

AIM/Enduse: Application to Bangladesh

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Presentation scheme

- Overview of Bangladesh's energy-economy
- Data estimation
- Scenario assumptions
- Preliminary results
- Agenda for further study

A Bangladesh – India Comparison

Item	Bangladesh	India
GDP	\$ 47.8 Billion	\$ 514.4 Billion
Population	132 Million	1000 Million
GDP growth	5.5-6.0%	4.5-6.0% (1998-2002)
Agriculture	35% of GDP	26% of GDP
Domestic reserves	Mainly Nat.Gas	Mainly Coal
Commercial energy	Gas dominated (71%) (in Power, Fertilizer)	Coal dominated (> 50%) (in Power, Heavy industry)
Accessibility to elec.	18%	80%
Persons/vehicle	1000	143

A Bangladesh – India Comparison

Item	Bangladesh	India
Nat.Gas reserves	16-38 Tcf	26 Tcf
Nat.Gas production	320 Bcf	800 Bcf
Oil reserves	57 Mill.bbl	5400 Mill.bbl
Oil production	4500 bbl/day	759,000 bbl/day
Oil imports	57,500 bbl/day	1,200,000 bbl/day
Coal reserves	-	82 Bt
Coal production	-	360 Mt
Electricity capacity	3.8 GW	112 GW
Electricity mix	87%G, 6%O, 6%H	70%C, 18%H, 2%N

A Bangladesh – India Comparison

Item	Bangladesh	India
Per capita comm.energy use	88 kgoe	317 kgoe
Per capita C emission	0.05 MtC	0.25 MtC
Fuel share of C emission	65%G, 34%O, 1%C	65%C, 30%O, 5%G


Traditional energy scenario:

Biomass energy use	13.8 Mtoe	163 Mtoe
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75% people use
biomass for cooking



Severe constraint on
biomass supply



AIM-Bangladesh: Data estimation

Examples of estimation of service demands in 1995:

$$\begin{aligned} \text{Rural cooking demand (in cooking hrs)} &= \\ &= (\text{RPOP} / \text{RHS}) * \text{DCH} * 365 \end{aligned}$$

$$\begin{aligned} \text{Urban lighting demand (in lighting hrs)} &= \\ &= (\text{UPOP} / \text{UHS}) * \text{UNL} * \text{UDLH} * 365 \end{aligned}$$

$$\begin{aligned} \text{Refrigerator demand (in no. of refrigerators)} &= \\ &= \{(\text{UPOP} / \text{UHS}) + (\text{RPOP} / \text{RHS})\} * \text{SAT} * \text{DUH} * 365 \end{aligned}$$

Calibration of aggregate data with IEA Balance Tables

AIM-Bangladesh: BAU Assumptions

Drivers for service demand forecasts
(from 2000–2032):

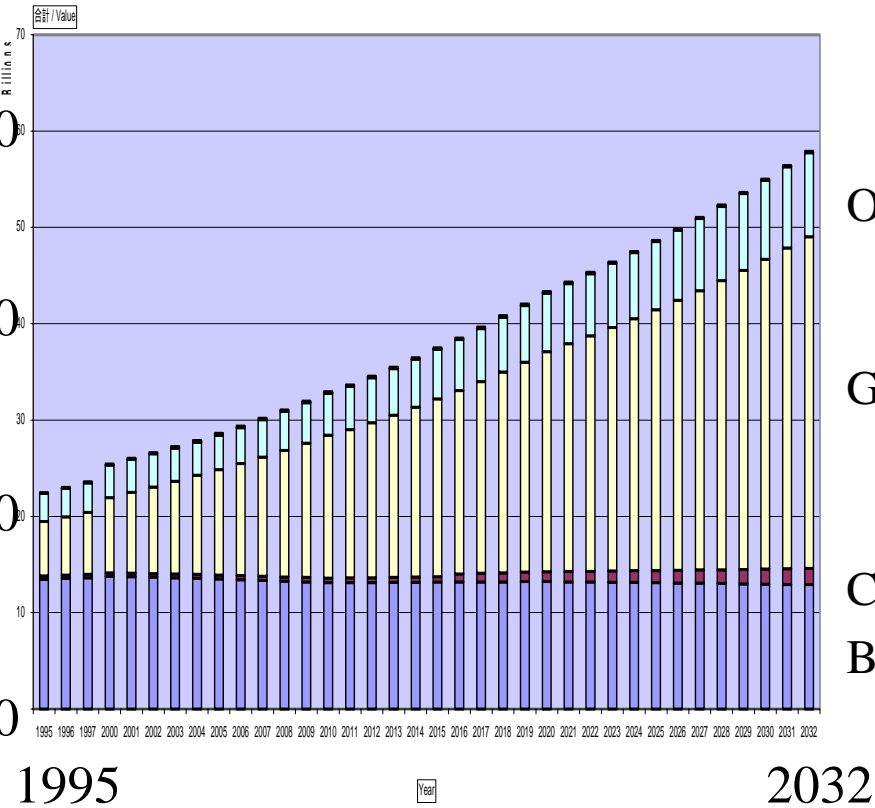
- GDP 4.7%
- Population 1.22%
- Industry value added 5.7%
- Commercial value added 5.2%
- Transport demand 4.7%
- Irrigated area 0.66%

AIM-Bangladesh: Three Scenarios

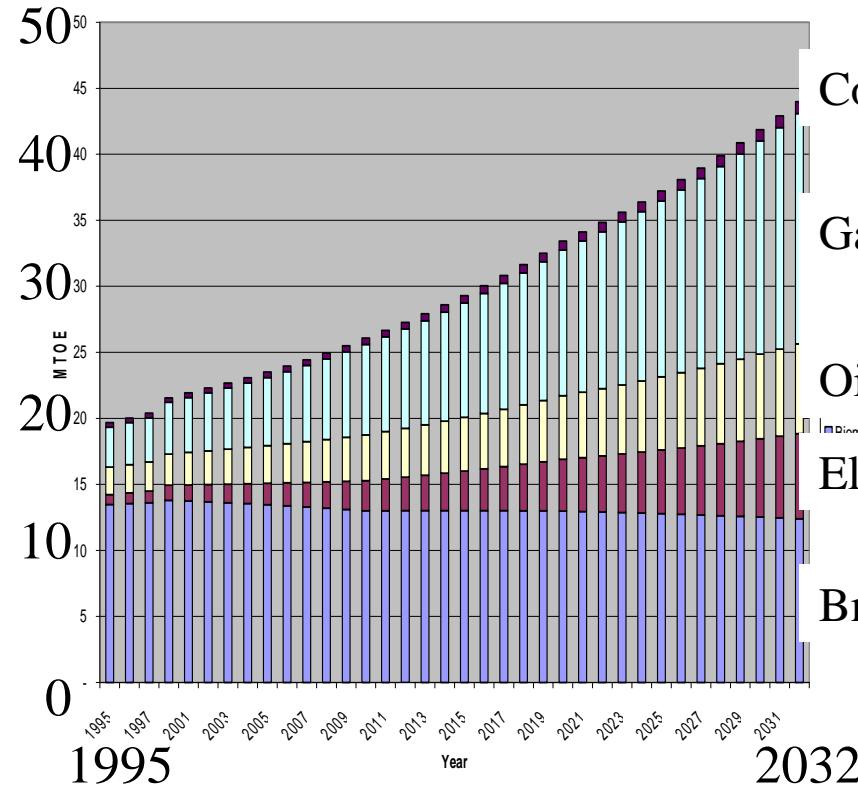
- BAU
 - Moderate efficiency improvement assumptions
 - Declining share of biomass cookstoves
 - No Tax
- C-Tax 100
 - Constant tax of \$100/tC from 2010 onwards
- C-Tax 100 + Hi Efficiency
 - Constant tax of \$100/tC from 2010 onwards, AND More opportunities for efficiency improvements in devices in all sectors

AIM-Bangladesh: BAU Results

Area: All | LPS: All | Region: All | Removal: All | Sector: All | Kind: ENG | Energy_Device: All



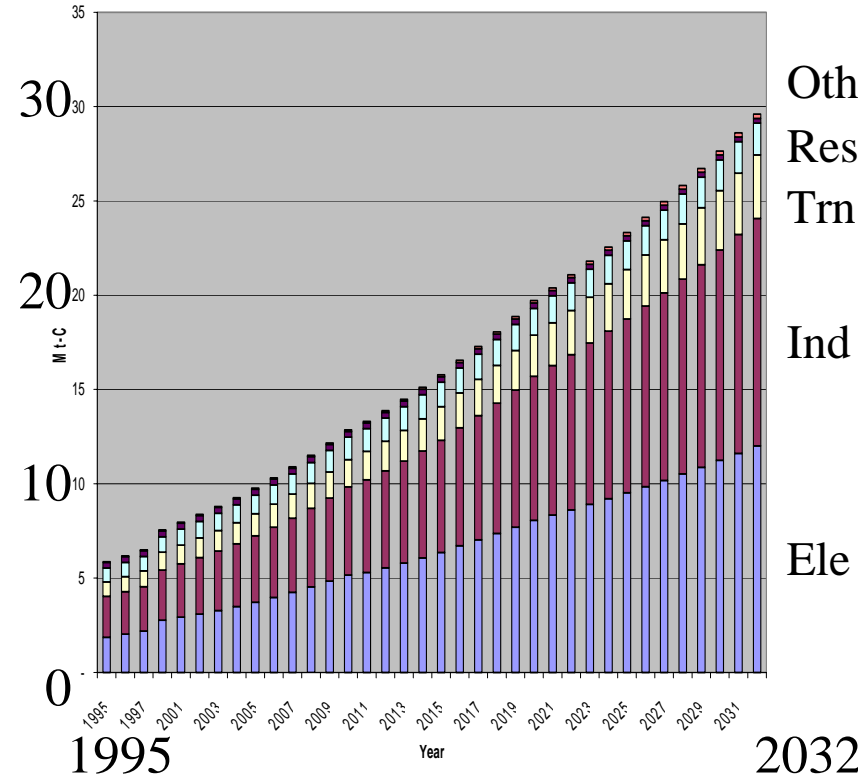
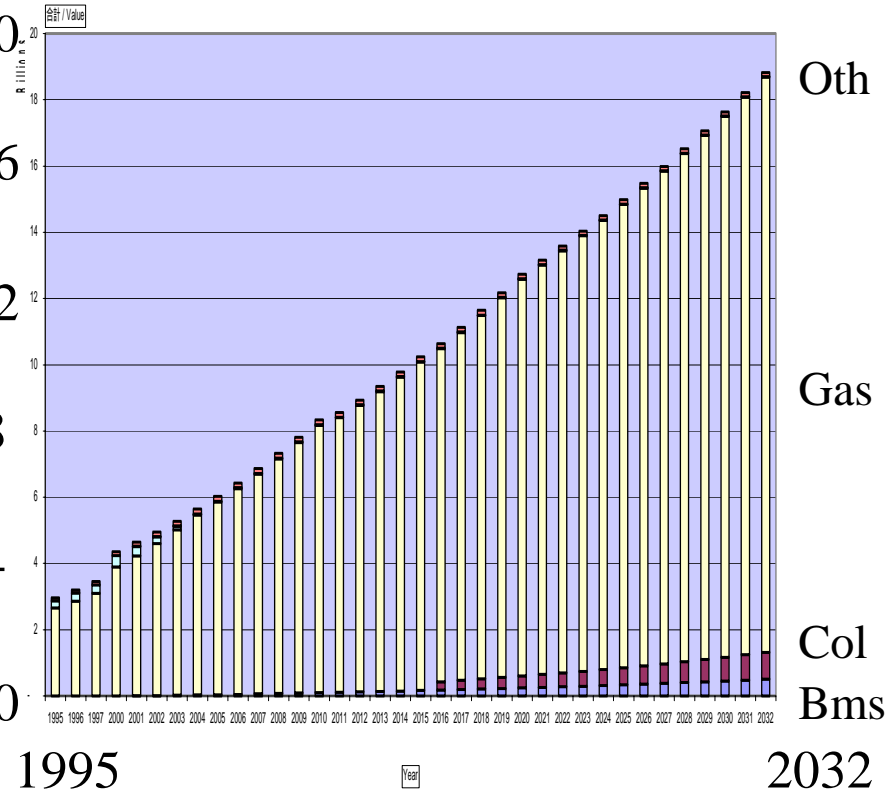
**Primary energy supply
(Mtoe)**



**Final energy use
(Mtoe)**

AIM-Bangladesh: BAU Results

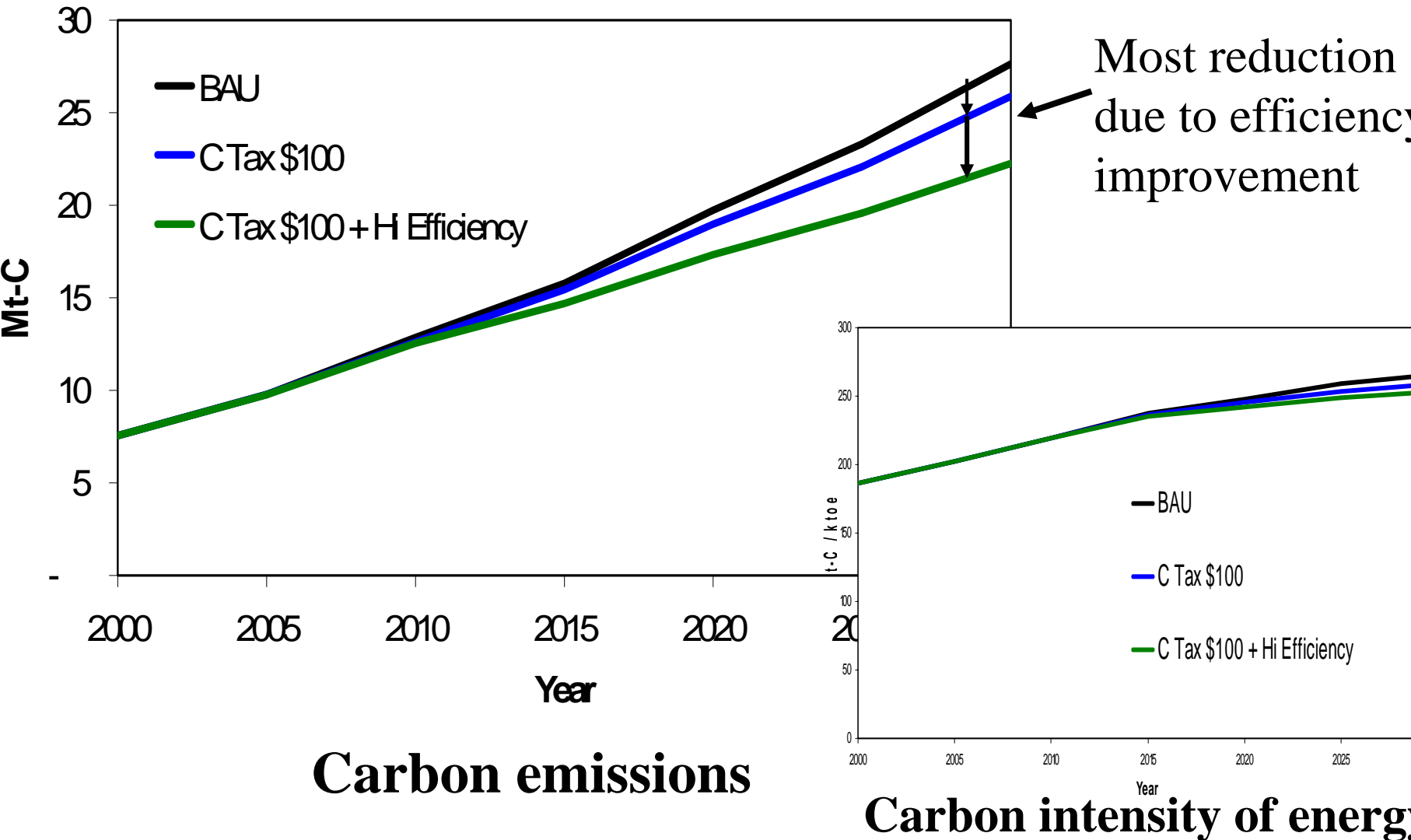
LPS_Area|All|LPS|All|Region|All|Removal|All|Sector|CV-ELE|Kind|ENG|Energy_Device|All



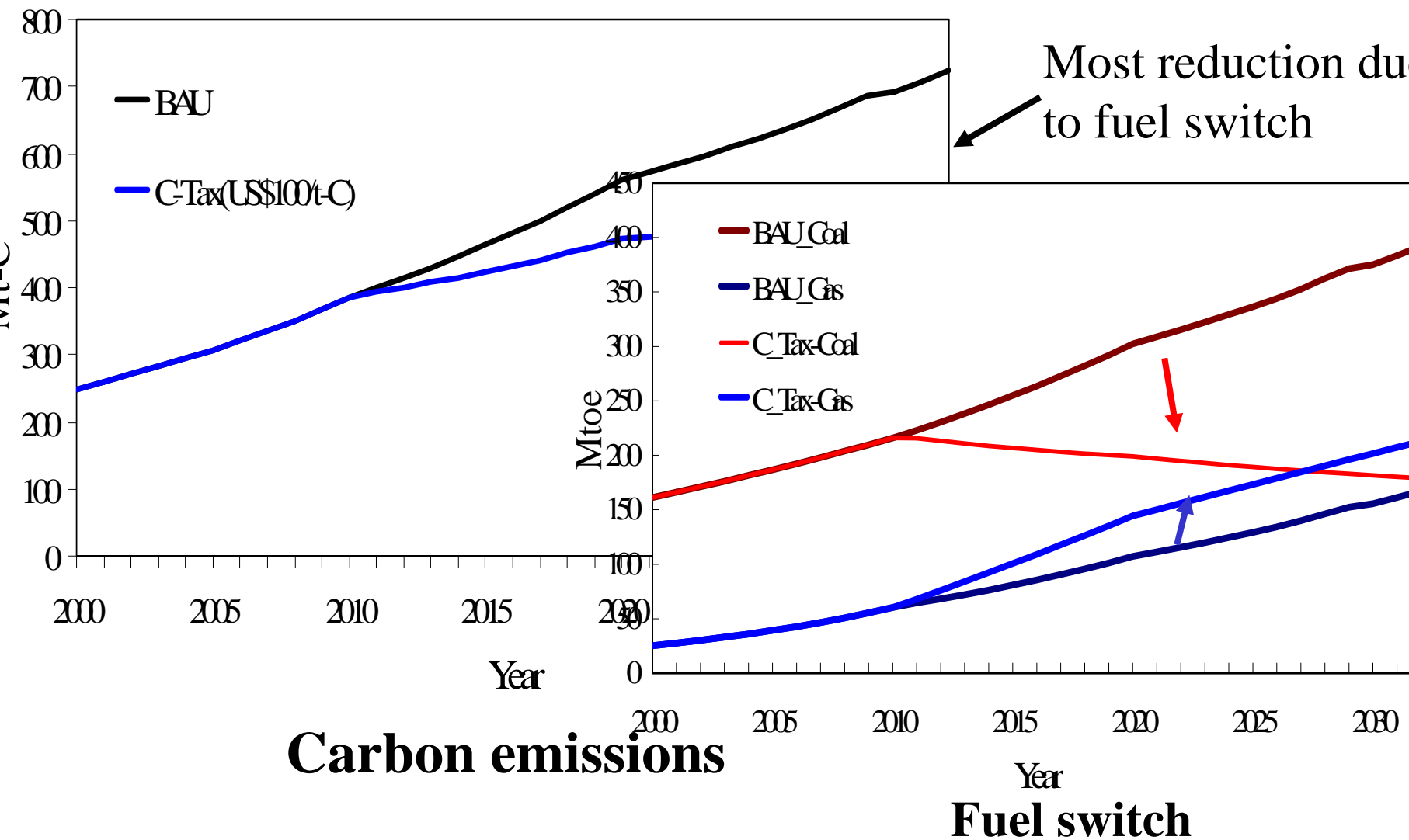
Primary energy in electricity (Mtoe)

CO2 emissions (MtC)

AIM-Bangladesh: Scenario Results



AIM-Bangladesh: Comparison with India



AIM-Bangladesh: Issues for further study

- Trade of natural gas with India
 - Potential for regionally optimal solutions by facilitating fuel switch in India and penetration of efficient industrial technologies in Bangladesh
- Uncertainty in availability/price of natural gas
- Non-CO₂ gases