



# LCSs for China

## Residential sector and transportation sector

China team

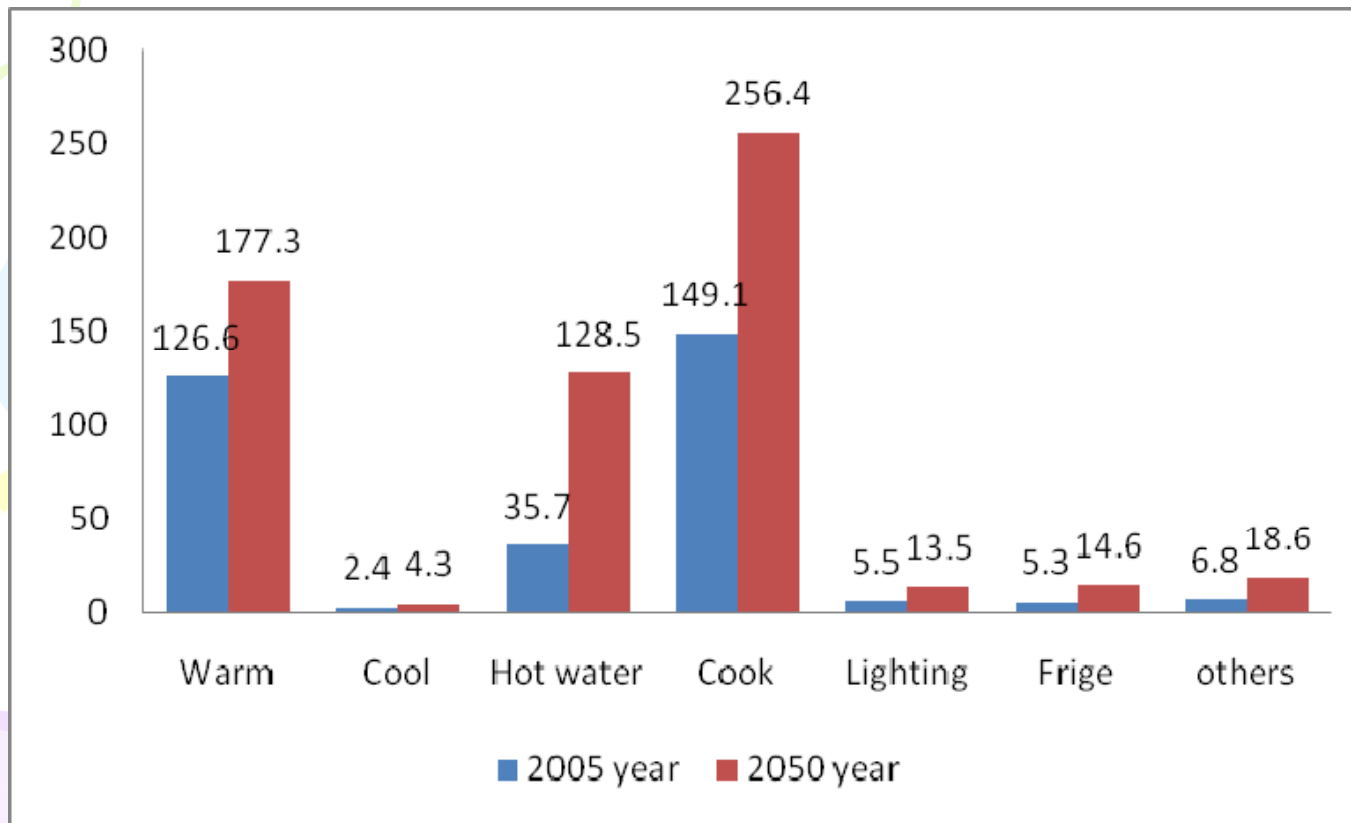
Tsukuba, workshop

2008/10/31



# **Demand change from ESS**

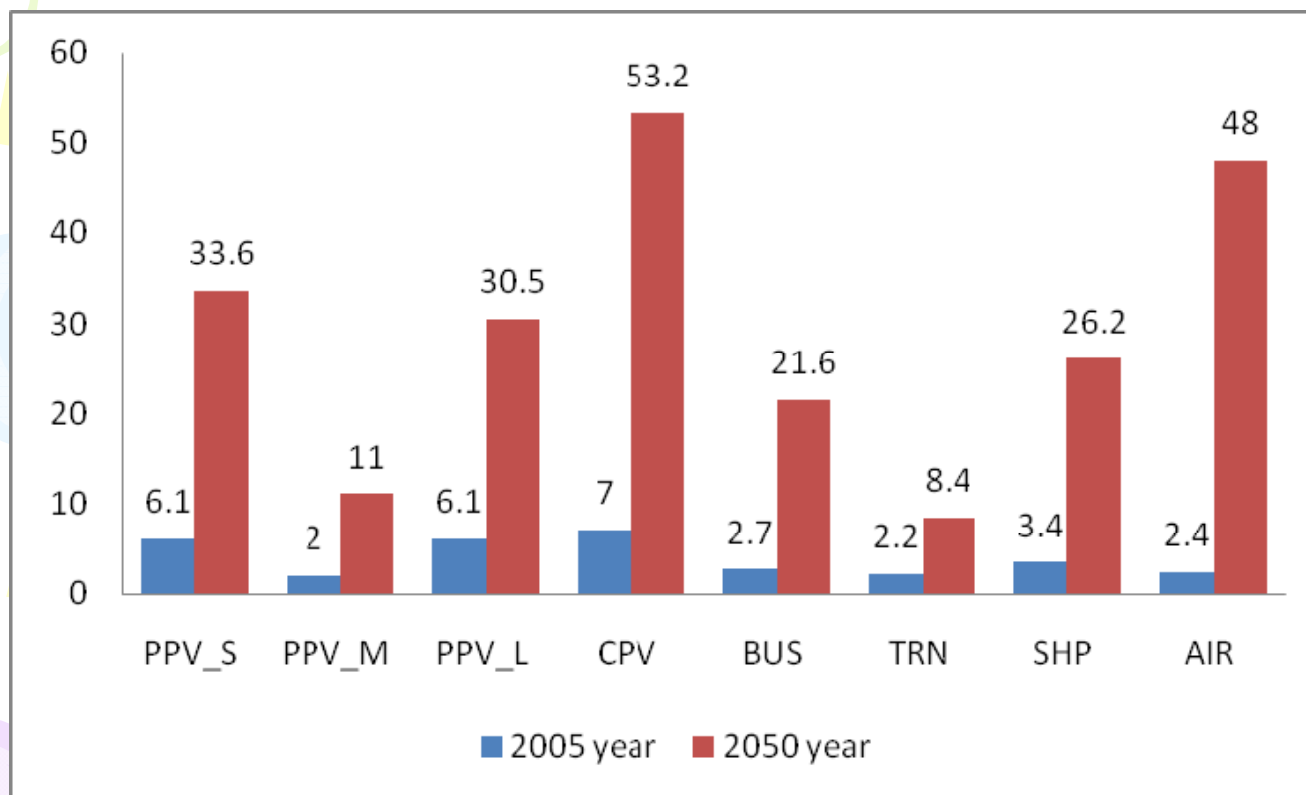
# Demand change (residential sector)



	2050/2005
Warm	1.40
Cool	1.79
Hot water	3.60
Cook	1.72
Lighting	2.45
Frige	2.75
others	2.74

Unit: Mtoe

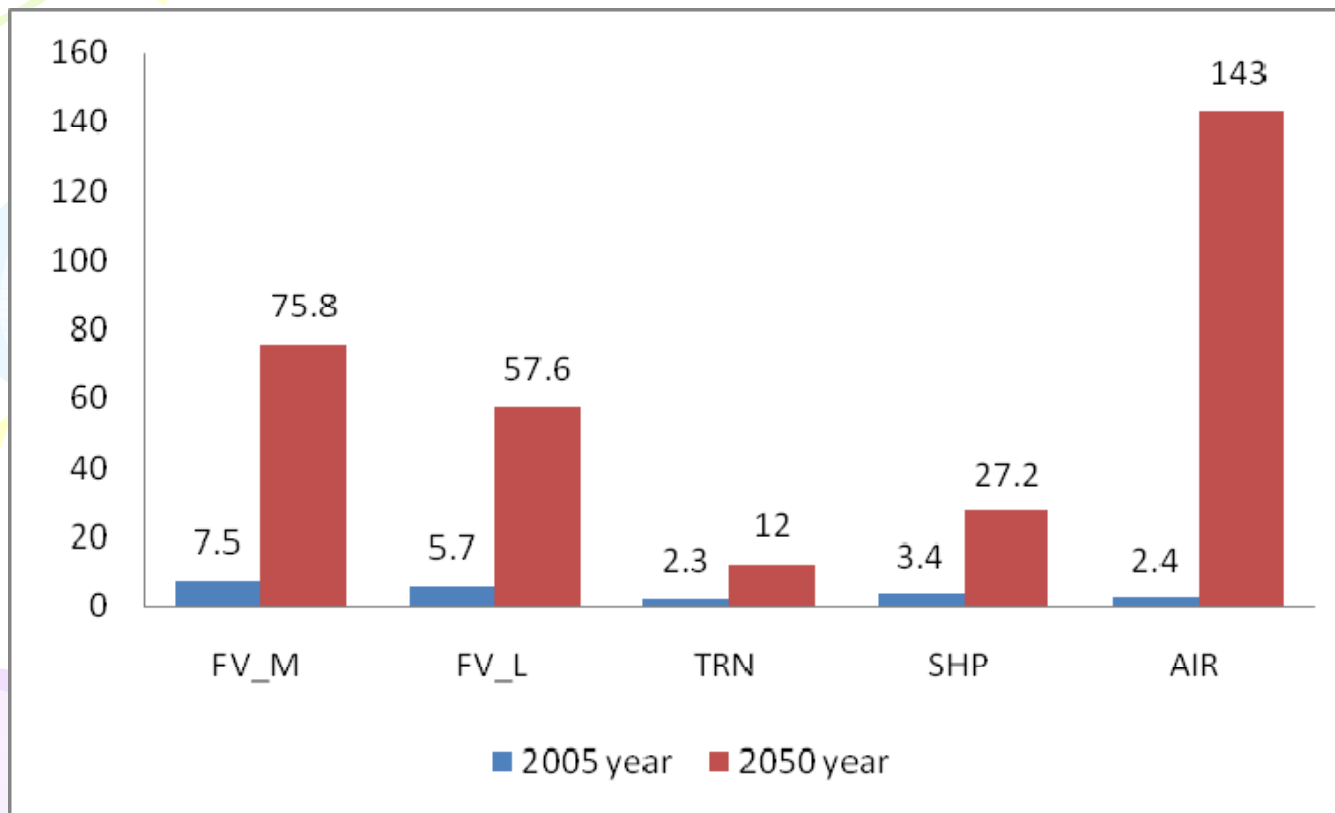
# Demand change (transportation-p sector)



	2050/2005
PPV_S	5.51
PPV_M	5.50
PPV_L	5.00
CPV	7.60
BUS	8.00
TRN	3.82
SHP	7.71
AIR	20.00

Unit: Mtoe

# Demand change (transportation-f sector)



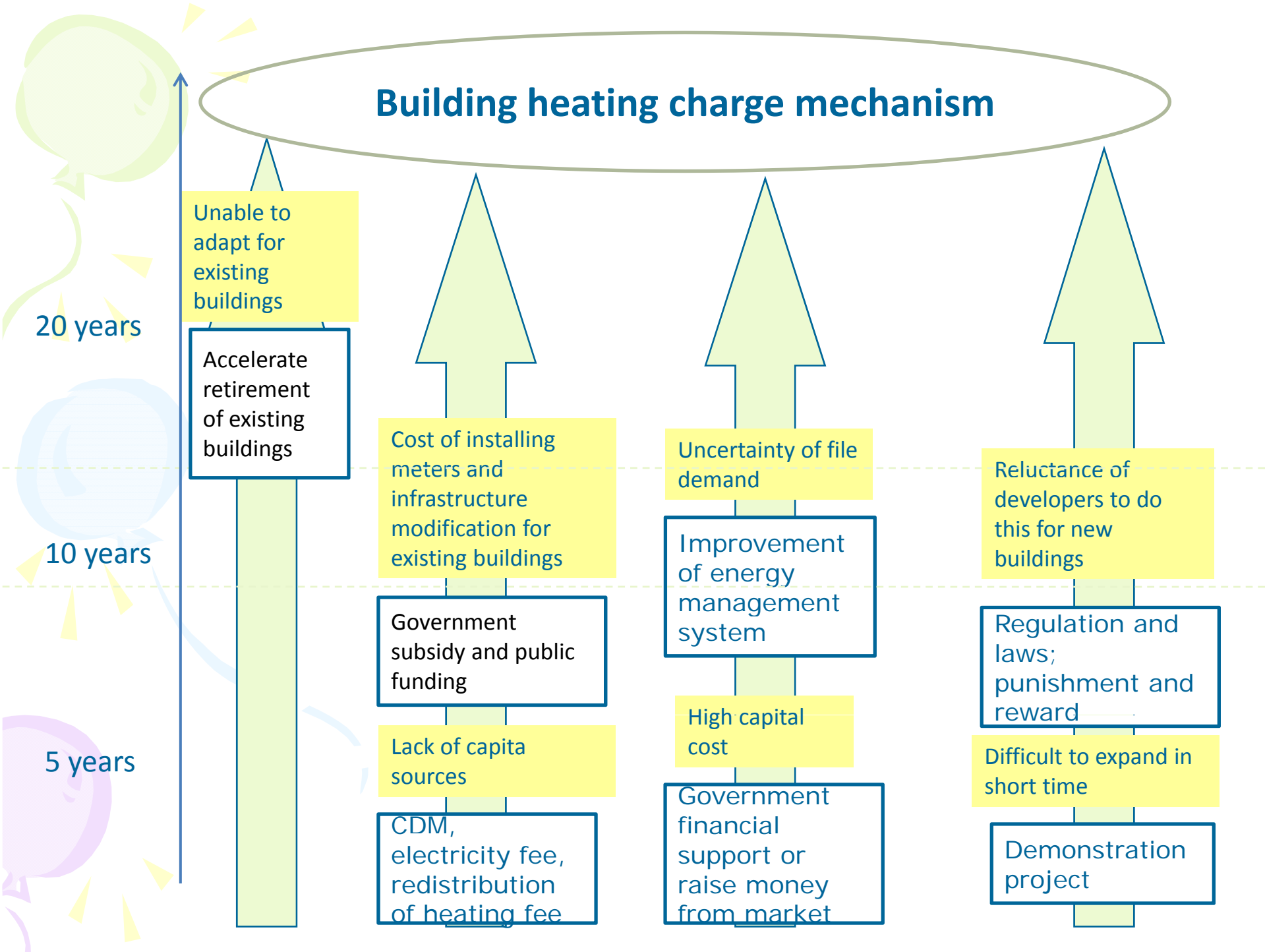
Unit: Mtoe

	2050/2005
FV_M	10.11
FV_L	10.11
TRN	5.22
SHP	8.00
AIR	59.58

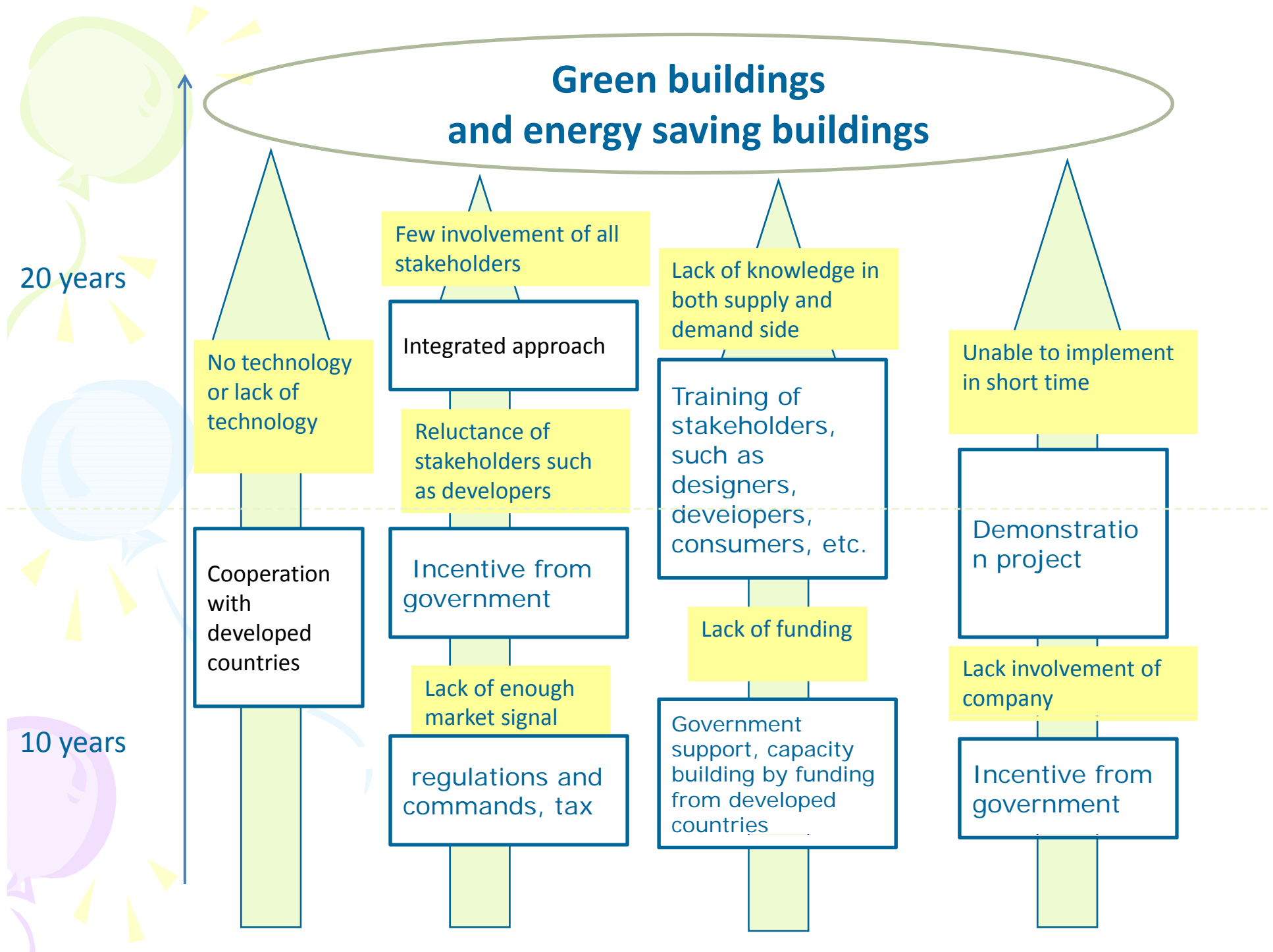


# Options

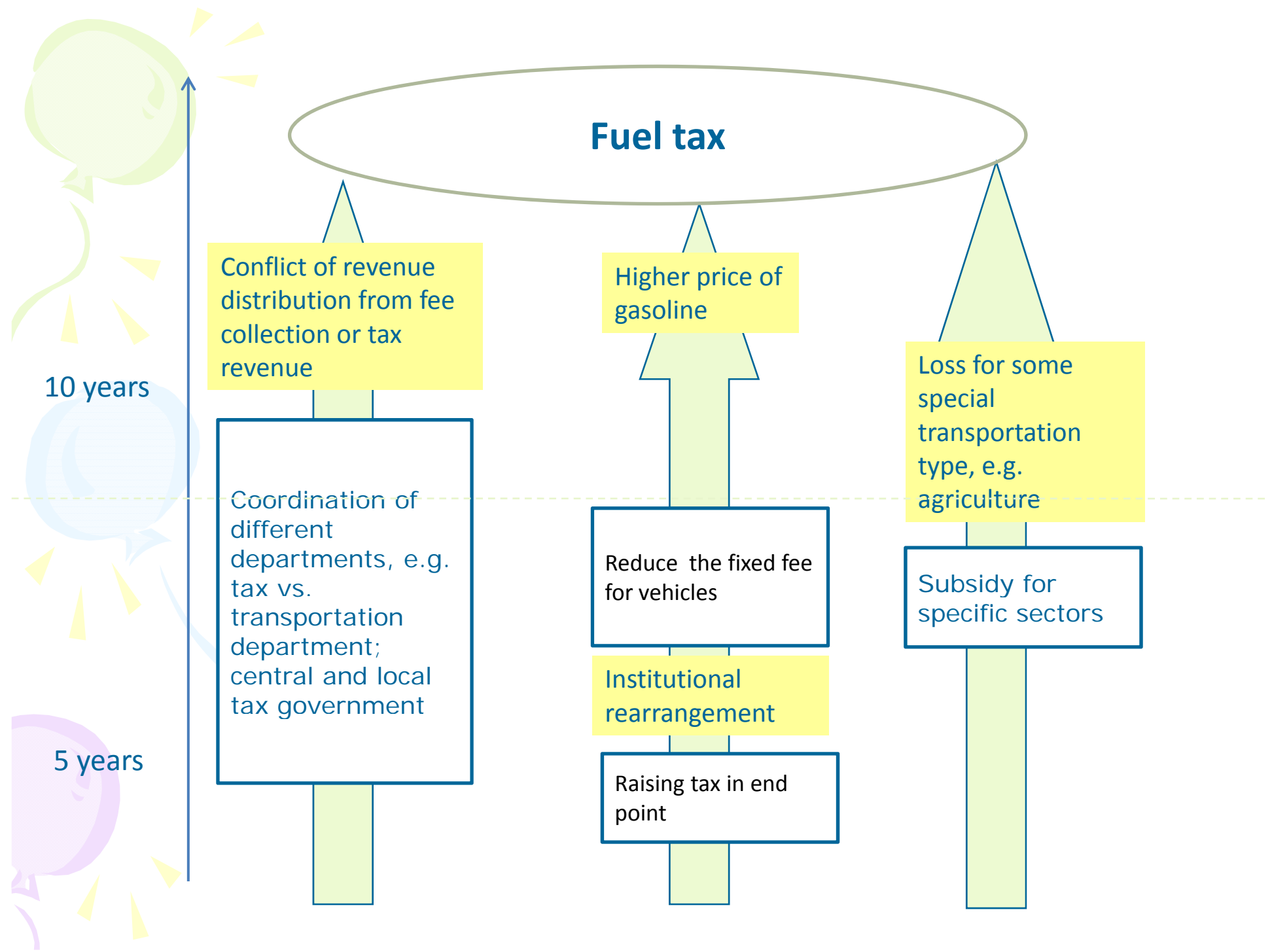
# Building heating charge mechanism



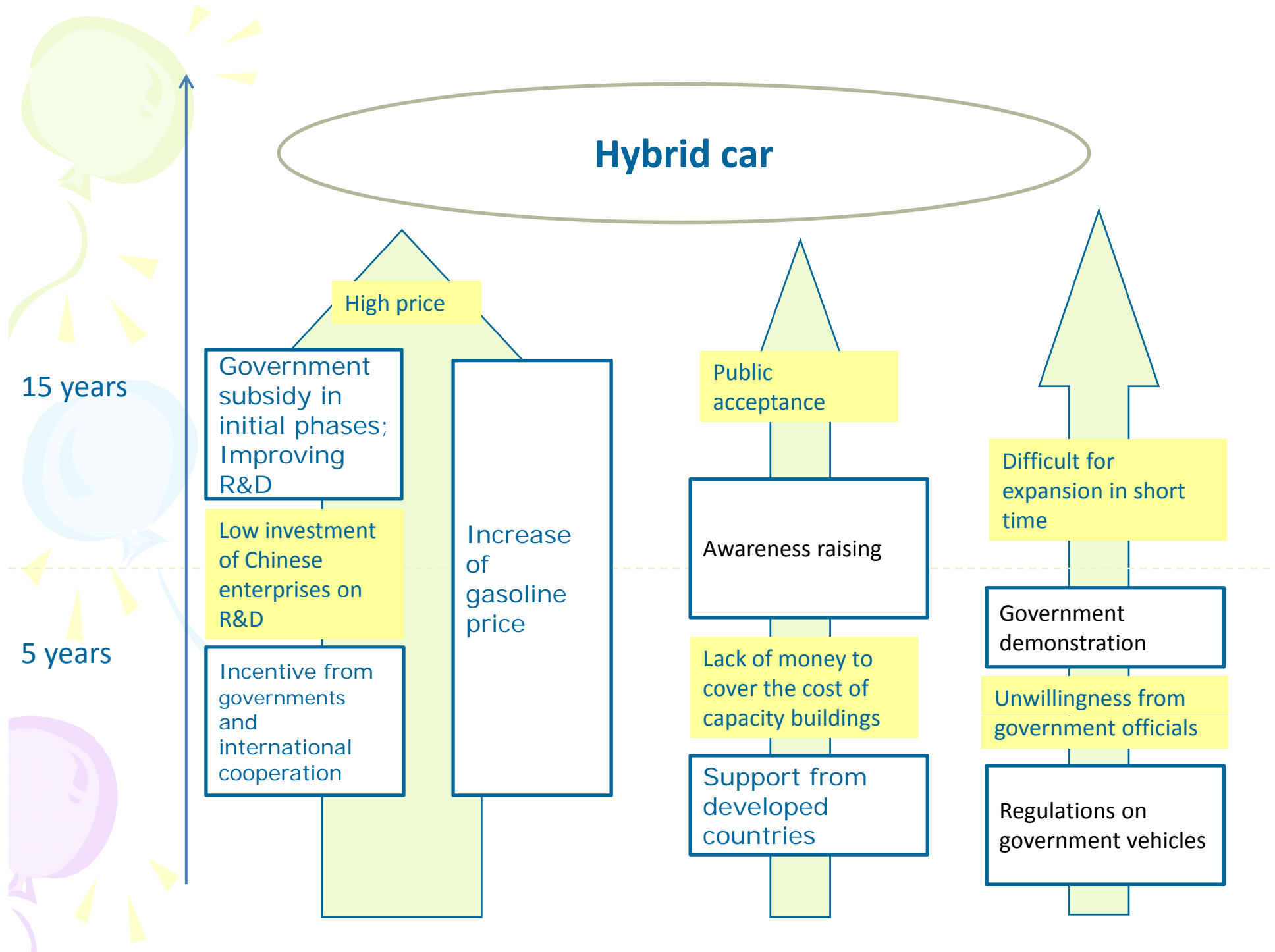
# Green buildings and energy saving buildings

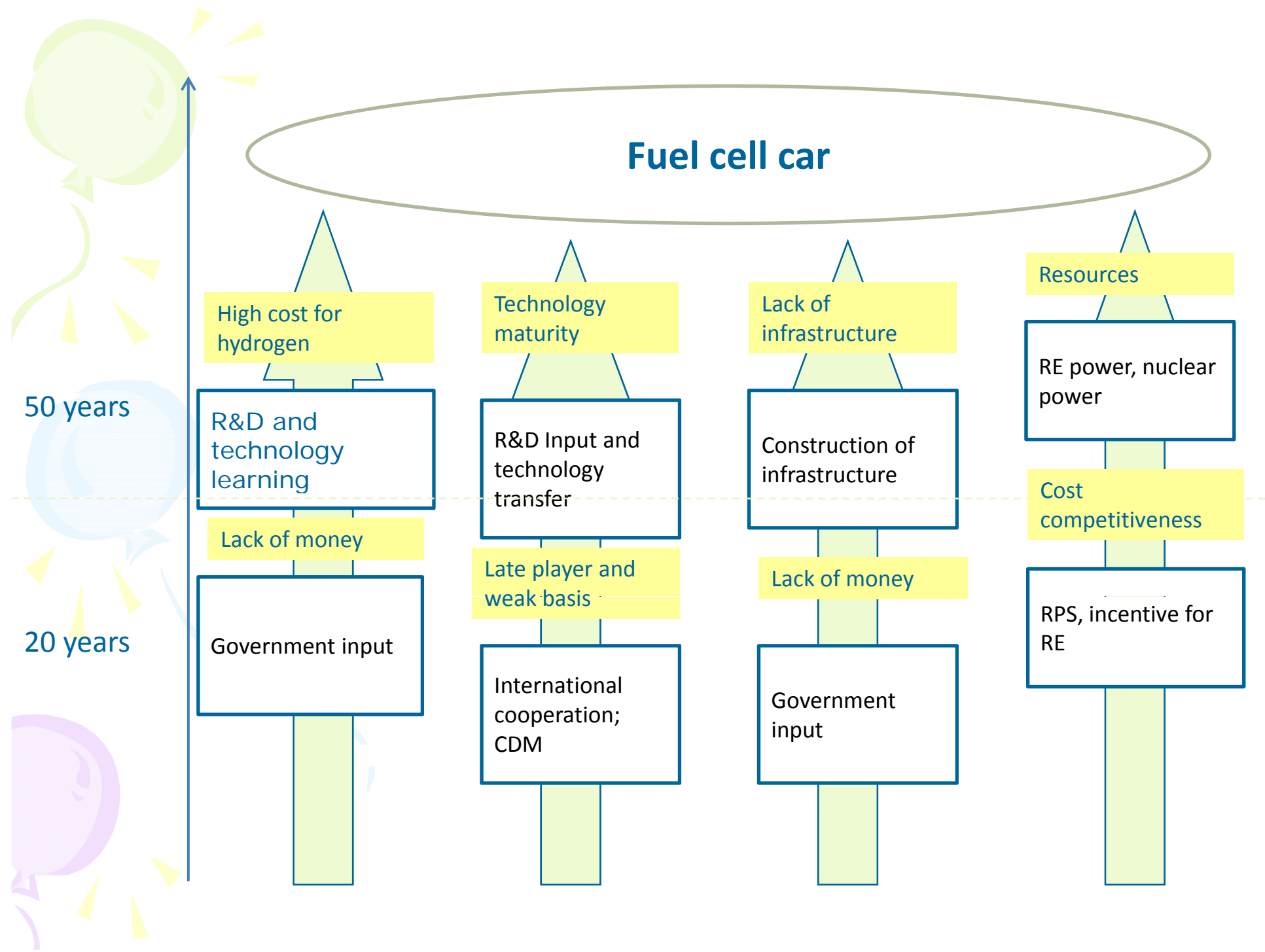






# Hybrid car





# Fuel cell car

High cost for hydrogen

Technology maturity

Lack of infrastructure

Resources

50 years

R&D and technology learning

R&D Input and technology transfer

Construction of infrastructure

RE power, nuclear power

20 years

Lack of money

Late player and weak basis

Lack of money

Cost competitiveness

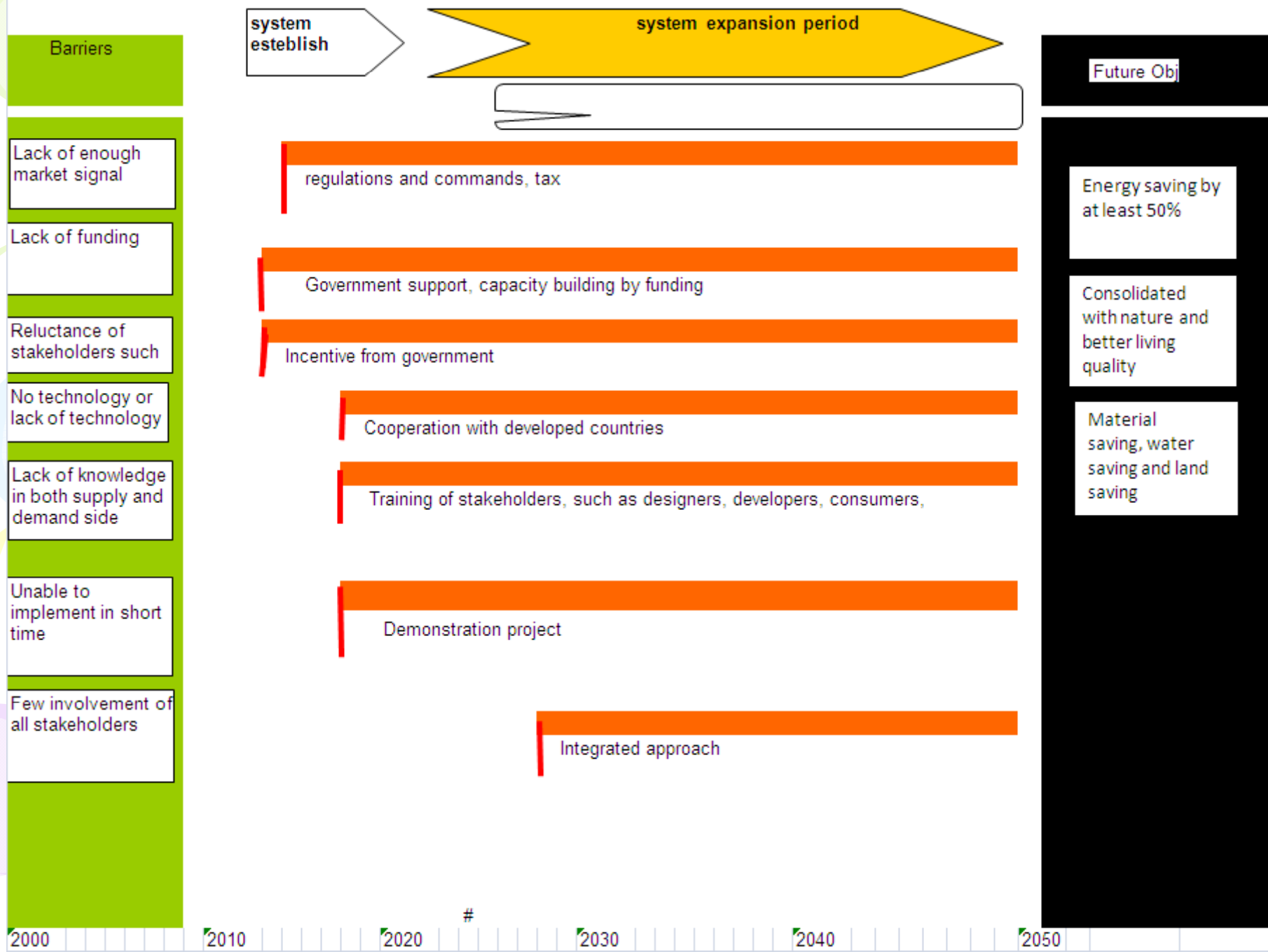
Government input

International cooperation; CDM

Government input

RPS, incentive for RE

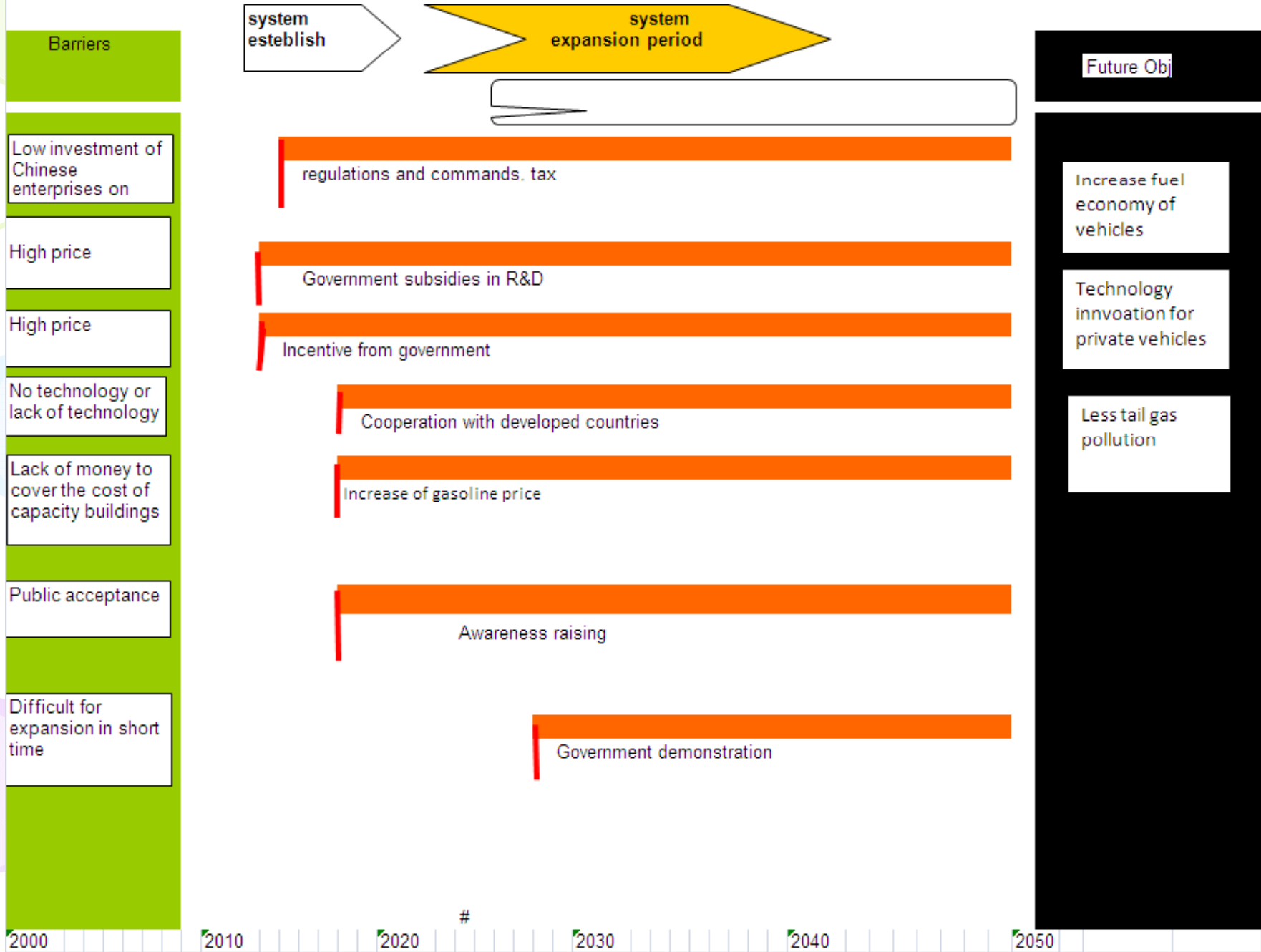
# Action: Green building



# Action: Building heating charge mechanism



# Hybrid car



# Action: Fuel tax

## Barriers

Institutional rearrangement

Higher price of gasoline

Loss for some special transportation

Conflict of revenue distribution from fee collection or tax revenue

system establish

system expansion period



CDM, electricity fee, redistribution of heating fee

Subsidy for specific sectors

government subsidy and public funding

Coordination of different departments, e.g. tax vs. transportation department; centra

## F Future Obj

Make vehicle charge system more reasonable



Motivate paper change behavior to save energy

Energy strucute change to CE

2000 2010 2020 # 2030 2040 2050



## Typical situation from Chinese perspective

- Institutional change need time
  - Culture difference
  - Command and control methods vs. market-based instruments
  - Obligatory vs. voluntary
- 
- 





# **Back casting model**

**Options definition**



# Building heating charge mechanism

- parameter set

	Building warm
Demand change	-20
Efficiency	
Fuel consumption change by fuel shift	+5(gas)
Implement	30 years



Unit: Mtoe



# Green buildings and energy saving buildings

- parameter set

	Green building		Energy saving building	
	warm	cool	warm	cool
Demand change	-18	-1	-0.23	-1.36
Efficiency	50%	50%	50%	50%
Implement	35years	35years	35years	35years



Unit: Mtoe



# Fuel tax-p

- parameter set

	PPV-S	PPV-M	PPV-L	CPV
Demand change	-30	-2	-25	-30
Efficiency				
Implement	35years	35years	40years	40years



Unit: Mtoe



# Hybrid car-p

- parameter set

	PPV-L
Demand change	
Efficiency	100%
Fuel consumption change by fuel shift	-5(oil)
Implement	40years

Unit: Mtoe



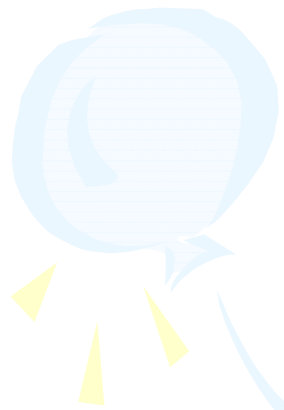
# Fuel cell car-p

- parameter set

	PPV-S	CPV
Demand change		
Efficiency		
Fuel consumption change by fuel shift	-20(oil)	-30(oil)
Implement	20years	20years



Unit: Mtoe



# Results and discussion





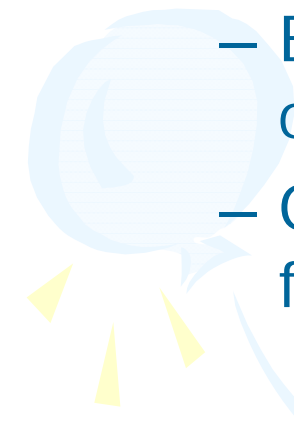







# Discussion

- Setup of options

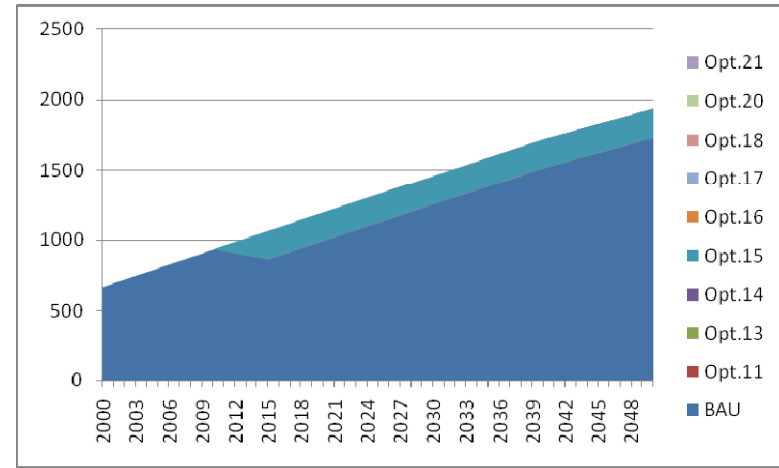
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- Barrier 1: Different sectors and fuels: too complex and easy to be confused
  - Options: flexibility for fuel and sector selection for one option
- 
- Barrier 2: Bugs, difficult to judge the reasonability of results
  - Options: update the program, which need every person's feedback



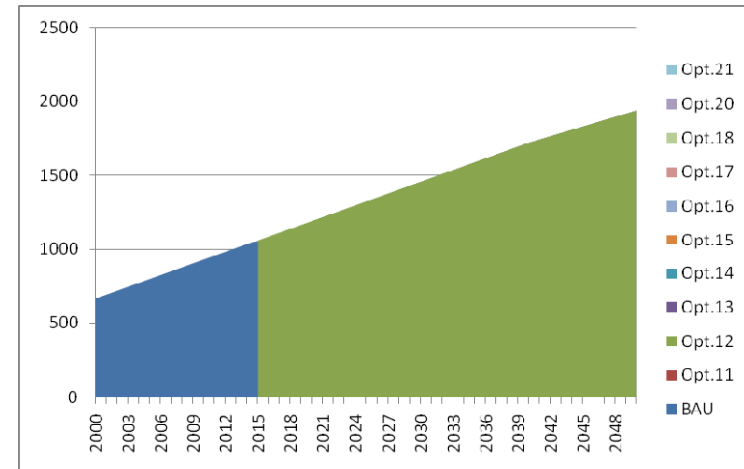
Strange  
Change of  
result



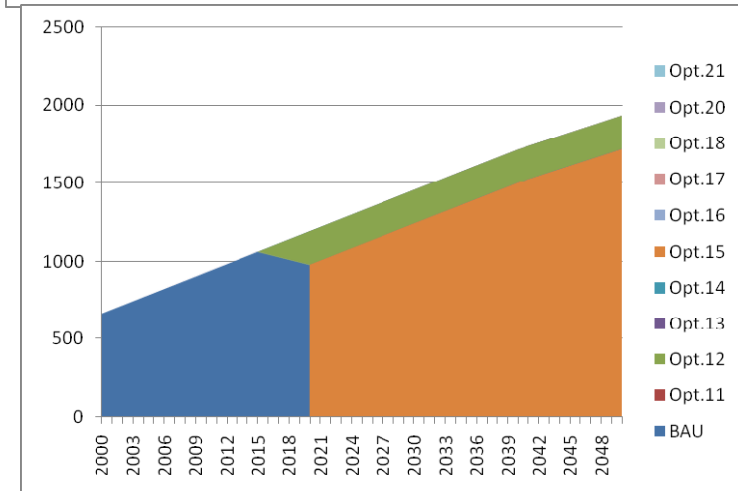
2015



2020





2025





# Discussion

- Options: How to consider the pre-request options?
    - Model problem
    - How to do for the options with less carbon reduction but investment collection which is also crucial
  - Uncertainties:
    - Time consuming
    - Assumption: too much, especially for cost
    - Linkage with other model: how to introduce?
    - Units: keep consistent
    - Effects: option do not take effect as assumed
    - Trend: linearly or other?
- 
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**Thank you!**