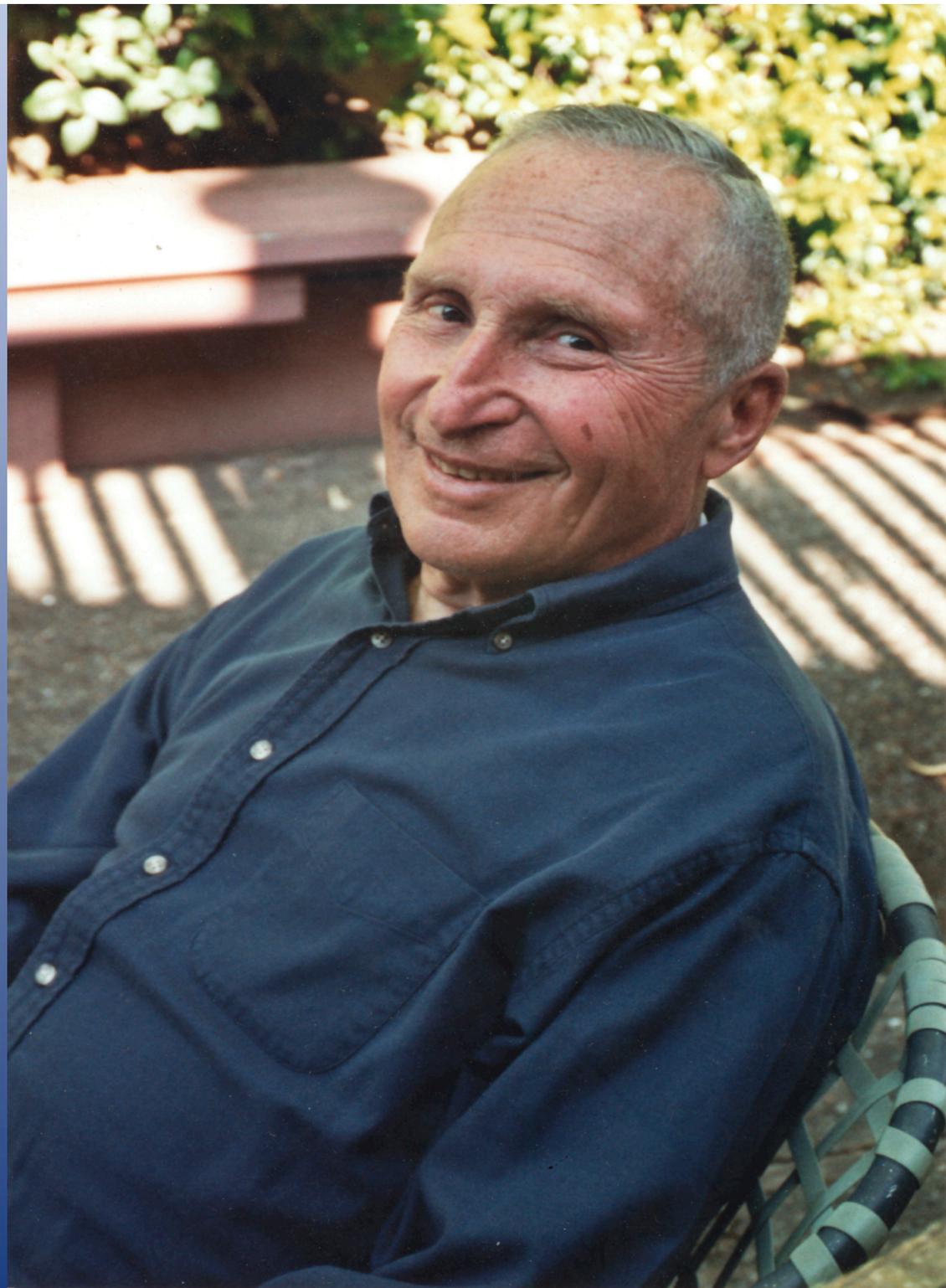


Energy Modeling and the IEW: A Historical Perspective

Chair: Geoff Blanford

Alan S. Manne

(1925-2005)



Avid Horseman



Alan Manne

The Founder of the IEW

Richard Richels
with the help of Tom Rutherford and John
Weyant

IEW
Stanford University
July 6, 2011

Appropriate that 30th Annual Meeting be held at Stanford

- Initial IEW meeting held at Stanford
- Home of the EMF
 - IEW grew out of the EMF
 - Designed to complement EMF
- EMF provided intellectual stimuli and institutional support to IEW
 - Jim Sweeney
 - John Weyant
 - Susan Sweeney
- After first IEW, it was decided that meeting would alternate between Stanford and IIASA with LEO Schrattenholzer becoming Co-Director

Biographical Information

1992-2005 Professor Emeritus of Operations Research, Stanford University

1976-1992 Professor of Operations Research, Stanford University

1974-1976 Professor of Political Economy, Harvard University

1973-1974 Economist, International Institute for Applied Systems Analysis,
Laxenburg, Austria

1970-1971 Fellow, Center for Advanced Study in the Behavioral Sciences

1966-1967 Economic Advisor, U.S. Agency for International Development, New
Delhi, India

1963-1964 Research Associate, M.I.T. Center for International Studies, New Delhi,
India

1961-1974 Professor of Economics and Operations Research, Stanford University

1956-1961 Associate Professor of Economics, Yale University

1952-1956 Economic Analyst, The RAND Corporation

1950-1952 Instructor in Economics, Harvard University

1950 Ph.D. in Economics, Harvard University

1943 A.B. in Economics, Harvard College

Honors

Phi Beta Kappa (1943)

Fellow of the Econometric Society (1963),

Lanchester Prize of the Operations Research Society of America (1974)

Fellow of the American Academy of Arts and Sciences (1986)

Honorary Doctorate from Goteburg University in Sweden (1988)

Fellow of the National Academy of Engineering (1990)

Larnder Memorial Prize of the Canadian Operational Research Society (1995)

Doctor Honoris Causa from Geneva University (1998)

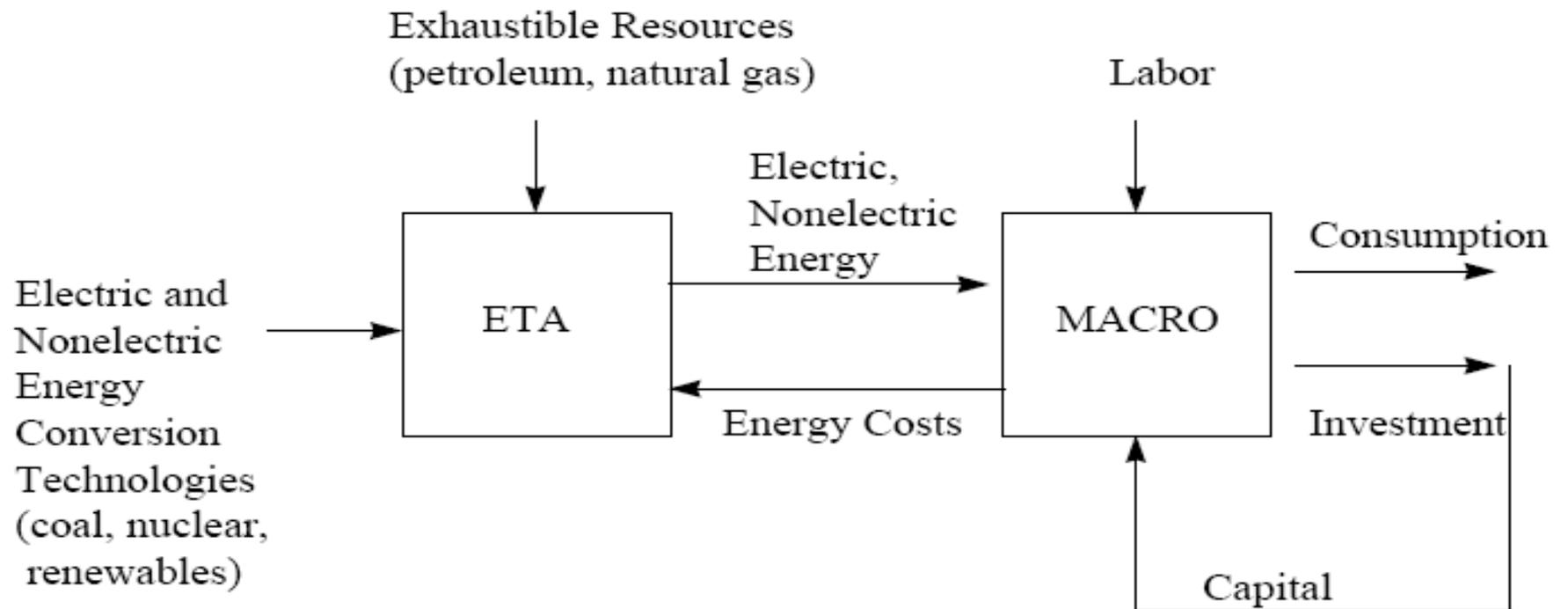
Recipient of the Paul Frankel award (1998)

U.S. Association for Energy Economics. Fellow of INFORMS (2002)

Pioneer in Energy-Economy Modeling - the 1970's

- Electric Sector Models
- ETA
- ETA-MACRO

An Overview of ETA-MACRO



Model Evolution

- Ramsey model of savings and investment
- Putty-clay technology
- Process model of electric and non-electric energy supply
- Double exponential resource exhaustion model
- AEEI (autonomous energy efficiency improvements)

Global Climate Change Research Program

- Produce models through which to quantify alternative ways of thinking about climate change, e.g., **cost-effectiveness or cost-benefit**
- Explore divergent views on a wide range of contentious issues, e.g., **the discount rate, technology costs and availability**
- Provide analytical tools for general use within the analytical community, i.e., **transferability**

MERGE MODEL

a model for evaluating the regional and global effects of
greenhouse gas reduction policies

Features of MERGE

- Intertemporal computable general equilibrium model
- Multiple regions (Each region had structure of ETA-MACRO
 - Bottom-up model of energy sector; top-down model of the balance of the economy
- Trade among regions: oil, gas, carbon emission rights
- Perfect foresight
- Multiple GHG's and carbon sinks
- Tradeoffs between gases based on “efficiency” prices rather than gwp's

Exploring key issues in global climate policy (Cost-Effectiveness)

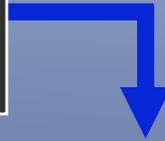
1. What is an appropriate framework for evaluating emissions abatement policies (cost effectiveness analysis)?

Causal Chain Between Human Activity and Damages

**Demographic/
Socio-economic/
Tech. futures**



Emissions



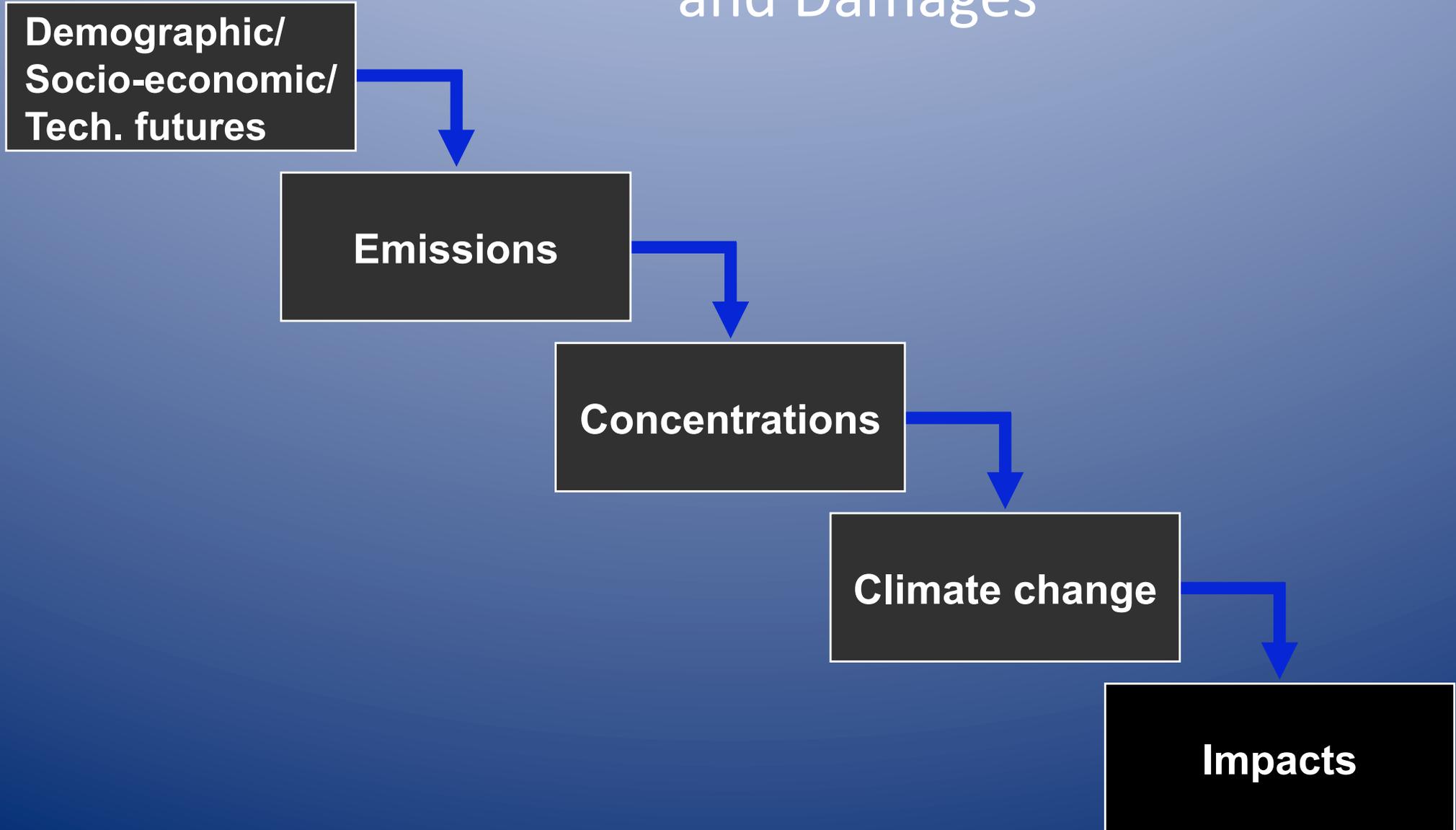
Concentrations



Climate change



Impacts



Exploring key issues in global climate policy (Cost-Effectiveness)

- What is an appropriate framework for evaluating carbon emissions abatement policies (cost effectiveness analysis)?
 - What is the cost of a particular climate policy?
 - What role should carbon sinks play in greenhouse gas policy?
 - How should climate policy measures treat different greenhouse gases?
 - How does learning-by-doing affect the quantitative properties of efficient climate policy?
 - How does the application of market exchange rates (as opposed to purchasing power parity) affect baseline emissions growth paths?
 - How do natural gas and petroleum resource exhaustion affect climate policy?
 - To what extent does international trade vitiate sub global carbon agreements?
- What are the strengths and weaknesses of specific climate policy proposals?

Continuing to explore key issues in global climate policy (cost-benefit)

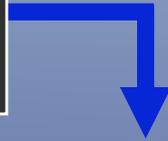
- How can we frame climate policy design from a cost-benefit perspective, accounting for market and non-market damages?
- How do equity and efficiency objectives affect the design of climate policy?

Causal Chain Between Human Activity and Damages

**Demographic/
Socio-economic/
Tech. futures**



Emissions



Concentrations



Climate change

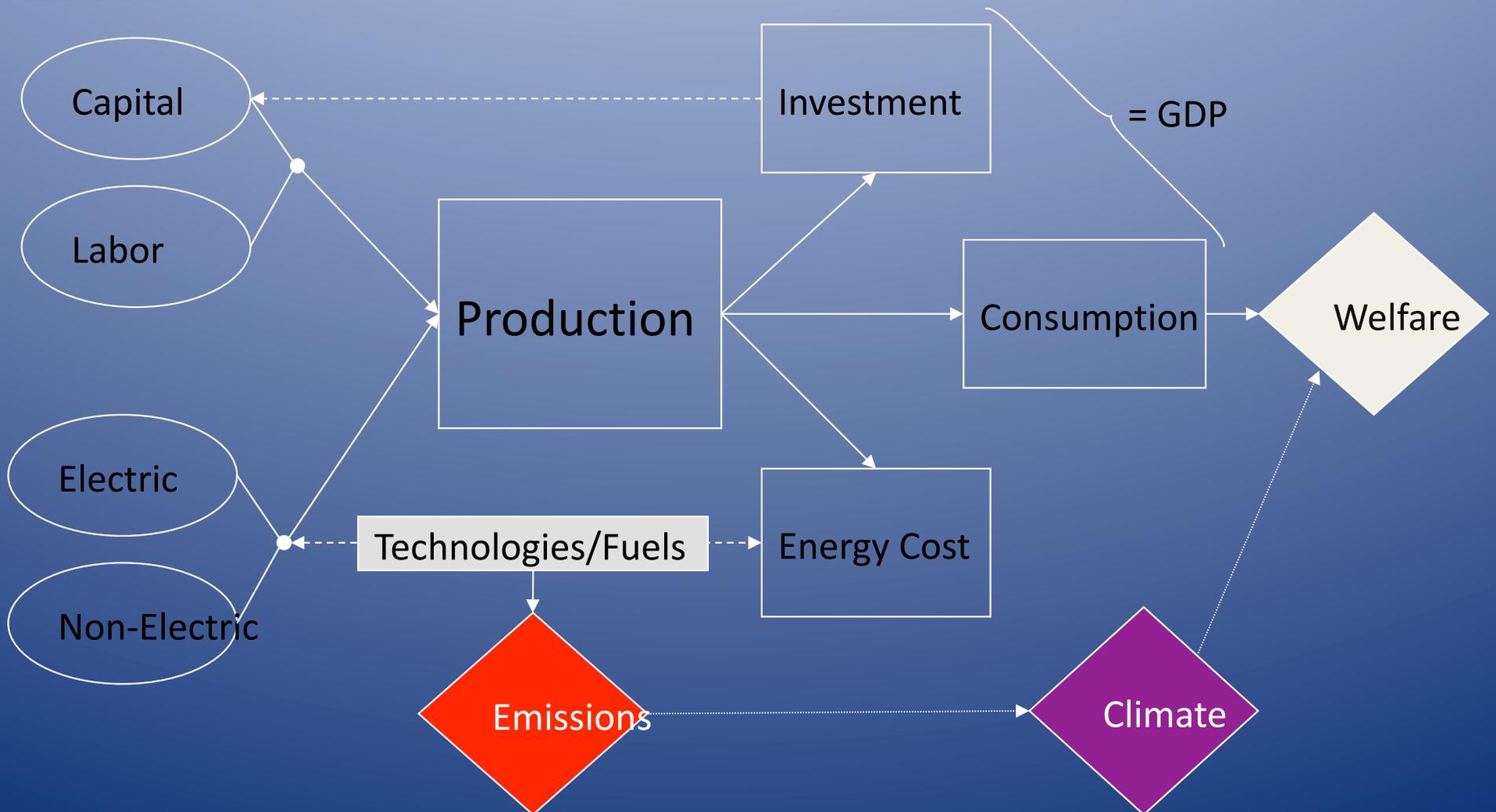


Impacts



Basic Structure of MERGE Model

INPUTS:



What are some of the key messages for climate policy

- “Market mechanisms” less costly than “command and control”
- Flexibility to deal with critical uncertainties
- Allows for learning and mid-course correction

What is the most-cost effective near-term hedging strategy?

Other key messages

Portfolio of Options for Managing Risks

- Mitigation
- Adaptation
- R&D
- Reducing Scientific Uncertainty
- Geoengineering (not as silver bullet but to buy time)

What is the most cost-effective mix

Other key messages

- Silver bullet unlikely
- No free lunch
- But given the alternative, may be the best lunch we ever buy

Need to promote climate policy not on the basis that it will be cheap but because the benefits outweigh the costs

Lessons for modelers

1. A policy analyst should be policy relevant not policy prescriptive
2. There is a big difference between a policy analyst and a policy advocate
3. Be transparent
4. No all purpose “hammer”
5. Know your “nail”

Lessons Learned - cont.

6. Do not let the “perfect” be the enemy of the “good”
7. If you are going to upset the “apple cart” make sure you make good “apple sauce”
8. Expect results to be misused in policy debate

Absent but
never forgotten

