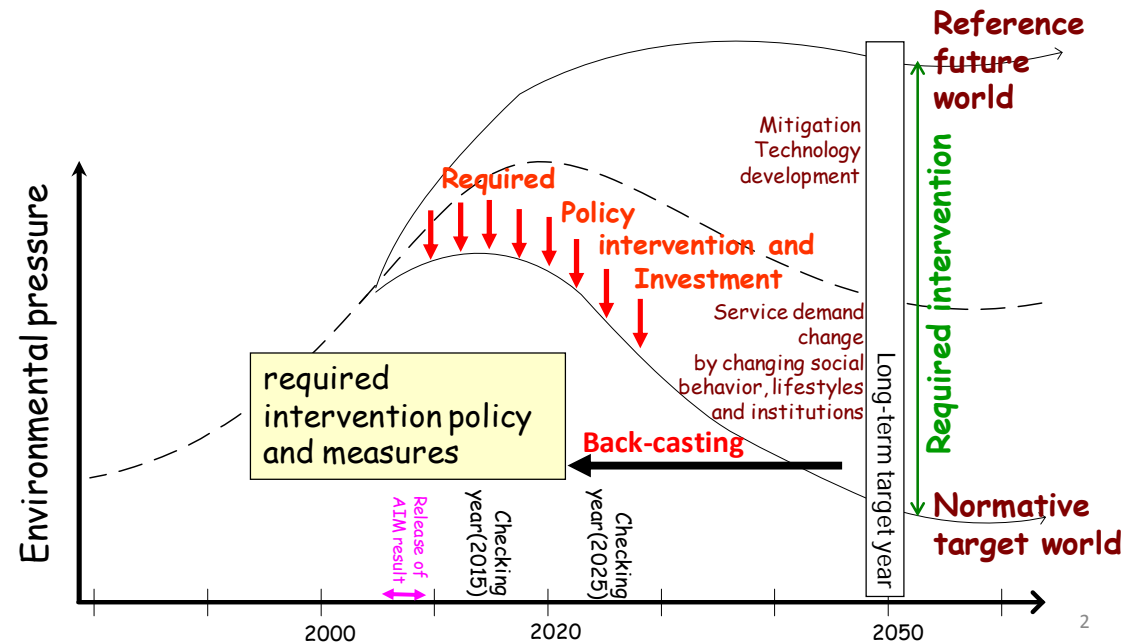


# Introduction to AIM/Backcasting Model



Shuichi Ashina

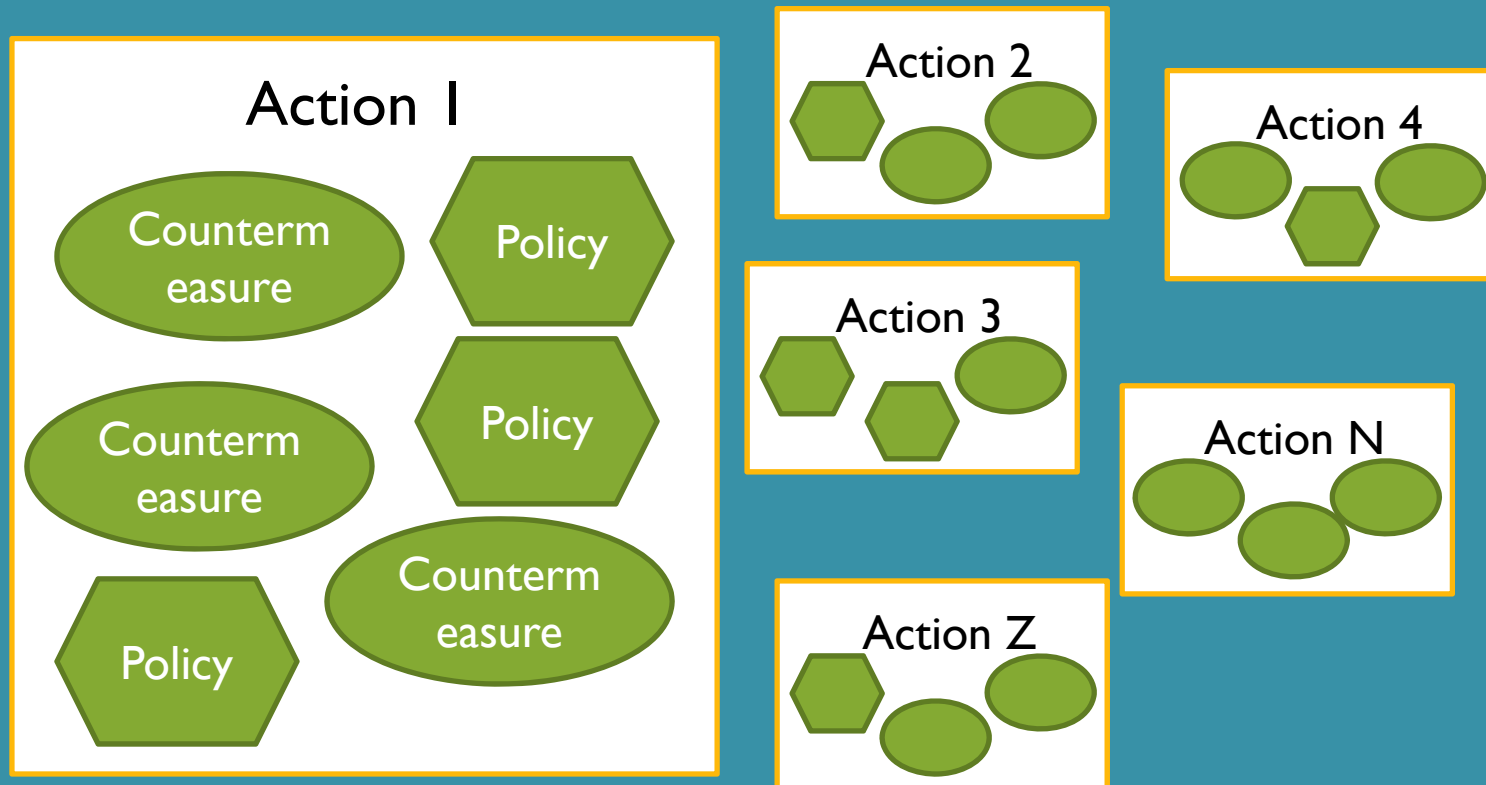
National Institute for Environmental Studies

# First of All :Definition of terms!

Terms	Definition
Innovation	Drastic changes in social factors in order to achieve the LCS. Any changes in factors such as social systems, technological development, and lifestyles are included if it is not an extension of current trends and needs drastic trend-breaks.
Policy	General terms for actions aiming to overcome specific political issues. In this project, “policies for low carbon society” is defined as an overall action to realize low carbon society
Action	Actions are defined as packages of options. The actions should be designed to be triggers and engines for innovations towards LCS, while keeping certain degrees of independency with other actions. Information of actions as an overall package such as specific target, features, time schedules, management framework, and feasibilities, should be assessed and identified.
Option	Individual activities that can contribute to achieving LCS. Can be divided into direct options and indirect options. Direct options are options that can directly change the driving forces of CO2 emissions. Indirect options, on the other hand, are options that can influence the effects of direct options and can contribute to LCS development indirectly.

# Strategy, Actions, Options, Policies : The Cell

## LCS Strategy in Japan





# I. General Introduction

# Outline of the model

- Purpose: Representing inter-temporal optimal strategy on introduction of new technologies and economic activity change in order to achieve the future targets such as carbon emissions in 2050.
- Core model: Dynamic optimization model with linear/mixed integer programming.
- The countermeasures proposed by the other models can be introduced, and evaluated.

From presentation of Dr. Masui in 12<sup>th</sup> AIM WS (2007).

# What is "Backcast" ?

Technology development, socio-economic change projected by historically trend

Environmental pressure

3. We need "Trend Breaks" to realize visions

required intervention policy and measures

Forecasting

Required Policy intervention and Investment

Back-casting

Reference future world

Mitigation Technology development

Service demand change by changing social behavior, lifestyles and institutions

Long-term target year

Required intervention

Normative target world

50% reductions In the world

2000

2020

2050

Release of AIM result

Checking year (2015)

Checking year (2025)

# What is “Backcast”? – to be more simply...

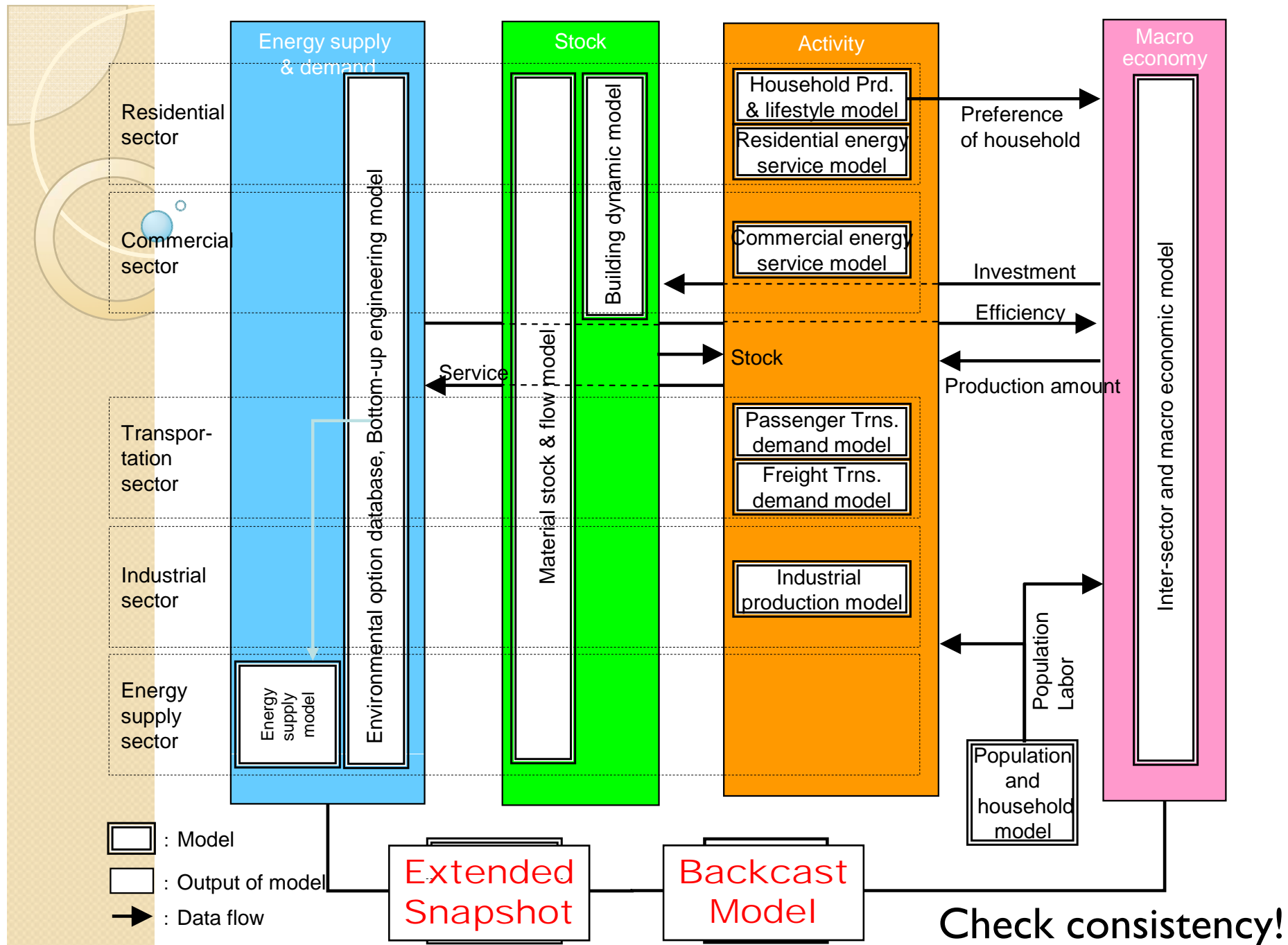
- I want to buy trumpet
  - Price : \$2,000
  - Savings : \$0
  - Pay: \$3,000/month
  - Bonus : \$4,000, Every Aug./Dec.
- Target : 2009, Oct (12 month later)
- How do I manage my money?
  1. \$500 /month, from next June
  2. \$100 / month, \$400 from each bonus



# What is “Backcast”? – to be more simply...


- We want to Reduce GHG emissions
  - Required reduction : 70% from 1990 level
  - Current effort : 0 Mt-C
  - Spending : ???/year
  - Bonus : from forestation, CCS, etc.
- Target : 2050 (42 years later)
- How do we manage our emissions?
  1. 10% /year, from 2043 ?
  2. Backcasting model will quantify of feasibilities of strategy





AIM (Asia-Pacific Integrated Modeling) for Japan LCS scenarios

# Steps of Japan LCS Study(I)

- Energy Snap Shot tool
  - Create narrative scenario (vision of 2050 LCS).
  - ESS shows us CO2 reduction quantitatively.
  - However, ESS doesn't provide us the concrete actions.
- Dozen of Actions 
  - “Dozen of Actions” shows concrete policies / actions to realize LCS.
  - Various candidates of action are described.
- Backcasting Model
  - Show “**When** Who What Where and How” towards the LCS quantitatively.

# Steps of Japan LCS Study(2)

- “Dozen of Actions” shows us what kind of actions are required to realize LCS, but we still don’t obtain quantitative information (cost of actions / required term for implementing actions).



- Back Cast(ing) Model

- BCM provide us following information quantitatively.
- Which policies / actions will be introduced
- When will those actions should be introduced
- How mach will we have to pay for
- Show “**When Who What Where and How**” towards the LCS quantitatively.

# What is needed ?

- **The model requires** two types of data sets: **Characteristics data** sets and **Relational data** sets
- Characteristics data
  - Descriptive information : Overview, etc
  - Data sets like AIM/Enduse : Costs, energy consumption, life time, etc.
- Relational data
  - Important to describing roadmaps.
  - Relationships between countermeasures, times for implementation, etc.

# Technological data sets

sector	Technology		Unit	Energy consumption (kgoe/Unit)		Capital cost (JPY/Unit)		Life time (year)
	LC tech (energy saving)	Conventional tech		LC tech	Conv. tech	LC tech	Conv. tech	
industry steel	High efficiency coke oven	Conventional coke oven	Crude steel 1t (converter)	COL 291.56	COL 298	9,247	8,026	30
	High efficiency sintering furnace	Conventional sintering furnace	Crude steel 1t (converter)	COL 39.45	COL 44	14,868	13,063	30
	High efficiency blast furnace	conventional blast furnace	Crude steel 1t (converter)	COL 8.64	COL 8.72	20,650	18,200	30
				ELE 5.27	ELE 5.50			
High efficiency electric furnace	High efficiency electric furnace	Crude steel 1t (electric furnace)	ELE 30.41	ELE 38.80	25,181	19,581	30	
:	:	:	:	:	:	:	:	:

From presentation of Dr. Masui in 12<sup>th</sup> AIM VWS (2007).

# Relational data sets

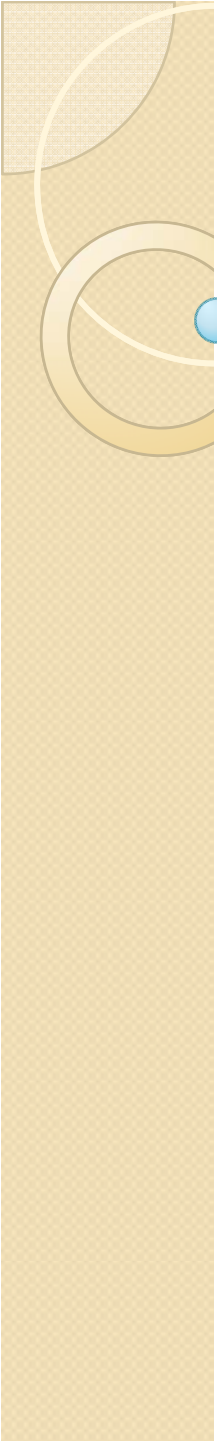
- Data are answers following questions:
  - When the CM\* will become in practical use?
  - How many years will be required to become widespread use?
  - What types of technology/policy is necessary before implementation of CM?

Example of Design Structure Matrix: Biomass utilization

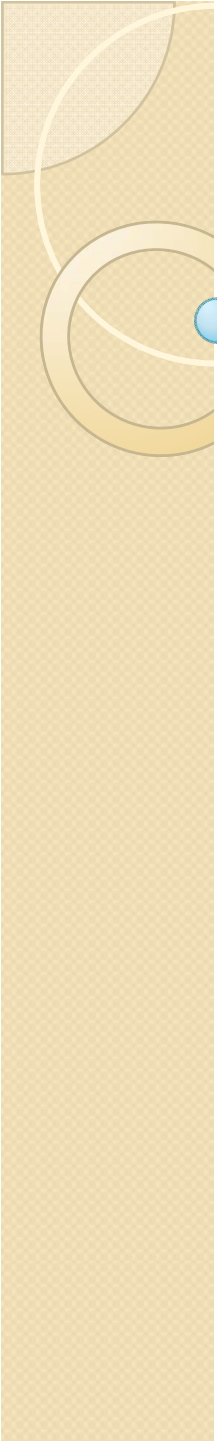
		A	B	C	D	E	F	G	H	I	J	K	L
A	バイオ車体の改良					①							
B	バイオエネルギー備蓄技術の開発					②							
C	ステーション数の確保		③		④								
D	GSへの補助金導入												
E	規格の統一												
F	バイオ資源量の確保							⑤	⑥	⑦			
G	セルロース分解技術の開発												
H	バイオエネルギーへの先行投資												
I	石油連盟の雇用対策												
J	健康影響評価												
K	バイオ燃料優先レーン												
L	バイオマス自動車への補助金・税優遇												

PP	バイオ自動車の導入	⑧	⑨			⑩					⑪	⑫	⑬
----	-----------	---	---	--	--	---	--	--	--	--	---	---	---

\*CM: Countermeasures



## 2. How to use the Backcast model



## 2. How to use the Backcast model

But before trying Backcast model, concepts of actions and options are revisited.



# Strategy, Actions, Options, Policies : The Cell

## LCS Strategy in Japan

Question :

How to break down narrative actions to options  
(policy and countermeasure) ?

This is mental gymnastics!

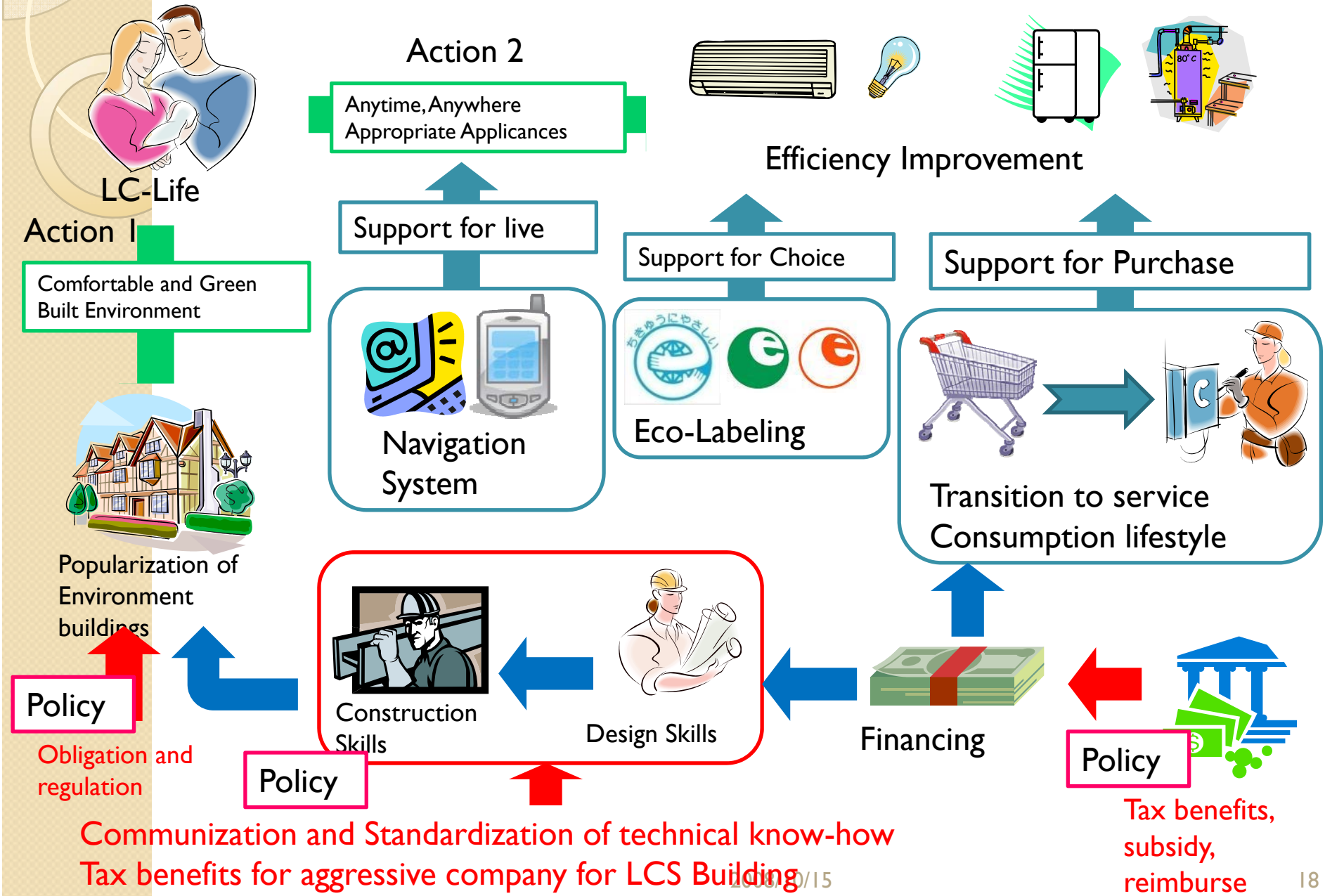
Policy

Countermeasure

Action Z

We can develop “Actions” in a narrative way

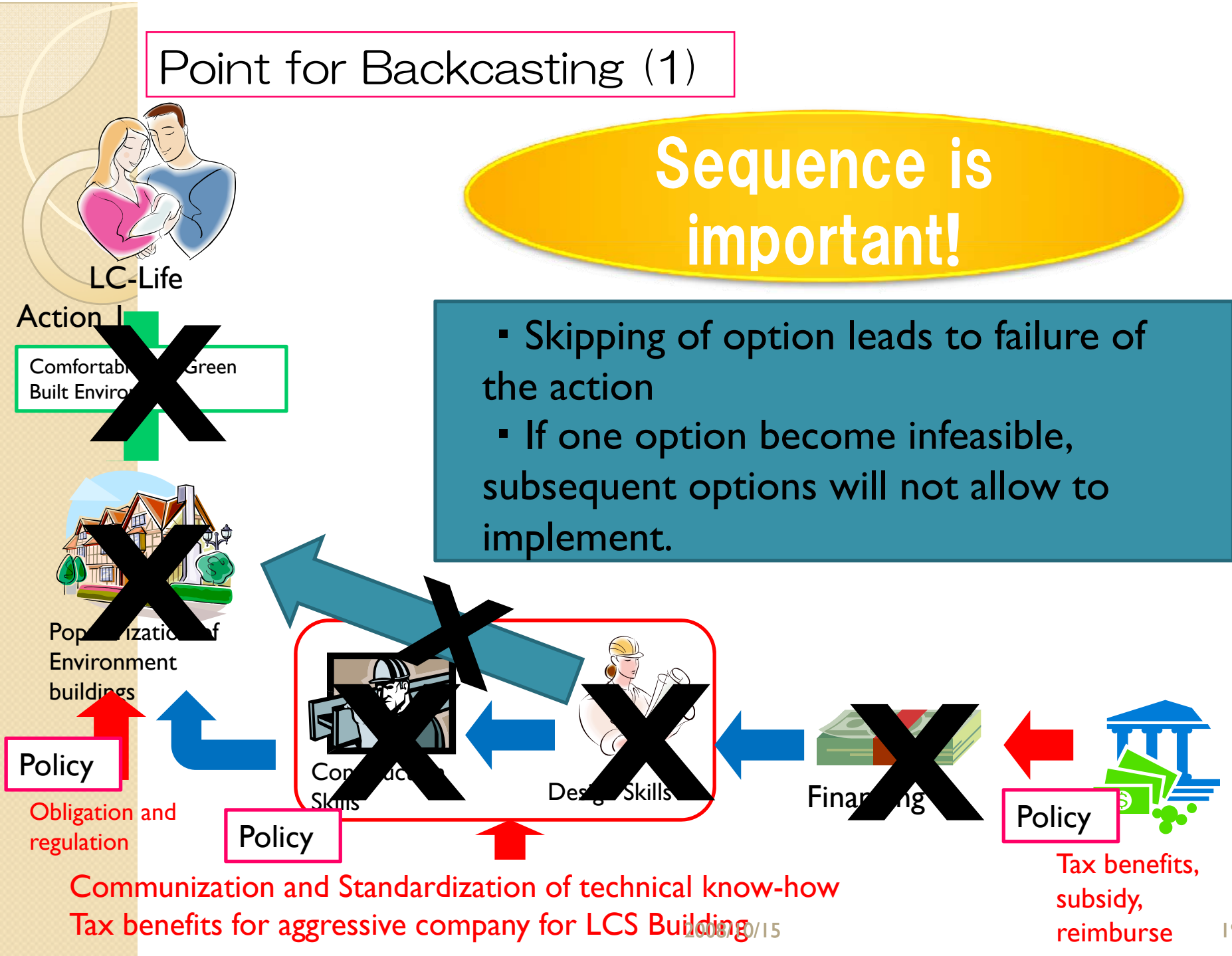
# How to decompose Actions to Options? : Backcasting



# Point for Backcasting (1)

**Sequence is important!**

- Skipping of option leads to failure of the action
- If one option become infeasible, subsequent options will not allow to implement.



LC-Life

Action I

Comfortable Green  
Built Environment



Popularization of  
Environment  
buildings

Policy

Obligation and  
regulation

Policy

Communization and Standardization of technical know-how  
Tax benefits for aggressive company for LCS Building



Construction  
Skills



Design Skills



Financing



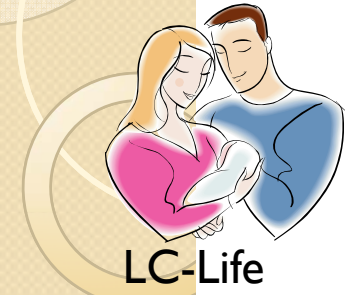
Policy

Tax benefits,  
subsidy,  
reimburse

# Point for Backcasting (2)

Time-line occupies important place in actions/options!

- In order to achieve our target by 2050, each option will start at least when?
- What option was started in 2020/2030?



LC-Life

Action I

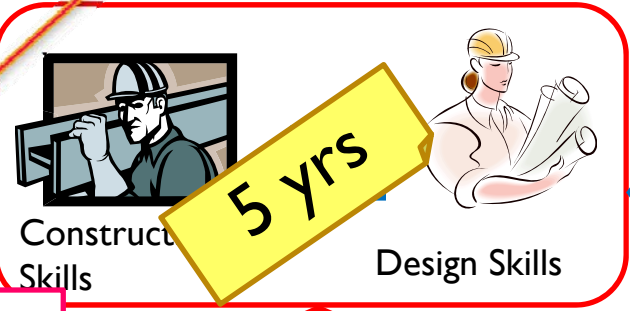
Comfortable and Green Built Environment



Popularization of Environment buildings

In 2020, we must reach here!

Action I requires 40 yrs

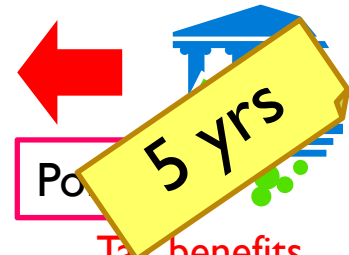


Construct Skills

Design Skills



Financing



Policy

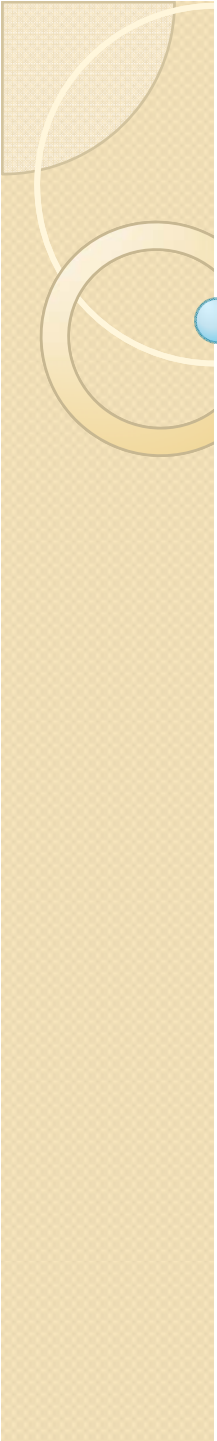
Tax benefits, subsidy, reimburse

Policy

Obligation and regulation

Policy

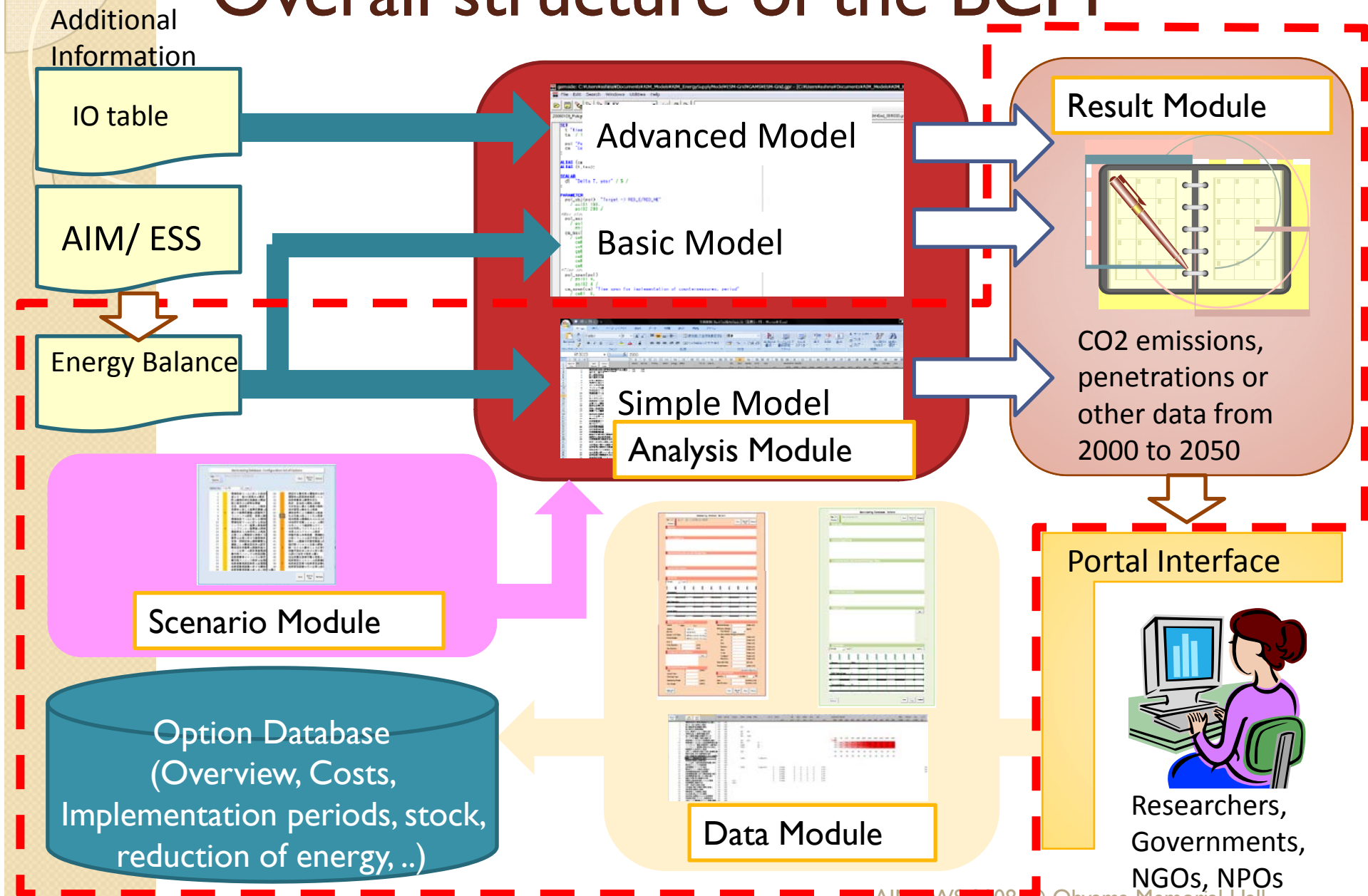
Communization and Standardization of technical know-how  
Tax benefits for aggressive company for LCS Building



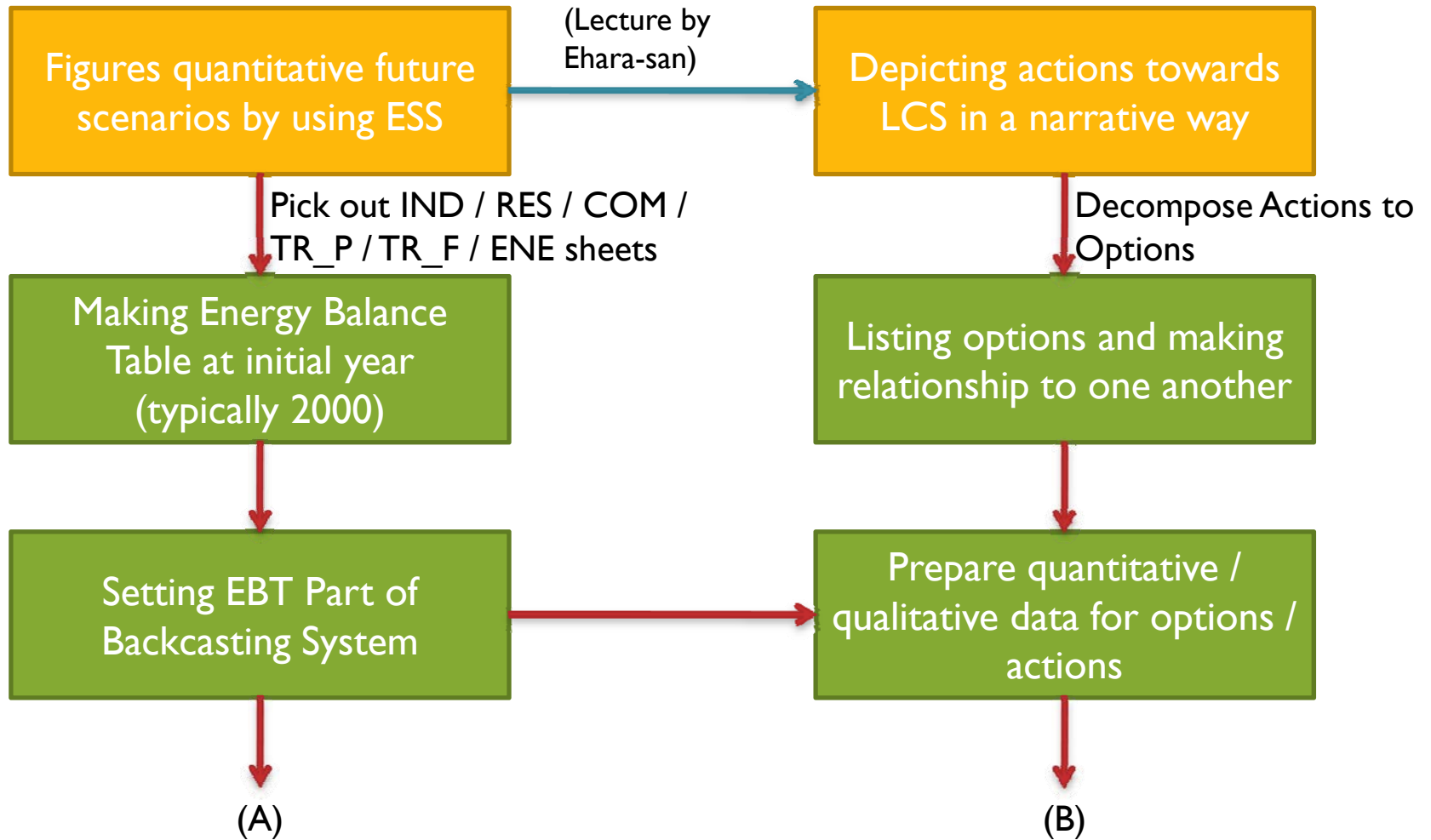
## 2. How to use the Backcast model

Describe Overall Structure and Flows in or before using backcast model

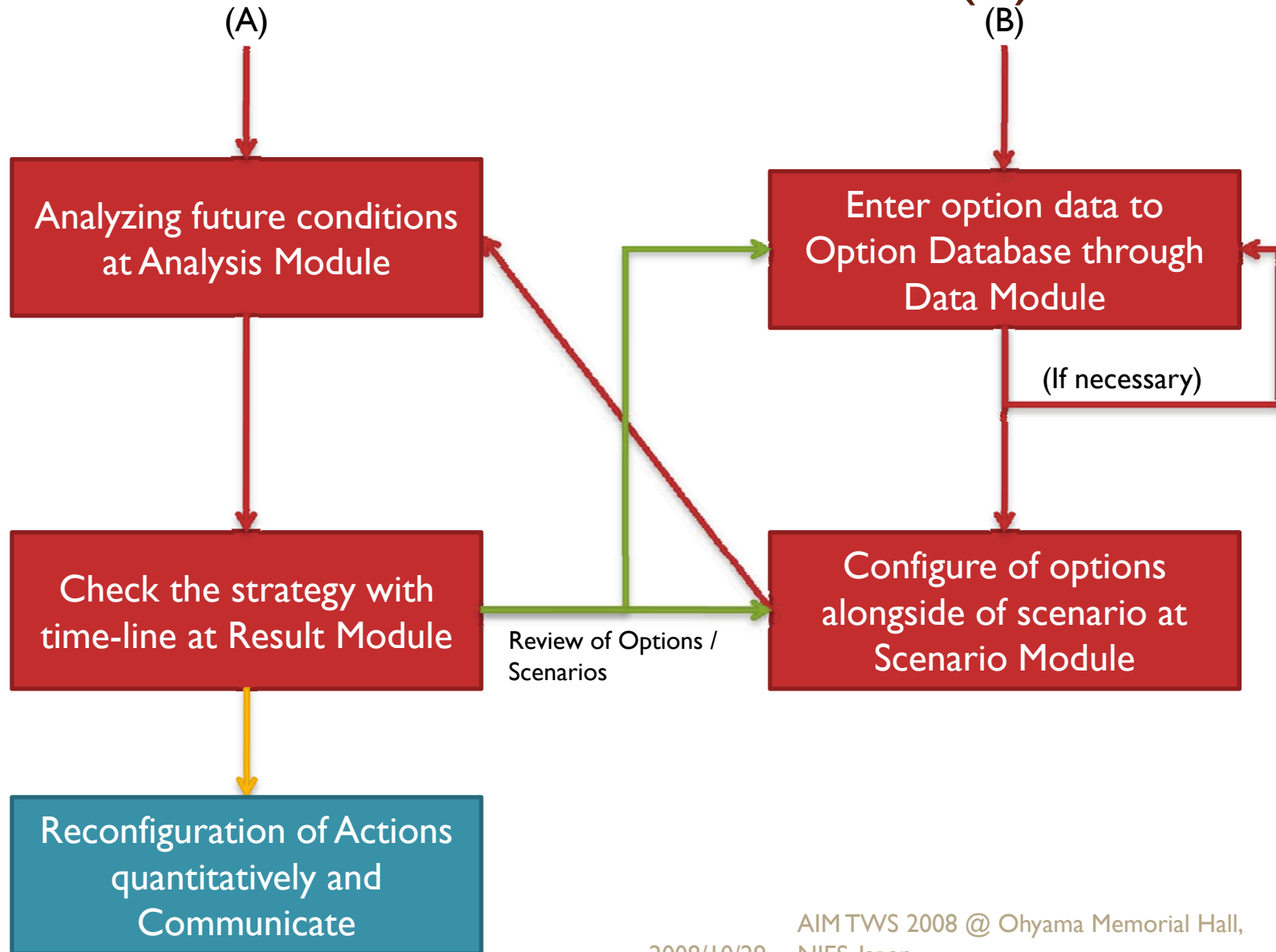
# Overall structure of the BCM



# Procedure of Backcast model (I): Data set up stage

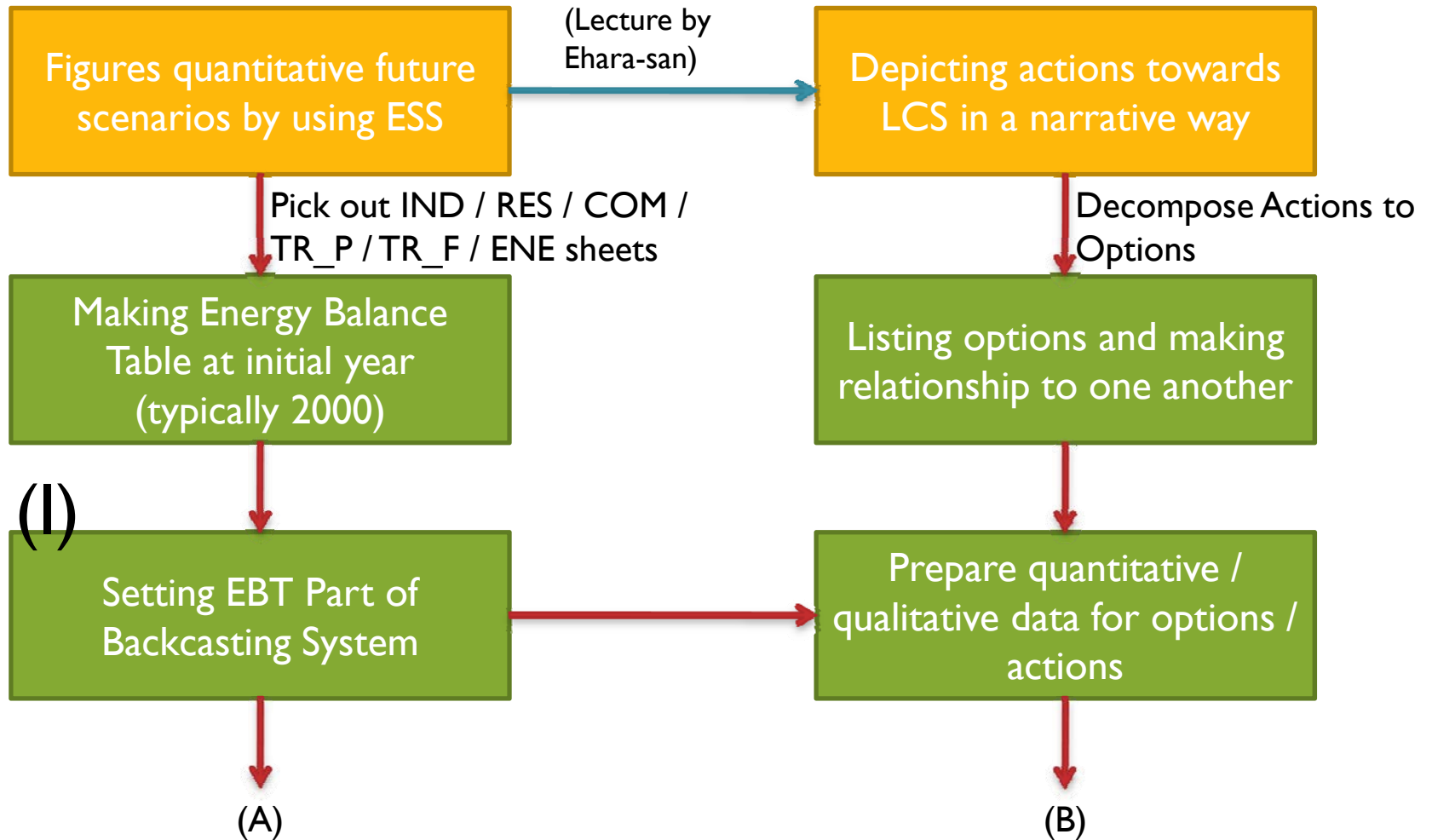


# Procedure of Backcast model (2)

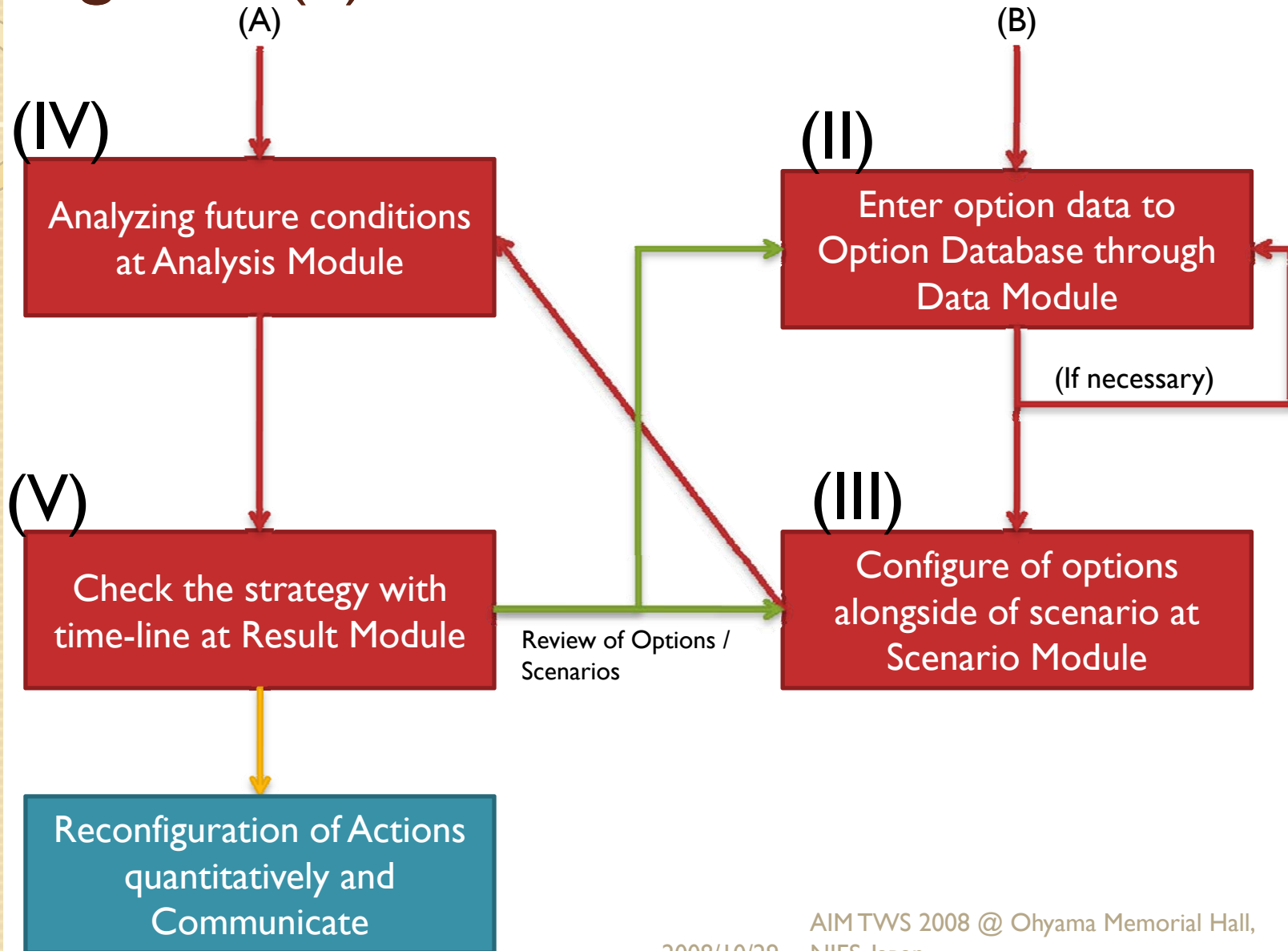




# Agenda (I)



## Agenda (2)

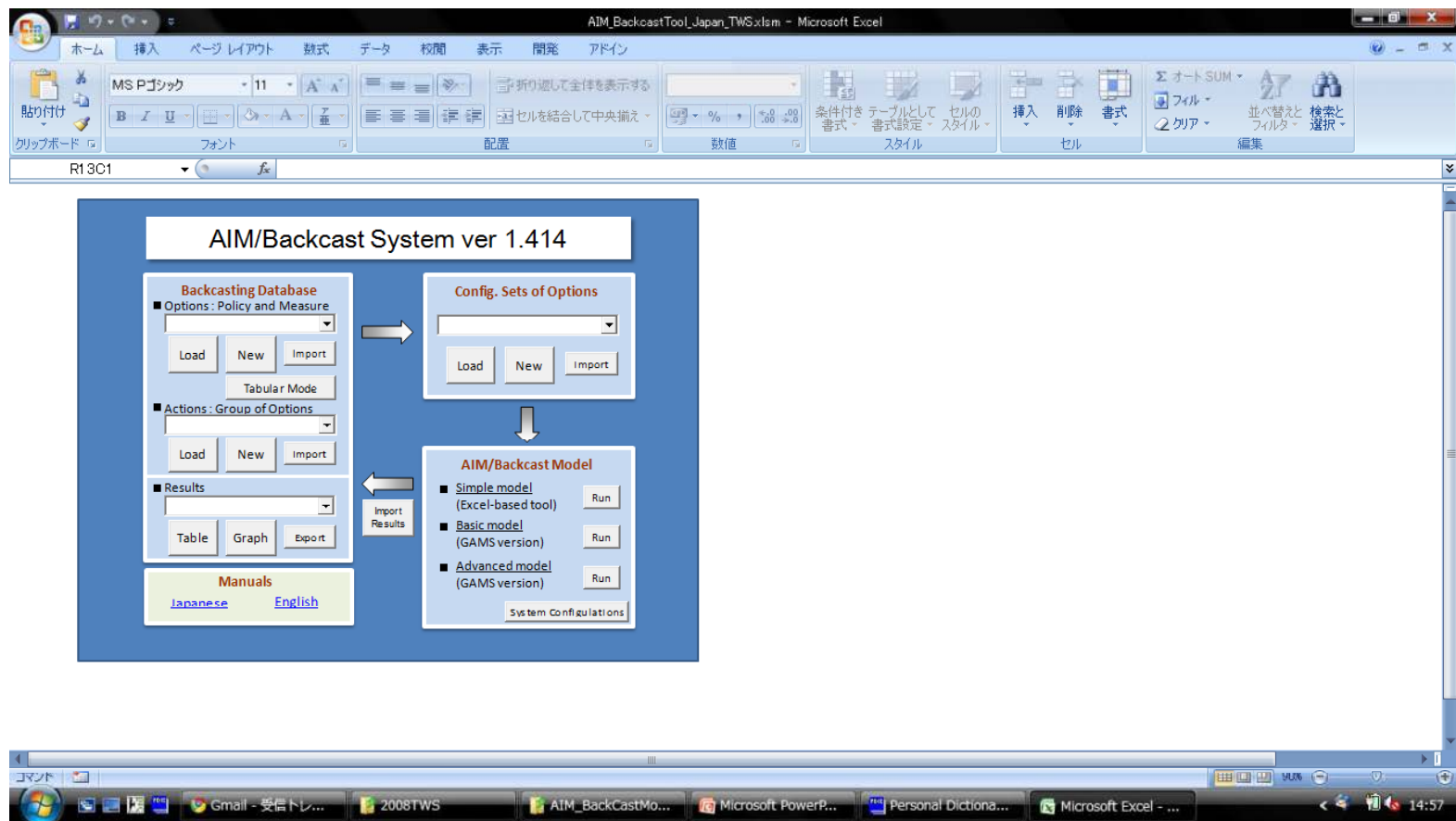


## (0) Open the Backcast Model

- Open the “AIM\_BackcastTool\_TWWS.xls” or “AIM\_BackcastTool\_TWWS.xlsm” (depend on your Excel version)
- Enabling the Macros

# (0) Open the Backcast Model

- Then, your computer shows



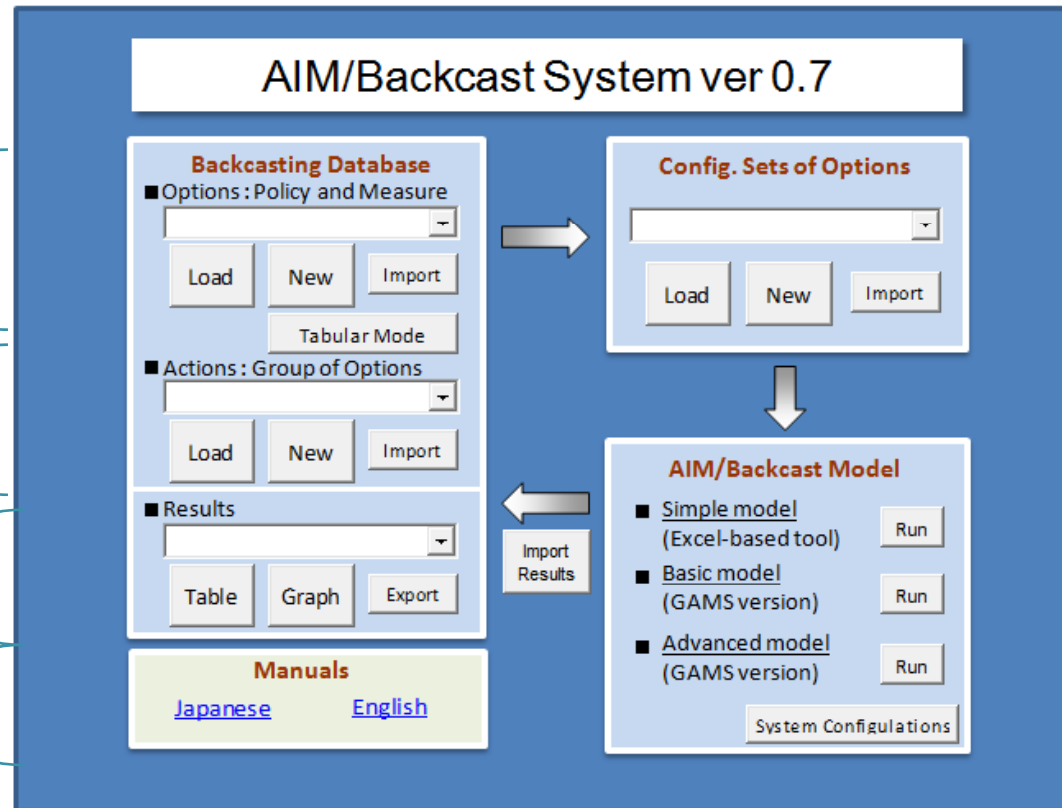
# AIM/Backcast Portal Interface

Launching Data module for Options

Launching Data module for Actions

Result Module

Open the manual PDF file



Launching Scenario module

Analysis module: Running models

Load : Launch existing data in the Option Database

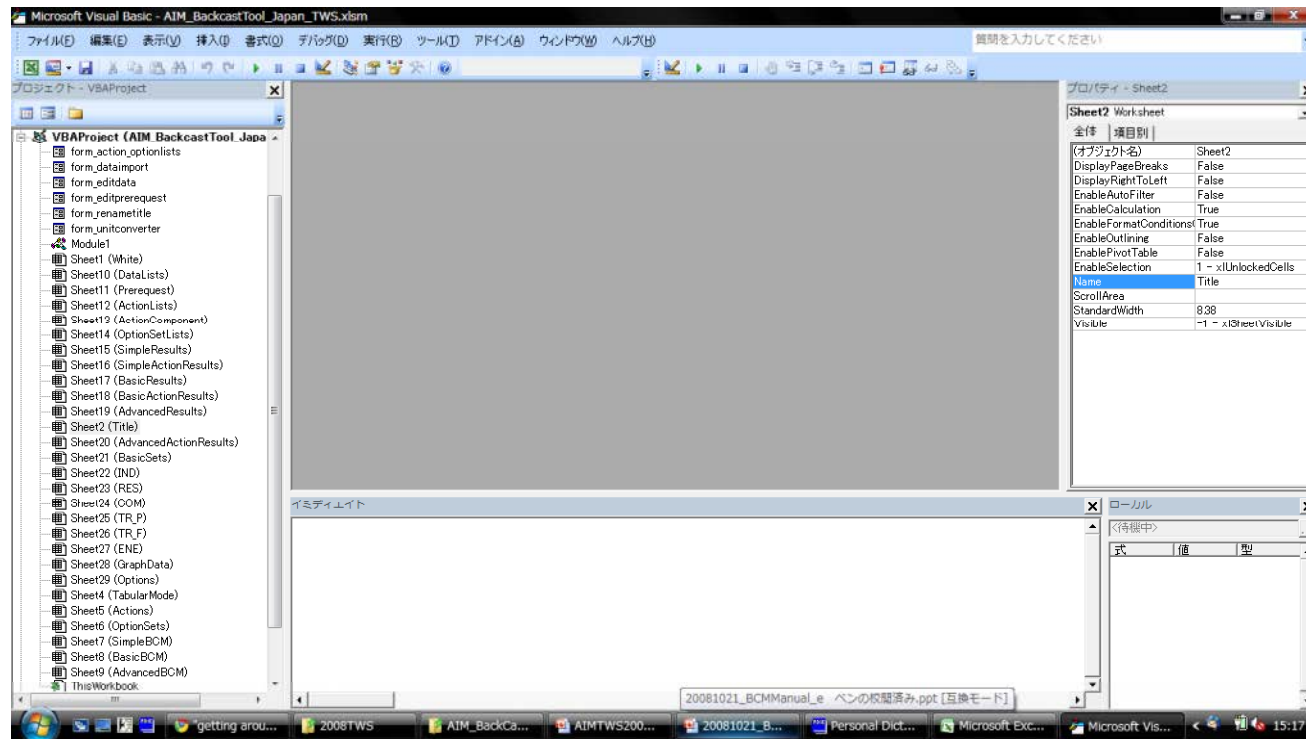
New : Create new data

Import : Import data from other BCM system

# (I) Setting EBT Part of backcasting System(I)

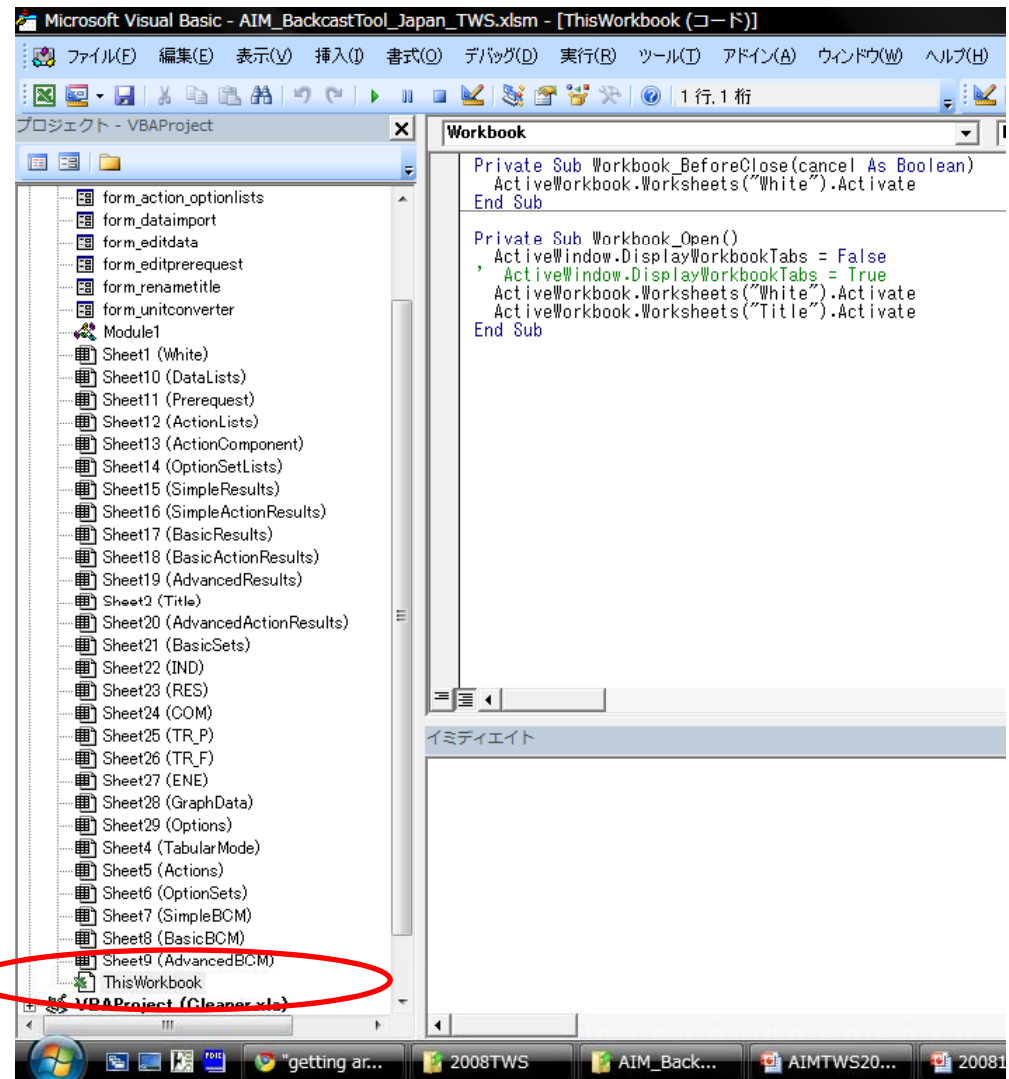
Note: If you already set your country's EBT of initial year, SKIP THIS PROCESS!

- Launch Visual Basic Editor



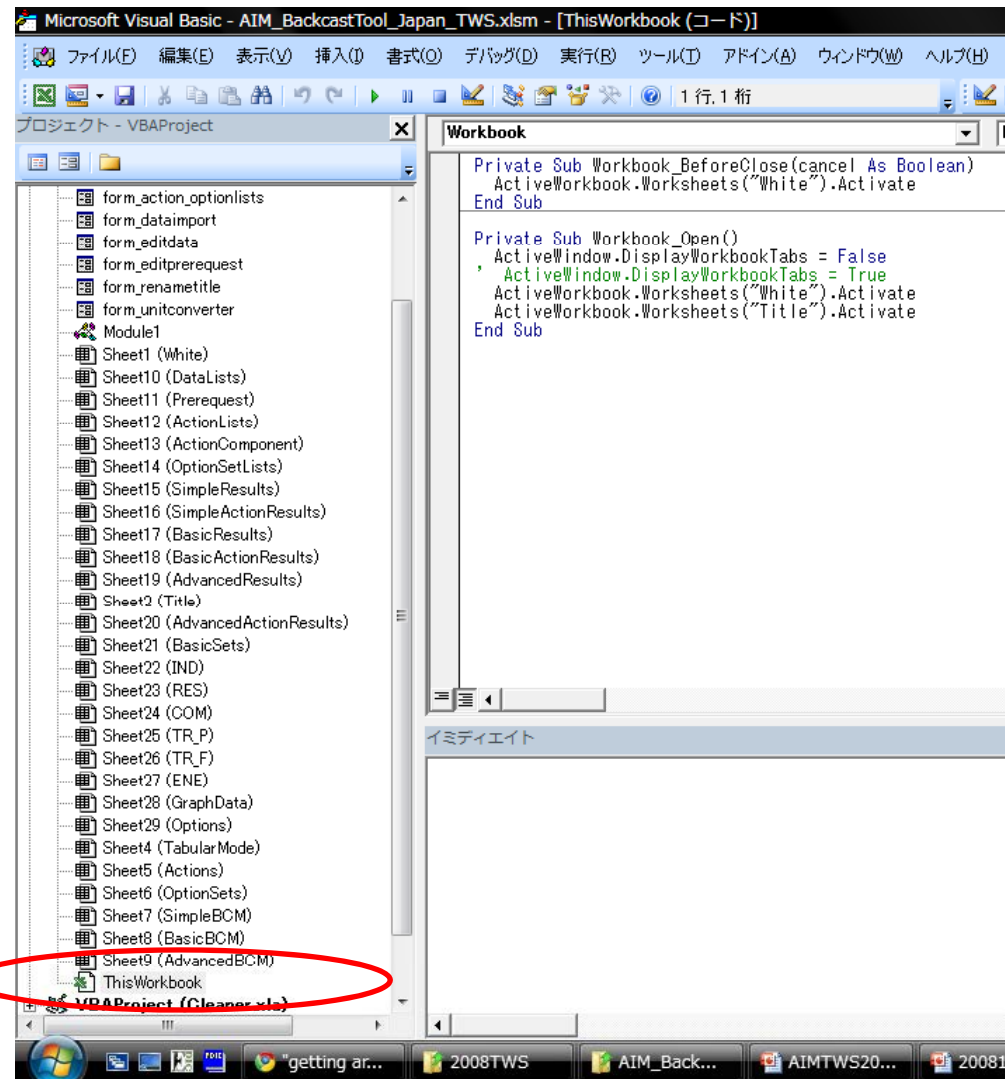
# (I) Setting EBT Part of backcasting System(2)

- Open “Thisworkbook”
  - Usually locates bottom of column



# (I) Setting EBT Part of backcasting System(3)

- Open “Thisworkbook”
  - Usually locates bottom of column





# (I) Setting EBT Part of backcasting System(4)

- Change program “Private Sub Workbook\_Open()”

```
Private Sub Workbook_Open()  
  ActiveWindow.DisplayWorkbookTabs = False  
' ActiveWindow.DisplayWorkbookTabs = True  
  ActiveWorkbook.Worksheets("White").Activate  
  ActiveWorkbook.Worksheets("Title").Activate  
End Sub
```



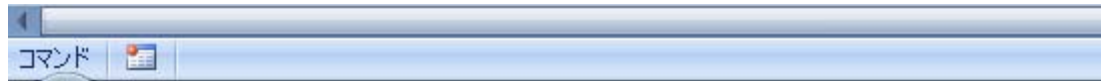
Apostrophe moves second line to first line

```
Private Sub Workbook_Open()  
' ActiveWindow.DisplayWorkbookTabs = False  
ActiveWindow.DisplayWorkbookTabs = True  
ActiveWorkbook.Worksheets("White").Activate  
ActiveWorkbook.Worksheets("Title").Activate  
End Sub
```

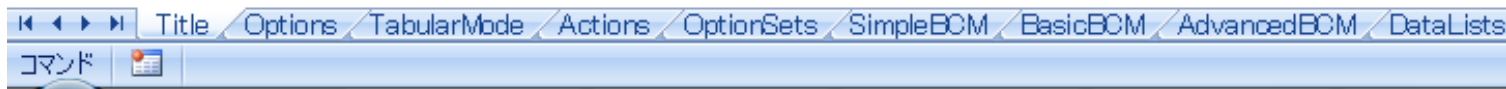
# (I) Setting EBT Part of backcasting System(5)

- Push “F5”
  - Sheet Tabs appear

Before



After



# (I) Setting EBT Part of backcasting System(6)

- Move to “IND” sheet
  - Sheet can be found at extreme right position

## Industrial sector

[Back to Simple BCM](#)

1 Energy service demand (BAU)

	Unit	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Agriculture	Bil. Y	15.5	16.0	16.5	17.0	17.5	18.0	18.5	18.9	19.4	19.9	20.4
Mining	Bil. Y	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.6
Construction	Bil. Y	77.1	76.7	76.4	76.0	75.7	75.3	75.0	74.6	74.3	73.9	73.6
Food	Bil. Y	35.8	37.8	39.8	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8
Textile	Bil. Y	7.0	7.5	8.0	8.6	9.1	9.7	10.2	10.7	11.3	11.8	12.4
Paper & Pulp	Mil-t	31.8	30.3	28.8	27.3	25.8	24.3	22.7	21.2	19.7	18.2	16.7
Petrochemicals	Mil-t	7.6	7.2	6.8	6.4	6.0	5.6	5.1	4.7	4.3	3.9	3.5
Other chemicals	Bil. Y	19.8	21.5	23.1	24.7	26.4	28.0	29.6	31.3	32.9	34.5	36.2
Cement	Mil-t	82.4	79.7	77.1	74.5	71.8	69.2	66.6	63.9	61.3	58.7	56.1
Other ceramic	Bil. Y	4.3	4.5	4.6	4.8	4.9	5.1	5.3	5.4	5.6	5.7	5.9
Steel	Mil-t	106.9	103.6	100.4	97.1	93.8	90.6	87.3	84.1	80.8	77.5	74.3
Non Ferrous	Bil. Y	6.2	6.3	6.4	6.6	6.7	6.8	6.9	7.0	7.2	7.3	7.4
Metal & Machine	Bil. Y	142.4	146.6	150.8	154.9	159.1	163.3	167.5	171.7	175.9	180.0	184.2
Other Manufactu	Bil. Y	36.9	37.7	38.4	39.2	40.0	40.8	41.5	42.3	43.1	43.9	44.6

CM

2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
15.5	16.0	16.3	16.5	16.8	17.0	17.2	17.4	17.7	17.9	18.2
1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.6
77.1	76.7	76.4	76.0	75.7	75.3	75.0	74.6	74.3	73.9	73.6
35.8	37.8	39.8	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8
7.0	7.5	8.0	8.6	9.1	9.7	10.2	10.7	11.3	11.8	12.4
31.8	30.3	28.8	27.3	25.8	24.3	22.7	21.2	19.7	18.2	16.7
7.6	7.2	6.8	6.4	6.0	5.6	5.1	4.7	4.3	3.9	3.5
19.8	21.5	23.1	24.7	26.4	28.0	29.6	31.3	32.9	34.5	36.2
82.4	79.7	77.1	74.5	71.8	69.2	66.6	63.9	61.3	58.7	56.1
4.3	4.5	4.6	4.8	4.9	5.1	5.3	5.4	5.6	5.7	5.9
106.9	103.6	100.4	97.1	93.8	90.6	87.3	84.1	80.8	77.5	74.3
6.2	6.3	6.4	6.6	6.7	6.8	6.9	7.0	7.2	7.3	7.4
142.4	146.6	150.8	154.9	159.1	163.3	167.5	171.7	175.9	180.0	184.2
36.9	37.7	38.4	39.2	40.0	40.8	41.5	42.3	43.1	43.9	44.6

2 Service Share

# (I) Setting EBT Part of backcasting System(7)

- Enter numbers for energy efficiency and energy consumption at initial year to non-colored cells

3 Energy efficiency

	Unit	2000								Total
		COI	OIL	GAS	BMS	S/W	Heat	H2	ELE	
Agriculture	'00=1.0	1.00	1.00	1.00	1.00					1.00
Mining	'00=1.0	1.00	1.00	1.00	1.00					1.00
Construction	'00=1.0	1.00	1.00	1.00	1.00					1.00
Food	'00=1.0	1.00	1.00	1.00	1.00					1.00
Textile	'00=1.0	1.00	1.00	1.00	1.00					1.00
Paper & Pulp	'00=1.0	1.00	1.00	1.00	1.00					1.00
Petrochemicals	'00=1.0	1.00	1.00	1.00	1.00					1.00
Other chemicals	'00=1.0	1.00	1.00	1.00	1.00					1.00
	'00=1.0	1.00	1.00	1.00	1.00					1.00
	'00=1.0	1.00	1.00	1.00	1.00					1.00
Non Ferrous	'00=1.0	1.00	1.00	1.00	1.00					1.00
Metal & Machine	'00=1.0	1.00	1.00	1.00	1.00					1.00
Other Manufacture	'00=1.0	1.00	1.00	1.00	1.00					1.00

4 Energy consumption

	Unit	2000								Total
		COI	OIL	GAS	BMS	S/W	Heat	H2	ELE	
Agriculture		0.0	10.3	0.0	0.1	0.0	0.0	0.0	0.3	10.8
Mining		0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.2	0.8
Construction		0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.1	4.0
Food		0.0	1.9	1.2	0.0	0.0	0.0	0.0	2.4	5.6
Textile		0.0	2.0	0.2	0.0	0.0	0.0	0.0	0.7	2.9
Paper & Pulp		1.3	3.0	0.7	2.4	0.0	0.0	0.0	3.1	10.6
Petrochemicals		0.8	8.7	1.7	0.0	0.0	0.0	0.0	3.7	14.9
Other chemicals		0.2	3.8	0.3	0.0	0.0	0.0	0.0	2.0	6.4
		5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.9	6.2
		0.0	3.6	0.4	0.0	0.0	0.0	0.0	1.0	4.9
		31.7	2.9	1.5	0.0	0.0	0.0	0.0	7.0	43.2
Non Ferrous		0.3	1.1	0.4	0.0	0.0	0.0	0.0	1.7	3.4
Metal & Machine		0.2	0.9	1.9	0.0	0.0	0.0	0.0	7.4	10.4
Other Manufacture		0.5	15.1	1.2	0.0	0.0	0.0	0.0	6.1	22.9
PGN_FS										0.0

# (I) Setting EBT Part of backcasting System(8)

- As for the demand, user enters future service demand in BAU.
  - If user enters number at intervals, blank cells are interpolated linearly.

## Industrial sector

Back to Simple BCM

1 Energy service demand (BAU)

	Unit	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Agriculture	Bil. Y	15.5	16.0	16.5	17.0	17.5	18.0	18.5	18.9	19.4	19.9	20.4
Mining	Bil. Y	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.6
Construction	Bil. Y	77.1	76.7	76.4	76.0	75.7	75.3	75.0	74.6	74.3	73.9	73.6
Food	Bil. Y	35.8	37.8	39.8	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8
Textile	Bil. Y	7.0	7.5	8.0	8.6	9.1	9.7	10.2	10.7	11.3	11.8	12.4
Paper & Pulp	Mil-t	31.8	30.3	28.8	27.3	25.8	24.3	22.7	21.2	19.7	18.2	16.7
Petrochemicals	Mil-t	7.6	7.2	6.8	6.4	6.0	5.6	5.1	4.7	4.3	3.9	3.5
Other chemicals	Bil. Y	19.8	21.5	23.1	24.7	26.4	28.0	29.6	31.3	32.9	34.5	36.2
Cement	Mil-t	82.4	79.7	77.1	74.5	71.8	69.2	66.6	63.9	61.3	58.7	56.1
Other ceramic	Bil. Y	4.3	4.5	4.6	4.8	4.9	5.1	5.3	5.4	5.6	5.7	5.9
Steel	Mil-t	106.9	103.6	100.4	97.1	93.8	90.6	87.3	84.1	80.8	77.5	74.3
Non Ferrous	Bil. Y	6.2	6.3	6.4	6.6	6.7	6.8	6.9	7.0	7.2	7.3	7.4
Metal & Machine	Bil. Y	142.4	146.6	150.8	154.9	159.1	163.3	167.5	171.7	175.9	180.0	184.2
Other Manufactu	Bil. Y	36.9	37.7	38.4	39.2	40.0	40.8	41.5	42.3	43.1	43.9	44.6

CM

2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
15.5	16.0	16.3	16.5	16.8	17.0	17.2	17.4	17.7	17.9	18.2
1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.6
77.1	76.7	76.4	76.0	75.7	75.3	75.0	74.6	74.3	73.9	73.6
35.8	37.8	39.8	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8
7.0	7.5	8.0	8.6	9.1	9.7	10.2	10.7	11.3	11.8	12.4
31.8	30.3	28.8	27.3	25.8	24.3	22.7	21.2	19.7	18.2	16.7
7.6	7.2	6.8	6.4	6.0	5.6	5.1	4.7	4.3	3.9	3.5
19.8	21.5	23.1	24.7	26.4	28.0	29.6	31.3	32.9	34.5	36.2
82.4	79.7	77.1	74.5	71.8	69.2	66.6	63.9	61.3	58.7	56.1
4.3	4.5	4.6	4.8	4.9	5.1	5.3	5.4	5.6	5.7	5.9
106.9	103.6	100.4	97.1	93.8	90.6	87.3	84.1	80.8	77.5	74.3
6.2	6.3	6.4	6.6	6.7	6.8	6.9	7.0	7.2	7.3	7.4
142.4	146.6	150.8	154.9	159.1	163.3	167.5	171.7	175.9	180.0	184.2
36.9	37.7	38.4	39.2	40.0	40.8	41.5	42.3	43.1	43.9	44.6

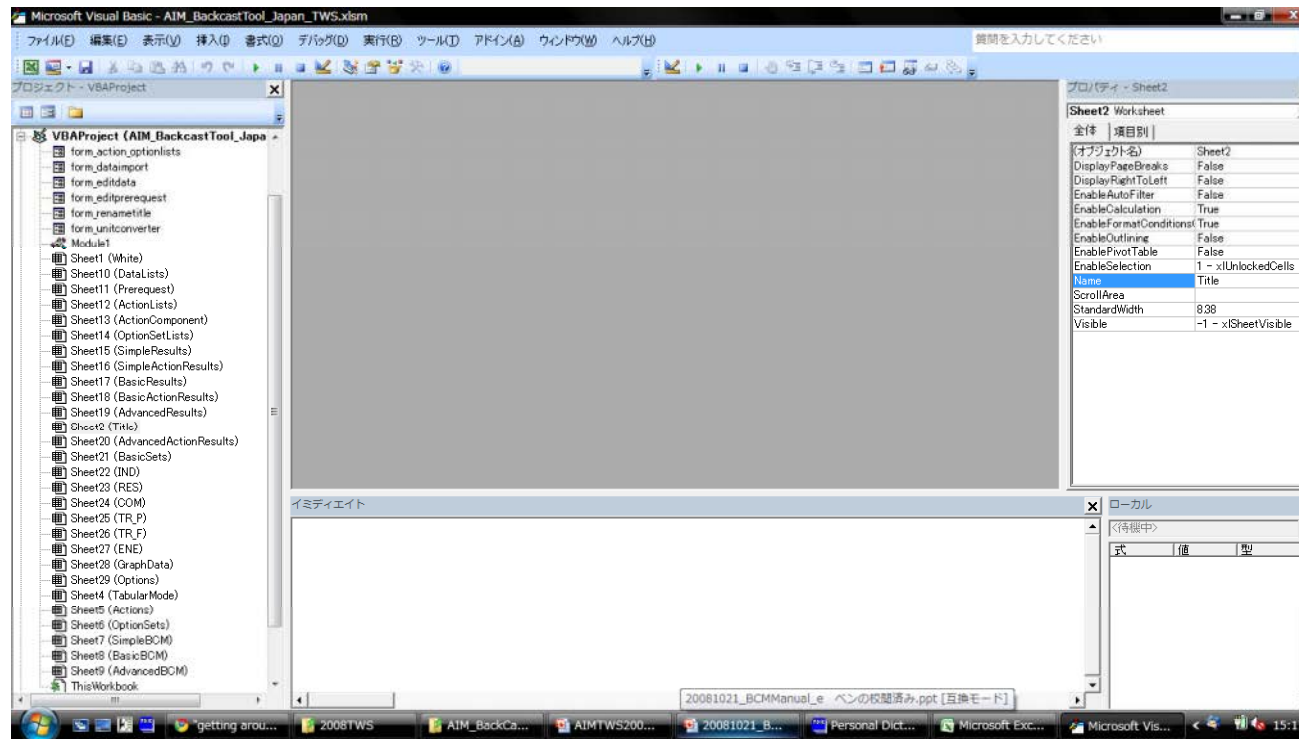
2 Service Share

## (I) Setting EBT Part of backcasting System(9)

- Do the same thing to RES, COM, TR\_P, TR\_F, ENE sheet, if you need.
  - In the ENE sheet, users does not required to set service demand. The demand calculates endogenously.

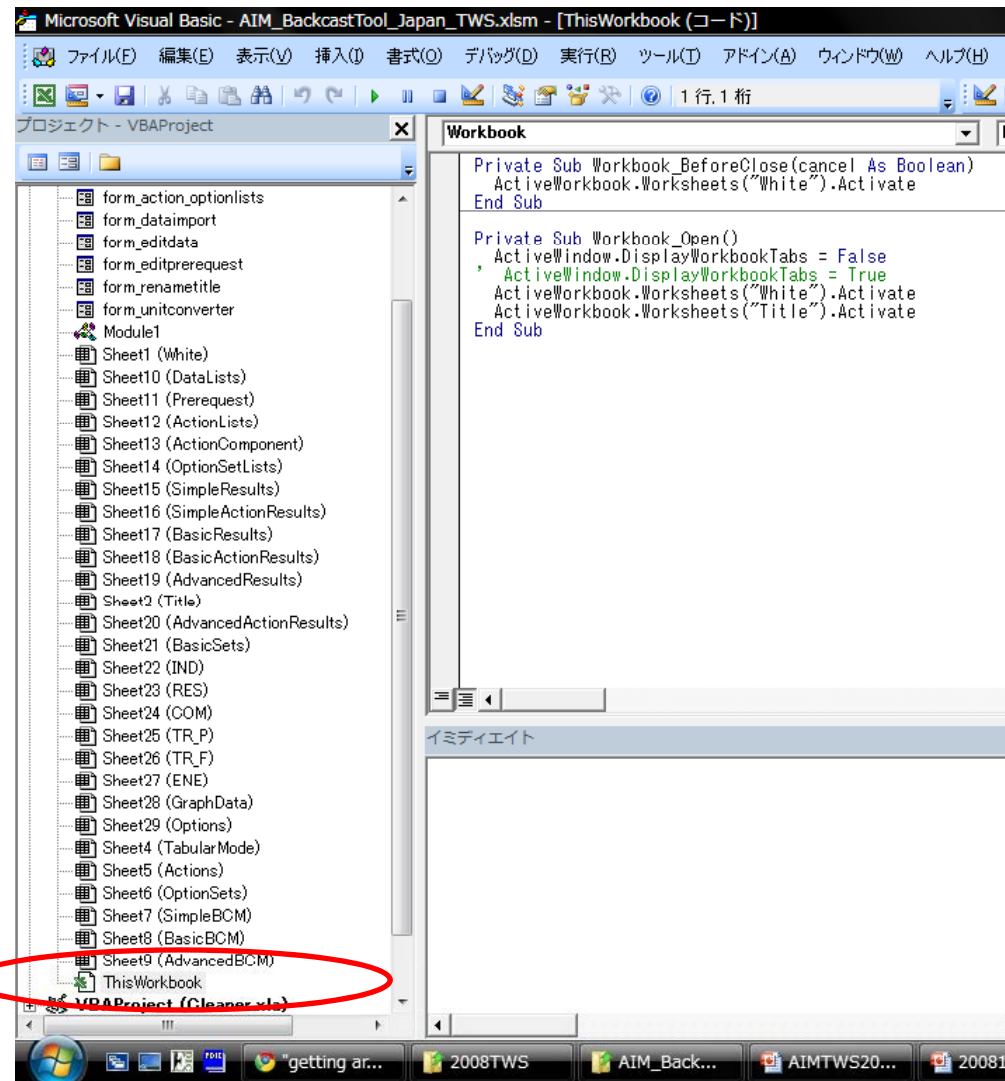
# (I) Setting EBT Part of backcasting System(I 0)

- Again, launch Visual Basic Editor



# (I) Setting EBT Part of backcasting System(II)

- Open “Thisworkbook”
  - Usually locates bottom of column





# (I) Setting EBT Part of backcasting System(12)

- Change program “Private Sub Workbook\_Open()”

```
Private Sub Workbook_Open()  
‘ ActiveWindow.DisplayWorkbookTabs = False  
ActiveWindow.DisplayWorkbookTabs = True  
ActiveWorkbook.Worksheets("White").Activate  
ActiveWorkbook.Worksheets("Title").Activate  
End Sub
```



Apostrophe moves first line to second line.

```
Private Sub Workbook_Open()  
ActiveWindow.DisplayWorkbookTabs = False  
‘ ActiveWindow.DisplayWorkbookTabs = True  
ActiveWorkbook.Worksheets("White").Activate  
ActiveWorkbook.Worksheets("Title").Activate  
End Sub
```

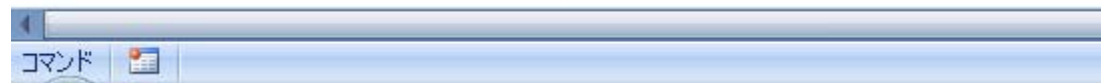
# (I) Setting EBT Part of backcasting System(13)

- Push “F5”
  - Sheet Tabs disappear

Before

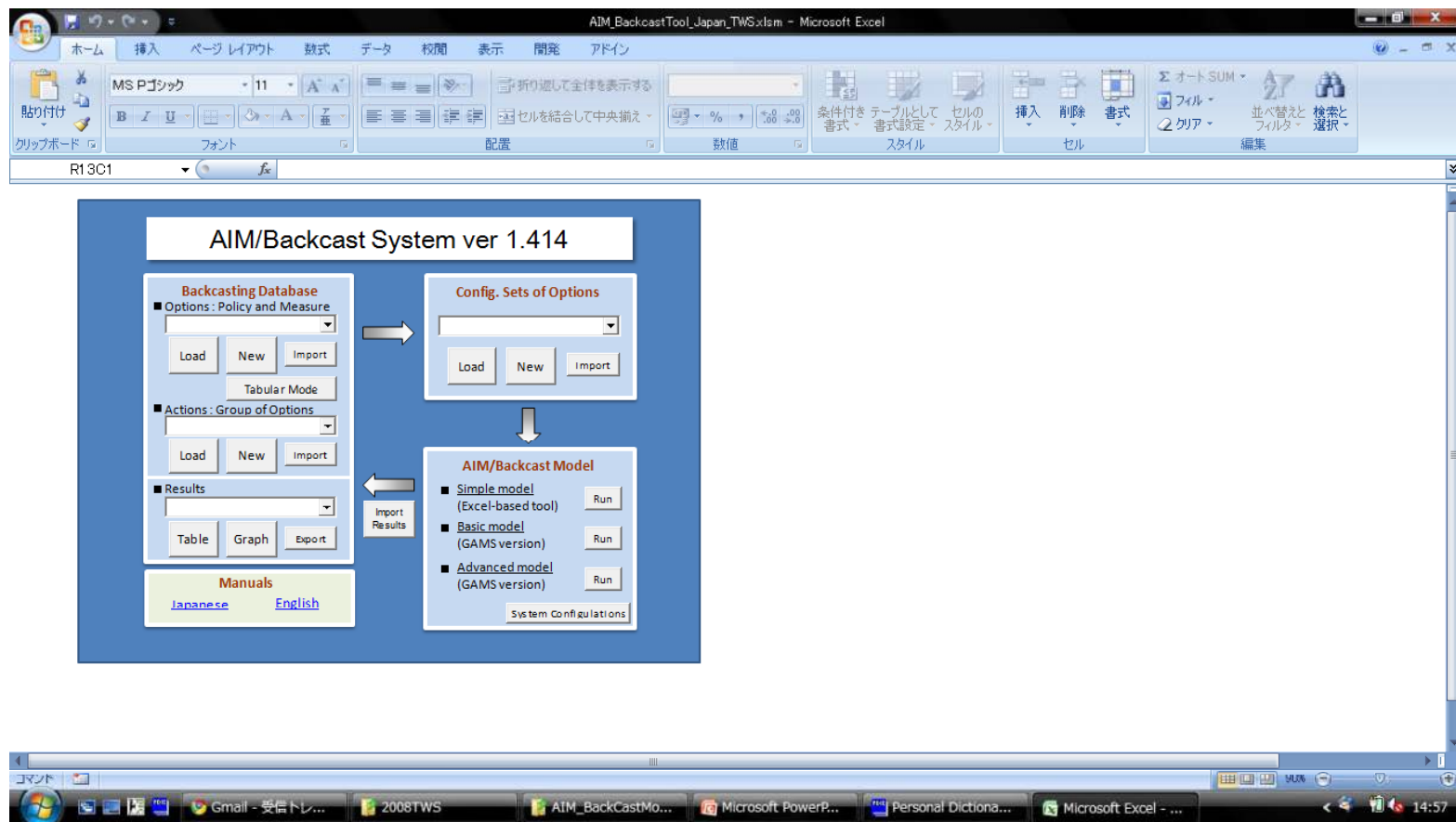


After

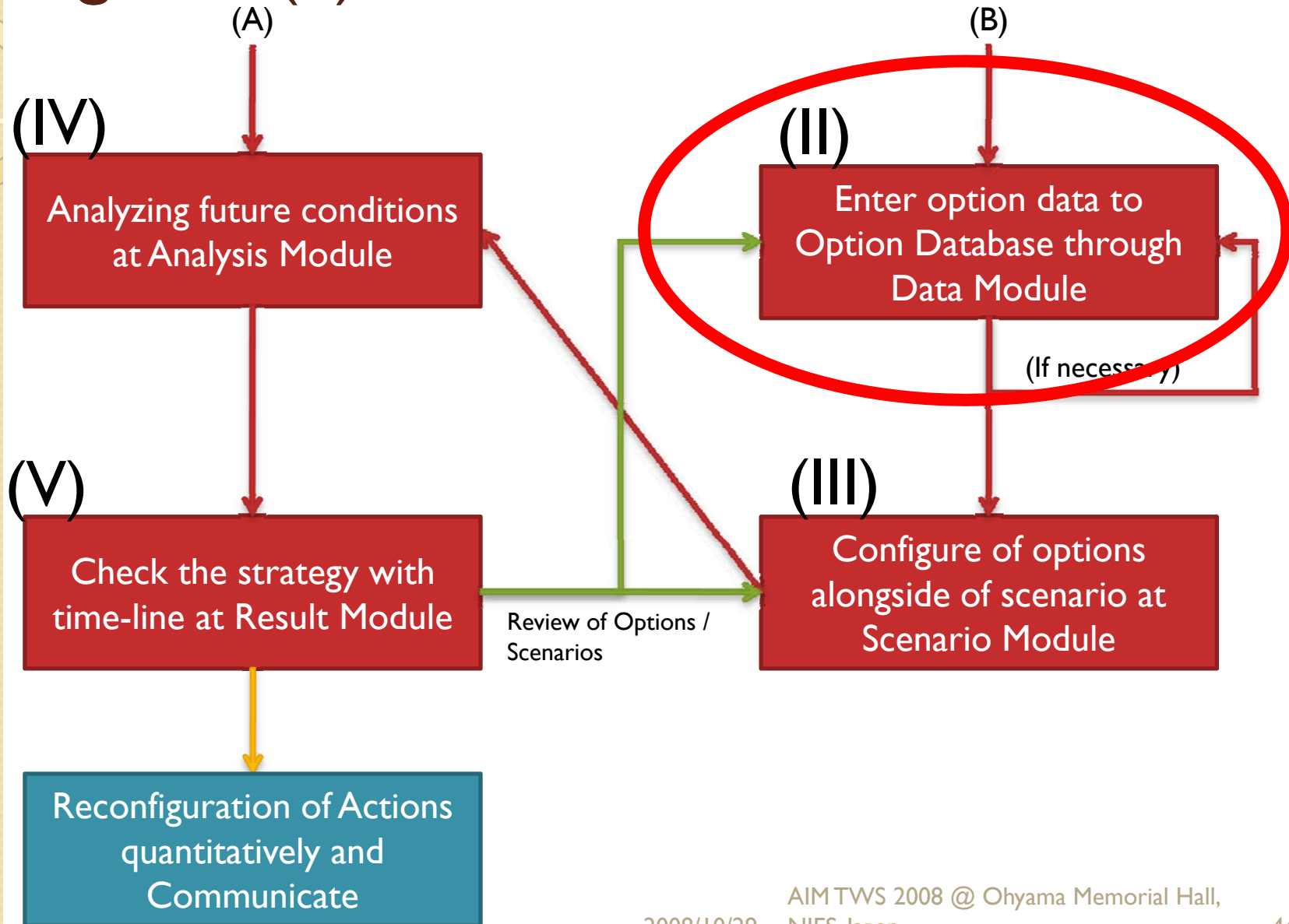


# (I) Setting EBT Part of backcasting System(14)

- Close Visual Basic Editor



# Agenda (2)



# (II) Enter option data to Option Database through Data Module (I)

- Data Module consists of three sheets

(A) Option Sheet

(B) Tabular Sheet

Series	No.	Ass	Invest	Operate	Sector	Service	Process	Factor	Energy	Effect	Unit	Q.	Max Q.	Comm.	Off	Term	Life	Cost	Est. Cost	Int. R.
Time		Option	Start	Start										(%)	(%)	(Yr)	(Yr)	(USD)	(USD)	(%)
	1	Option1			IND	AGR		DEF		-5	MWh/yr	0	0	0	0	10	100	100	0	2%
	2	Option2			IND	AGR				0	MWh	0	0	0	0	10	100	100	0	2%
	3	Option3			RES	WATER				0	MWh	0	0	0	0	10	100	100	0	2%
	4	Option4			RES	WATER				0	MWh	0	0	0	0	10	100	100	0	2%
	5	Option5			IND	AGR				0	MWh	0	0	0	0	10	100	100	0	2%
	6	Option6			RES	WATER				0	MWh	0	0	0	0	10	100	100	0	2%
	7	Option7			IND	AGR				0	MWh	0	0	0	0	10	100	100	0	2%
	8	Option8			RES	WATER				0	MWh	0	0	0	0	10	100	100	0	2%
	9	Option9			IND	AGR				0	MWh	0	0	0	0	10	100	100	0	2%
	10	Option10			RES	COOL				0	MWh	0	0	0	0	10	100	100	0	2%

(C) Action Sheet

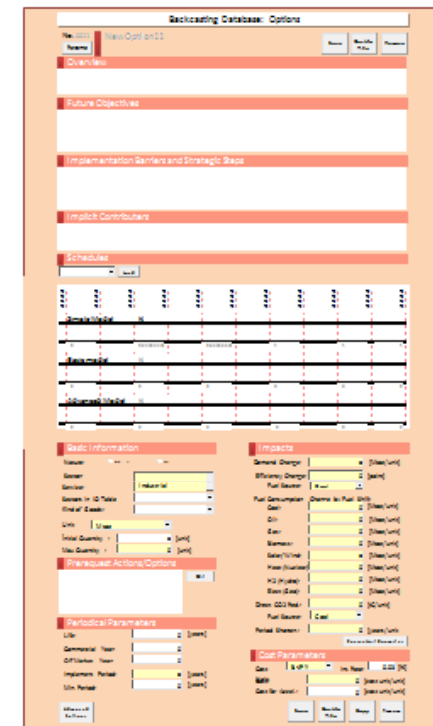
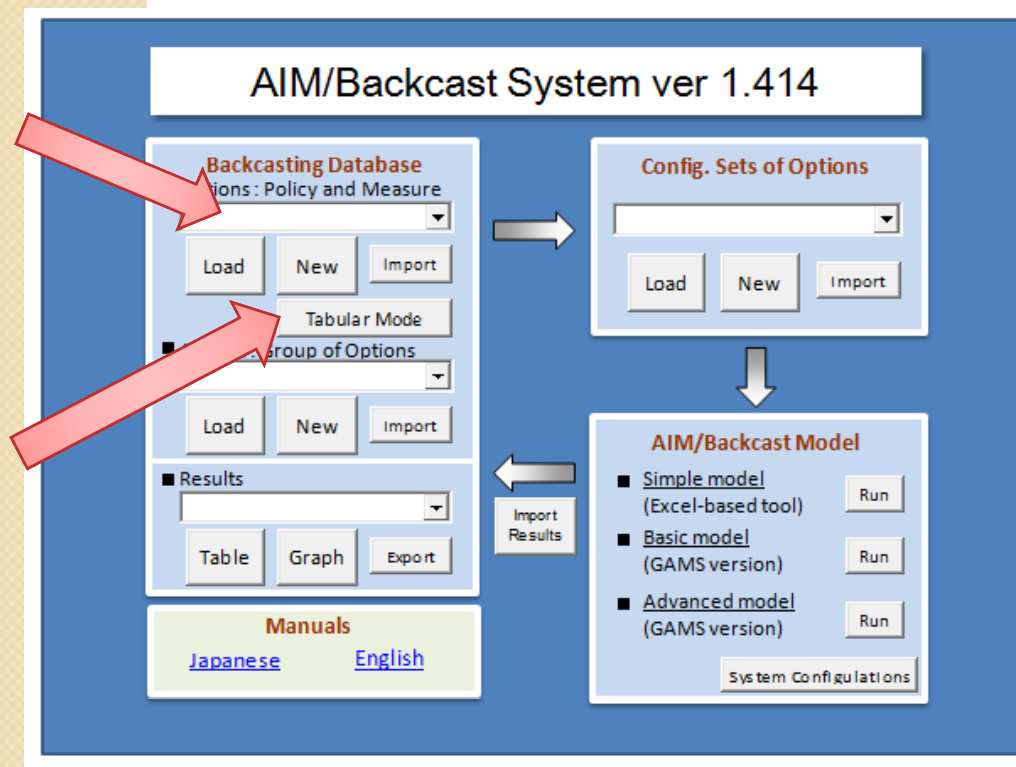
Enter data for Options

Enter data for Options

## (II) Enter option data to Option Database through Data Module (2)

### (A) Option Sheet

- Select a option which user want to edit, and click “Load”
- Or Click “New” button, then open “Option Sheet”.



## (II) Enter option data to Option Database through Data Module (3)

### (A) Option Sheet

Backcasting Database: Options

No. 0001 建築物用途別の簡易性能評価手法の確立

Rename Save Back to Title Remove

Overview

Future Objectives

Implementation Barriers and Strategic Steps

Implicit Contributors

Option Number (Automatically) and title

Overview

Future Objectives

Implementation barriers and strategic steps

Implicit contributors

Save : Save the data into the Option Database

Back to Title : **DO NOT SAVE DATA** and return to portal interface

Remove : Remove data from Option Database

## (II) Enter option data to Option Database through Data Module (4)

### (A) Option Sheet

Schedules

Penetration

	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Simple Model			%								
	0		0		0		0		0		0
Basic model			%								
	0		0		0		0		0		0
Advanced Model			%								
	0		0		0		0		0		0

Showing the results of Penetration/CO2/Cost from three types of models



# (II) Enter option data to Option Database through Data Module (5)

## (A) Option Sheet

Types of options: Sector, Service, Commodity

Initial/Max stock

Prerequisite options

Life, commercialized conditions and periods

Basic Information		Impacts	
Nature:	<input type="radio"/> Stock <input checked="" type="radio"/> Flow	Demand Change:	<input type="text" value="0"/> [Mtoe/unit]
Sector:	<input type="text" value="Industrial"/>	Efficiency Change:	<input type="text" value="0"/> [point]
Service:	<input type="text" value="Agriculture"/>	Fuel Source:	<input type="text"/>
Sectors in IO Table:	<input type="text" value="A01 Agriculture, forest"/>	Fuel Consumption Change by Fuel Shift:	
Kind of Goods:	<input type="text" value="A01 Agriculture, forest"/>	Coal:	<input type="text" value="0"/> [Mtoe/unit]
Unit:	<input type="text" value="Mtoe"/>	Oil:	<input type="text" value="0"/> [Mtoe/unit]
Initial Quantity:	<input type="text" value="0"/> [unit]	Gas:	<input type="text" value="0"/> [Mtoe/unit]
Max Quantity:	<input type="text" value="0"/> [unit]	Biomass:	<input type="text" value="0"/> [Mtoe/unit]
Prerequisite Actions/Options		Solar:	<input type="text" value="0"/> [Mtoe/unit]
<input type="button" value="Edit"/>		Wind:	<input type="text" value="0"/> [Mtoe/unit]
Periodical Parameters		Hydrogen:	<input type="text" value="0"/> [Mtoe/unit]
Life:	<input type="text" value="0"/> [years]	Electricity:	<input type="text" value="0"/> [Mtoe/unit]
Commercial Year:	<input type="text" value="0"/>	Direct CO2 Red.:	<input type="text" value="0"/> [tC/unit]
Off Market Year:	<input type="text" value="0"/>	Period Shorten.:	<input type="text" value="0"/> [years/unit]
Implement Period:	<input type="text" value="0"/> [years]	<input type="button" value="Energy Unit Converter"/>	
Min. Period:	<input type="text" value="0"/> [years]	Cost Parameters	
		Cost Unit:	<input type="text" value="B-JPY"/> Int. Rate: <input type="text" value="0"/> [%]
		Cost:	<input type="text" value="0"/> [cost unit/unit]
		Cost for Accel.:	<input type="text" value="0"/> [cost unit/unit]

Demand reduction

Efficiency Improvement

Energy consumption change by fuel shift

Direct CO2 reduction

Acceleration effect to other options

Energy Unit Converter

Yellow-colored blocks indicate data required to run the simple model.

Advanced model requires all of the data in this part.

## (II) Enter option data to Option Database through Data Module (6)

### How to make quantitative data?

**Basic Information**

Nature:  Stock  Flow

Sector:

Service:

Sectors in IO Table:

Kind of Goods:

Unit:

Initial Quantity:  [unit]

Max Quantity:  [unit]

**Impacts**

Demand Change:  [Mtoe/unit]

Efficiency Change:  [point]

Fuel Source:

Fuel Consumption Change by Fuel Shift:

Coal:  [Mtoe/unit]

Oil:  [Mtoe/unit]

Gas:  [Mtoe/unit]

Biomass:  [Mtoe/unit]

Solar:  [Mtoe/unit]

Wind:  [Mtoe/unit]

Hydrogen:  [Mtoe/unit]

Electricity:  [Mtoe/unit]

Direct CO2 Red.:  [tC/unit]

Period Shorten.:  [years/unit]

**Prerequisite Actions/Options**

**Periodical Parameters**

Life:  [years]

Commercial Year:

Off Market Year:

Implement Period:  [years]

Min. Period:  [years]

**Cost Parameters**

Cost Unit:  Int. Rate:  [%]

Cost:  [cost unit/unit]

Cost for Accel.:  [cost unit/unit]

## (II) Enter option data to Option Database through Data Module (7)

### Quantity and Impacts : Demand Change

- Example : Efficient insulation house
- 1 housing unit of efficient insulation house constructs,
  - $x$  Mtoe of warming service demand decrease.
  - However, our country could constructs  $y$  of house at maximum.
  - Target year's number of house is  $z$ .
- Normal way :
  - Max Quantity =  $y/z$
  - Demand Change =  $-x$
- Standardization way : Max Quantity is always 1
  - Max Quantity = 1
  - Demand Change =  $-x*y/z$
- Note : Both ways are OK. But **Keep consistency in your data set!**

## (II) Enter option data to Option Database through Data Module (8)

### Quantity and Impacts : Energy Efficiency

- Example : Efficient Air-Conditioner
- 1 unit of air-conditioner replaces more efficient one,
  - $x$  % of energy efficiency improves.
  - However,  $y$  of household will purchase energy efficient one at maximum.
  - Target year's number of household is  $z$ .
- Normal way :
  - Max Quantity =  $y/z$
  - Efficiency Change =  $x$
- Standardization way : Max Quantity is always 1
  - Max Quantity = 1
  - Efficiency Change =  $x*y/z$

## (II) Enter option data to Option Database through Data Module (9)

### Quantity and Impacts : Fuel Shift

- Example : Replacing kerosene heater to air conditioner
- 1 unit of kerosene heater replaces air conditioner,
  - $x$  Mtoe of kerosene consumption reduces
  - But  $x'$  Mtoe of electricity consumption increases
  - However,  $y$  of household will replace at maximum.
  - Target year's number of household is  $z$ .
- Normal way :
  - Max Quantity =  $y/z$
  - Fuel Consumption Change (Kerosene) =  $-x$
  - Fuel Consumption Change (Electricity) =  $x'$
- Standardization way : Max Quantity is always 1
  - Max Quantity = 1
  - Fuel Consumption Change (Kerosene) =  $-x*y/z$
  - Fuel Consumption Change (Electricity) =  $x'*y/z$

## (II) Enter option data to Option Database through Data Module (10)

### Quantity and Impacts : CO<sub>2</sub> Reduction

- Example : CCS
- 1 unit of CCS installs 1 MW coal-fired power plant,
  - x tC of CO<sub>2</sub> reduces
  - But x' Mtoe of Coal consumption increases
  - However, y MW of plant will install at maximum.
  - Target year's capacity of plant is z MW.
- Normal way :
  - Max Quantity =  $y/z$
  - Fuel Consumption Change (Coal) =  $x'$
  - Direct CO<sub>2</sub> Reduction =  $-x$
- Standardization way : Max Quantity is always 1
  - Max Quantity = 1
  - Fuel Consumption Change (Coal) =  $x'*y/z$
  - Direct CO<sub>2</sub> Reduction =  $-x'*y/z$

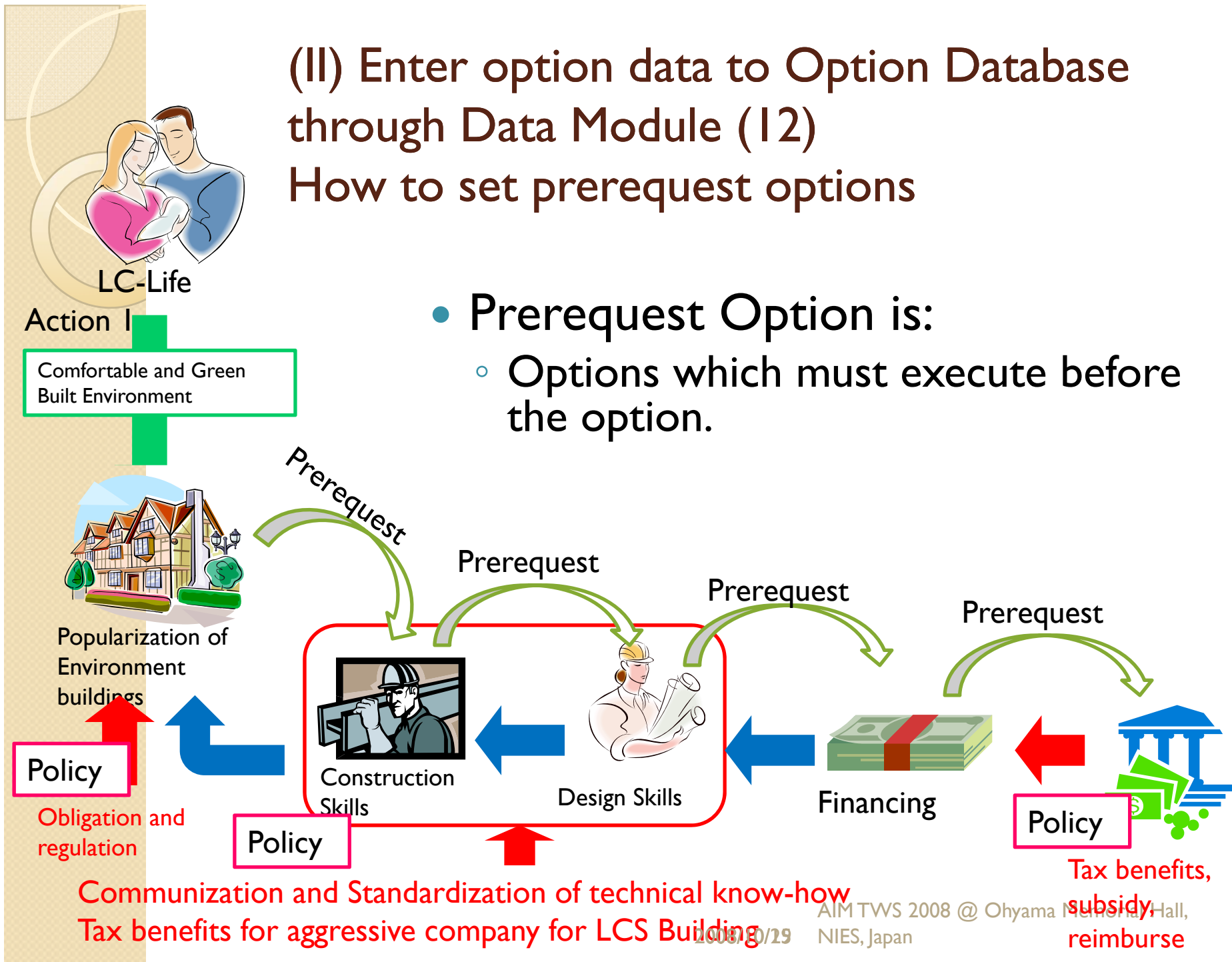
## (II) Enter option data to Option Database through Data Module (II)

### Quantity and Impacts : Period Shorten

- Example : Relaxation of regulation
- $x$  years are required to penetrate energy efficient machines,
  - But Governments employs deregulation policy, penetration of the machine shortens within  $y$  years ( $y < x$ ).
- Normal way :
  - Max Quantity =  $I$
  - Period shorten =  $x-y$
- Standardization way : Max Quantity is always  $I$ 
  - Max Quantity =  $I$
  - Period Shorten =  $x-y$

## (II) Enter option data to Option Database through Data Module (I2)

### How to set prerequisite options



- Prerequisite Option is:
  - Options which must execute before the option.



## (II) Enter option data to Option Database through Data Module (13)

### How to set Prerequisite Options

- Click “Edit” Button

The screenshot displays a software interface for entering option data, divided into several sections:

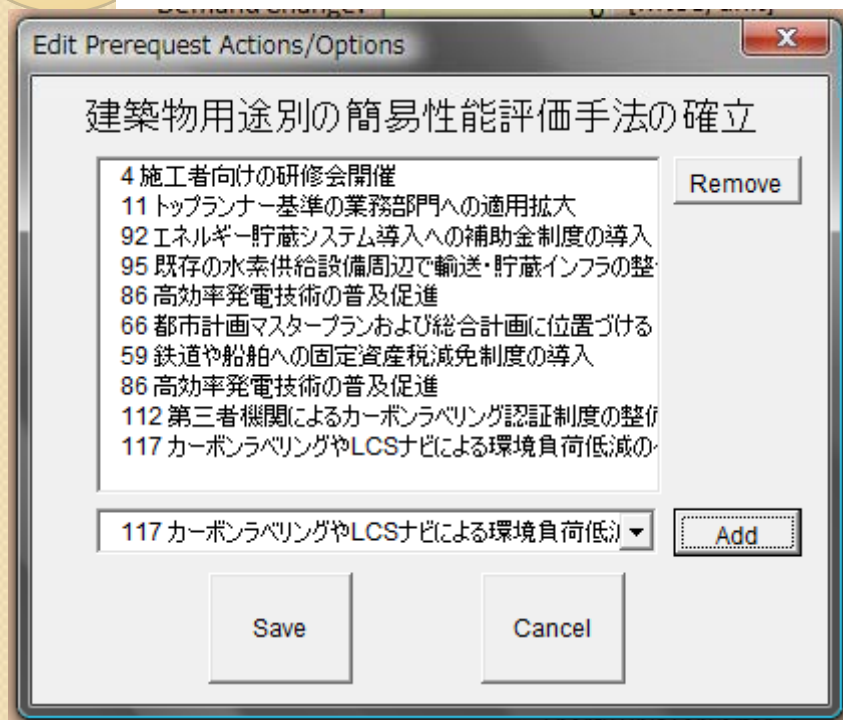
- Basic Information:** Includes fields for Nature (Stock/Flow), Sector (Industrial), Service (Agriculture), Sectors in IO Table (A01 Agriculture, forest), Kind of Goods (A01 Agriculture, forest), Unit (Mtoe), Initial Quantity (0 [unit]), and Max Quantity (0 [unit]).
- Prerequisite Actions/Options:** Contains an empty table and an **Edit** button. A red arrow points to this button.
- Parameters:** Includes fields for Commercial Year (0), Off Market Year (0), Implement Period (0 [years]), and Min. Period (0 [years]).
- Impacts:** Includes fields for Demand Change (0 [Mtoe/unit]), Efficiency Change (0 [point]), Fuel Source, Fuel Consumption Change by Fuel Shift (Coal, Oil, Gas, Biomass, Solar, Wind, Hydrogen, Electricity), Direct CO2 Red. (0 [tC/unit]), and Period Shorten. (0 [years/unit]).
- Cost Parameters:** Includes fields for Cost Unit (B-JPY), Int. Rate (0 [%]), Cost (0 [cost unit/unit]), and Cost for Accel. (0 [cost unit/unit]).

An **Energy Unit Converter** button is located between the Impacts and Cost Parameters sections.

## (II) Enter option data to Option Database through Data Module (I4)

### How to set Prerequisite Options

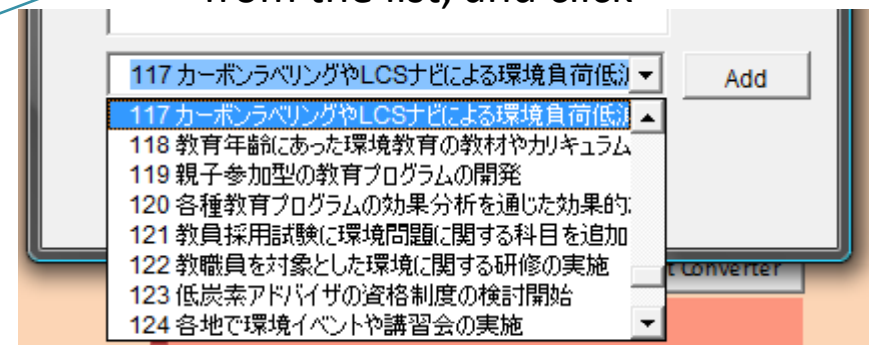
- Then, Edit Window opens and edit it.



Save : Set the list of prerequisite options  
Cancel : Abort prerequisite setting process  
(prerequisite data do not change)

Select Prerequisite Option on upper-side box and click.

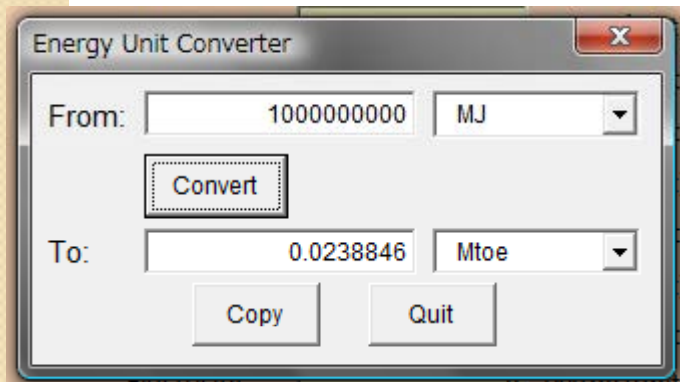
Select Prerequisite Option from the list, and click



## (II) Enter option data to Option Database through Data Module (I5)

### Tool for Tool : Energy Unit Converter

- Click “Energy Unit Converter” button



Copy : Copy the calculated value to the ClipBoard

Quit : Quit and back to Option sheet

## (II) Enter option data to Option Database through Data Module (I6)

- Data Module consists of three sheets

(A) Option Sheet

**(B) Tabular Sheet**

Series No.	Year	Asset Option	Invest. Date	Operate Date	Sector	Service	Priority	Factor	Energy Effect	Unit	Unit G. Max G.	Unit	Comm. Off. Rate	Term	Life	Cost	Est. Cost	Int. R.
1	Option1	IND	AGR		IND	AGR	0	0	0	0	0	0	0	10	100	100	0-PPY	3%
2	Option2	IND	AGR		IND	AGR	0	0	0	0	0	0	0	10	100	100	0-PPY	3%
3	Option3	RES	WATER		RES	WATER	0	0	0	0	0	0	0	10	100	100	0-PPY	3%
4	Option4	RES	WATER		RES	WATER	0	0	0	0	0	0	0	10	100	100	0-PPY	3%
5	Option5	IND	AGR		IND	AGR	0	0	0	0	0	0	0	10	100	100	0-PPY	3%
6	Option6	RES	WATER		RES	WATER	0	0	0	0	0	0	0	10	100	100	0-PPY	3%
7	Option7	IND	AGR		IND	AGR	0	0	0	0	0	0	0	10	100	100	0-PPY	3%
8	Option8	RES	WATER		RES	WATER	0	0	0	0	0	0	0	10	100	100	0-PPY	3%
9	Option9	IND	AGR		IND	AGR	0	0	0	0	0	0	0	10	100	100	0-PPY	3%
10	Option10	RES	COOL		RES	COOL	0	0	0	0	0	0	0	10	100	100	0-PPY	3%

(C) Action Sheet

Enter data for Options

Enter data for Options

## (II) Enter option data to Option Database through Data Module (17) Tabular Sheet

- Click “Tabular Mode” button, then open tabular sheet

**AIM/Backcast System ver 1.414**

**Backcasting Database**

Options: Policy and Measure

Load New Import

Tabular Mode

Actions: Config of Options

New Import

Results

Table Graph Export

Manuals

[Japanese](#) [English](#)

**Config. Sets of Options**

Load New Import

**AIM/Backcast Model**

- Simple model (Excel-based tool) Run
- Basic model (GAMS version) Run
- Advanced model (GAMS version) Run

System Configurations

Access No.	Year	Add. Option	Insert Date	Delete Date	Sector	Service	Process	Factor	Energy	Effect	Unit	Q. Max Q.	Cost	Off. Max	Term. (Moy)	Life	Cost	Est. Cost	Inv. K.	
1	Option1	IND	AGR		DRV			0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0
2	Option2	IND	AGR					0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0
3	Option3	RES	WATER					0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0
4	Option4	RES	WATER					0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0
5	Option5	IND	AGR					0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0
6	Option6	RES	WATER					0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0
7	Option7	IND	AGR					0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0
8	Option8	IND	AGR					0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0
9	Option9	IND	AGR					0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0
10	Option10	RES	COOL					0	1	Mio/Year	0	1	100	0	20	100	100	0	0	0

## (II) Enter option data to Option Database through Data Module (18) Tabular Sheet

SAVE the data and return to the portal interface

Add new option data

Insert additional data in existing options. User denotes data with an X mark at first line.

Backto Title	No.	Add Option	Insert Data	Delete Data	Sector	Service	Prereq.	Factor	Energy	Effect	Init. Q.	Max Q.	Comm.	Off Mrkt	Term (Min)	Life	Cost	Ext. Cost	Int. R.		
									unit		unit		[Yr.]	[Yr.]	[Yr.]	[Yr.]		unit	[%]		
	1	建築物用途別の簡易性能評価手法の確立			IND	AGR					0	Mtoe							B-JPY		
	2	省エネ・省CO2診断士の養成			IND	AGR					0	Mtoe							B-JPY		
	3	匠の建築技術伝承講座の開講			IND	AGR					0	Mtoe							B-JPY		
X	4	施工者向けの研修会開催			IND	AGR					0	Mtoe							B-JPY		
	5	住宅・建築物ラベリング制度の導入			IND	AGR					0	Mtoe							B-JPY		
	6	長期的な省エネ基準目標値の設定			Commer	Cool					0	Mtoe							B-JPY		
X	7	省エネ基準目標値の段階的引き上げ			IND	AGR					0	Mtoe							B-JPY		
	8	ラベリングの認証・登録の義務づけ			TR_P	MINI					0	Mtoe							B-JPY		
	9	環境性能ラベルに応じた税制優遇の創設			IND	AGR					0	Mtoe							B-JPY		
	10																				
X	11	トップランナー基準の業務部門への適用			IND	AGR					0	Mtoe							B-JPY		
	12	トップランナー基準値の評価方法の見直し			IND	AGR					0	Mtoe							B-JPY		
	13	機器単体での効率向上の推進			IND	AGR					0	Mtoe							B-JPY		
	14	企業ごとの貢献度を評価する第三者機関			IND	AGR					0	Mtoe							B-JPY		
	15	優秀な企業に対する報奨制度の導入			IND	AGR					0	Mtoe							B-JPY		
	16	技術・評価技術の国際標準化に向けた取組			IND	AGR					0	Mtoe							B-JPY		
	17	機器ごとの最低回収率の設定			IND	AGR					0	Mtoe							B-JPY		
	18	最低回収率基準の段階的強化			IND	AGR					0	Mtoe							B-JPY		
	19	リース企業への固定資産税減免措置の導入			IND	AGR					0	Mtoe							B-JPY		
	20	Test			Resider	Cool					0										
	21	低炭素農業アドバイザーの育成			IND	IND		EEF	GAS	2 Point	0	0	Mtoe		0	0	0	0	0	B-JPY	3%

Yellow-colored columns show the minimum data required for running a simple model. In this sheet, user does not enter any letters.

X mark show/erase by clicking

## (II) Enter option data to Option Database through Data Module (19)

### Tabular Sheet: How to set Data

- Click the Cells then,
  - Select box appears at Sector / Service / Factor / Energy / unit

Negotiation in the world for establishing	IND	AGR					
Adoption of flexible tax measures	IND	AGR					
Efficient insulation	RES	WARM	114,115,116,1	DRV			-11.028
Efficient air conditioner	RES	COOL	126,128,129,	EEF	ELE		431.45
Efficient air conditioner	RES	WARM	126,128,129,	EEF	ELE		516
Building energy management system	RES	HTWTR		DRV			-0.4735
Efficient electric water heater	RES	COOK	138,				
Efficient oil water heater	RES	LIGHT	126,128,129,	EEF	ELE		538
Efficient gas water heater	RES	REFRI	126,128,129,	EEF	OIL		20
Efficient biomass water heater	RES	IoT	126,128,129,	EEF	GAS		20
Efficient insulation	RES	APP	126,128,129,	EEF			
Efficient oil cooking appliances	RES	HTWTR	133,135,137,	EEF	BMS		20
	RES	HTWTR	141,	DRV			-1.4227
	RES	COOK	126,128,129,	EEF	OIL		10

- Enter numbers directly
- Enter a prerequisite option number with comma-delimited style, like “1,2,3”.



## (II) Enter option data to Option Database through Data Module (20)

### Tabular Sheet: How to set Data

- Way to make quantitative data is completely same as that of Option Sheet, so Skip!



## (II) Enter option data to Option Database through Data Module (21)

- Data Module consists of three sheets

(A) Option Sheet

(B) Tabular Sheet

Series No.	Option No.	Asset	Invest Date	Operate Date	Sector	Service	Priority	Factor	Energy Effect	Unit	Unit G.	Max G.	Price	Comm. Off	Term	Life	Cost	Est. Cost	Int. S.
1	Option1	IND	AGR		IND	AGR	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF
2	Option2	IND	AGR		RES	WATER	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF
3	Option3	RES	WATER		RES	WATER	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF
4	Option4	RES	WATER		IND	AGR	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF
5	Option5	IND	AGR		RES	WATER	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF
6	Option6	RES	WATER		IND	AGR	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF
7	Option7	IND	AGR		RES	WATER	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF
8	Option8	RES	WATER		IND	AGR	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF
9	Option9	IND	AGR		RES	WATER	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF
10	Option10	RES	WATER		RES	COOL	0	0	0	0	0	0	0	0	0	0	100	100	B-PFF

(C) Action Sheet

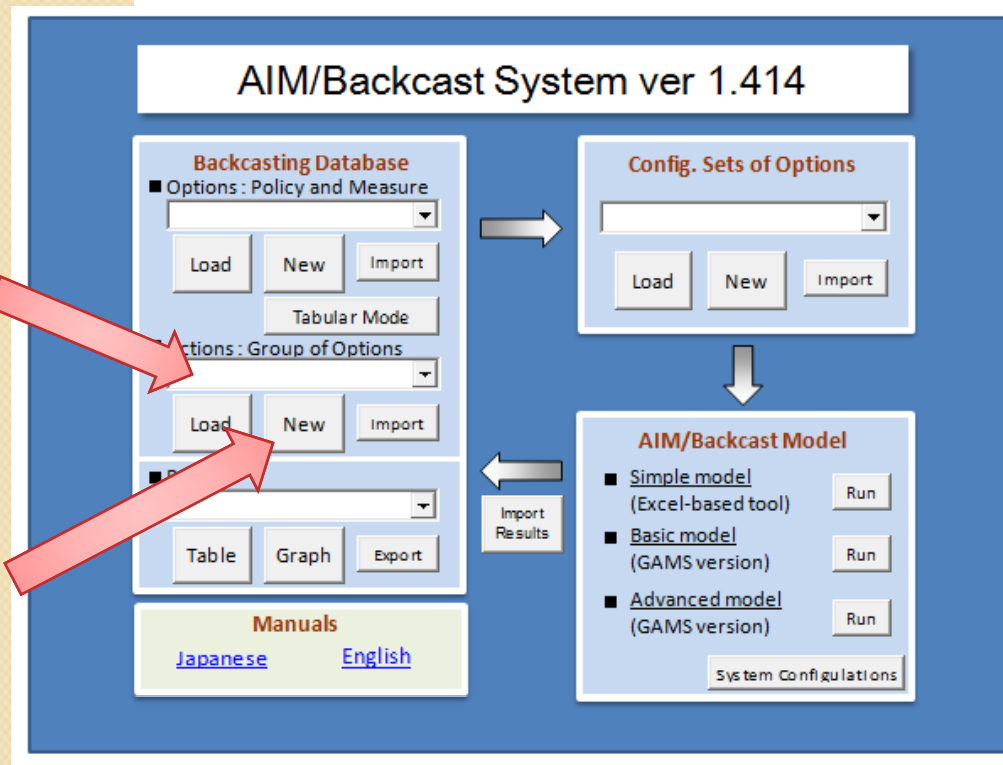
Enter data for Options

Enter data for Options

## (II) Enter option data to Option Database through Data Module (22)

### (C) Action Sheet

- Select a action which user want to edit, and click “Load”
- Or Click “New” button, then open “Action Sheet”.



## (II) Enter option data to Option Database through Data Module (23)

Action Sheet : Contains basically qualitative data

Backcasting Database: Actions

No. 0001 test1

Rename Save Back to Title Remove

Overview

Future Objectives

Implementation Barriers and Strategic Steps

Implicit Contributors

Action Number and title

Overview

Future Objectives

Implementation barriers and strategic steps

Implicit contributors

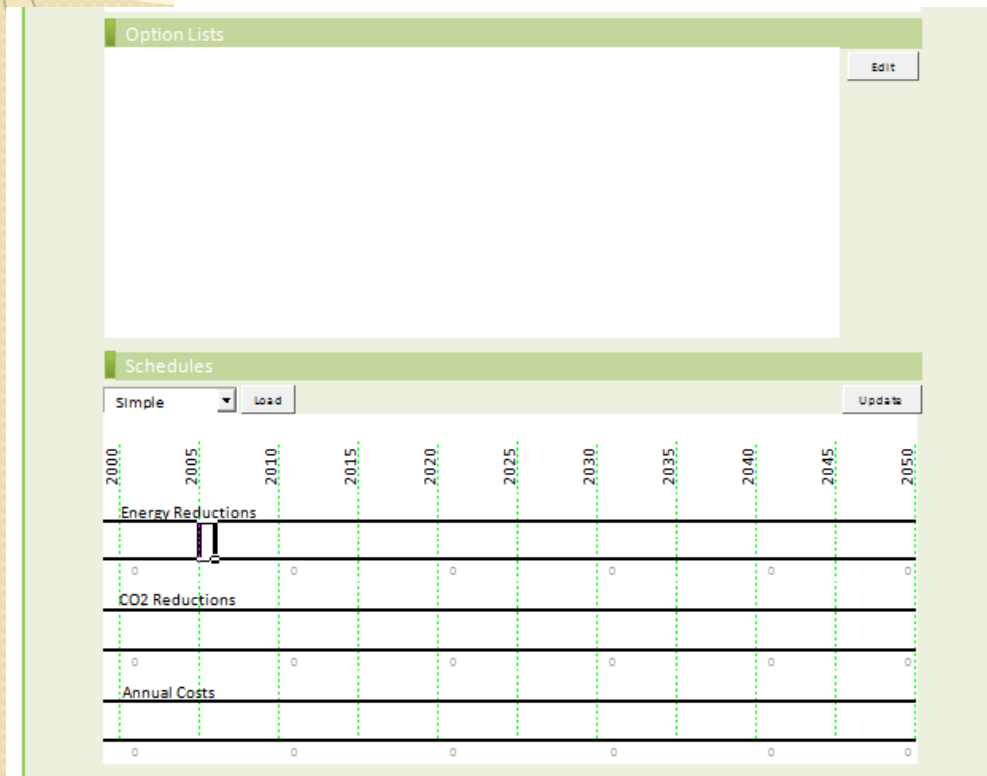
Save : Save the action data into the Option Database

Back to Title : **DO NOT SAVE THE DATA** and return to the portal interface

Remove : Remove the action data from the Option Database

## (II) Enter option data to Option Database through Data Module (24)

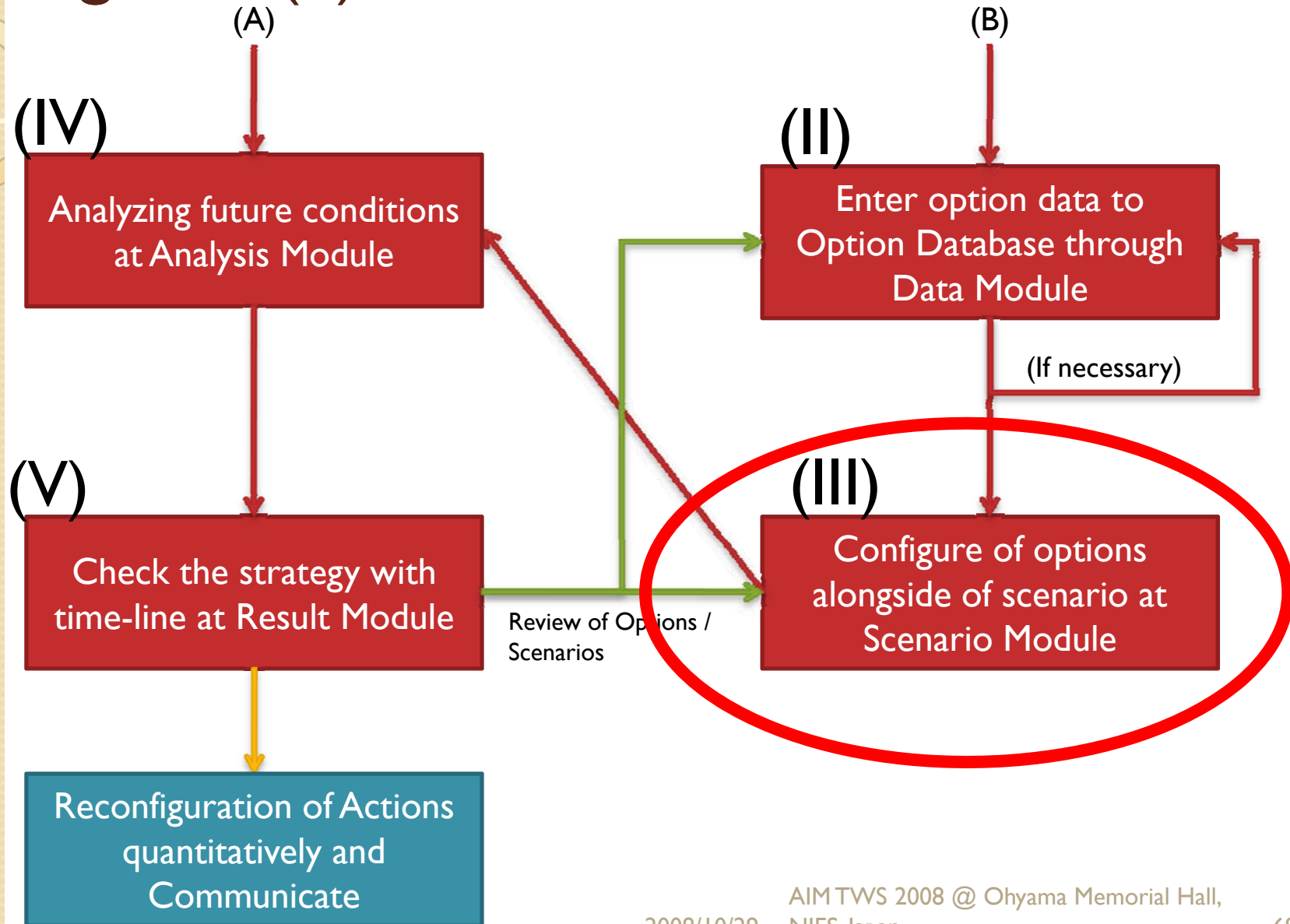
Action Sheet : Contains basically qualitative data



Packages of options

Showing integrated results of options including the action

# Agenda (2)



## (III) Configure of options alongside of scenario at Scenario Module (I)

- Select a scenario which user want to edit, and click “Load”
- Or Click “New” button, then launch Scenario Module

**AIM/Backcast System ver 1.414**

The interface is divided into several sections:

- Backcasting Database:** Contains a dropdown for 'Options: Policy and Measure', buttons for 'Load', 'New', and 'Import', a 'Tabular Mode' button, and a dropdown for 'Actions: Group of Options' with 'Load', 'New', and 'Import' buttons.
- Results:** Contains a dropdown menu and buttons for 'Table', 'Graph', and 'Export'.
- Manuals:** Links for 'Japanese' and 'English'.
- Config. Sets of Options:** A central panel with a dropdown menu and 'Load', 'New', and 'Import' buttons. Red arrows indicate the flow from the 'Load' button in the Backcasting Database to this panel, and from the 'New' button in this panel to the AIM/Backcast Model.
- AIM/Backcast Model:** Contains three model options: 'Simple model (Excel-based tool)', 'Basic model (GAMS version)', and 'Advanced model (GAMS version)', each with a 'Run' button. A 'System Configurations' button is at the bottom.

**Backcasting Database: Configuration Set of Options**

No. 0012 New Option Sets0012 [Save] [Back to Title] [Remove]

Option No. 51 to 100 [Load]

51	X	炭素税の導入と長期的な税率	76	X	将来像に沿った技術開発の強
52	X	先進的な取り組みを行った企	77	X	将来の低炭素電力供給像の形
53	X	世界各国への国際的な持組み	78	X	安全かつ開かれた原子力運営
54	X	SCMの普及費用対効果の評価	79	X	適切な原子力発電に対する理
55	X	SCMをネットワーク経由で利	80	X	電力品質維持費用の需要家へ
56	X	日本で開発した規格の世界標	81	X	電力価格制度の抜本的見直し
57	X	複数の輸送機関間の陸路をな	82	X	電力市場の完全自由化の実現
58	X	必要インフラの整備に対する	83	X	電力関連規制のグリーン化の
59	X	鉄道や船舶への固定資産税減	84	X	次世代発電技術の実用化
60	X	トッピング制度の全輸送	85	X	系統インフラの低コスト化・準
61	X	輸送用エネルギーに対する放	86	X	高効率発電技術の普及促進
62	X	輸送機関の状況のリアルタイ	87	X	コスト低減に向けた技術開発
63	X	エコラベリング制度の普及	88	X	再生可能エネルギー取り価格の
64	X	貨物輸送に伴う温室効果ガス	89	X	エネルギー貯蔵装置の技術研
65	X	市民参加による集約型土地利	90	X	電力会社の系統対策費用への
66	X	都市計画マスタープランおよ	91	X	太陽光・風力導入時のエネル
67	X	エネルギー貯蔵装置および車	92	X	エネルギー貯蔵システム導入
68	X	公共交通機関の効率向上に重	93	X	適宜電力供給ネットワークの
69	X	中心市街地における税制上の	94	X	将来の水素需要をならみにつ
70	X	上下分離方式の導入	95	X	既存の水素供給設備周辺で解
71	X	低炭素貨物車両の導入に向け	96	X	既存の水素供給設備周辺で解
72	X	低炭素貨物車両に対する標準	97	X	既存の水素供給設備周辺で解
73	X	レアメタル資源量確保戦略の	98	X	水素拠点配置計画に基づく水
74	X	代替材料の研究開発の促進	99	X	水素供給ネットワーク拡大へ
75	X	電力供給将来像の検討シス	100	X	建築物用送別の船隻性能評価

[All] [Clear] [Save] [Back to Title] [Remove]

## (III) Configure of options alongside of scenario at Scenario Module (2)

Scenario number and title

Show another page.  
One page includes up to 50 Options.

Options for the scenario can be set by clicking yellow lines.

Backcasting Database: Configuration Set of Options

No. 0012 New Option Sets0012

Save Back to Title Remove

Option No. 51 to 100 Load

51	X	炭素税の導入と長期的な税率	76	X	将来像に沿った技術開発の強
52	X	先進的な取り組みを行った企	77	X	将来の低炭素電力供給像の必
53	X	世界各国への国際的な枠組み	78	X	安全かつ開かれた原子力運送
54	X	SCMの普及費用対効果の評価	79	X	適切な原子力発電に対する理
55	X	SCMをネットワーク経由で利	80	X	電力品質維持費用の需要家へ
56	X	日本で開発した規格の世界標	81	X	電力価格制度の抜本的見直し
57	X	複数の輸送機関間の陸路をな	82	X	電力市場の完全自由化の実施
58	X	必要インフラの整備に対する	83	X	電力関連税制のグリーン化の
59	X	鉄道や船舶への固定資産税減	84	X	次世代発電技術の実用化
60	X	トップランナー制度の全輸送	85	X	系統インフラの低ロス化・非
61	X	輸送用エネルギーに対する放	86	X	高効率発電技術の普及促進
62	X	輸送機関の状況のリアルタイ	87	X	コスト低減に向けた技術開発
63	X	エコラベリング制度の普及	88	X	再生可能エネルギー取り価格の
64	X	貨物輸送に伴う温室効果ガス	89	X	エネルギー貯蔵装置の技術研
65	X	市民参加による集約型土地利	90	X	電力会社の系統対策費用への
66	X	都市計画マスタープランおよ	91	X	太陽光・風力導入時のエネル
67	X	エネルギー貯蔵装置および非	92	X	エネルギー貯蔵システム導入
68	X	公共交通機関の効率向上に向	93	X	適宜電力供給ネットワークの
69	X	中心市街地における規制上の	94	X	将来の水素需要をにらみつつ
70	X	上下分離方式の導入	95	X	既存の水素供給設備周辺で解
71	X	低環境負荷車両の導入に向け	96	X	既存の水素供給設備周辺で水
72	X	低環境負荷車両に対する候選	97	X	既存の水素供給設備周辺で水
73	X	レアメタル資源確保戦略の	98	X	水素拠点配置計画に基づく水
74	X	代替材料の研究開発の促進	99	X	水素供給ネットワーク拡大へ
75	X	電力供給将来像の検討システ	100	X	建築物用途別の断熱性能評価

All Clear Save Back to Title Remove

All : All options in the page are selected.

Clear : Release all options in the page

Save : Save the data into the Option Database

Back to Title : WITHOUT SAVING THE DATA, and return to the portal interface

Remove : Remove scenario from the Option Database

# (III) Configure of options alongside of scenario at Scenario Module (3)

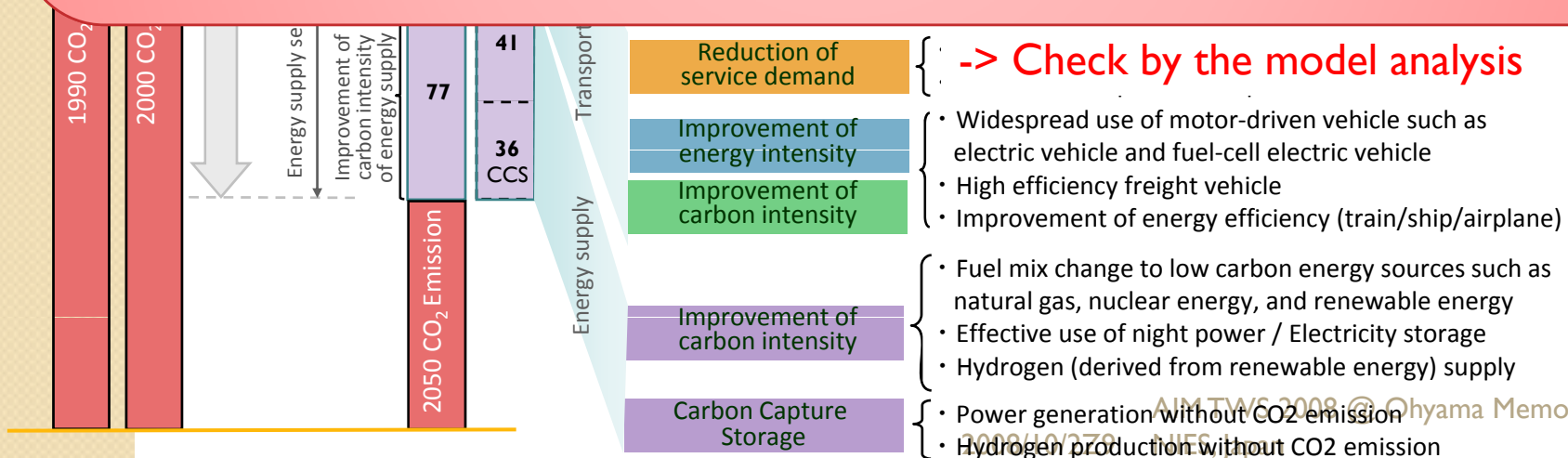
## Why do we need the module?

Change

Change of activity

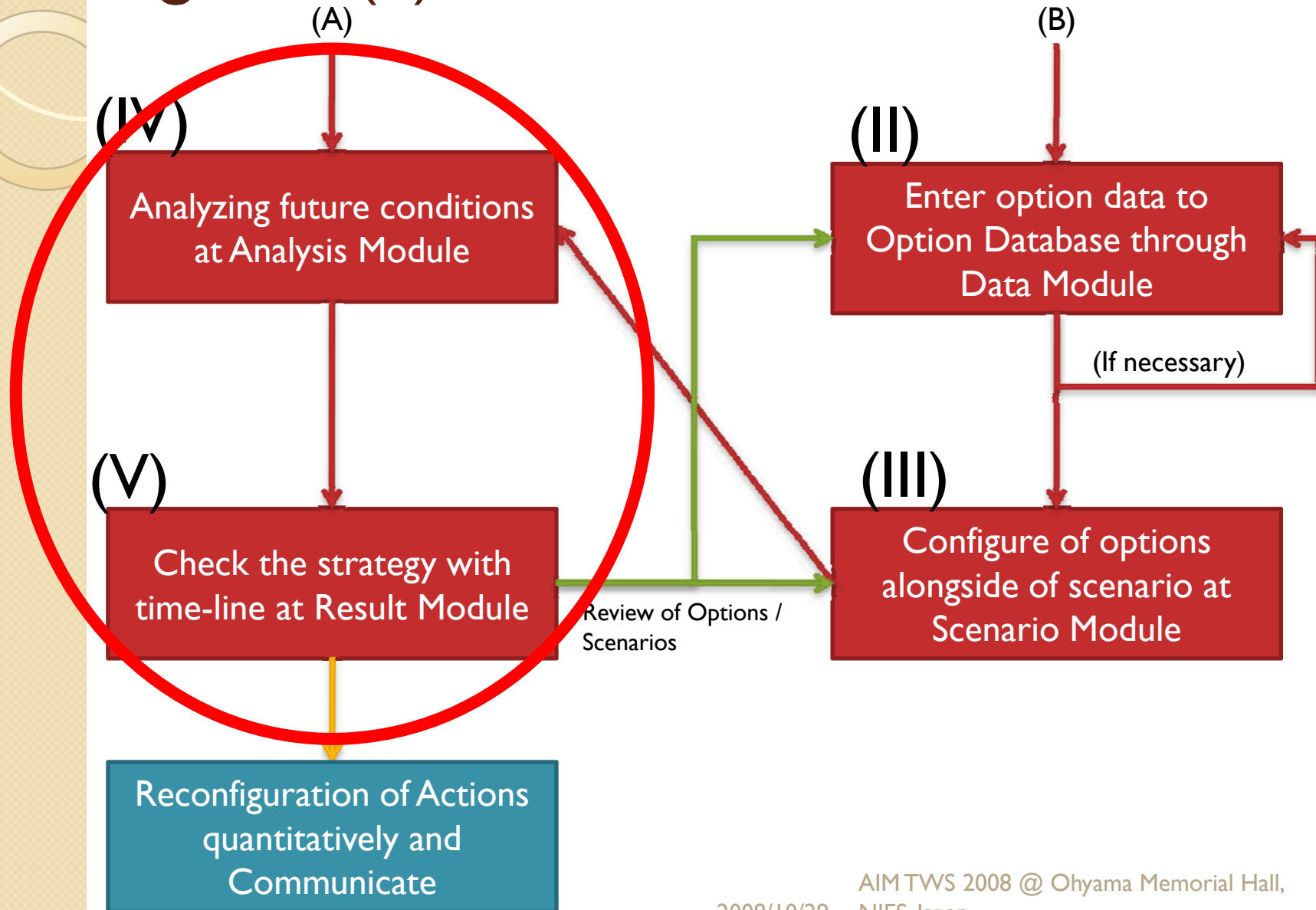
- High economic growth, Increase of service demand per household, Increase of office floor (increase)
- Servicing of industry, Decline in number of households,

**Scenario Module  
= Advanced Preparation Module for Uncertainty  
Analysis of Policy / Countermeasures (Not  
Quantification data)**



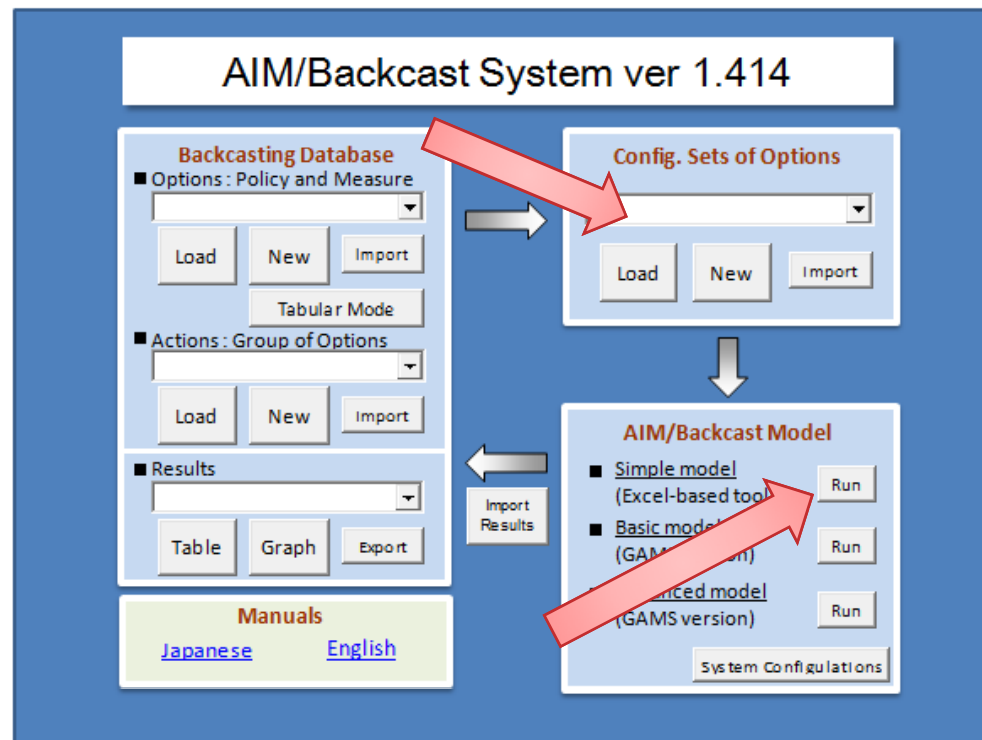


# Agenda (2)



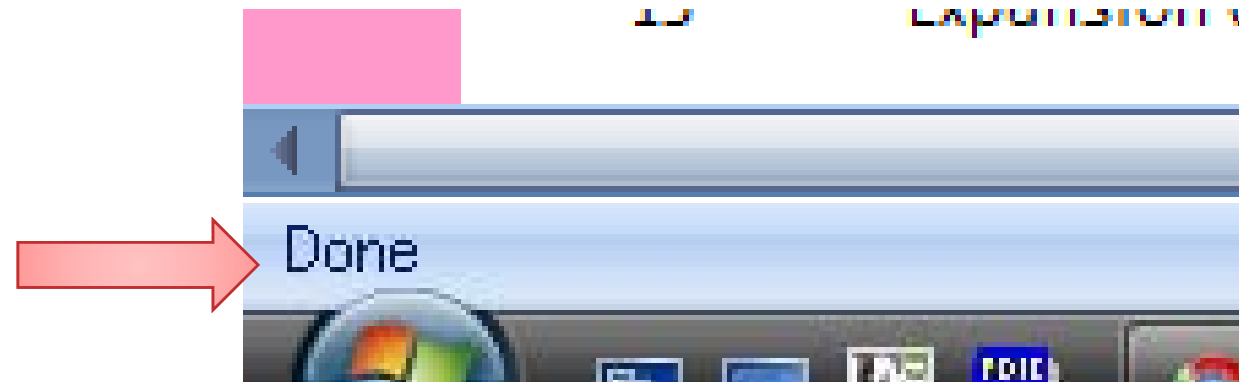
## (IV) Analyzing future conditions at Analysis Module(I)

- Select a scenario which user want to analyze, and click “Run” of Simple Model
- Or Just Click “Run” button, then user can get BAU (or Technology Frozen) Scenario results



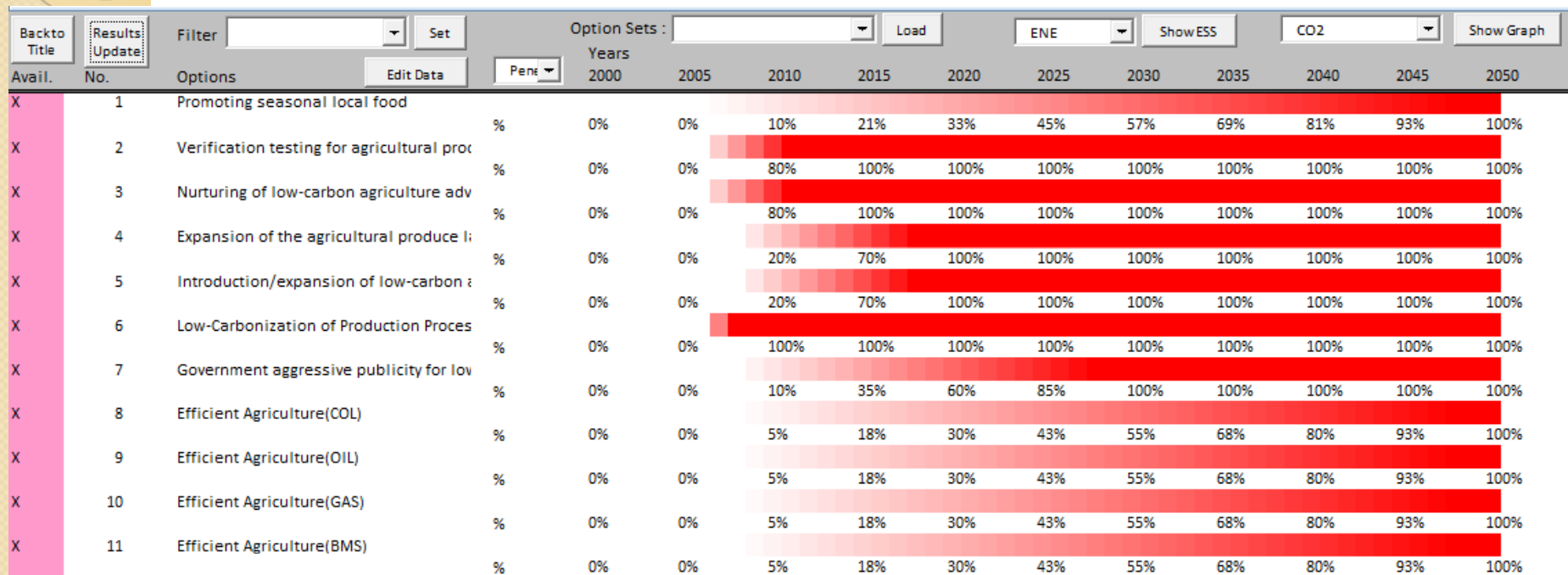
## (IV) Analyzing future conditions at Analysis Module(2)

- The model takes several minutes to run (depends on PC performance, in my case, 2-3 minutes). Basically, xlsx file is faster than xls (but Excel 2007 only).
  - take your new coffee or tea!
- User can check current progress on the bottom side bar of Excel (Status Bar)



## (IV) Analyzing future conditions at Analysis Module(3)

- When calculation finishes, user can check the results



When calculation has done, changes in penetration rate is shown.  
 First line shows changes in results visually (more close to Max Q, more color close to red),  
 And second line displays results directly.

# (IV) Analyzing future conditions at Analysis Module(4)

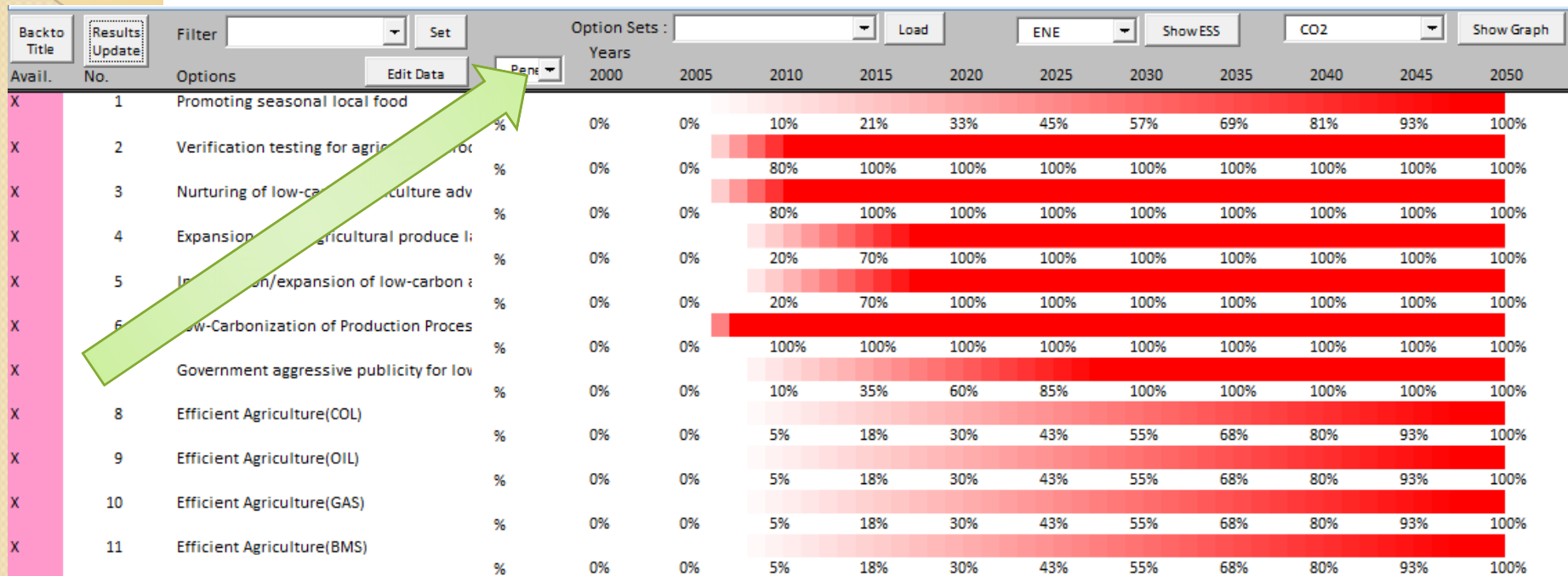
## First of all...Apologize for you

- Following buttons do not work in this version.
  - Final version (will be released by the end of this FY) employs full set of button actions.

Avail.	No.	Options	Edit Data	Penet	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
X	1	Promoting seasonal local food	%		0%	0%	10%	21%	33%	45%	57%	69%	81%	93%	100%
X	2	Verification testing for agricultural proc	%		0%	0%	80%	100%	100%	100%	100%	100%	100%	100%	100%
X	3	Nurturing of low-carbon agriculture adv	%		0%	0%	80%	100%	100%	100%	100%	100%	100%	100%	100%
X	4	Expansion of the agricultural produce li	%		0%	0%	20%	70%	100%	100%	100%	100%	100%	100%	100%
X	5	Introduction/expansion of low-carbon :	%		0%	0%	20%	70%	100%	100%	100%	100%	100%	100%	100%
X	6	Low-Carbonization of Production Proces	%		0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%
X	7	Government aggressive publicity for lov	%		0%	0%	10%	35%	60%	85%	100%	100%	100%	100%	100%
X	8	Efficient Agriculture(COL)	%		0%	0%	5%	18%	30%	43%	55%	68%	80%	93%	100%
X	9	Efficient Agriculture(OIL)	%		0%	0%	5%	18%	30%	43%	55%	68%	80%	93%	100%
X	10	Efficient Agriculture(GAS)	%		0%	0%	5%	18%	30%	43%	55%	68%	80%	93%	100%
X	11	Efficient Agriculture(BMS)	%		0%	0%	5%	18%	30%	43%	55%	68%	80%	93%	100%

## (IV) Analyzing future conditions at Analysis Module(5)

- User can check another results (CO2 reduction and Cost) by changing result box.



First line shows changes in results visually (more close to Max Q, more color close to red),  
And second line displays results directly.

## (IV) Analyzing future conditions at Analysis Module(6)

### How to check the whole results visually

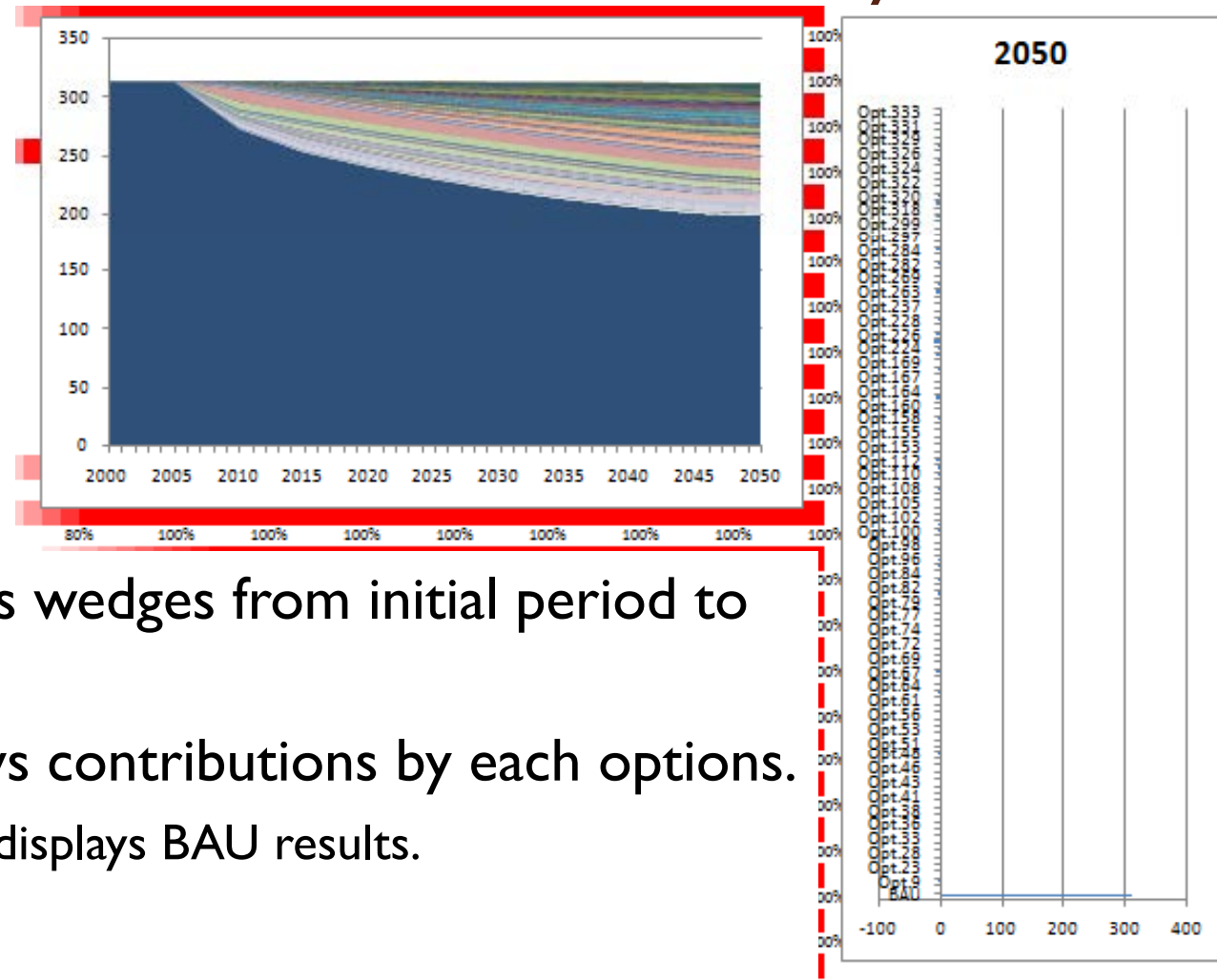
- Select the type of results from the list box, and click “Show Graph”
- User can select three types of results, penetration, CO2 and Cost



## (IV) Analyzing future conditions at Analysis Module(7)

### How to check the whole results visually

In case of CO2



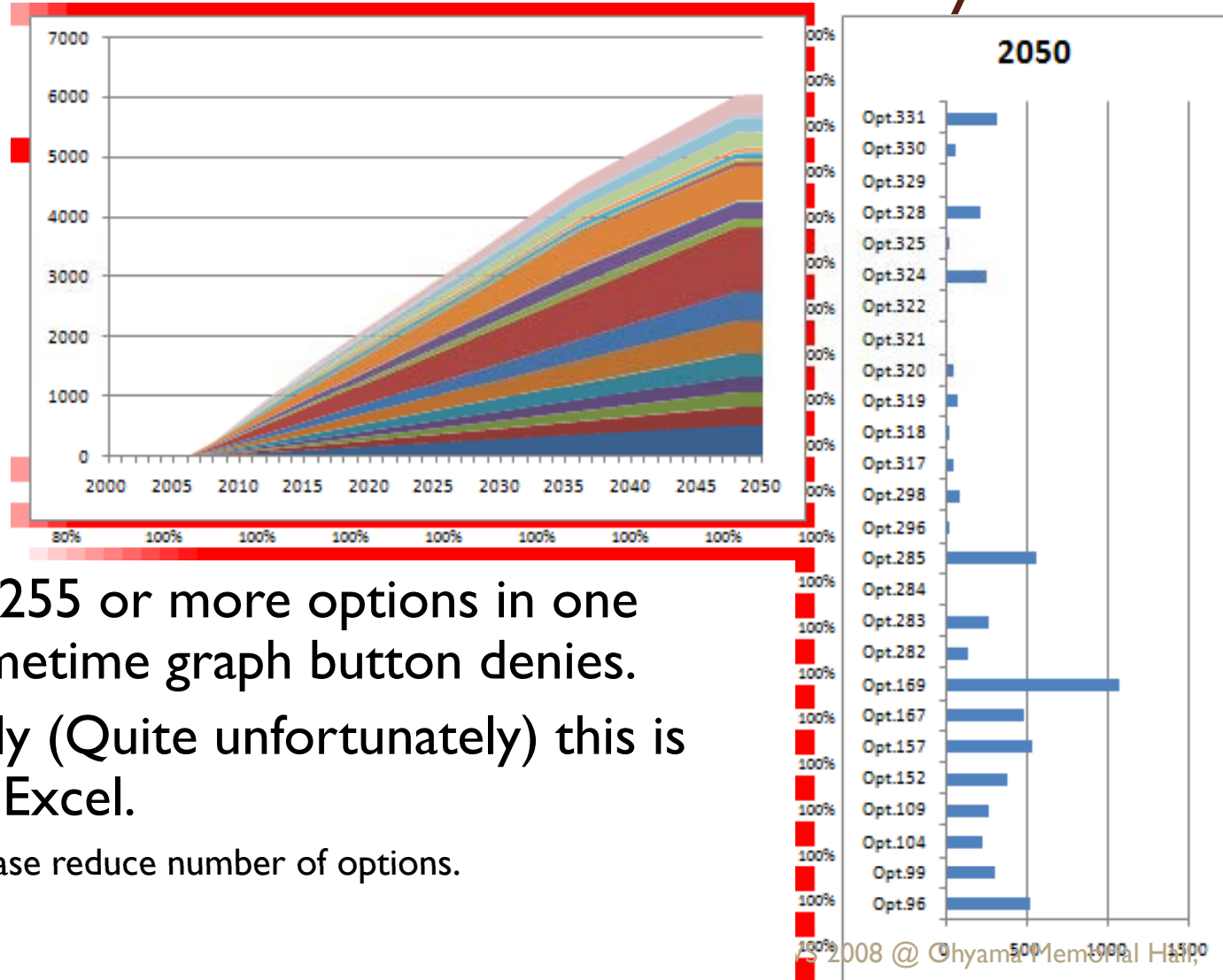
- Left Graph shows wedges from initial period to target period.
- Right graph shows contributions by each options.
  - Only CO2 graph displays BAU results.



# (IV) Analyzing future conditions at Analysis Module(8)

## How to check the whole results visually

In case of Cost

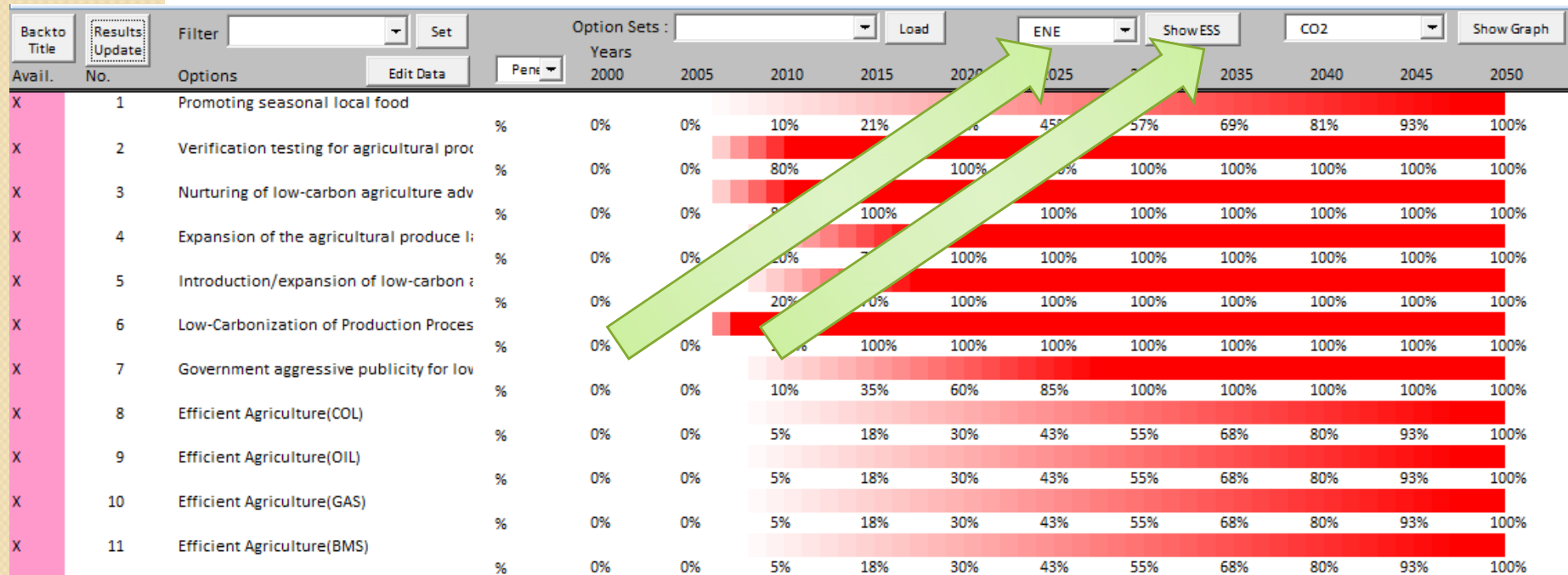


- If users sets 255 or more options in one scenario, sometime graph button denies.
- Unfortunately (Quite unfortunately) this is limitation of Excel.
  - In this case, please reduce number of options.

## (IV) Analyzing future conditions at Analysis Module(9)

### How to check the Energy Balance

- Select name of sector from the list box, and click “Show ESS”



# (IV) Analyzing future conditions at Analysis Module(I0)

## How to check the Energy Balance

- User can check the energy balance by 5 years.
- Basics are common in the ESS.

Industrial sector

[Back to Simple BCM](#)

1 Energy service demand (BAU)

Unit	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Agriculture Bil. Y	15.5	16.0	16.5	17.0	17.5	18.0	18.5	18.9	19.4	19.9	20.4
Mining Bil. Y	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.6
Construction Bil. Y	77.1	76.7	76.4	76.0	75.7	75.3	75.0	74.6	74.3	73.9	73.6
Food Bil. Y	35.8	37.8	39.8	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8
Textile Bil. Y	7.0	7.5	8.0	8.6	9.1	9.7	10.2	10.7	11.3	11.8	12.4
Paper & Pulp Mil-t	31.8	30.3	28.8	27.3	25.8	24.3	22.7	21.2	19.7	18.2	16.7
Petrochemicals Mil-t	7.6	7.1	6.8	6.4	6.0	5.6	5.1	4.7	4.3	3.9	3.5
Other chemicals Bil. Y	19.8	21.5	23.1	24.7	26.4	28.0	29.6	31.3	32.9	34.5	36.2
Cement Mil-t	82.4	79.7	77.1	74.5	71.8	69.2	66.6	63.9	61.3	58.7	56.1
Other ceramic Bil. Y	4.3	4.5	4.6	4.8	4.9	5.1	5.3	5.4	5.6	5.7	5.9
Steel Mil-t	106.9	103.6	100.4	97.1	93.8	90.6	87.3	84.1	80.8	77.5	74.3
Non Ferrous Bil. Y	6.2	6.3	6.4	6.6	6.7	6.8	6.9	7.0	7.2	7.3	7.4
Metal & Machine Bil. Y	142.4	146.6	150.8	154.9	159.1	163.3	167.5	171.7	175.9	180.0	184.2
Other Manufacture Bil. Y	36.9	37.7	38.4	39.2	40.0	40.8	41.5	42.3	43.1	43.9	44.6

CM

Unit	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Agriculture Bil. Y	15.5	16.0	16.3	16.5	16.8	17.0	17.2	17.4	17.7	17.9	18.2
Mining Bil. Y	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.6
Construction Bil. Y	77.1	76.7	76.4	76.0	75.7	75.3	75.0	74.6	74.3	73.9	73.6
Food Bil. Y	35.8	37.8	39.8	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8
Textile Bil. Y	7.0	7.5	8.0	8.6	9.1	9.7	10.2	10.7	11.3	11.8	12.4
Paper & Pulp Mil-t	31.8	30.3	28.8	27.3	25.8	24.3	22.7	21.2	19.7	18.2	16.7
Petrochemicals Mil-t	7.6	7.1	6.8	6.4	6.0	5.6	5.1	4.7	4.3	3.9	3.5
Other chemicals Bil. Y	19.8	21.5	23.1	24.7	26.4	28.0	29.6	31.3	32.9	34.5	36.2
Cement Mil-t	82.4	79.7	77.1	74.5	71.8	69.2	66.6	63.9	61.3	58.7	56.1
Other ceramic Bil. Y	4.3	4.5	4.6	4.8	4.9	5.1	5.3	5.4	5.6	5.7	5.9
Steel Mil-t	106.9	103.6	100.4	97.1	93.8	90.6	87.3	84.1	80.8	77.5	74.3
Non Ferrous Bil. Y	6.2	6.3	6.4	6.6	6.7	6.8	6.9	7.0	7.2	7.3	7.4
Metal & Machine Bil. Y	142.4	146.6	150.8	154.9	159.1	163.3	167.5	171.7	175.9	180.0	184.2
Other Manufacture Bil. Y	36.9	37.7	38.4	39.2	40.0	40.8	41.5	42.3	43.1	43.9	44.6

2 Service Share

Unit	2000										2005										2010										2015									
	COL	OIL	GAS	BMS	S/W	Heat	H2	ELE	Total	COL	OIL	GAS	BMS	S/W	Heat	H2	ELE	Total	COL	OIL	GAS	BMS	S/W	Heat	H2	ELE	Total	COL	OIL	GAS	BMS	S/W	Heat	H2	ELE	Total				
Agriculture	96%			1%				3%	100%	96%			1%				3%	100%	96%			1%				3%	100%	96%			1%			3%	100%					
Mining	73%							27%	100%	73%			1%				27%	100%	73%			1%				27%	100%	73%			1%			27%	100%					
Construction	98%							2%	100%	98%							2%	100%	98%							2%	100%	98%						2%	100%					
Food	35%	22%						43%	100%	35%	22%						43%	100%	35%	22%						43%	100%	35%	22%					43%	100%					
Textile	1%	70%	7%					23%	101%	1%	70%	7%					23%	101%	1%	70%	7%					23%	101%	1%	70%	7%				23%	101%					
Paper & Pulp	13%	29%	7%	23%				29%	101%	13%	29%	7%	23%				29%	101%	13%	29%	7%	23%				29%	101%	13%	29%	7%	23%			29%	101%					
Petrochemicals	3%	39%	11%					25%	100%	3%	39%	11%					25%	100%	3%	39%	11%					25%	100%	3%	39%	11%			25%	100%						
Other chemicals	4%	38%	8%					30%	100%	4%	38%	8%					30%	100%	4%	38%	8%					30%	100%	4%	38%	8%			30%	100%						
Cement	85%							15%	100%	85%							15%	100%	85%							15%	100%	85%						15%	100%					
Other ceramic		72%	8%					20%	100%		72%	8%					20%	100%		72%	8%					20%	100%		72%	8%			20%	100%						
Steel	73%	7%	4%					16%	100%	73%	7%	4%					16%	100%	73%	7%	4%					16%	100%	73%	7%	4%			16%	100%						
Non Ferrous	8%	31%	11%					30%	100%	8%	31%	11%					30%	100%	8%	31%	11%					30%	100%	8%	31%	11%			30%	100%						
Metal & Machine	2%	9%	18%					71%	100%	2%	9%	18%					71%	100%	2%	9%	18%					71%	100%	2%	9%	18%			71%	100%						
Other Manufacture	2%	66%	3%					27%	100%	2%	66%	3%					27%	100%	2%	66%	3%					27%	100%	2%	66%	3%			27%	100%						

# (IV) Analyzing future conditions at Analysis Module(II)

## How to check the Energy Balance

- Click "Back to Simple BCM" button, then user can return to Simple Model result sheet.

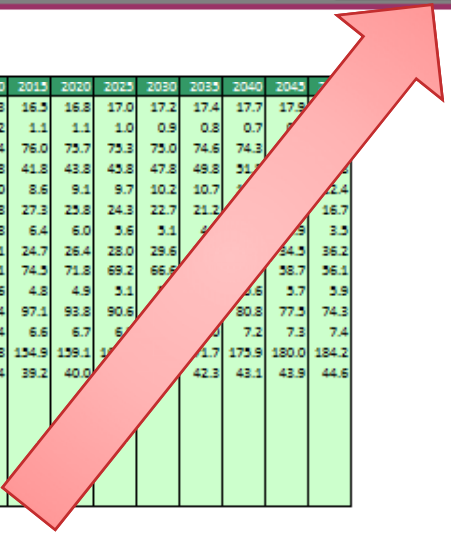
Industrial sector Back to Simple BCM

1 Energy service demand (BAU)

Unit	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Agriculture	15.5	16.0	16.5	17.0	17.5	18.0	18.5	18.9	19.4	19.9	20.4
Mining	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.6
Construction	77.1	76.7	76.4	76.0	75.7	75.3	75.0	74.6	74.3	73.9	73.6
Food	35.8	37.8	39.8	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8
Textile	7.0	7.5	8.0	8.6	9.1	9.7	10.2	10.7	11.3	11.8	12.4
Paper & Pulp	31.8	30.3	28.8	27.3	25.8	24.3	22.7	21.2	19.7	18.2	16.7
Petrochemicals	7.6	7.1	6.8	6.4	6.0	5.6	5.1	4.7	4.3	3.9	3.5
Other chemicals	19.8	21.5	23.1	24.7	26.4	28.0	29.6	31.3	32.9	34.5	36.2
Cement	82.4	79.7	77.1	74.5	71.8	69.2	66.6	63.9	61.3	58.7	56.1
Other ceramic	4.3	4.5	4.6	4.8	4.9	5.1	5.3	5.4	5.6	5.7	5.9
Steel	106.9	103.6	100.4	97.1	93.8	90.6	87.3	84.1	80.8	77.5	74.3
Non Ferrous	6.2	6.3	6.4	6.6	6.7	6.8	6.9	7.0	7.2	7.3	7.4
Metal & Machine	142.4	146.6	150.8	154.9	159.1	163.3	167.5	171.7	175.9	180.0	184.2
Other Manufacture	36.9	37.7	38.4	39.2	40.0	40.8	41.5	42.3	43.1	43.9	44.6

CM

Unit	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Agriculture	15.5	16.0	16.3	16.5	16.8	17.0	17.2	17.4	17.7	17.9	18.1
Mining	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.8	0.7	0.7	0.6
Construction	77.1	76.7	76.4	76.0	75.7	75.3	75.0	74.6	74.3	73.9	73.6
Food	35.8	37.8	39.8	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8
Textile	7.0	7.5	8.0	8.6	9.1	9.7	10.2	10.7	11.3	11.8	12.4
Paper & Pulp	31.8	30.3	28.8	27.3	25.8	24.3	22.7	21.2	19.7	18.2	16.7
Petrochemicals	7.6	7.1	6.8	6.4	6.0	5.6	5.1	4.7	4.3	3.9	3.5
Other chemicals	19.8	21.5	23.1	24.7	26.4	28.0	29.6	31.3	32.9	34.5	36.2
Cement	82.4	79.7	77.1	74.5	71.8	69.2	66.6	63.9	61.3	58.7	56.1
Other ceramic	4.3	4.5	4.6	4.8	4.9	5.1	5.3	5.4	5.6	5.7	5.9
Steel	106.9	103.6	100.4	97.1	93.8	90.6	87.3	84.1	80.8	77.5	74.3
Non Ferrous	6.2	6.3	6.4	6.6	6.7	6.8	6.9	7.0	7.2	7.3	7.4
Metal & Machine	142.4	146.6	150.8	154.9	159.1	163.3	167.5	171.7	175.9	180.0	184.2
Other Manufacture	36.9	37.7	38.4	39.2	40.0	40.8	41.5	42.3	43.1	43.9	44.6



2 Service Share

Unit	2000										2005										2010										2015									
	COL	OIL	GAS	BMS	S/W	Heat	H2	ELE	Total	COL	OIL	GAS	BMS	S/W	Heat	H2	ELE	Total	COL	OIL	GAS	BMS	S/W	Heat	H2	ELE	Total	COL	OIL	GAS	BMS	S/W	Heat	H2	ELE	Total				
Agriculture	96%			1%				3%	100%	96%							3%	100%	96%							3%	100%	96%							3%	100%				
Mining	73%							27%	100%	73%							27%	100%	73%							27%	100%	73%							27%	100%				
Construction	98%							2%	100%	98%							2%	100%	98%							2%	100%	98%							2%	100%				
Food	35%	22%						43%	100%	35%	22%						43%	100%	35%	22%						43%	100%	35%	22%						43%	100%				
Textile	1%	70%	7%					23%	101%	1%	70%	7%					23%	101%	1%	70%	7%					23%	101%	1%	70%	7%					23%	101%				
Paper & Pulp	13%	29%	7%	23%				29%	101%	13%	29%	7%	23%				29%	101%	13%	29%	7%	23%				29%	101%	13%	29%	7%	23%				29%	101%				
Petrochemicals	5%	39%	11%					25%	100%	5%	39%	11%					25%	100%	5%	39%	11%					25%	100%	5%	39%	11%					25%	100%				
Other chemicals	4%	38%	8%					30%	100%	4%	38%	8%					30%	100%	4%	38%	8%					30%	100%	4%	38%	8%					30%	100%				
Cement	85%							15%	100%	85%							15%	100%	85%							15%	100%	85%							15%	100%				
Other ceramic	72%	8%						20%	100%	72%	8%						20%	100%	72%	8%						20%	100%	72%	8%						20%	100%				
Steel	73%	7%	4%					16%	100%	73%	7%	4%					16%	100%	73%	7%	4%					16%	100%	73%	7%	4%					16%	100%				
Non Ferrous	8%	31%	11%					30%	100%	8%	31%	11%					30%	100%	8%	31%	11%					30%	100%	8%	31%	11%					30%	100%				
Metal & Machine	2%	9%	18%					71%	100%	2%	9%	18%					71%	100%	2%	9%	18%					71%	100%	2%	9%	18%					71%	100%				
Other Manufacture	2%	66%	3%					27%	100%	2%	66%	3%					27%	100%	2%	66%	3%					27%	100%	2%	66%	3%					27%	100%				



## (IV) Analyzing future conditions at Analysis Module(12)

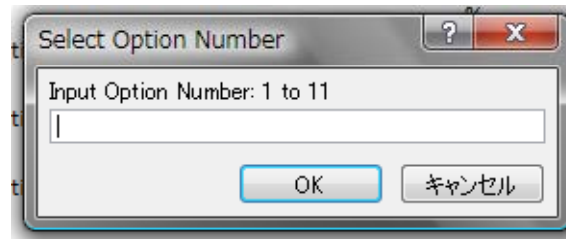
### Current Issues for Simple BCM

- CO2 emissions of individual options are not corresponds to the result from ESS part.
  - CO2 emissions in ESS part are valid one.
  - Close, but not equal.
  - If you show the results, please use the CO2 emissions comes from ESS part.
  - Graph shown in simple BCM result sheet is treated as a reference.

## (IV) Analyzing future conditions at Analysis Module(13)

### How to adjust data of options

- Click “Edit Data” button, then option number enter window open.
- Enter the option number and click OK, then data edit window is shown.



# (IV) Analyzing future conditions at Analysis Module(I4)

## How to adjust data of options

Way to input data is same as option sheet

**Edit Data**  
No. 0001 Option1  
Basic Information | Prerequisite | Impact | Period | Cost

Sector: Industrial  
Service: Agriculture

Initial Quantity: 0 [unit]  
Max Quantity: 1 [unit]  
Unit: Mtoe

Save Back to BCM

**Edit Data**  
No. 0001 Option1  
Basic Information | Prerequisite | Impact | Period | Cost

Remove

Add

Save Back to BCM

**Edit Data**  
No. 0001 Option1  
Basic Information | Prerequisite | Impact | Period | Cost

Demand Change: -1 [Mtoe/unit]  
Efficiency Change: 0 [point]  
Direct CO2 Reduction: 0 [tC/unit]  
Period Shorten: [years/unit]

Fuel Consumption Change by Fuel Shift:  
Coal: 0 [Mtoe/unit]  
Oil: 0 [Mtoe/unit]  
Gas: 0 [Mtoe/unit]  
Biomass: 0 [Mtoe/unit]  
Solar/Wind: 0 [Mtoe/unit]  
Heat(Nuc.): 0 [Mtoe/unit]  
H2(Hydro): 0 [Mtoe/unit]  
Elect (Geo): 0 [Mtoe/unit]

Save Back to BCM

**Edit Data**  
No. 0001 Option1  
Basic Information | Prerequisite | Impact | Period | Cost

Implement Period: 30 [years]  
Min. Period: 0 [years]  
Commercial year: 0  
Off Market year: 0  
Life: 0 [years]

Save Back to BCM

**Edit Data**  
No. 0001 Option1  
Basic Information | Prerequisite | Impact | Period | Cost

Cost: 100  
Cost for Accel: 0  
Cost Unit: B-JPY  
Int. Rate: 0

Save Back to BCM

## (IV) Analyzing future conditions at Analysis Module(15) For Uncertainty analysis

- Select the left side line (Pink colored), then X mark appears/disappears.
  - X marked option means the option included scenario.
- Click “Result Update”, then all results are updated.

Avail.	No.	Options		Option Sets :	Years	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
X	1	Promoting seasonal local food	%			0%	0%	10%	21%	33%	45%	57%	69%	81%	93%	100%
X	2	Verification testing for agricultural pro	%			0%	0%	80%	100%	100%	100%	100%	100%	100%	100%	100%
X	3	Nurturing of low-carbon agriculture adv	%			0%	0%	80%	100%	100%	100%	100%	100%	100%	100%	100%
X	4	Expansion of the agricultural produce l	%			0%	0%	20%	70%	100%	100%	100%	100%	100%	100%	100%
X	5	Introduction/expansion of low-carbon :	%			0%	0%	20%	70%	100%	100%	100%	100%	100%	100%	100%
X	6	Low-Carbonization of Production Proces	%			0%	0%	20%	70%	100%	100%	100%	100%	100%	100%	100%
X	7	Government aggressive publicity for lov	%			0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%
X	8	Efficient Agriculture(COL)	%			0%	0%	10%	35%	60%	85%	100%	100%	100%	100%	100%
X	9	Efficient Agriculture(OIL)	%			0%	0%	5%	18%	30%	43%	55%	68%	80%	93%	100%
X	10	Efficient Agriculture(GAS)	%			0%	0%	5%	18%	30%	43%	55%	68%	80%	93%	100%
X	11	Efficient Agriculture(BMS)	%			0%	0%	5%	18%	30%	43%	55%	68%	80%	93%	100%