### The 28th AIM International Workshop 13/09/2022

30 Years of AIM - Backbone of Japanese Science-based Climate Policy

Shuzo Nishioka IGES

Azumino in June

246 - 265 - 266 -

Prehistory

# Can We Delay A Greenhouse Warming?

Implication of Findings

- Global greenhouse warming is neither trivial nor just a long-term problem
- Research should focus on how atmospheric temperature responses to changes in GHG
- A 2 degree increase in temperature by (or perhaps well before)the middle of the next century leaves us only a few decades to plan and cope with a change in habitability in many geographic regions.
- Changes by the end of 21<sup>st</sup> century could be catastrophic taken in the context of today's world.

Prediction of temperature rise responding to emissions



Based on IEA Edmonds & Reilly Model and EPA



1. Establishment of science-based policymaking methods

#### Framing climate policy and role of AIM:(1) COSMO Plan: Comprehensive Strategies for Moderating Global Warming Plan (1989-92)

11 experts from wide discipline/sector discussed and concluded:

#### 5 principles of Japanese action

(1)Fulfilment of own Polluter-Pays Principle responsibility
(2)Contribution as an environmental nation with technology
(3)International cooperation based on equal footing position
(4)Leadership in environmental action internationally
(5)Promotion of International agreement framework

#### • Framework of climate policy & policy options

energy saving

inducing innovation by early ambitious target setting

- $\cdot \text{co-benefit}$  with pollution control  $\cdot \text{urban}$  energy change
- sustainable forestry ·agricultural productivity
- ·just technology transfer ·simple life, economic instruments…

# Framing climate policy and role of AIM COSMO Plan(2)

# Creation of climate policy science community

Special characteristics of climate change, with its matters of value choice, pass dependency, more than optimization and inevitable risk concept, requires reasonably harmonized analysis and policy formation with natural science, and policy scientific insight.

(1)Establish domestic policy science research community Research group for Japan-specific policy, networked by linkage model

Capacity development at universities

Financial and organizational research support systems

(2)Establish international network of policy science community Formation of invisible research institute for fermenting international agreement

(3)Enhance academic society for policy science, economics, international relations and ethics for global environment

# Framing climate policy and role of AIM **COSMO Plan**(3)

- These research results on comprehensive policy structure for CC, compiled into two volumes of journal, was submitted as a Japanese proposal 'Fifteen proposals for the Restructuring Contemporary Social Systems for Stable Climate' to UNCED (Earth Summit: 1992)
- The suggestion of inevitable socio-economic restructure led climate policy of Japan thereafter, to a transition to 'Low Carbon Society', not a simple energy transition,
- And it suggested to the structure of AIM models and potential policy options as well.

	環境研究 1992. Na86	WEN 0285-0769	<b>T</b>
旗旗振开究 1932. Na86	Agriculture and Forestry	TTT	李エット立て正クロ
COSMO Plan II from Jupan Fifteen Proposals for the Restructuring Contemporary Social Systems for a Stable Climate	sublishing recycling and recirculation system in local and regional material flow is essential for	一時間が	<b>新環境研究</b>
tor a Statute Cumate In order to stabilize future climate of the earth, we are corrince of the need to change the socio-economic arcture of contemporary society. Outlined below are fifteen proposals which would lead to the achievement that goal.	Explanation and a second se	現代防止のための社会経済システムの構成改革に関する状策) コスモプラン II コスモプラン II の現 方三	《地球気候安定化に向けた総合戦略 特別号》
a range stand wether with an over	prime of the second sec	さための社会経済システム Ⅱ	序にかえて
Citizen Life Styles	arbitists of the cases of contract notes of an the rimppines and contract afforestation in Thailand. In mis aubists of the cases of contract notes of the result of the rest of the result of the result of the result of the resu	暖化防止のため コスモン	地球温暖化対策検討グループ中間報告西岡 秀三
proting public awareness of the effectiveness of the change to environmentally sound life-styles y reduce energy consumption by 10–18% in Japan in the coming two decades, Dr. H. Tsuchiya has	Ean		地球温暖化対策に求められる政策科学的視座西岡 秀三
alated the conservation potentials of life style change in daily life, which our future society confront to per or later. "Contest and Prize", "Subsidization" and "Tax and Penalty on the waste-inducing technolo-	Objective, Organization and Research	壊化助止のパ コスペー ■酸化防止のための社会経済システムの ■酸化防止のための社会経済システムの 構造改革に関する提案コスモブラジ II	地球気候安定化のための政策オブションの体系森田 恒幸
are the key implementation to reach this goal.	t southed and human resources as a results of south at	日暖化防止のため町する提案 コンステムの構造両間 秀三 超屋 治紀	産業及び都市の基本構造の転換に向けた
taneous activities. This is a result Dr. M. Aoyagi estimated from her survey of more than 600 families an. This showed the practical effectiveness of environmental education, and the importance of fostering	Despening of capital and human resources as a results of population control acceleraes the mechanism of increasing per capita income. This relation is confirmed by Professor N. Ogawa in his ex-	国際化防止のための社会経済シスモブラン 構造改革に関する異素コンステンの構造経済 に対象などのための社会経済システムの構造経済 必能の社会、コスモブラン IIIの第二、「新聞、方二」に構成 がしていための計算者学習 が上すってスタイルの変化を促す政策・「新聞みどり がよりたったちめの消費者学習 が見ていため、「「新聞、「「「」」」 がしていための消費者学習 がしていための消費者学習 がしていための消費者学習 の の の の の の の の の の の の の	政策オプション
mmental conservation groups on a neighborhood basis facilitating case of participation by local people	mechanism of mechanism of mechanism of the mechanism of the strengthened of the strengthened into economic growth planning of developing countries.	「「確保安定にはる」コムと、カイルのタイレー	発展途上国の自立に向けて
al Symbiogenetic Society with five step scenario is proposed in Professor T. Morioka's design of dis 21 & Ecolife 21, in which the key words are "seven R's" for energy saving and waste reduction.	and be integrated in the state of the modified into those that properly reflect the damage to the existing economic indicators should be modified into those that properly reflect the damage to the environment and the deterioration of environmental resources, which is to be used as a common goal and the state of t	政策に関わるライの消費者学習	住宅の保温構造化による省エネルギー中上 英俊
eling in product stream management and the innovative climax of a physically simple life.	environment and the docal policy. Dr. T. Morita and Professor Y. Matsuoka propose that "co-existence and	ネルギー 一部一日本 一部一部一部一部一部一部一部一部一部	農業部門の政策
Urban Design, Transportation and Information System			炭素の放出源から吸収源へ
WARDER BALL MORE THE REAL PROPERTY OF THE REAL PROP	enting social description of the second seco	昭市構造及び都川市の土地利用・文品 名和小小市 合阪	大気汚染の総合管理に向けた政策オプション井村 秀文
alized Location of Compact Cities is the ultimate image of ecological land use and city design. aggestion of Professor Y. Matsuoka, Dr. T. Morita and Mr. T. Arimura concluded after their statisti-	solvents a scenario under which the carbon di- orde concentration is automatically controlled by allocating one and 2-3 tons per capita emission for develop- ion and developed countries respectively.	2 数第の24年の 5 イラスション ホルギーに関わための消費者等部 活電速化防止のための消費者等部 活得濃度の指示時気度と応考発生型社会システムの構築 活得濃度の指示的形式を注意現代会システムの構築 加速度有限1歳のたちが見た。 電気度素素型活動の発展、低加 、 有度度素素型活動の発展、 、 有点 に に に に に に に に に に に に に	地球気候安定化と経済的手段森田 恒幸 高効率エネルギー技術の国際的移転計画 槌屋 治紀
is of the energy consumption of world cities and their spatial distribution within each country	Establishment of Asian Global Environmental Research Consortium that endorses a cooperative	環境負荷物の環境監査の接近	環境調和型ライフスタイル実現のための
chanism of apportioning fringe profit from railway construction in developed countries tance for developing countries in introducing a well-though-out plan of mass-traffic infra-	research network among developed and developing countries is essential. Dr. S. Nishioka proposes, in or- der to reduce the uncertainties that prevent us from recognizing coming trans-generational environmental	は活地水の脳が中部市配置と地球本 転回 52滴政第 都市構造2 5部市配置と地球本 転回 52滴政第 環境資源用減の下めの都市の土地利用 52滴政第 電域算過減化防止のための環境整整制度の提案 64 海球温暖化防止のための環境整整制度の提案 64 省大市 4-5型社会/経済構造 の存在 4-1 省大市 4-5型社会/経済構造 の存在 4-1 第六前中当によるCO3种出削減 目示的手法によるCO3种出削減 日本の2015年の1440万円面性と現実	政策科学的アプローチ
is required to reduce the energy consumption of cities, which depends on the compactness of ur- re and on the supply level of mass transit system. This is the conclusion of Professor Y. Hausehite	perils. This new big science of global environmental research requires new management concepts which	ボエネルギー」なCO2排出用のための営農技術	・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・
nternational comparison study of traffic system.	peris, this are defined as "integrating autonomous research". This kind of cooperation would promote the early par- signation of developing countries into negotiations on international environmental voltes.	経済的手法に産システムな林の可能性となったのでは、国家に	(付属資料)シミュレーション・モデルに関する資料

### Establishing of science based policy making methods: Development & deployment of AIM through IPCC



### Contribution of AIM to high-level decisions of Japanese climate policy

Year	Decision	Contribution	Memo
1997	Japanese 6% Reduction target for Kyoto Protocol	Provided negotiation team reduction options using IAM End use model	Debut of AIM, Sole IAM in Japan Adopted as in-house model of Environment Agency
2008	Japanese long-term reduction target for G8 Toyako Summit : Prime Minister Fukuda's Declaration of '2050 Japan Low Carbon Society'	Result of "Japan Low Carbon Society Scenarios toward 2050 Project- Possibility of 70% reduction"	<ul> <li>Three time lectures to Environment Minister</li> <li>2012→ The 4<sup>th</sup> Environment Plan set 80% reduction target</li> </ul>
2009	Japanese mid-term – reduction target for submission to UNFCCC/COP15	Options and their evaluation using AIM End-use/CGE/Impact	Cabinet Office invited 5 Models Still, AIM was only one IAM in Japan
2010 - 2012	Mid & long-term roadmap to achieve reduction target (Central Environment Council)	Long-term Prediction of emission compiled by AIM results of discussion by nearly 100 expert of 11 subgroups	
2011 _ 2012	Energy-Environment strategy after Fukushima nuclear accident caused by Great East Japan Earthquake- (Cabinet Office)	Options of Nuclear share (in electricity) 0%, 15%, 20-25% compiled by AIM provided to nation wide deliberative poll	Result: •Strengthen energy saving •Prioritize RE •Reduce nuclear dependency 0% 15%, 20-25% Poll 47% 15% 13%
2020 - 2021	The 6 <sup>th</sup> mid-term energy plan and NDC (METI & MoE)	Feasibility of GHG net zero emission in 2050	First occasion invited to energy plan discussion

# The Kyoto Controversy: Integrated system thinking vs. Sectoral inconsistent thinking



From H. Kobayashi

# Mourning for Prof. Dr. Morita

1988-2003 15 years! He did a lot!

# We have lost a great lighthouse to guide us

## **IPCC** chair

NEL ON CLIMATE CHANGE

Mrs Morita TOKYO Japan

Potsdam, 4 September 2003

Dear Mrs Morita,

第13回 Froto 地球最优的经堂,表彰 国际新国际会馆展示寄赠品として

京都議定書に貢献すれた

at we received the tragic news of the sudden demise of of. T. Morita. This information came when we were idam at which he was to be present but for his illness.

is meeting we stood in silence at the beginning to pay lecided collectively to convey our shock and sense of

condolences on behalf of the IPCC and our feelings of

世森田恒幸会に捧げる 西田秀ミン28人の仲間 Dedication to Dr. Morita

ここにある

Dedication to Dr. Moi for The Earth Hall of Fame Kyoto Yours sincerely,

Haban

R.K. Pachauri Chairman



By Jun Morita



Prime Minister outlines green 'Fukuda Vision of Low Carbon Society Japan' on 9<sup>th</sup> June 2008 pledging to cut 60-80% of greenhouse gas emissions based on current levels by 2050 in Japan Impossible Dream? or A Ray of Hope? 環境省地球環境研究総合推進費(S-3)「脱温暖化 2050プロジェクト」シンポジウム報告書

Global Environmental Research Fund (GERF/S-3) Japan Low-Carbon Society (LCS) Scenarios toward 2050 Project Symposium

低炭素社会への道筋:日本とアジア -「脱温暖化 2050 プロジェクト」研究成果発表会-

Path toward Low-Carbon Society : Japan and Asia -Results from Japan Low-Carbon Society (LCS) Scenarios Study-



2009.2.12(Thu) 於:ホテルメトロボリタンエドモント (Hotel Metropolitan Edmont, TOKYO)



Introduction of Japan LCS Research Project Junchi Fujino (NIES), Japan LCS symposium, Feb 12, 2009, Tokyo Unichi Fujino (NIES), Japan LCS symposium, Feb 12,

### Creation of climate related policy science community

*Framing climate policy and role of AIM COSMO Plan (1992)* 

Achievement: Present status

- Establish domestic policy science research group for Japan-specific policy, networked by linkage model
- Financial and organizational research support
- Capacity development at universities
- Establish international network of policy science community. Formation of invisible research institute for fermenting international agreement
- Enhance policy science, economics, international relations and ethics & global environmental resource data base



Society for Environmental Economics and Policy Studies (SEEPS, est.1995)......

### 3. Expansion of internal cooperation

#### 1996 AIM Workshop started The First AIM WS, 1996 NIES



### and grown up

#### IPCC Asia –Pacific Workshop on Integrated Assessment Model 1997, at UNU Tokyo

Overview of socio-economic models, <u>J.Edmonds</u> Several gaps between IAM and D-ping co, <u>T. Morita</u> • How adequately do IAM reflect socio-economic structure of developing countries? PR. Shukla

Is it Possible to apply the same policy instruments to developing & developed countries? <u>T. Jung</u>
How realistically do IAMs estimate climate change impacts in developing countries? <u>Y. Matsuoka/ I.Sun</u>



Major participants B. Bolin, H.S Lee S. Schneider, N. Nakicenovic, J. Wayent, J. Alcomo, A.Amano...

Organizing Committee H.Uzawa, J.Houghton, Y.Kaya W. Nordhous, H.J.Schllnhuber. R. Watson...

90 scientists from abroad
3 days with audience of 300
Secretary: NIE/CGER



IATE CHANGE AND INTEGRATED ASSESSMENT MODELS [IAMs] - BRIDGING THE GATS



Proceedings of the IPCC Asia - Pacific Workshop on Integrated Assessment Models

United Nations University, Tokyo, Japan, March 10-12, 1997

This workshop was agreed in advance as part of the IPCC workplan, but this does not imply working group or panel endorsement or approval of th proceedings or any recommendations or conclusions contained herein

Matsuoka (2016) Bibliographies on Systems Analysis of Environmental Problems

4. Future and unfinished business

26





Increasing emissions

## Did We Delay A Greenhouse Warming?



a. Long term trend of anthropogenic CO2 emissions sources



# Nature's suggestion for policy formation to stabilize climate: update(1)



- 1. Solution & remaining time
  - net zero within 30-50 years
  - Immediate deep reduction inevitable
  - > Enough technological potential with reasonable cost exists
  - Be cautious of depending too much on technological panacea
- 2. Carbon budget:
  - Don't waste scarce carbon budget
  - > Mainstream decarbonizing policy in economic policy: green deal
- 3. Risk avoidance:
  - Climate changes are almost irreversible
  - > Overshooting is highly risky. We haven't yet sure technology to reverse it
  - > We can't adapt forever. Mitigation first, adaptation in parallel
- 4. Awe Nature:
  - Nature base solution is quite competitive with food production and ecosystem
  - Low-likelihood CC outcomes cannot be ruled out
  - Possible cause of cascading change in tipping point

# Nature's suggestion for policy formation to stabilize climate: update (2)

- **5** Barriers to transition
  - Economic and institutional feasibility are high barriers in implementation

#### Peakibility Concerns (2020-2100) - 35P2 - All below 1.5 C Scenarios=76 Scenarios=76 Scenarios=76 Socio-cultural economic Institutional technology Technology Economic Socio-cultural Overall

- 6 Demand-side strategies for mitigation
  - restructuring climate policy by bottom up (demand-side) may have reduction potential of 40-70 %
- ⑦ Reforming current economic structure?

#### Demand-side strategies for mitigation

(a) Tilting the balance towards less resource intensive service provisioning



**Barrier in implementation** 

### Thank you for your kind attention!!

Thirty years we studied Thirty years we should act

Enjoy exciting & challenging thirty years of big revolution

Respect nature and human beings

Good luck to you all, AIM Colleagues!

Thank you for your attention!!

Thirty years we studied Thirty years we should act

Enjoy exciting & challenging thirty years of big revolution

Respect nature and human beings Good luck to you all. AIM Colleagues!



Dedication to Dr. Morita for the Earth Hall of Fame Kyoto



# The Earth Hall of Fame Kyoto





