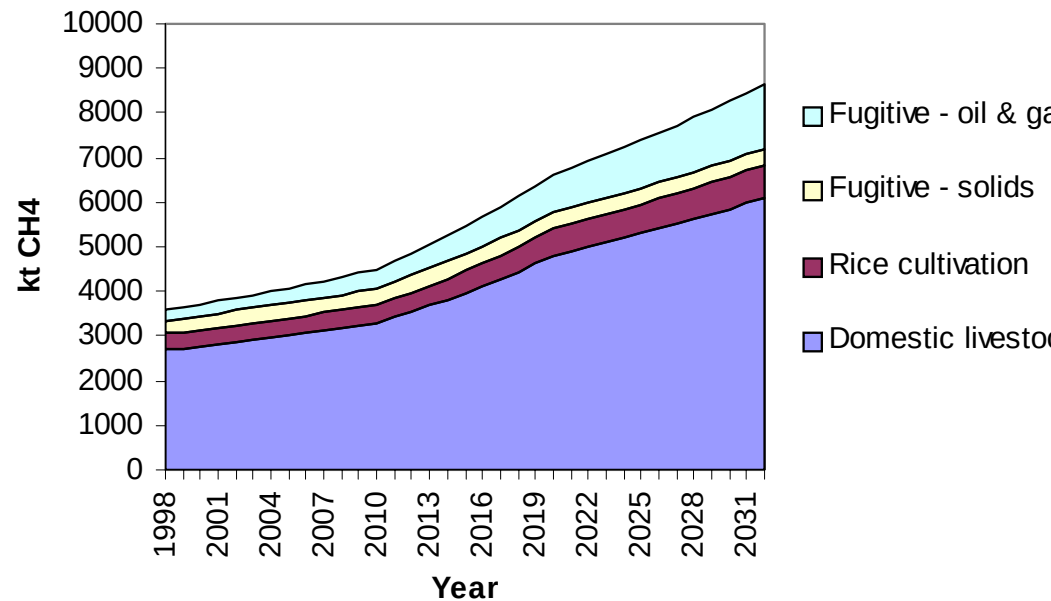
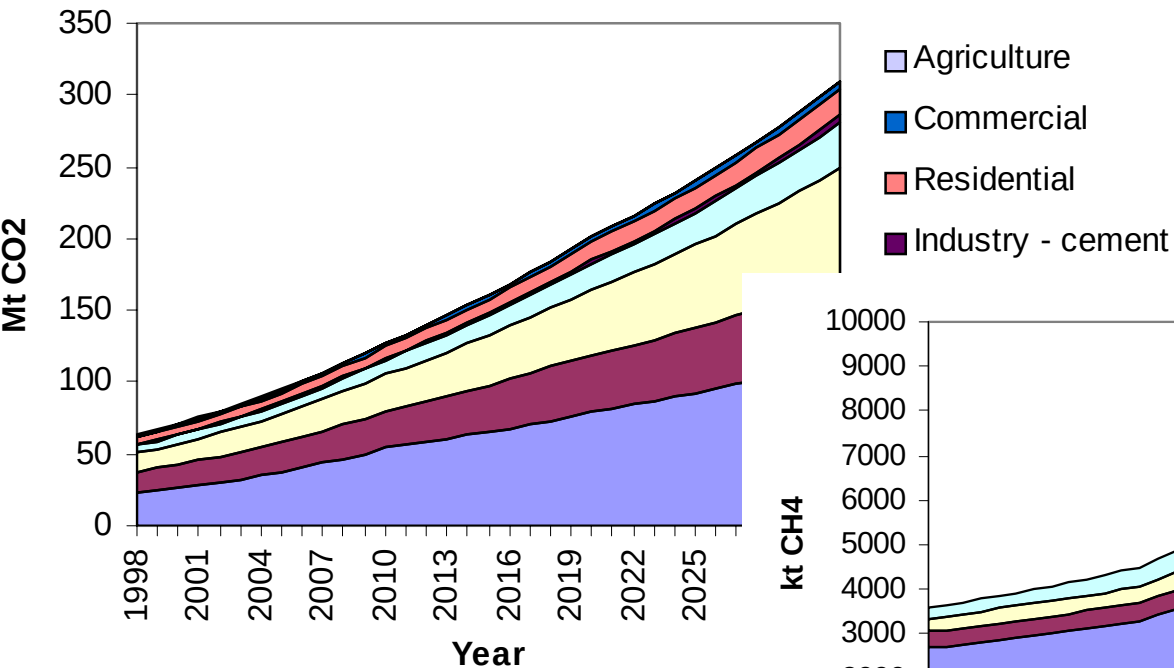


Primary energy

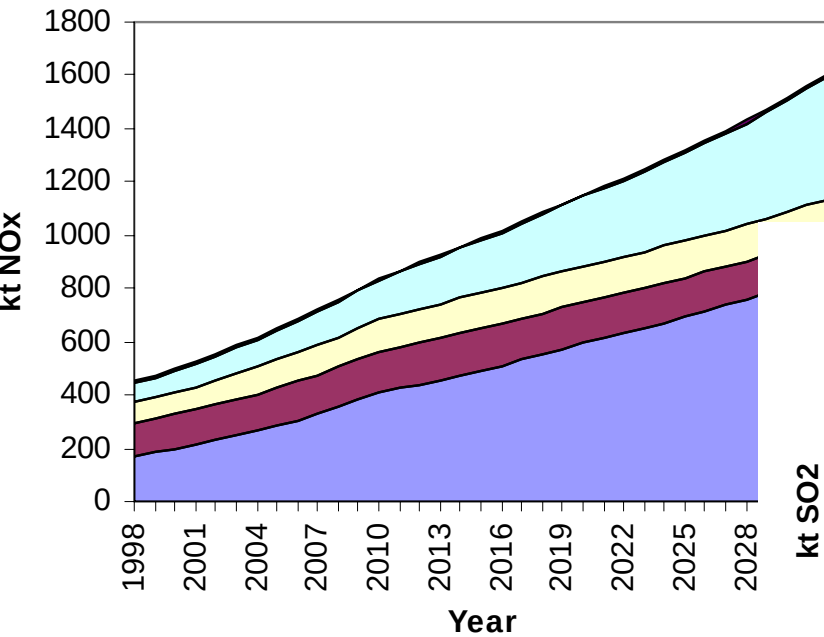


Primary energy use in power sector

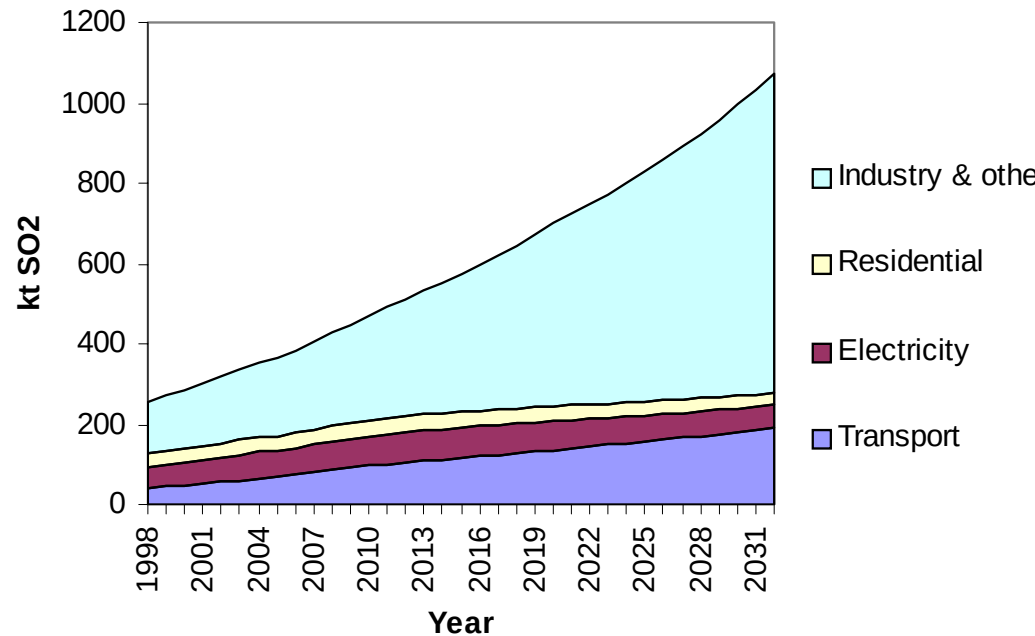
AIM-Pakistan: BAU Results



AIM-Pakistan: BAU Results

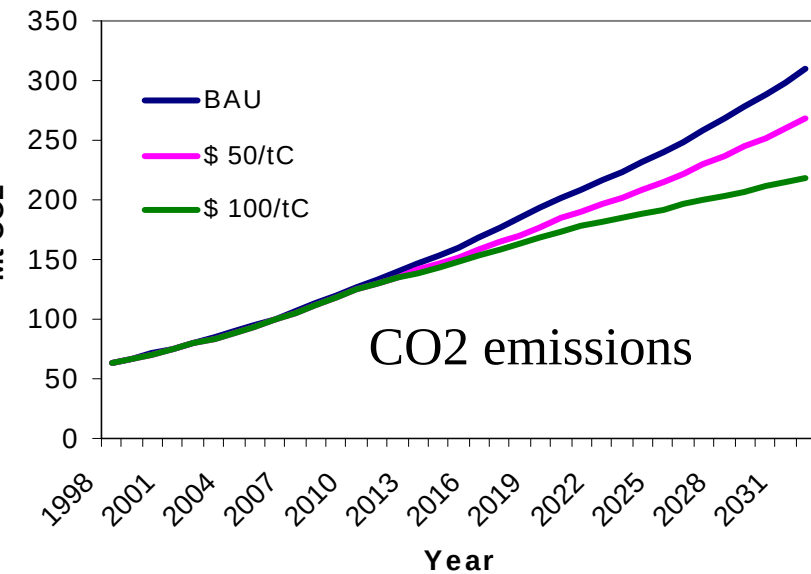


NOx emissions



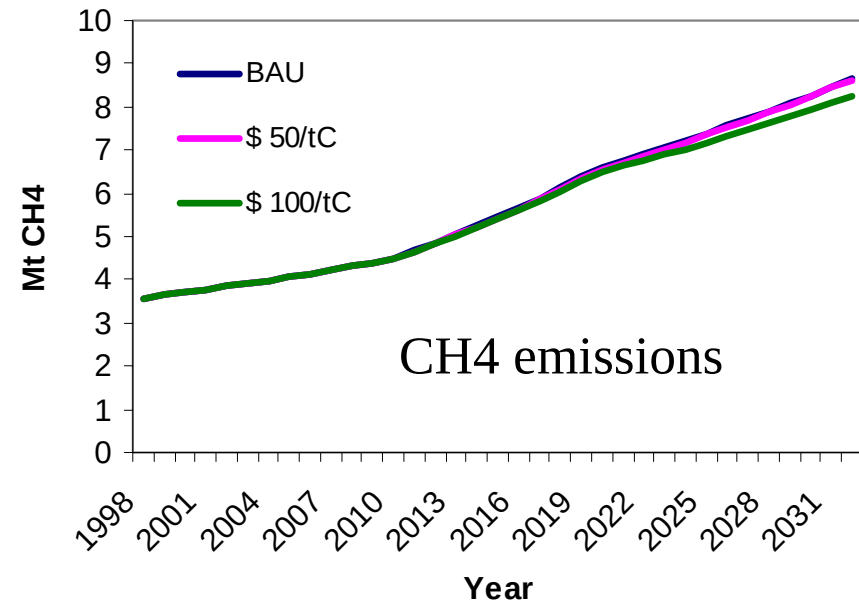
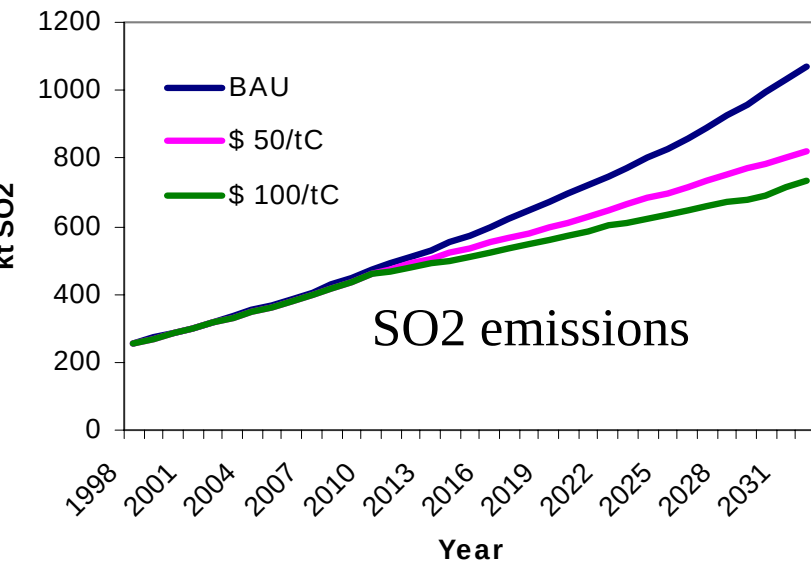
SO2 emissions

AIM-Pakistan: Scenario Results

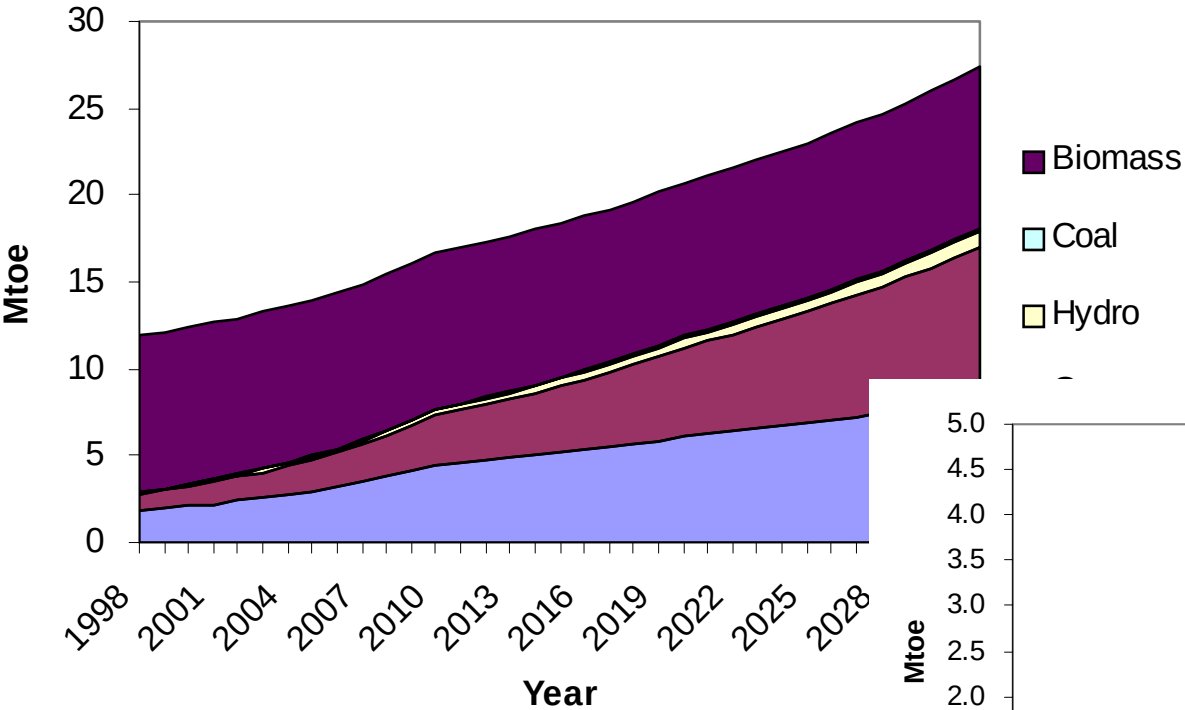


Efficiency improvement in Industry, Transport; Oil to Electricity, Oil to Gas

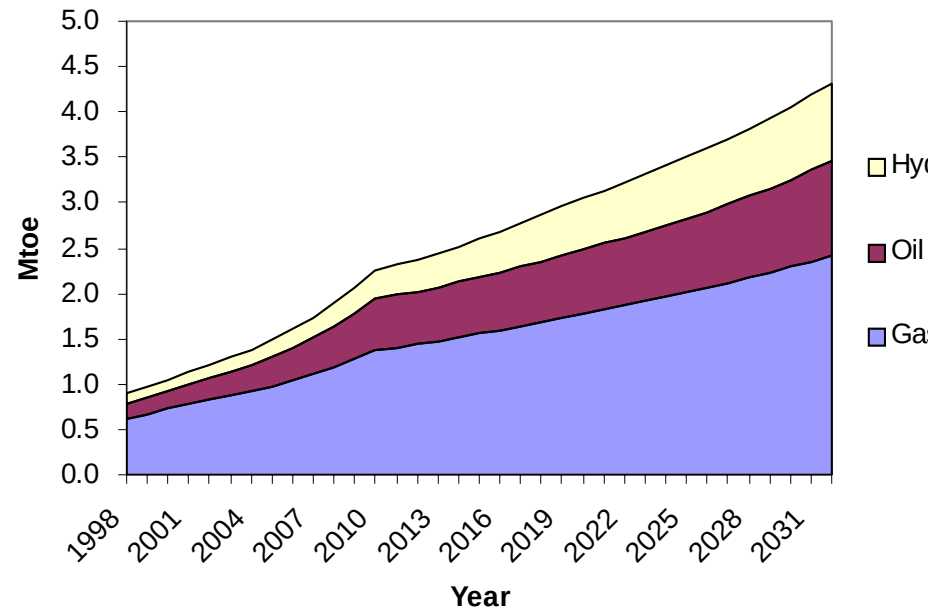
Primary energy switch from Oil to Renewables



AIM-Myanmar: BAU Results

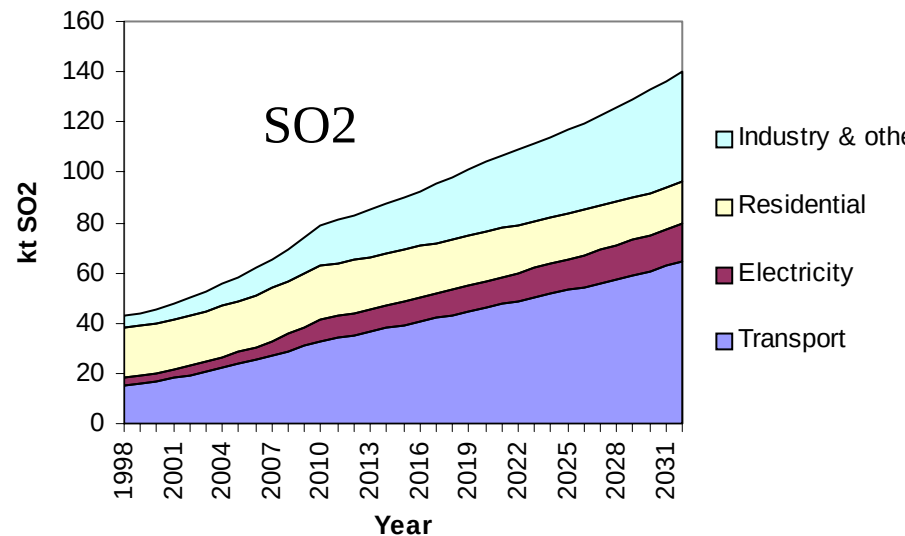
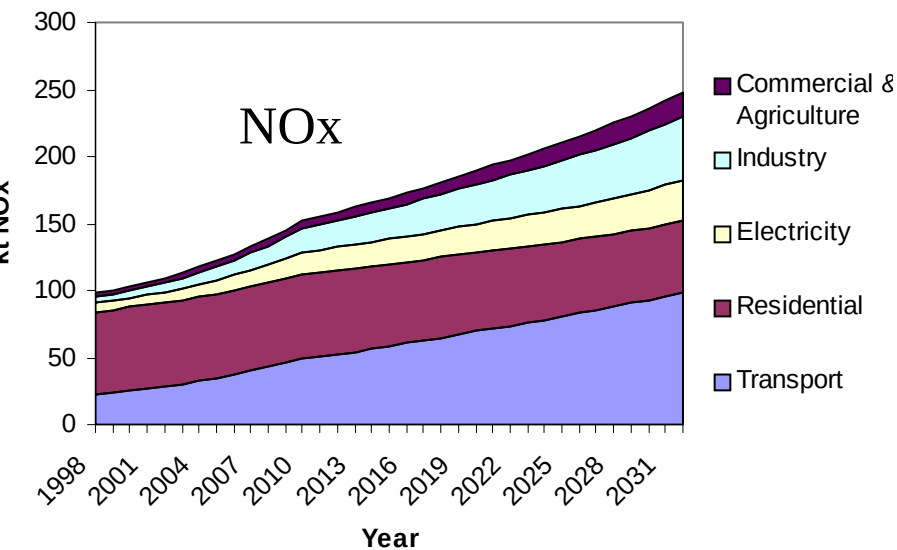
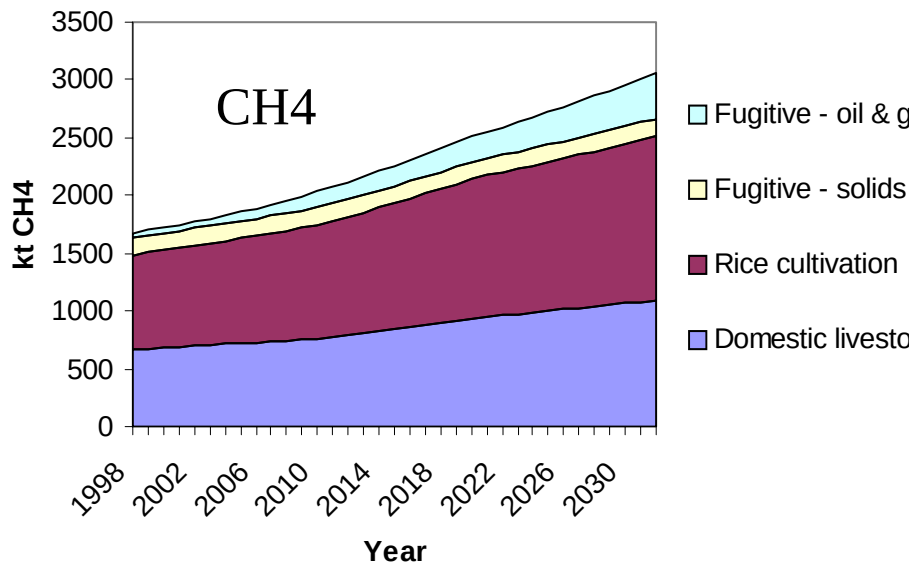
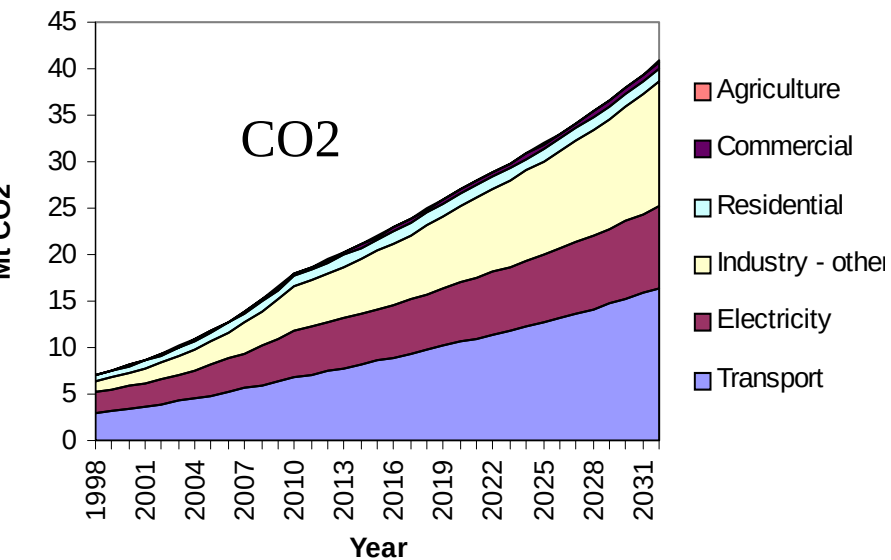


Primary energy



Primary energy in power sector

AIM-Myanmar: BAU Results



Future Work

- Disaggregate Myanmar database; Myanmar mitigation analysis
- Non-CO2 database for Bangladesh
- Detailed analysis for Pakistan & Bangladesh
- Validate Non-CO2 database
- Costs of Non-CO2 abatement options
- Other countries