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Achieving China's Intended Nationally Determined Contribution: Implications of the Building Sector

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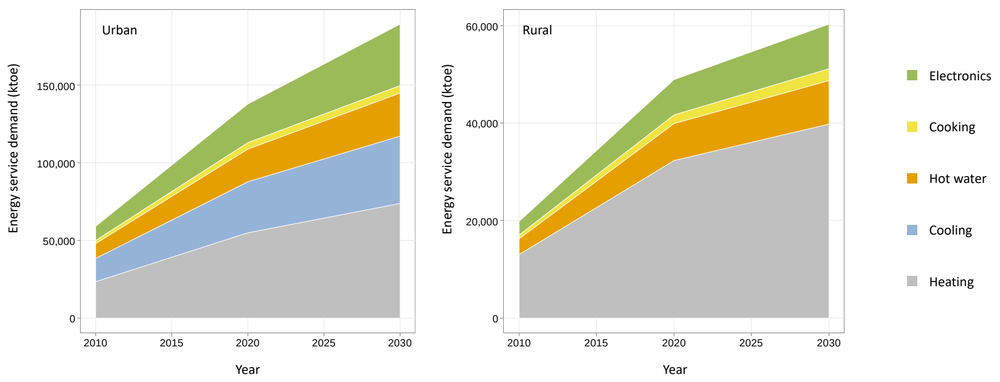
Introduction

- China's INDC: A reduction of carbon dioxide emissions per unit of GDP by 60% to 65% from the 2005 level by 2030
- This study looks into the contribution from building sector (urban/urban residential, service) to achieve China's INDC

Energy service demand

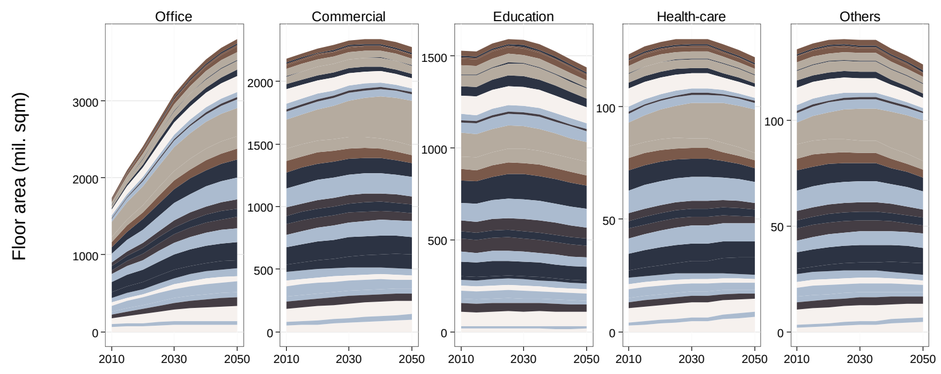
Residential Sector



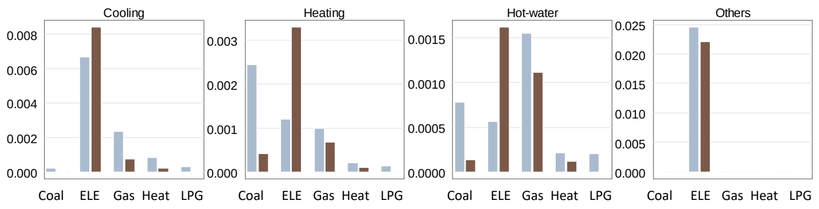
Xing R., et al., Journal of Cleaner Production, 2017

Service Sector

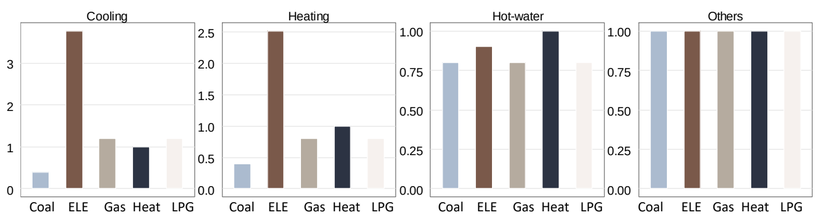
Service floor area of 31 Chinese regions



Per floor area energy consumption (ktoe/m²)



Device efficiency



Xing R., et al., Energy Procedia, 2017

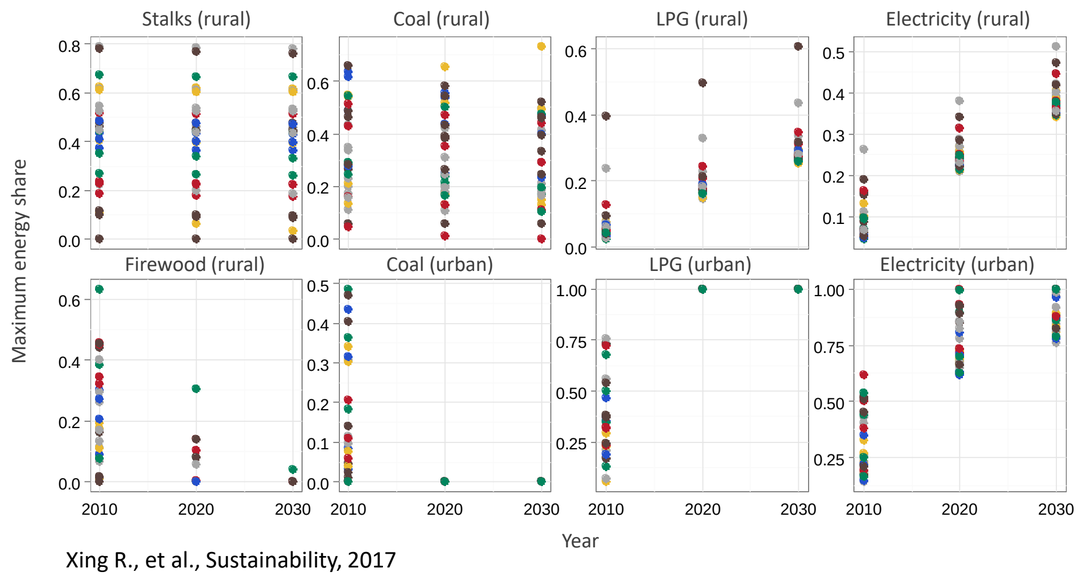
Energy transition

- Residential sector: Regression analysis on 12 socio-economic indicators

Influencing socioeconomic indicators of each energy source (U=Urban; R=Rural)

Perspective	Explanatory variable	Stalks		Firewood		Coal		LPG		Electricity	
		R		R		U	R	U	R	U	R
Development	Income (2011$US)			√		√		√	√	√	√
	Educated in college and higher level	√					√				
Climate	HDD dummy ("1" if central heated "0" if not)						√				
	HDD18	√		√							
Household	Household size (persons/household)							√		√	
Housing	Per capita floor area (m²)										
Age	Dependency ((Age 0-14 + Age 65 and over)/Age 15-64)						√		√		√
Energy resource	Cereal production share	√									
	Timber production share			√							
	Coal production share										
	Coal production dummy ("1" if more than 3% of national total "0" if not)										
Gender	Female share in household (female pop./household)										

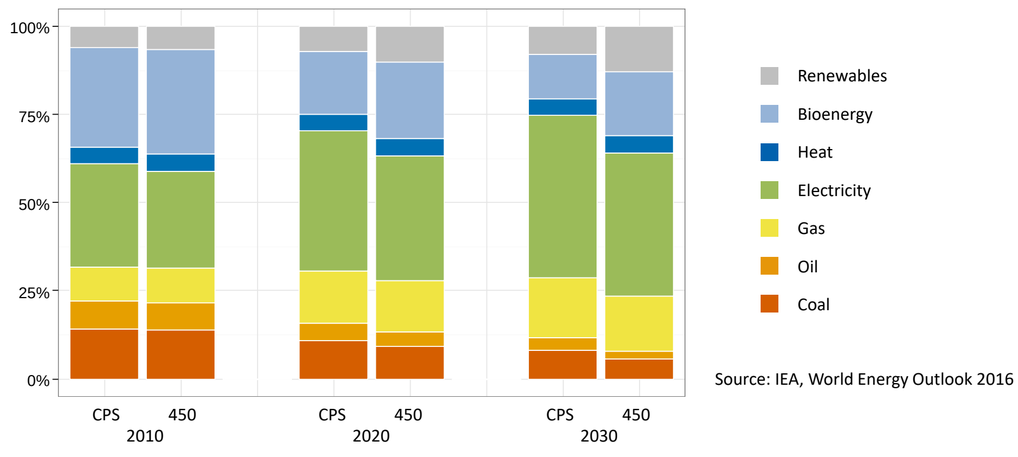
- Household energy transition: Primitive → Transition → Advanced
- Urban China: Coal phrase out; 100% access to LPG and electricity
- Rural China: Rather low share of LPG and electricity



Xing R., et al., Sustainability, 2017

- Service sector: Energy share constraints set based on IEA's projection

Energy demand (China, building): Current Policies and 450 Scenarios



Source: IEA, World Energy Outlook 2016

Results

Residential Sector

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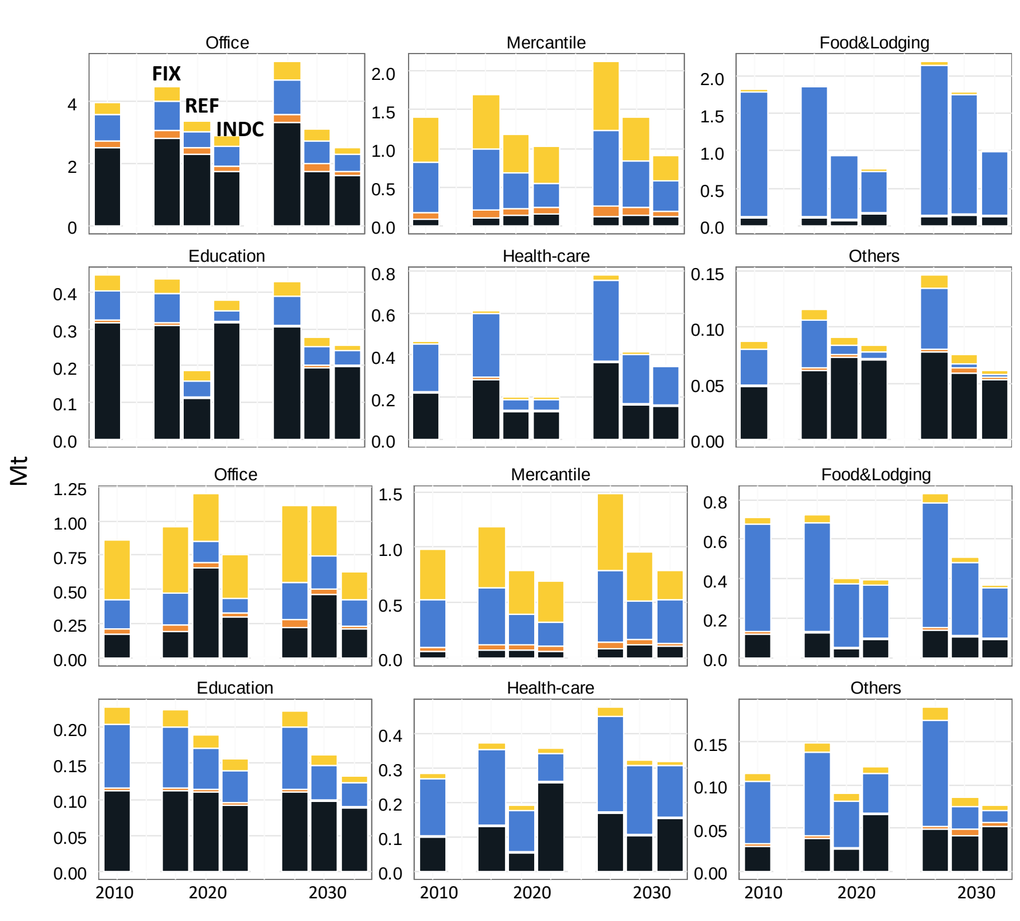
Service Sector



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