



# Theory and Methods Workshops: Understanding the Rebound Effect

June 13<sup>th</sup>, 2011

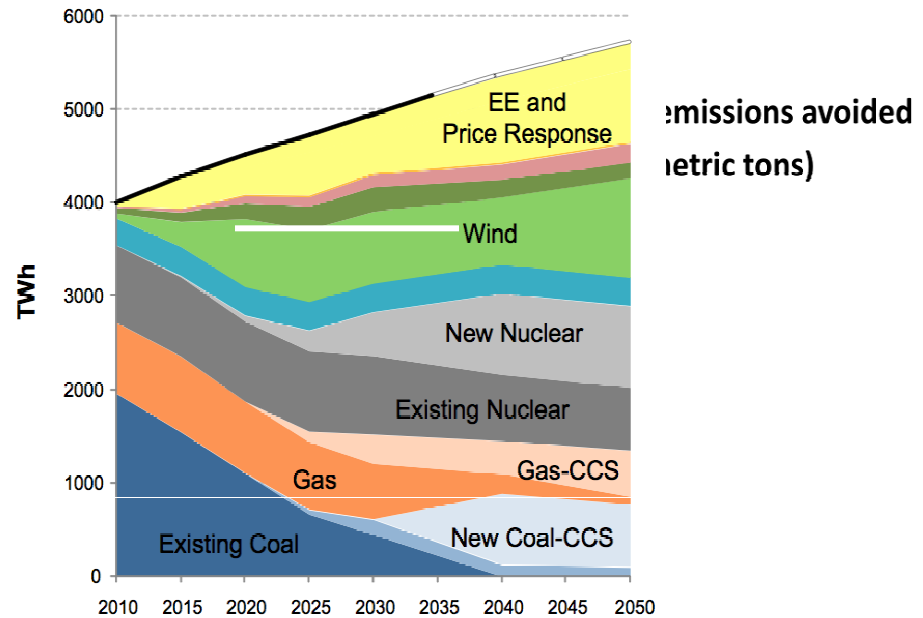
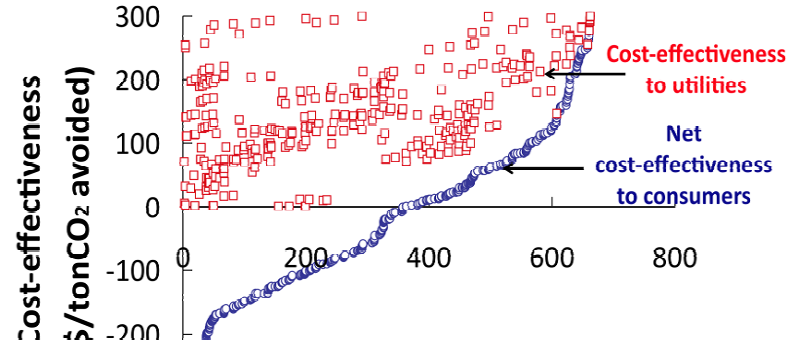
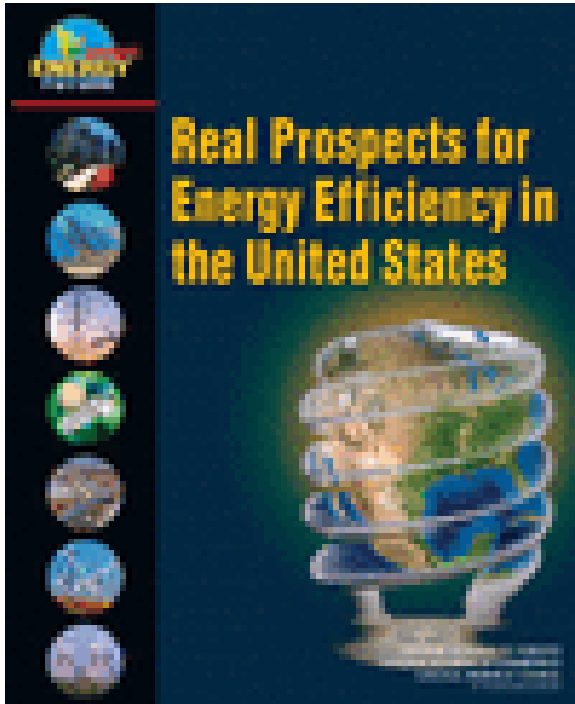
Prepared for CEDM Annual Meeting 2011

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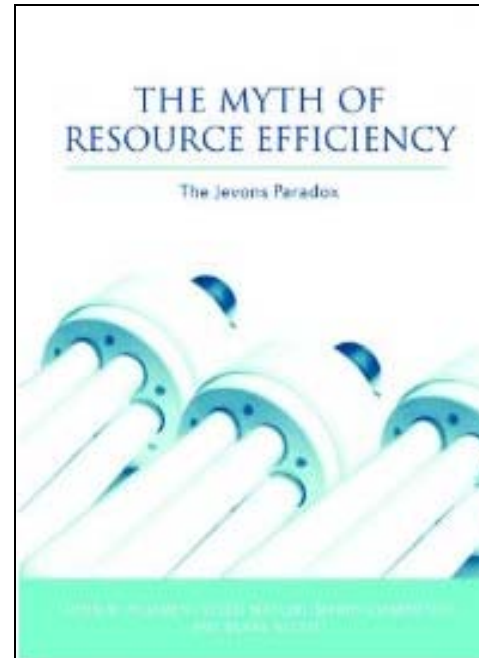
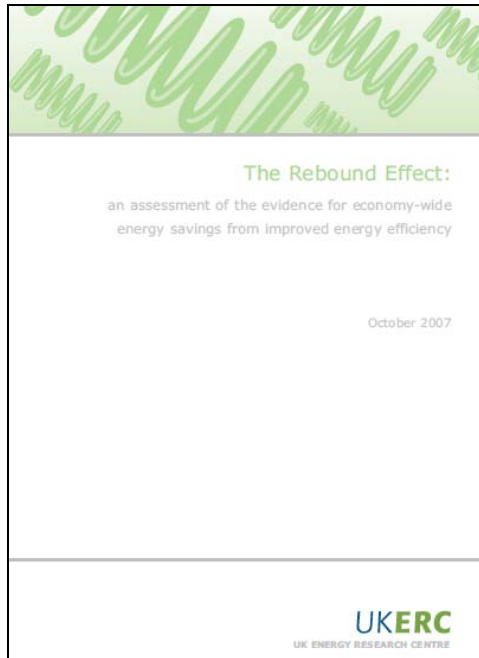
Assistant Research Professor, EPP

# Many governments and others are placing great store in energy efficiency as part of a portfolio of strategies to reduce energy consumption and CO<sub>2</sub> emissions



**There is an ongoing debate (since the 90ies...) on whether much of the anticipated reductions may be illusionary - this because of either direct or indirect "rebound."**

The literature is of very mixed quality, and recent work provides reviews, but very little new empirical research...



# Definitions

**Direct rebound effect:** If consumers adopt energy efficient technologies that are saving them money, they might use that good/service more often. For example, one might substitute incandescent bulbs with CFLs but then leave them on all night.

**Substitution effect:** Part of the economic savings described in 1) could be used to increase consumption of other goods/services, and erode some of the energy or GHG savings. For example, one could use the savings from energy efficiency investments to do more travel.

**Economy wide effect:** "a fall in the real price of energy services may reduce the price of intermediate and final goods throughout the economy, leading to a series of price and quantity adjustments, with energy-intensive goods and sectors likely to gain at the expense of less energy-intensive ones" (Sorrell, 2008).

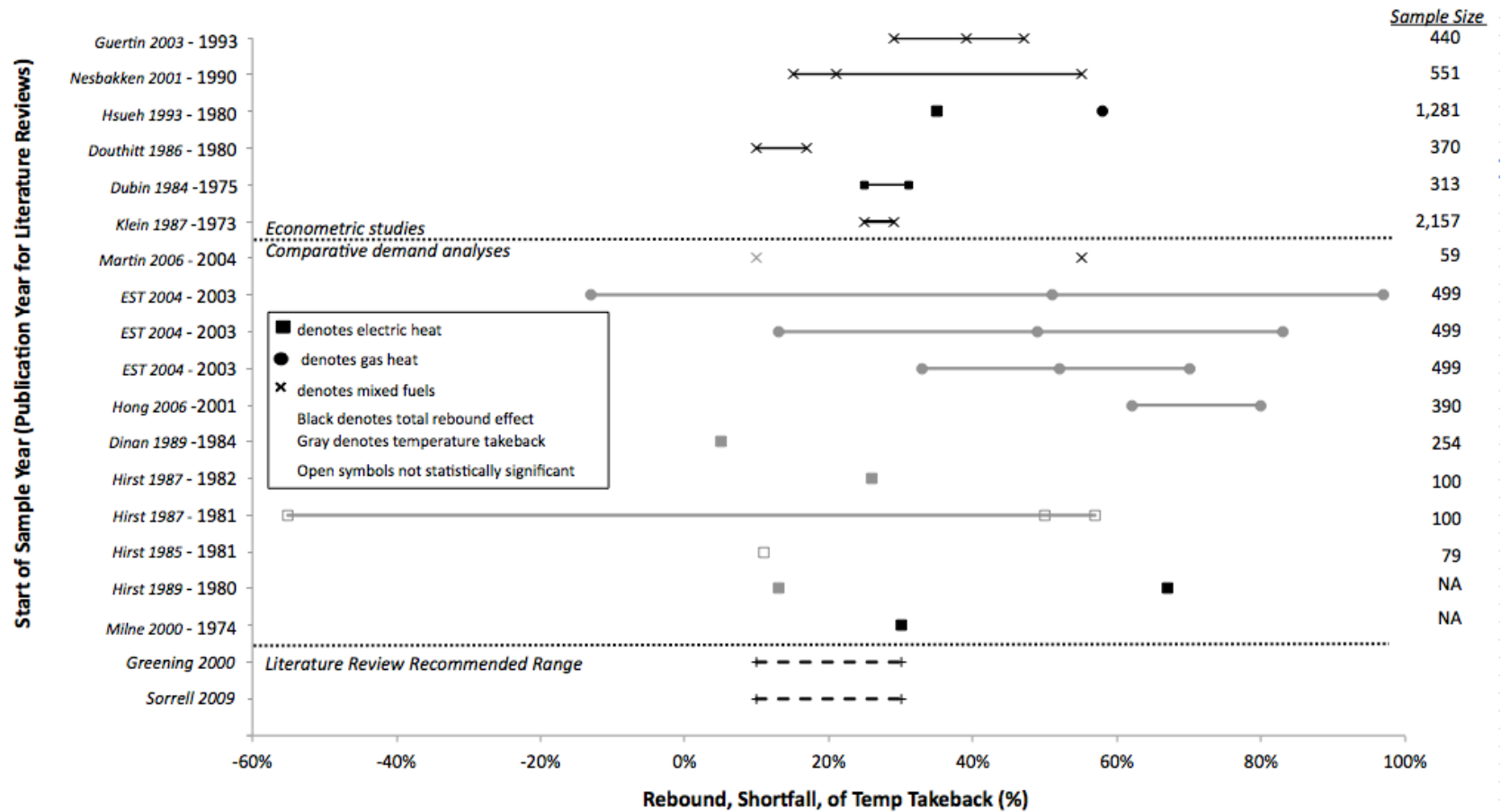
**It is unclear whether these effects are large or marginal...**

Some argue that rebound is an un-important issue.

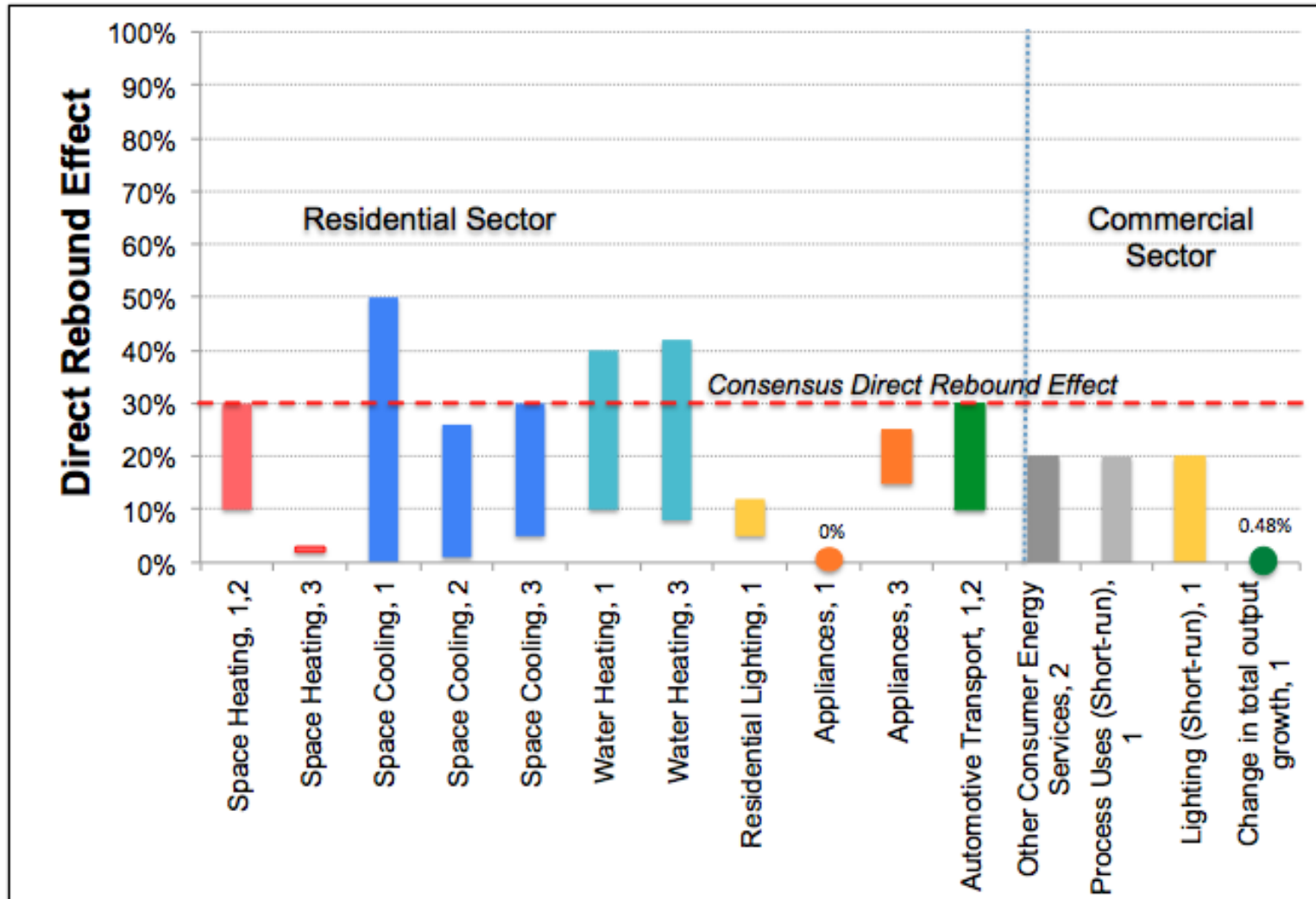
Others arguing that energy and carbon dioxide savings will be eroded and in some cases that policy will even "back-fire," leading to an increase in energy consumption and emissions as opposed to a decrease.

Results in the literature are all over the map

# Example: residential heating

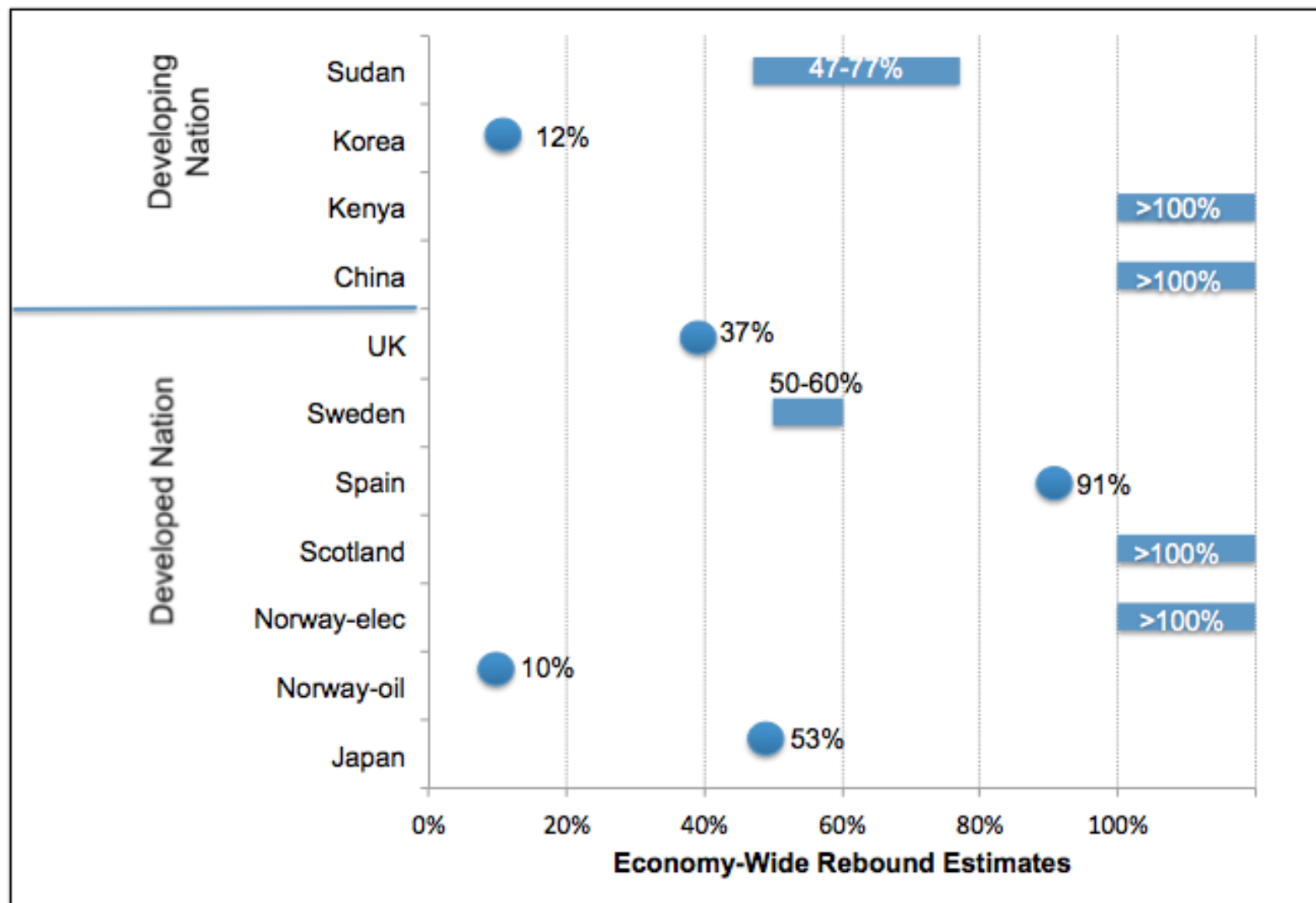


# From other sectors:



Direct rebound effect estimates by sector and end-use. Sources: (1) Greening et al., 2000; (2) Sorrell et al., 2009; (3) Parti and Parti (1980), with appliances defined as freezers, dryers, and electric ranges.

And internationally:



Economy-wide rebound effect estimates. Sources: Reviewed in Sorrell et al. (2007); Spanish estimate from Guerra and Sancho (2010); Korean estimate (GHG rebound) from Howells et al. (2007).



# We are undertaking a collaborative effort:

- The Climate and Energy Decision Making Center
- ZIRN at the University of Stuttgart, Germany (Prof. Ortwin Renn)
- School of Public Management at Tsinghua, China (Prof. XUI Lan)

This will be done under the auspices of the IRGC and will include 2 workshops:

1. June 27-28, Washington D.C.
2. October 13-14, Stuttgart, Germany.

# Goal

- Assess the state of understanding.
- Lay out a research agenda that is specific, identifying studies that can inform the needs of those developing energy policy.
- Publish the conclusions as an IRGC report and in the refereed literature.

# Draft agenda for June 27-8:

<u>June 27th</u>		<u>June 28th</u>	
8:00am - 8:30am	Breakfast	8am - 8:30am	Breakfast
8:30am - 9:00am	Welcome and introduction	8:30am to 9:45am	<u>Session 6: Use of rebound estimates in energy and climate models</u>
9:00am - 9:15am	Goals and organization		<u>Session 7: Consumer choice models and rebound</u>
9:15am - 11:30am	<u>Session 1: Defining the rebound effect</u>	9:45am to 11:00am	Should there be a categorization of different goods based on the potential for saturation?
	Definitions of direct, indirect and economy wide rebound		Is there evidence of backfire?
	The direct rebound effect		How to incorporate time, and time value of money to address the issue of rebound?
	The indirect rebound effect		<u>Session 8: Policies to overcome the</u>
	Economy-wide effects		Outlining policy mechanisms that could overcome rebound
	Discussion		Policy experience from different countries
11:30am - 12:30am	<u>Session 2: Sector analysis</u>	11:00am - noon	<u>rebound effect</u>
	Residential/Commercial sector		
	Transportation		
	Discussion		
12:30am - 1:15pm	<i>Lunch</i>	Noon - 1:00pm	<i>Lunch</i>
1:15pm - 2:30pm	<u>Session 3: International Comparisons</u>	1:00pm – 2:00pm	<u>Breakout groups to identify and discuss relevant research areas</u> (the outcome should be further refinement of draft calls for proposals)
	Studies on rebound effects in the U.S.		<u>Review of the findings from the breakout groups by the rapporteurs and next steps</u>
	Studies on rebound effects in the EU		<i>Wrap up</i>
	Studies on rebound effects in the China		
	Discussion		
2:30pm – 3pm	<u>Session 4: Overview of methods and summary of</u>		
<u>morning sessions</u>	Discussion		
3:00pm to 3:20pm	<i>Coffee Break</i>	2:00pm – 3:00pm	
3:20pm – 5:10pm	<u>Breakout groups: identification of relevant research</u> (the outcome should be the beginning of what calls for proposals could look like)	3:00pm – 3:30pm	
	<u>Session 5: Review of the findings from the breakouts</u>		
5:10am - 6:10pm	<i>Break</i>		
6:10pm to 7:00pm	Dinner		
7pm			

Mr. Steven Sorell	University of Sussex
Dr. Karen Turner	University of Stirling
Dean John Graham	Indiana University
Dr. Inês Azevedo	CMU
Mr. Michael Blackhurst	CMU
Dr. Hadi Dowlatabadi	UBC
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~ 30 participants

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