Session 2: Policy Processes and Actors of Energy Governance:

'City Level Energy Governance: the Carbon Reduction Implementation Model (CRIAM)'

Dr. Maria Francesch-Huidobro, PhD
City University of Hong Kong and
AECOM

International Conference on Regional Energy Governance and the Nexus Perspective: Challenges in the Asia Pacific Region
Kuala Lumpur, Malaysia
5-6 Dec 2012

Objectives & Questions

- For energy policy to work, reduction measures need to be translated into a set of policy tools
- We use a policy tools approach to interrogate the HKSAR-ERM and WWWF-Arup climate reduction measures and enable them achieve the reduction targets
- Why? Policy tools: better signifiers of political commitment. Deploying the requires money, time and energy
- We develop a governance model (CRIAM) to test the impact of individual tools on the implementation of each measure.

Reduction targets

- China's national target: reduce CO2 per yuan of national income (carbon intensity) by 40-50% by 2020 (of 2005 levels)

- Hong Kong's proposed target: 50-60% by 2020 (of 2005 levels) by revamping fuel mix:
  - Natural gas up to 40% by 2020;
  - Nuclear intake from Mainland up to 50% by 2020 (compared to 23% in 2009)

Selecting the Sectors

Use of fuel in land *transport*

Electricity generation for *buildings*

Other end use of fuel for *electricity* generation

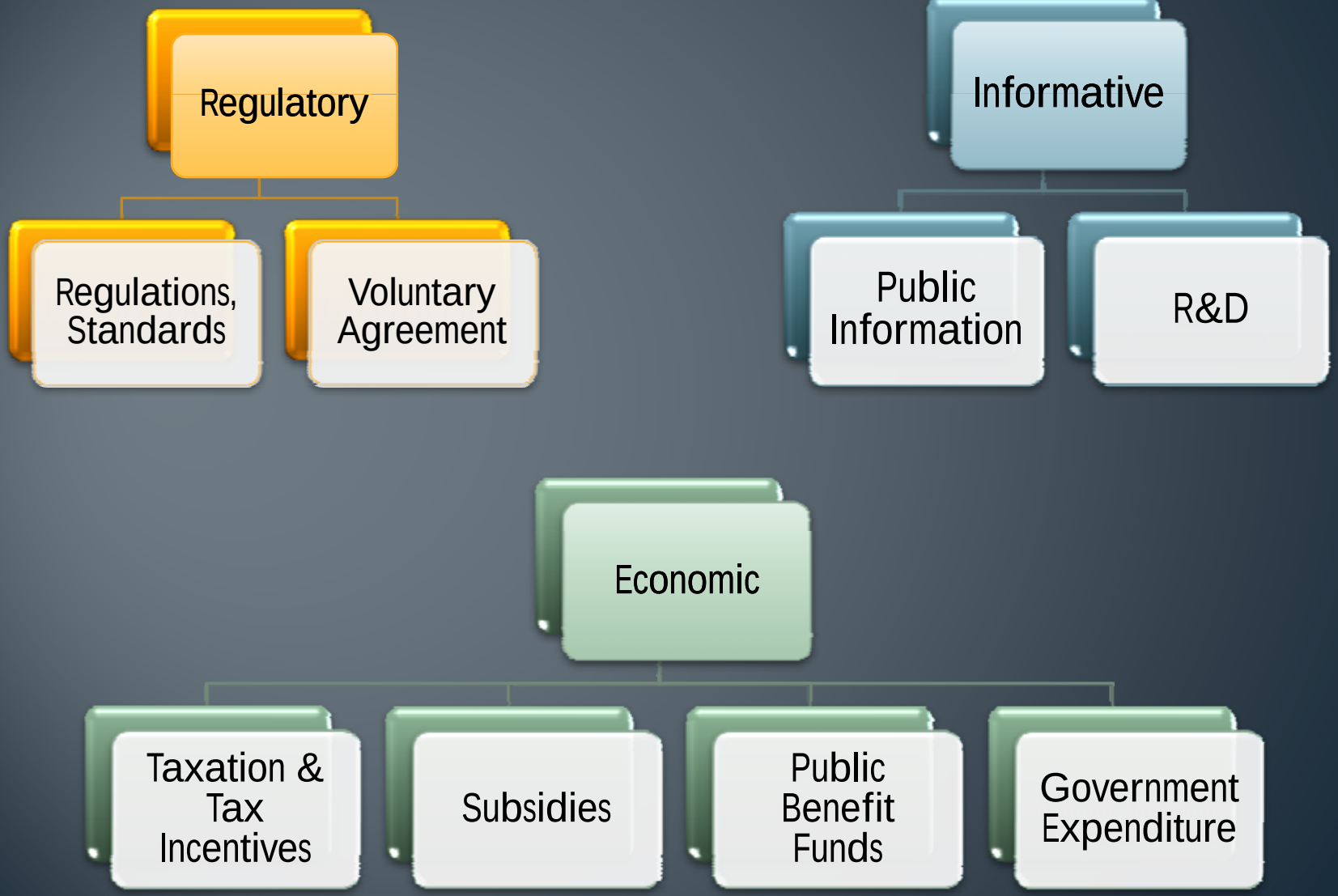
Identifying Proposed Measures

Sector	Measures
Building	Building Energy Codes
	Building Energy Codes
	District cooling
	Water-Cooled Aircon
	Overall Thermal Transfer Value (OTTV) / Green Roofing (GR)
	Energy Efficient (EE) systems
	EE appliances
	EE appliances
	Power plants Energy Saving Scheme (ESS)
	EE Behaviour

Sector	Measures
Transport	Alternative fuels
	Alternative fuels
	Fleet efficiency
	Electric Vehicles (EVs)
	Pedestrianization
	Biofuels
Energy	Coal
	Gas
	Gas
	Renewable Energy (RE)
	Renewable Energy (RE)
	Nuclear

HKSAR-ERM | WWF-Arup

Classifying Policy Tools



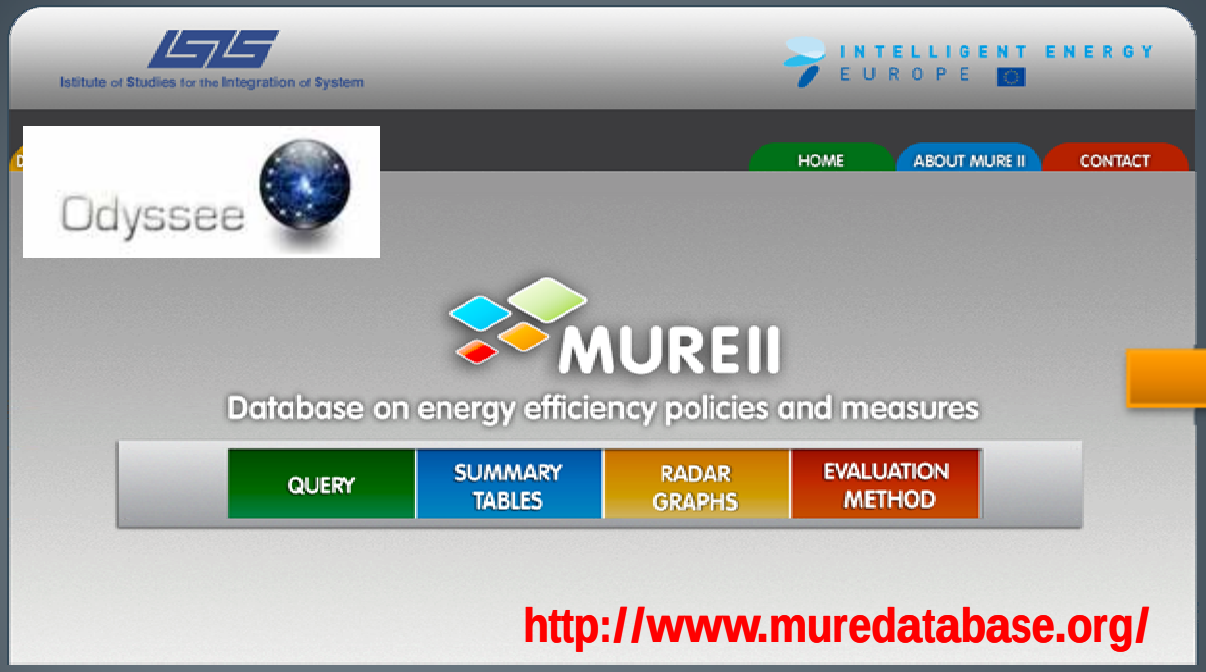
Choosing Policy Tools

Building an Integrated Governance Model

- CRIAM – Carbon Reduction Implementation and Assessment Model
- Considers the most efficient, effective, and cost-effective policy tools to match the policy measures, but also the socio-political, policy and institutional context in which the tools are deployed.

Methods and Data

(1) Quantitative Datasets



Percentage of total expected impact of each policy tool on each proposed measure

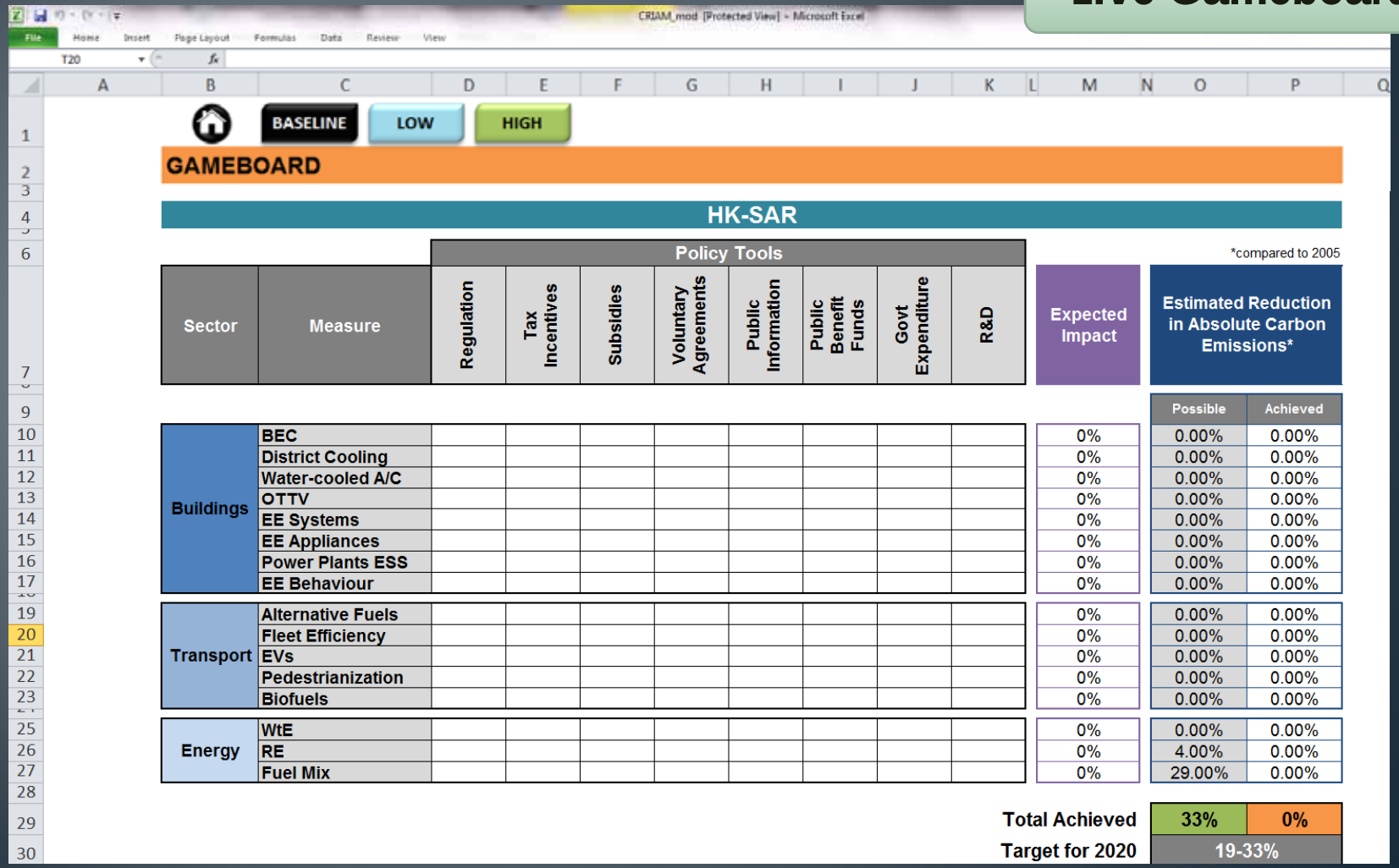
Estimated reduction in absolute carbon emission of each proposed measure

(2) Qualitative Data: Stakeholder Focus Groups

Government	Business	Civil Society
2	3	5

Outputs in Quantitative Analysis: CRIAM

Live Gameboard



BASELINE | LOW | HIGH

GAMEBOARD

HK-SAR

*compared to 2005

Sector	Measure	Policy Tools: Regulation	Tax Incentives	Subsidies	Voluntary Agreements	Public Information	Public Benefit Funds	Govt Expenditure	R&D	Expected Impact	Estimated Reduction in Absolute Carbon Emissions*	
											Possible	Achieved
Buildings	BEC									0%	0.00%	0.00%
	District Cooling									0%	0.00%	0.00%
	Water-cooled A/C									0%	0.00%	0.00%
	OTTV									0%	0.00%	0.00%
	EE Systems									0%	0.00%	0.00%
	EE Appliances									0%	0.00%	0.00%
	Power Plants ESS									0%	0.00%	0.00%
	EE Behaviour									0%	0.00%	0.00%
Transport	Alternative Fuels									0%	0.00%	0.00%
	Fleet Efficiency									0%	0.00%	0.00%
	EVs									0%	0.00%	0.00%
	Pedestrianization									0%	0.00%	0.00%
	Biofuels									0%	0.00%	0.00%
Energy	WtE									0%	0.00%	0.00%
	RE									0%	4.00%	0.00%
	Fuel Mix									0%	29.00%	0.00%
										Total Achieved	33%	0%
										Target for 2020	19-33%	

Outputs in Quantitative Analysis: CRIAM

Measures Library

Expected Impact of Decision Making Tools

			Policy Tools							
Sector	Measure		Regulation	Tax Incentives	Subsidies	Voluntary Agreements	Public Information	Public Benefit Funds	Govt Expenditure	R&D
Buildings	BEC	Impact	66%	45%	43%	35%	42%	43%	43%	0%
		Source	ISIS 2012 (Note E7)	ISIS 2012 (Note F7)	ISIS 2012 (Note G7)	ISIS 2012 (Note H7)	ISIS 2012 (Note I7)	Hypothesis (Note J7)	Hypothesis (Note K7)	N.A. (Note L7)
	District Cooling	Impact	66%	45%	43%	35%	42%	43%	43%	0%
		Source	ISIS 2012 (Note E7)	ISIS 2012 (Note F7)	ISIS 2012 (Note G7)	ISIS 2012 (Note H7)	ISIS 2012 (Note I7)	Hypothesis (Note J7)	Hypothesis (Note K7)	N.A. (Note L7)
	Water-cooled A/C	Impact	66%	45%	43%	35%	42%	43%	43%	0%
		Source	ISIS 2012 (Note E7)	ISIS 2012 (Note F7)	ISIS 2012 (Note G7)	ISIS 2012 (Note H7)	ISIS 2012 (Note I7)	Hypothesis (Note J7)	Hypothesis (Note K7)	N.A. (Note L7)
	OTTV	Impact	73%	45%	43%	35%	42%	43%	43%	43%
		Source	ISIS 2012 (Note E13)	ISIS 2012 (Note F7)	ISIS 2012 (Note G7)	ISIS 2012 (Note H7)	ISIS 2012 (Note I7)	Hypothesis (Note J7)	Hypothesis (Note K7)	Hypothesis (Note L13)
	EE Systems	Impact	63%	45%	43%	35%	42%	43%	43%	43%
		Source	ISIS 2012 (Note E15)	ISIS 2012 (Note F7)	ISIS 2012 (Note G7)	ISIS 2012 (Note H7)	ISIS 2012 (Note I7)	Hypothesis (Note J7)	Hypothesis (Note K7)	Hypothesis (Note L13)
	EE Appliances	Impact	57%	45%	70%	35%	42%	70%	70%	70%
		Source	ISIS 2012 (Note E17)	ISIS 2012 (Note F7)	ISIS 2012 (Note G17)	ISIS 2012 (Note H7)	ISIS 2012 (Note I7)	Hypothesis (Note J7)	Hypothesis (Note K7)	Hypothesis (Note L13)
	Power Plants ESS	Impact	83%	45%	43%	35%	42%	43%	43%	43%
		Source	Hypothesis (Note E 19)	ISIS 2012 (Note F7)	ISIS 2012 (Note G7)	ISIS 2012 (Note H7)	ISIS 2012 (Note I7)	Hypothesis (Note J7)	Hypothesis (Note K7)	Hypothesis (Note L13)
	EE Behaviour	Impact	63%	45%	43%	35%	42%	43%	43%	43%
		Source	ISIS 2012 (Note E21)	ISIS 2012 (Note F7)	ISIS 2012 (Note G7)	ISIS 2012 (Note H7)	ISIS 2012 (Note I7)	Hypothesis (Note J7)	Hypothesis (Note K7)	Hypothesis (Note L13)

Outputs in Quantitative Analysis: CRIAM

Baseline Scenario

BASELINE

HK-SAR

*compared to 2005

Sector	Measure	Policy Tools: Regulation	Tax Incentives	Subsidies	Voluntary Agreements	Public Information	Public Benefit Funds	Govt Expenditure	R&D	Expected Impact	Estimated Reduction in Absolute Carbon Emissions*: Possible	Achieved
Buildings	BEC	Y								66%	0.00%	0.00%
	District Cooling							Y		43%	0.00%	0.00%
	Water-cooled A/C					Y			Y	42%	0.00%	0.00%
	OTTV	Y								73%	0.00%	0.00%
	EE Systems					Y			Y	85%	0.00%	0.00%
	EE Appliances	Y			Y	Y				100%	0.00%	0.00%
	Power Plants ESS									0%	0.00%	0.00%
	EE Behaviour					Y				42%	0.00%	0.00%
Transport	Alternative Fuels		Y	Y					Y	100%	0.00%	0.00%
	Fleet Efficiency		Y	Y						98%	0.00%	0.00%
	EVs		Y	Y				Y	Y	100%	0.00%	0.00%
	Pedestrianization									0%	0.00%	0.00%
	Biofuels		Y							55%	0.00%	0.00%
Energy	WtE							Y		43%	0.00%	0.00%
	RE								Y	51%	4.00%	2.04%
	Fuel Mix			Y						43%	29.00%	12.36%

Total Achieved	33%	14%
Target for 2020	19-33%	

Outputs in Quantitative Analysis: CRIAM

Baseline Scenario

WWF/ARUP

*compared to 2005

Sector	Measure	Policy Tools: Regulation	Tax Incentives	Subsidies	Voluntary Agreements	Public Information	Public Benefit Funds	Govt Expenditure	R&D	Expected Impact	Estimated Reduction in Absolute Carbon Emissions*	
											Possible	Achieved
Buildings	BEC	Y								66%	6.62%	4.35%
	District Cooling							Y		43%	0.00%	0.00%
	Water-cooled A/C					Y			Y	42%	0.00%	0.00%
	OTTV	Y								73%	0.00%	0.00%
	EE Systems					Y			Y	85%	0.00%	0.00%
	EE Appliances	Y			Y	Y				100%	2.22%	2.22%
	Power Plants ESS									0%	4.33%	0.00%
	EE Behaviour					Y				42%	3.40%	1.42%
Transport	Alternative Fuels		Y	Y					Y	100%	1.00%	1.00%
	Fleet Efficiency		Y	Y						98%	1.40%	1.37%
	EVs		Y	Y				Y	Y	100%	1.00%	1.00%
	Pedestrianization									0%	0.00%	0.00%
	Biofuels		Y							55%	0.00%	0.00%
Energy	WtE							Y		43%	2.44%	1.04%
	RE								Y	51%	1.15%	0.59%
	Fuel Mix			Y						43%	13.39%	5.70%

Total Achieved	37%	19%
Target for 2020	37%	

Findings in Qualitative Analysis

Business stakeholder perspective on applicable policy tools for proposed measures

		Policy Tools							
Sector	Measures	Regulation	Taxation	Subsidies	Voluntary agreements	Public information	Public benefit funds	Government expenditure	R&D
Building	BEC	1							
	District Cooling								
	WAC	1							
	OTTV								
	EE systems	1		2		3			
	EE appliances	1		2		3			
	Power Plants ESS								
	EE Behaviour					1			
Transport	Alt fuels	1							
	Fleet eff	1							
	EVs		1						
	Pedestrianization	1							
	Biofuels	1							

Note: The numbers in the table indicate the order in which the tools would be most applicable to the measure.

Findings in Qualitative Analysis

NGO stakeholder perspective on applicable policy tools for proposed

			Policy Tools							
Sector	Measures		Regulation	Taxation	Subsidies	Voluntary agreements	Public information	Public benefit funds	Govt expenditure	R&D
Building	Standa-rd	BEC			3	1				1
		OTTV								
	Technol-ogy	WAC			1				3	1
		District Cooling								
	DSM	EE systems		2	1		1	1		
		EE appliances								
		Power Plants ESS								
		EE Behaviour								
Transport	Alt fuels			1	1	1	1		1	
	Fleet eff			1						
	EVs			1	1		1		1	1
	Pedestrianization						1		1	
	Biofuels			1						1

Note: The numbers in the table indicate the order in which the tools would be most applicable to the measure.

Findings in Qualitative Analysis

- Problems of proposed measures from stakeholders' perspective:
  - Lack of clear direction
  - Lack of economic analysis on the viability of each reduction measures – actual financial impact and cost of implementation
  - Actual effectiveness of specific measures (infrequent energy audits, impractical district cooling, etc.)
  - Need to strengthen demand side management (DSM) to achieve behavioral change, given the current Scheme of Control on power companies
  - Need to take an integrated overall approach to tackle climate change issues

Conclusions

- **Quantitative** analysis shows a Demand Side Management (DSM) strategy can achieve the desired target without applying more heavily weighted measures to the fuel mix.
- **Qualitative** analysis shows stakeholders support the HIGH scenario because it is clear what is needed and what should be eliminated.
- In summary, we challenge whether a focus on fuel mix is the answer to lowering carbon emissions and instead propose that a DSM can achieve the same results if not better, with reduced risks to the city's energy security.

Q& A

THANK YOU!

maria.francesch@cityu.edu.hk