MERGE

A Model for Evaluating Regional and Global Effects of GHG Policies



MERGE Model Description

- Top-down global IAM with bottom-up description of energy supply
- Developed by Alan Manne and Richard Richels, current team includes Geoff Blanford and Tom Rutherford



- 10 year time steps, 2010 2100 (climate model to 2200)
- Intertemporal optimization
- General equilibrium (aggregate)
- Solved in GAMS (~20K variables, ~20K equations)

MERGE Model Description

- Key Inputs
 - Benchmark growth paths for GDP and energy use
 - Technology cost and performance trajectories
 - Resource endowments
 - Elasticities, introduction and decline rates
- Key Outputs
 - Energy prices, levels, and technology mix
 - Emissions levels and permit prices
 - Realized GDP, delta from baseline
 - Climate outcomes (concentrations, RF, average temp)



MERGE Regions

- Flexible regional composition
 - Base year country level data is aggregated into 35 "subregions" (19 individual countries, 16 groups)
 - Key parameters are specified for each subregion
 - At run time, model regions can be defined according to any combination of subregions
- Example:

USA	EUR	JPN		RUS	CHN	IND	XAS	ROW	
USA	DEU GBR FRA ITA ESP XE15 XDE EE1 XA12	JPN	CAN AUS NZL	RUS	CHN	IND	KOR IDN XDA XAS1 XAS2	BRA MEX XLA1 XLA2 EE2 XFSU XDV	TUR ZAF OLX1 OLX2 XME XAF

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Baseline assumptions for China



Per capita energy use in China



Different scales, similar abatement opportunities



Mitigation in anticipation of future commitments

