

1.5°C Target: how to understand it?

China Studies in 2017

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Research Activities in 2017

1.5 Scenario for China

1.5 Scenario for Beijing

Beijing's Energy Planning up to 2035 and 2050

NEA's Energy Transition Roadmap

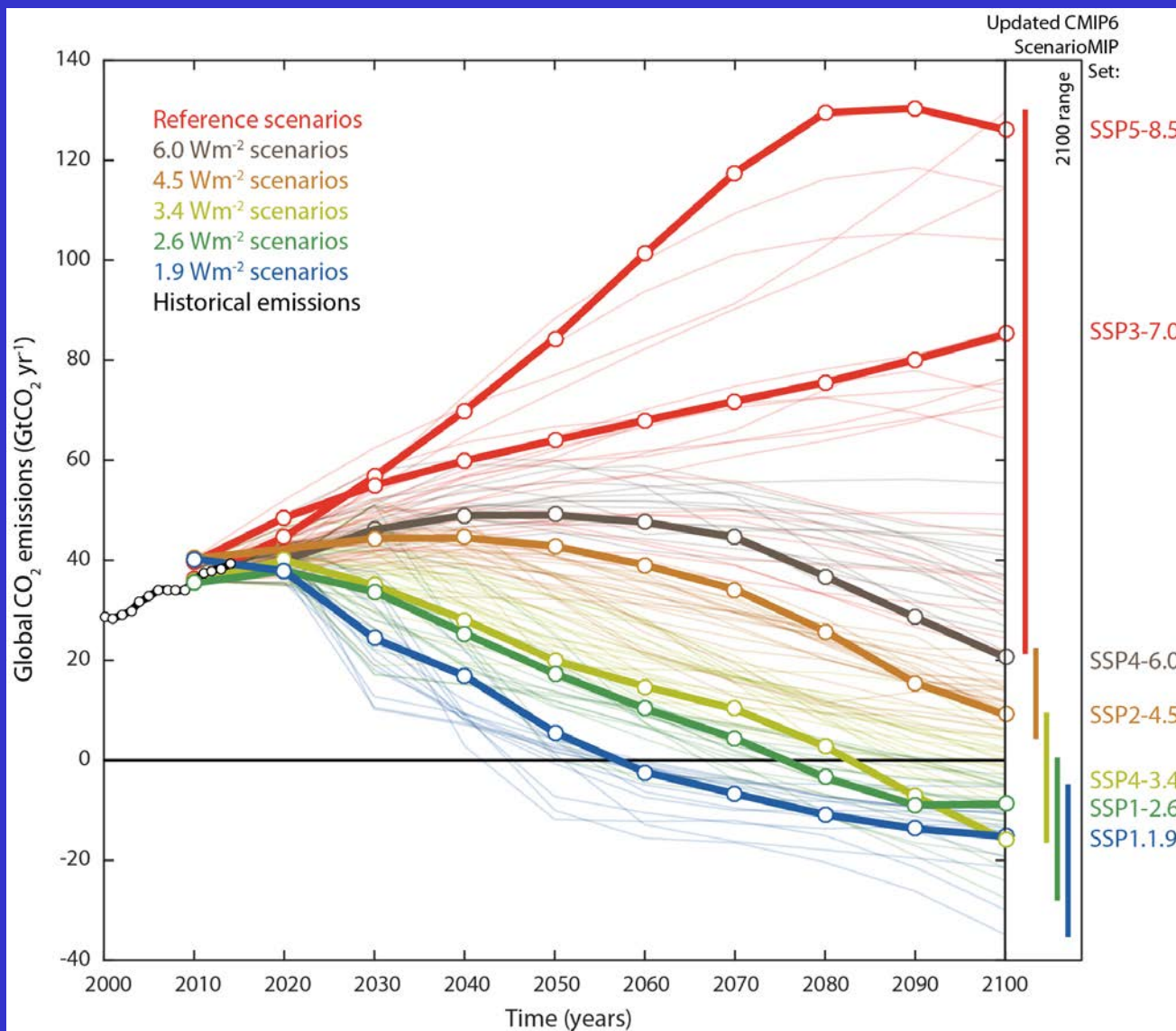
Roadmap of Air Quality Improvement for China

Earlier CO₂ Emission Peaking for China

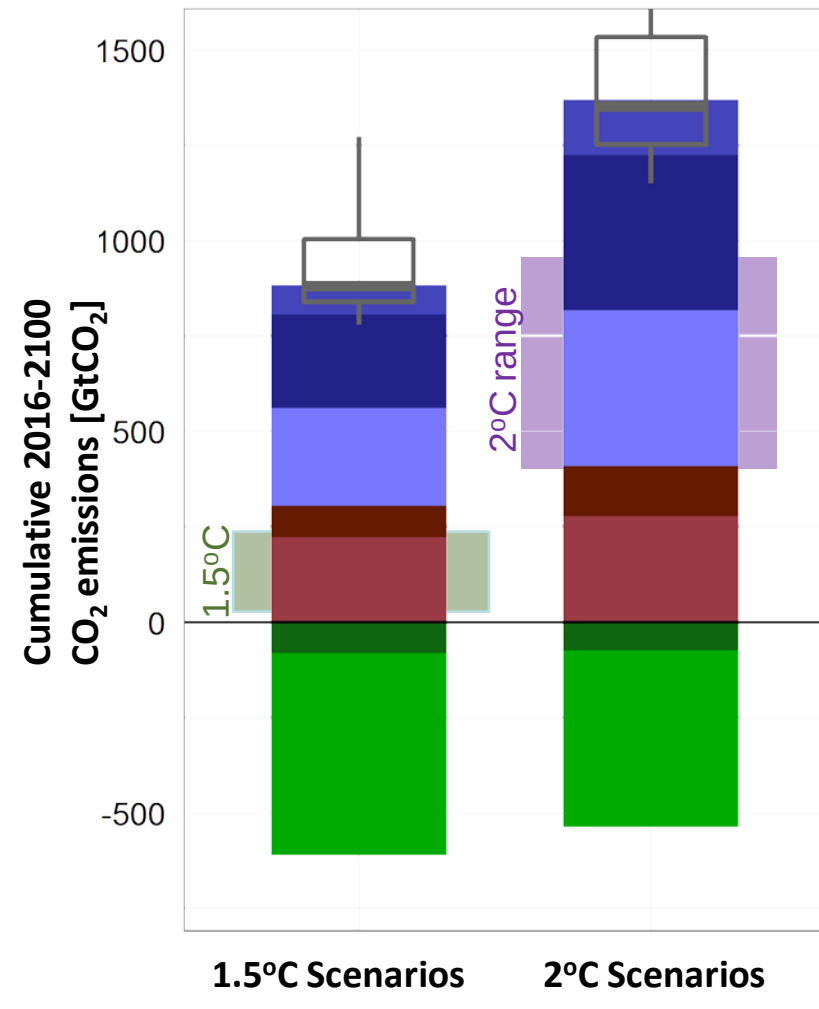
EMF33

Air Quality Control Scenario for 26+2 cities in China

CD-LINK



Remaining CO₂ budget vs. residual fossil emissions



Residual emissions determined by

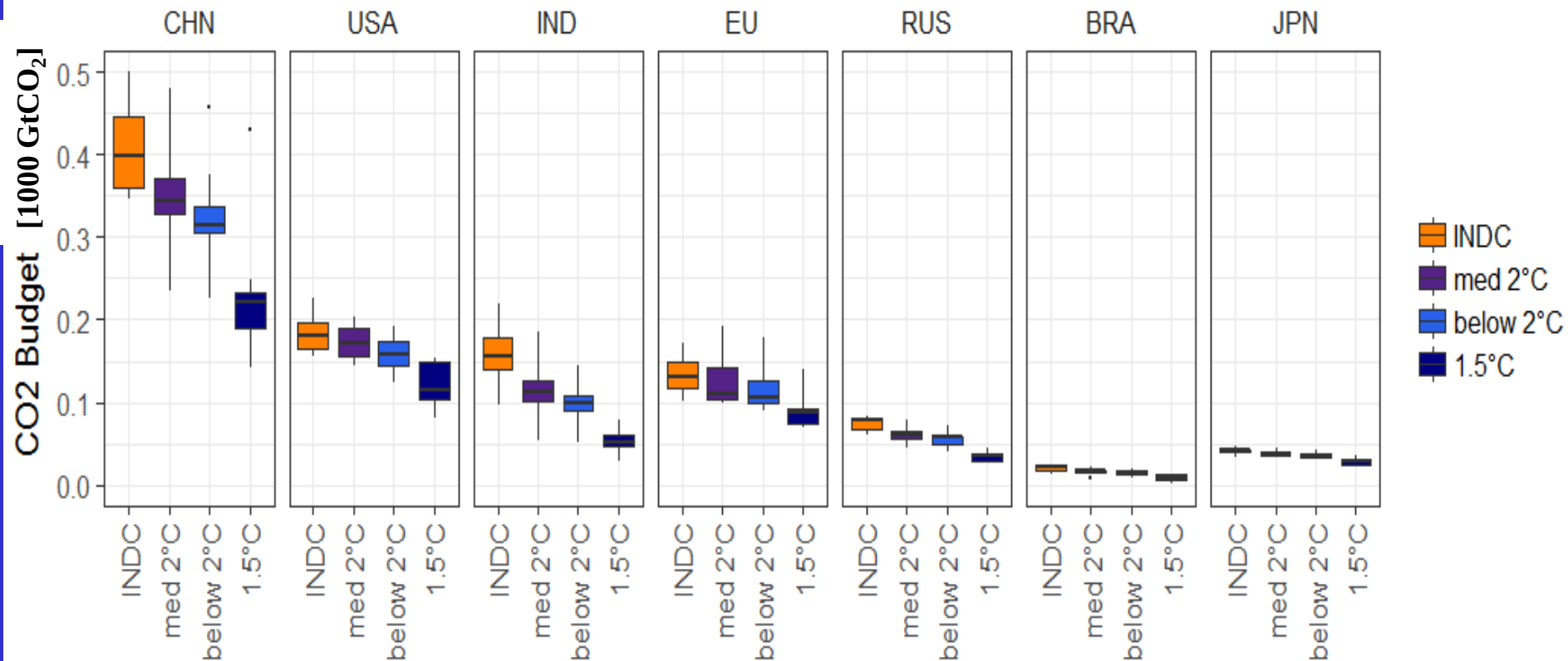
- Pace of decarbonization
- Configuration of (net) zero-carbon and zero-emissions society

Main mitigation options:

- Demand reductions & efficiency improvements
- Electrification
- switch to biomass / hydrogen / *other carbon-neutral fuels*
- Dietary changes, *Synthetic feed and meat*
- CDR & CCU

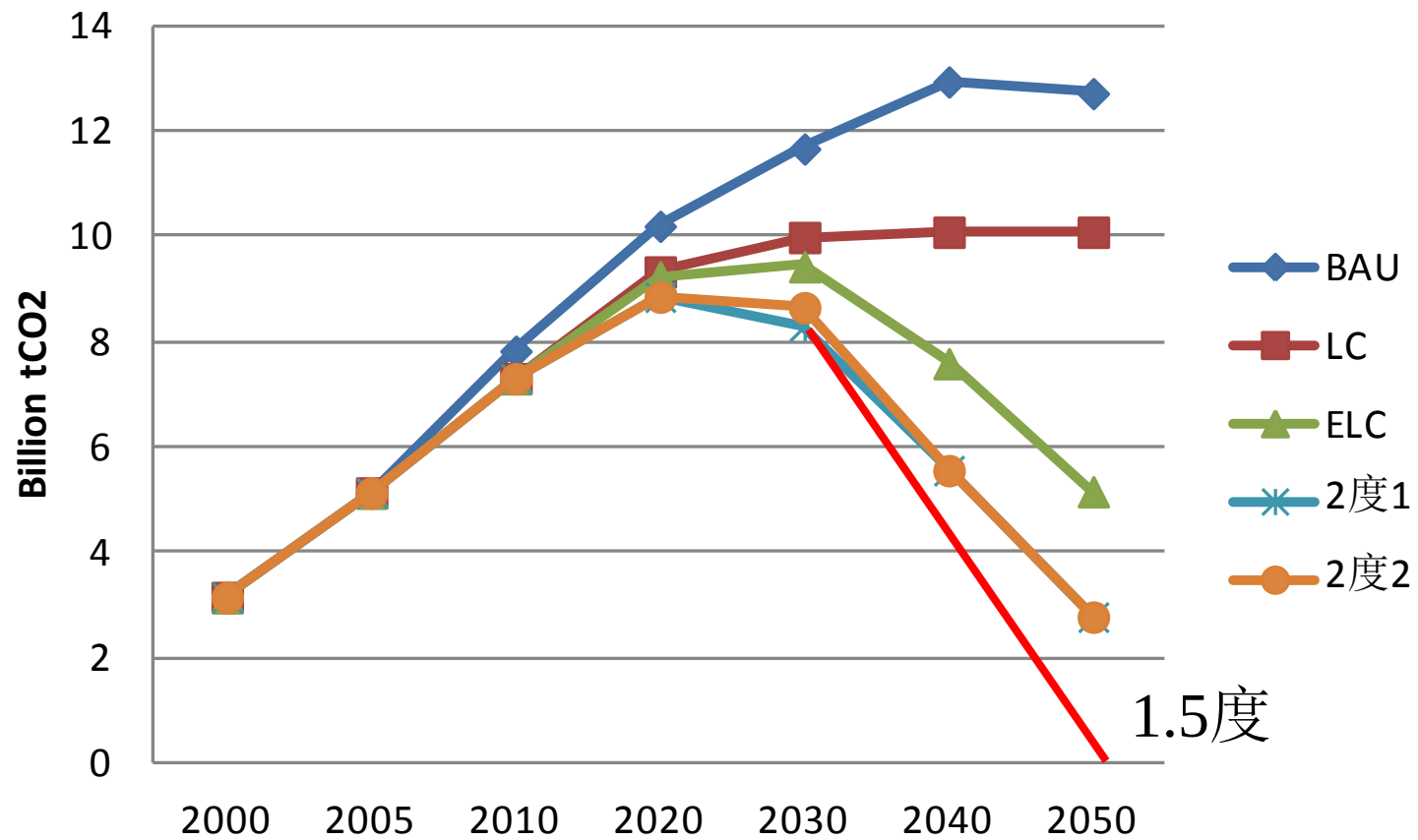
Consistent global and national emissions constraints

CO₂ fossil fuel and industry (2011-2050)



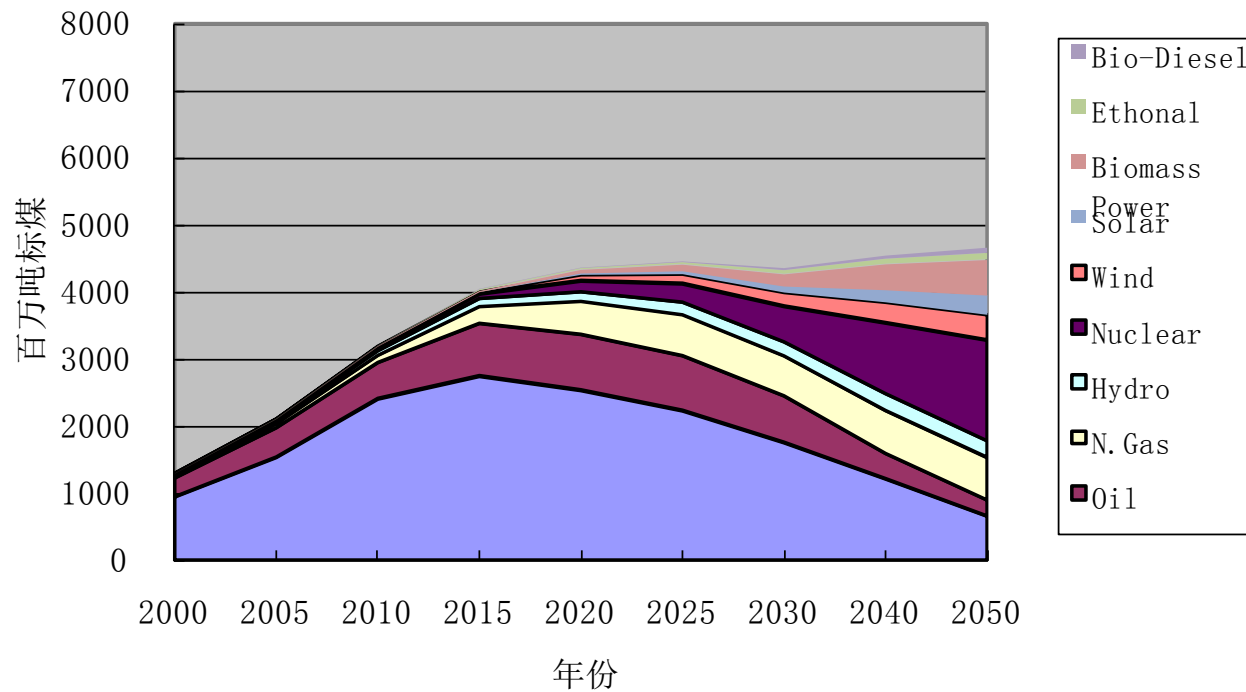
Preliminary results

CO2 Emission

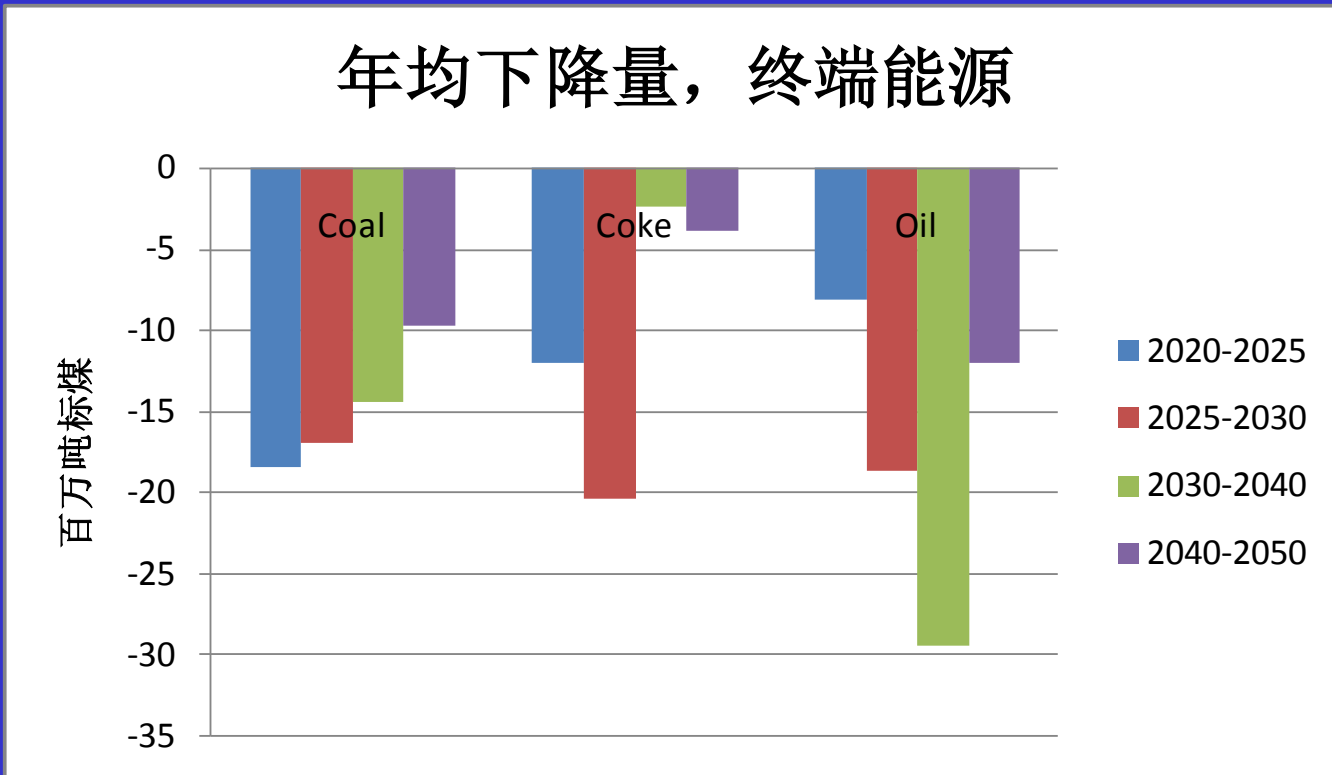


Primary energy demand in China

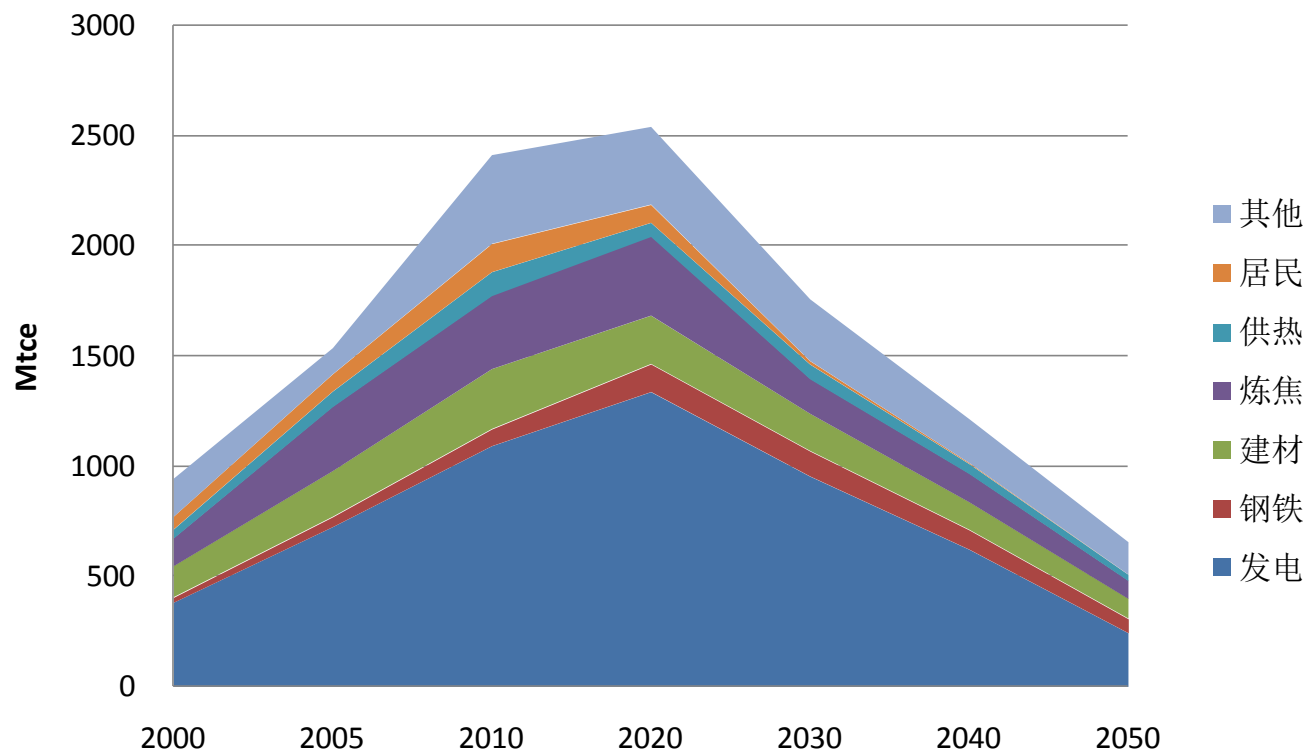
一次能源需求量，1.5℃情景A



Decrease of final energy demand

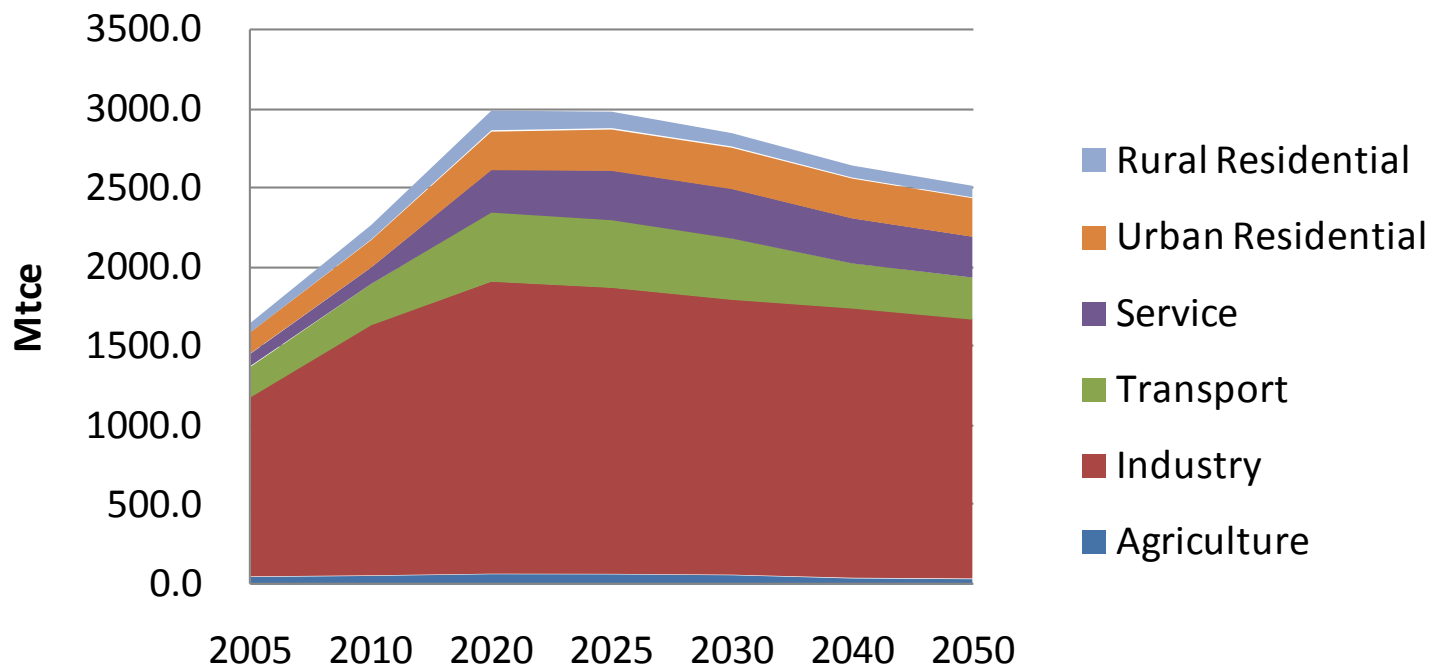


煤炭消费量

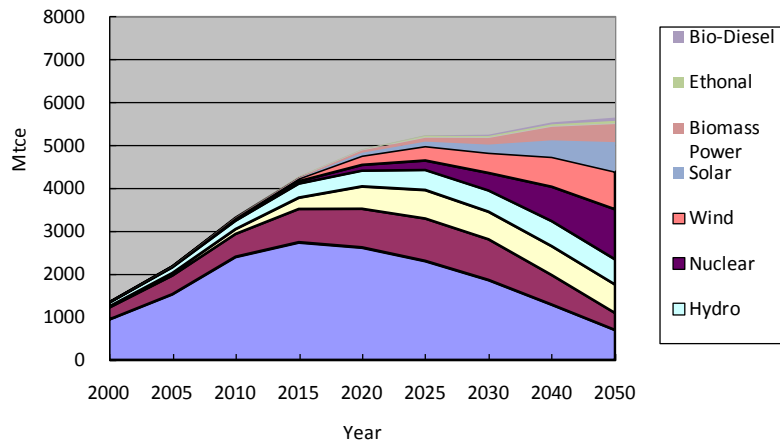


Final Energy Demand by Sector

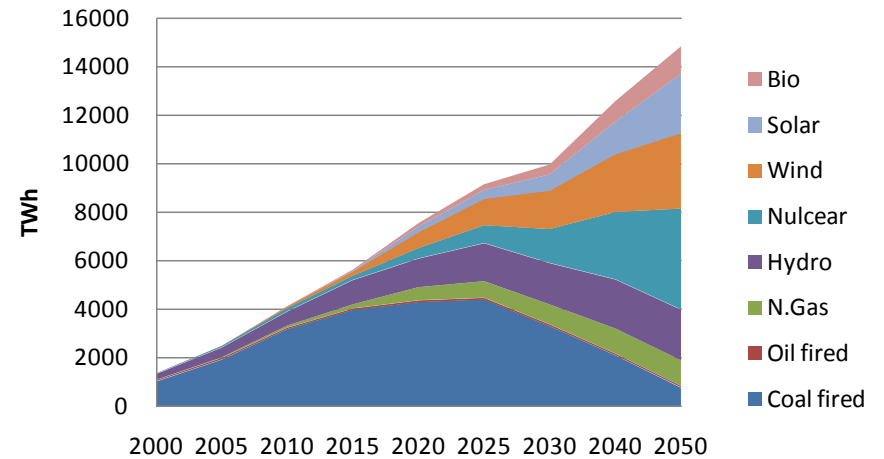
分部门终端能源需求



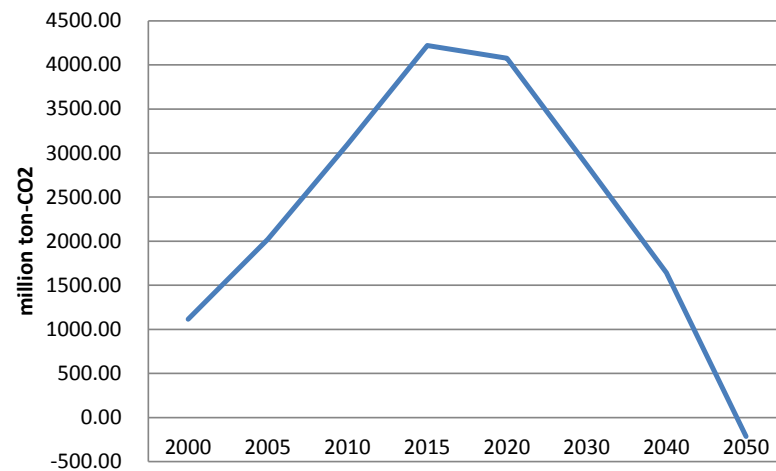
TPE, 1.5°C Scenario



Power Generation, 1.5°C Scenario

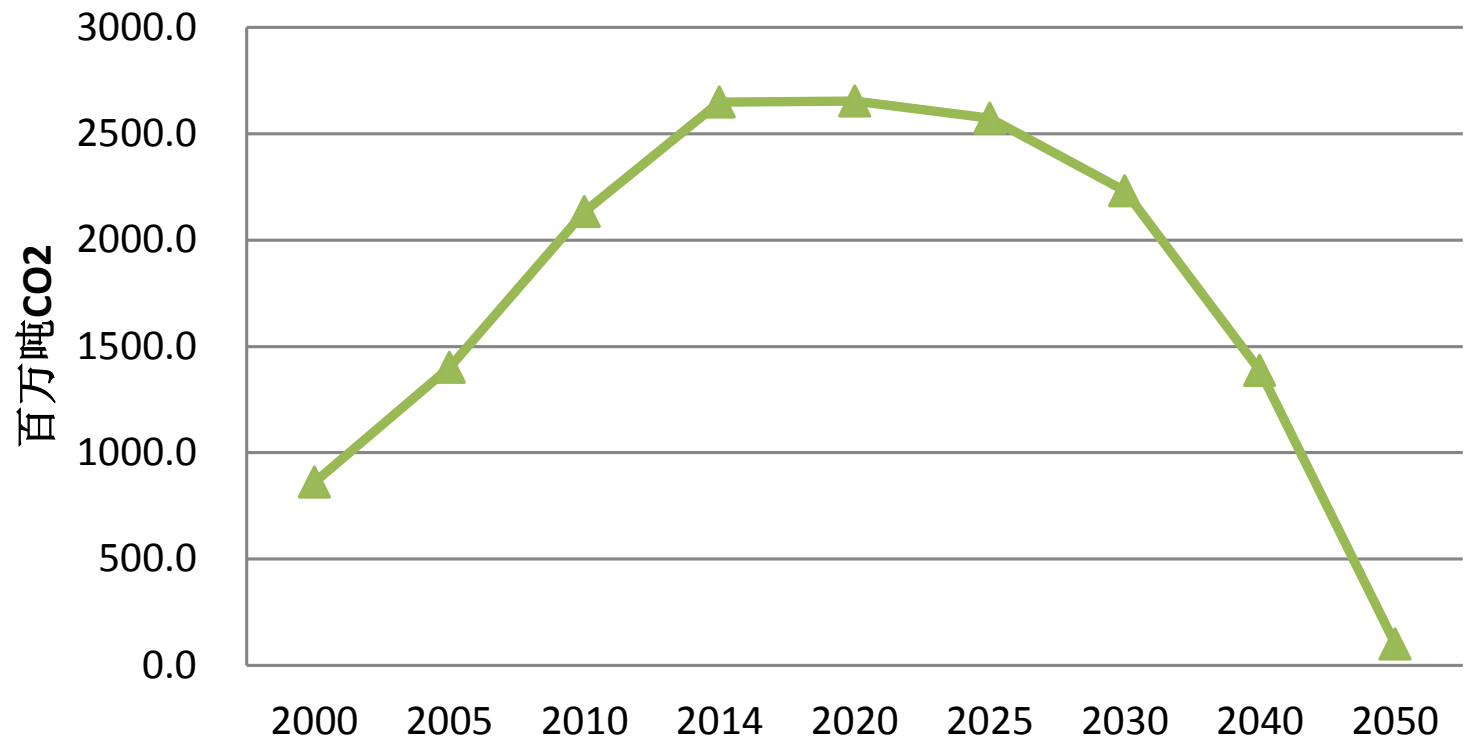


CO2 emission in power sector



CO2 Emission, 1.5°C

CO2排放量, 1.5度情景



Near Zero Emission in Transport

Electric car/fuel cell car: 100% of market in 2025

Large vehicle : fuel cell vehicle by 2035

Vessel/ship : fuel cell by 2035

Airplane : biofuel by 2035 , fuel cell starts from 2040

Other transport : electricity driven

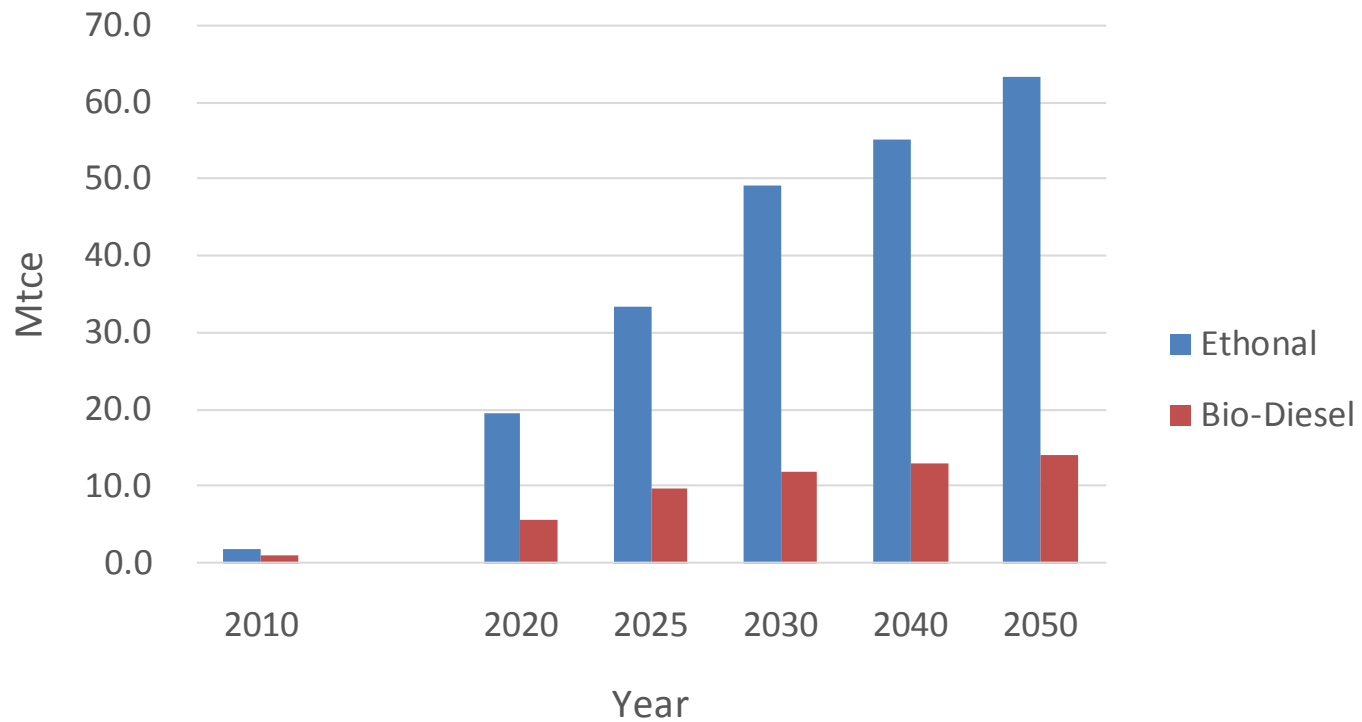
四、影响电动汽车发展的主要制约因素分析

4. Analysis Major Constraints Factors

■ 3.3 电动汽车实现经济性的趋势分析 Trend Analysis on EVs

电动汽车与先进汽油和柴油车成本变化趋势分析					
	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030
电动汽车Evs					
电池充满电时总容量kWh	16	24	48	80	112
电力销售价格 (元/kWh)	0.48	0.60	0.75	0.94	1.18
单位里程耗电量 (kWh/km)	0.18	0.13	0.08	0.08	0.07
单位里程耗电费用 (yuan/km)	0.09	0.08	0.06	0.08	0.08
电动汽车燃料成本 (yuan/car)	43200	39067	30104	37694	41299
单位电池容量成本(USD/kWh)	750	375	130	75	30
Evs车电池组成本(yuan/car)	80400	60300	41808	40200	22512
电池组寿命 (年)	3.6	5	11	22	22
电池组更换次数 (set/year)	4.1	2.8	1.4	0.7	0.7
EVs全寿期电池成本 (yuan/car)	413256	226728	99503	67938	38045
EVs全寿期电耗和电池总成本 (yuan/car)	456456	265795	129607	105632	79345
每年费用 (yuan/car)	30430	17720	8640	7042	5290
先进汽油汽车ICE					
汽油销售价格 (yuan/liter)	6.6	8.5	10.2	11.0	11.8
柴油销售价格 (yuan/liter)	6.4	8.3	9.9	10.6	11.4
单位里程耗汽油 (L/km)	0.050	0.039	0.031	0.024	0.020
单位里程耗柴油 (L/km)	0.047	0.038	0.030	0.024	0.020
全寿期行驶里程 (km)	500000	500000	500000	500000	500000
先进汽油车燃料成本 (yuan/car)	165000	167550	158356	133574	117738
先进柴油车燃料成本 (yuan/car)	150400	155333	149317	128100	114170
每年费用	11000	11170	10557	8905	7849
比较 (Evs车费用 - ICE车费用)	291456	98245	-28749	-27941	-38394

Bio-fuel use in transport



Near Zero Emission in Building

No fossil fuel use in building

Cooking : electrified , 2035-2040

Space heating : electricity

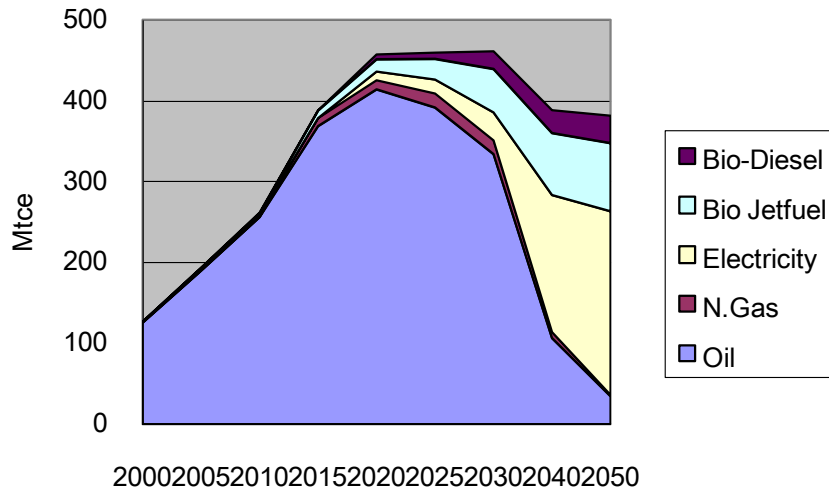
Low emission in industry

Raising share of electricity
driven by electric motor
steel making: recycled steel with electric arc furnace
recycled metals

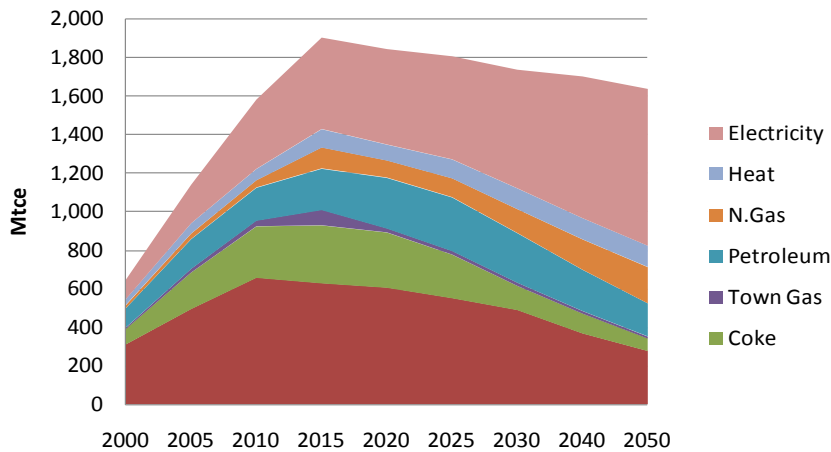
CCS utilization:
steel making, cement manufacture

New industrial process:
Reduction by hydrogen

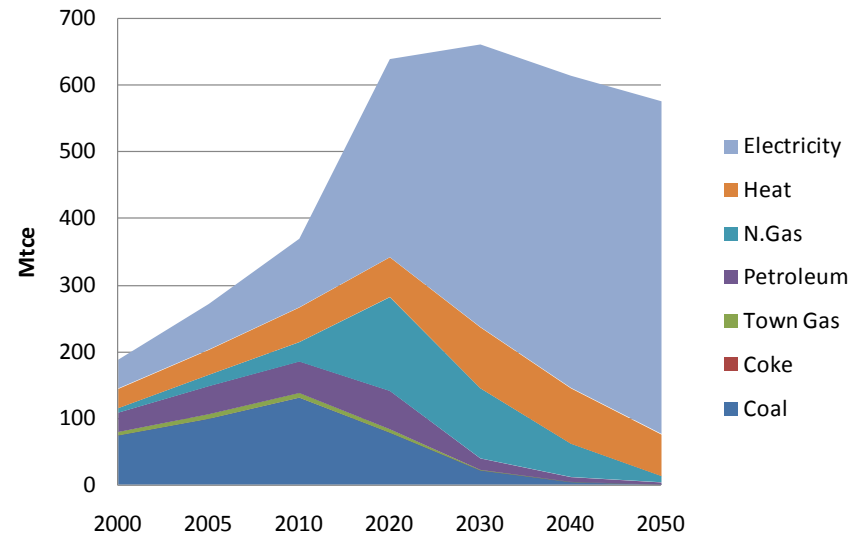
Energy use in transport



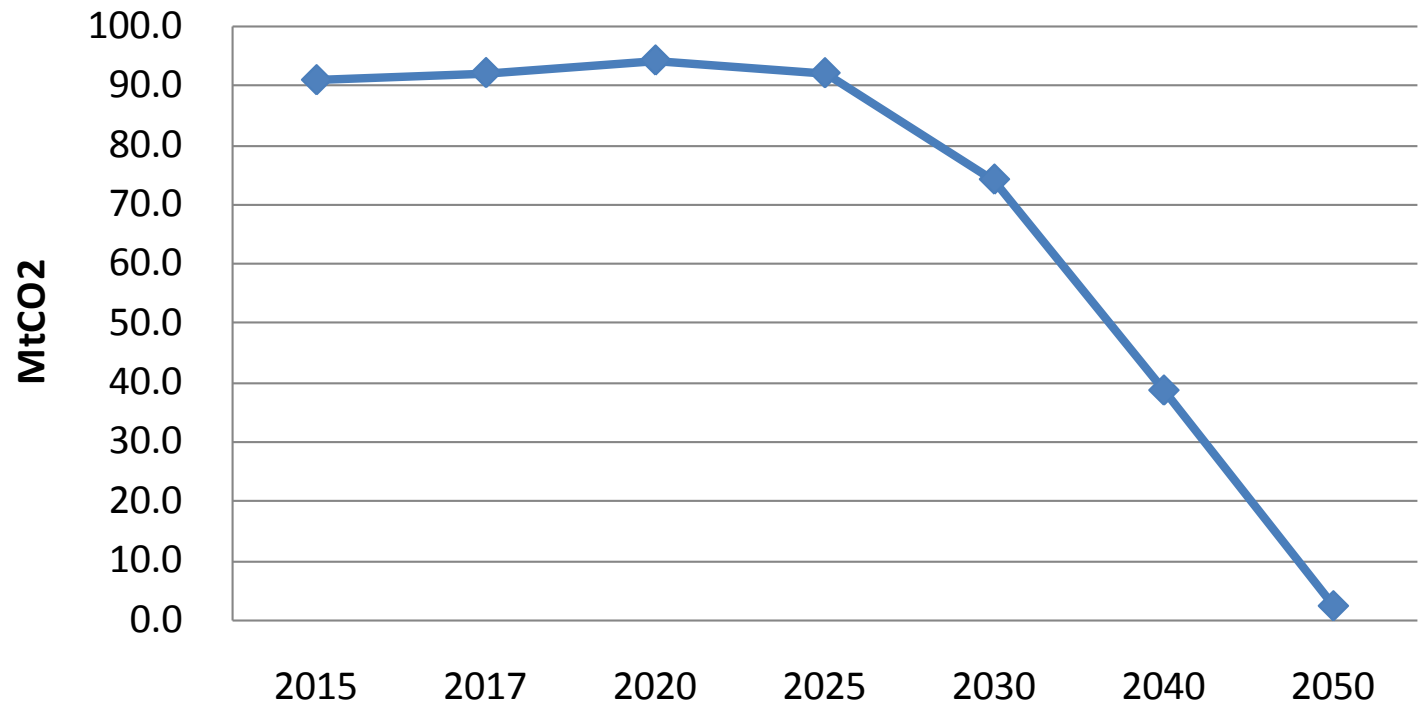
Energy use in industry



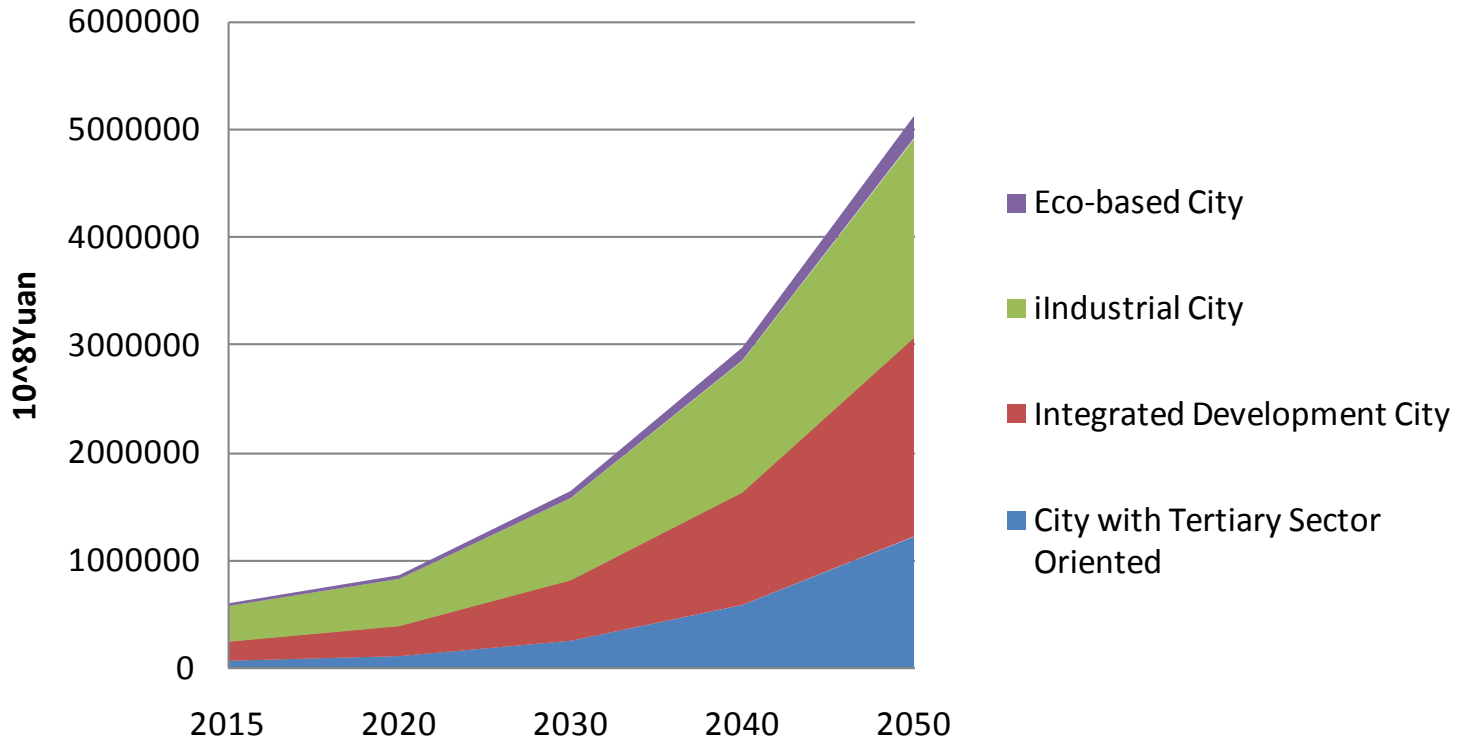
Energy Demand in Building



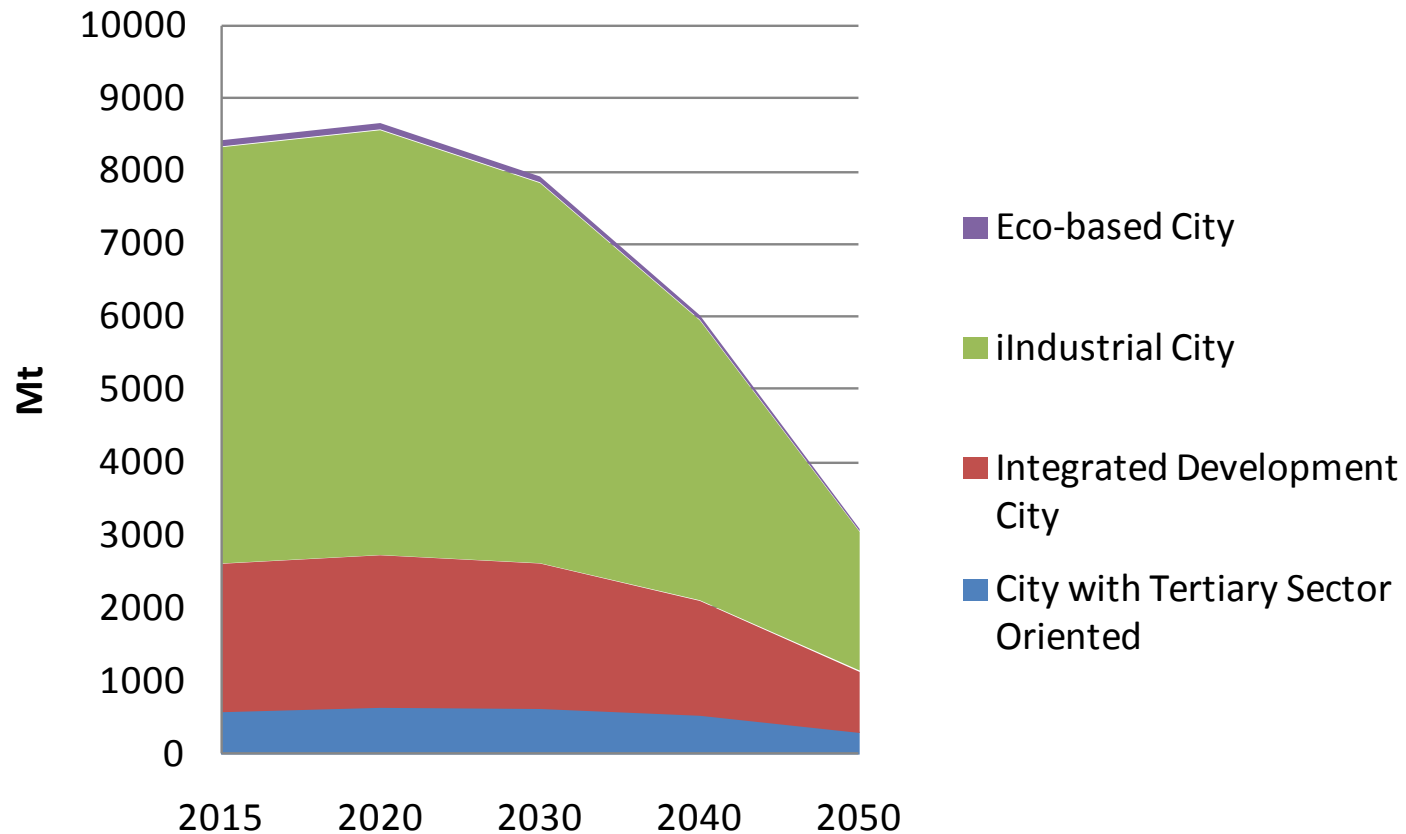
CO2 Emission in Beijing



GDP by Type of Cities



CO2 Emission by Type of City



CO2 Emission Per Capita

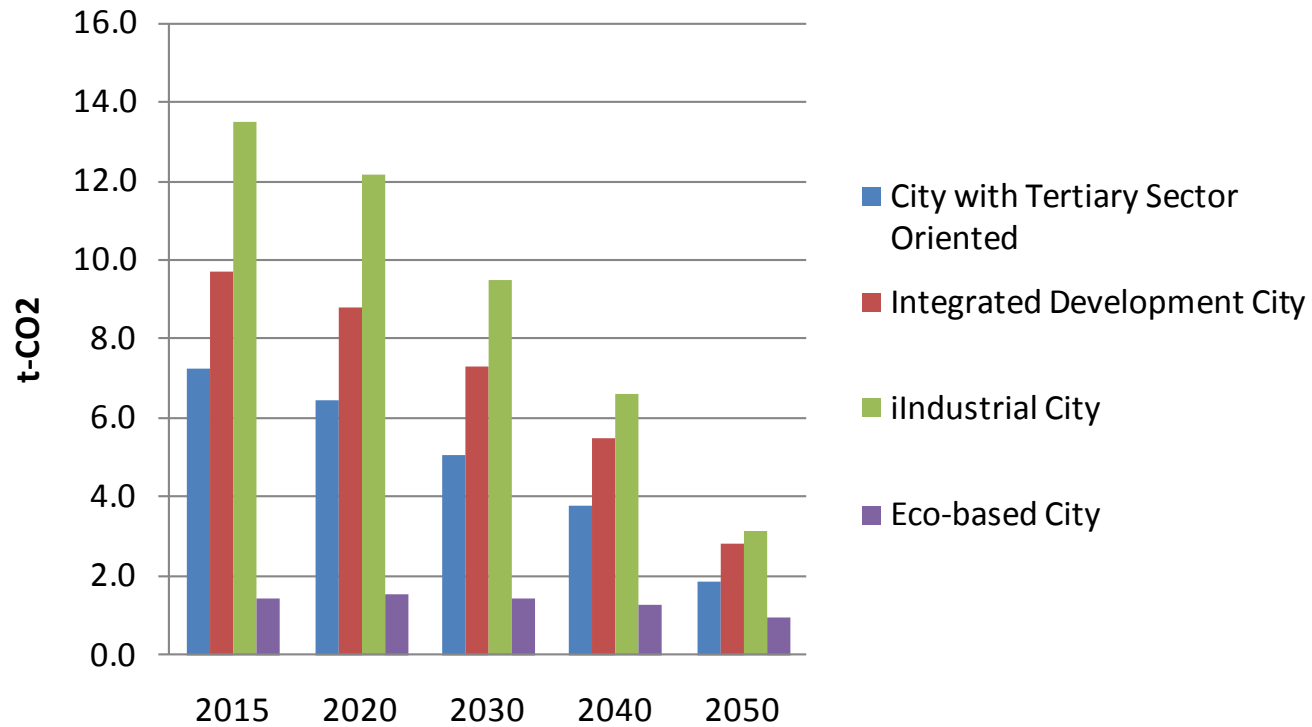
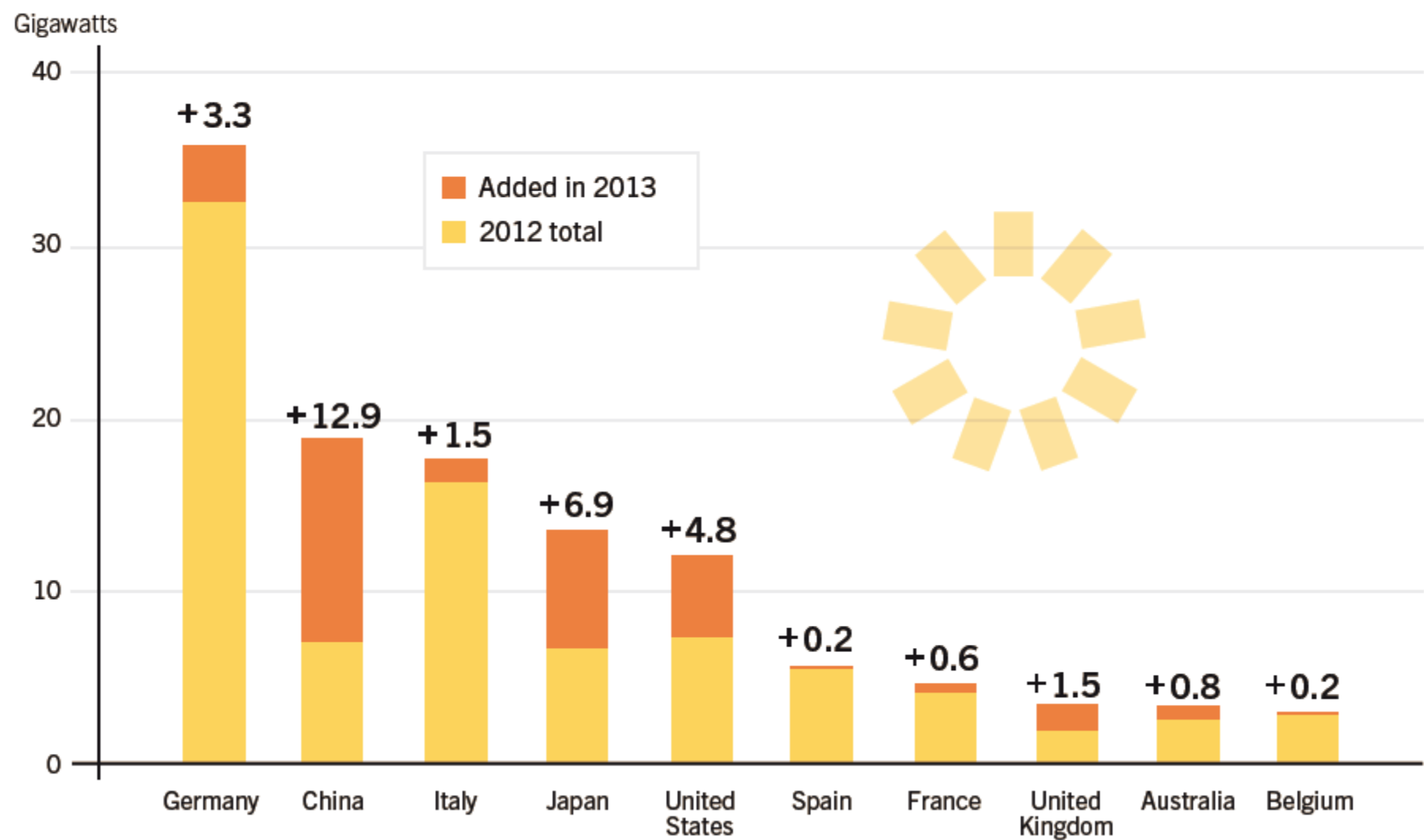


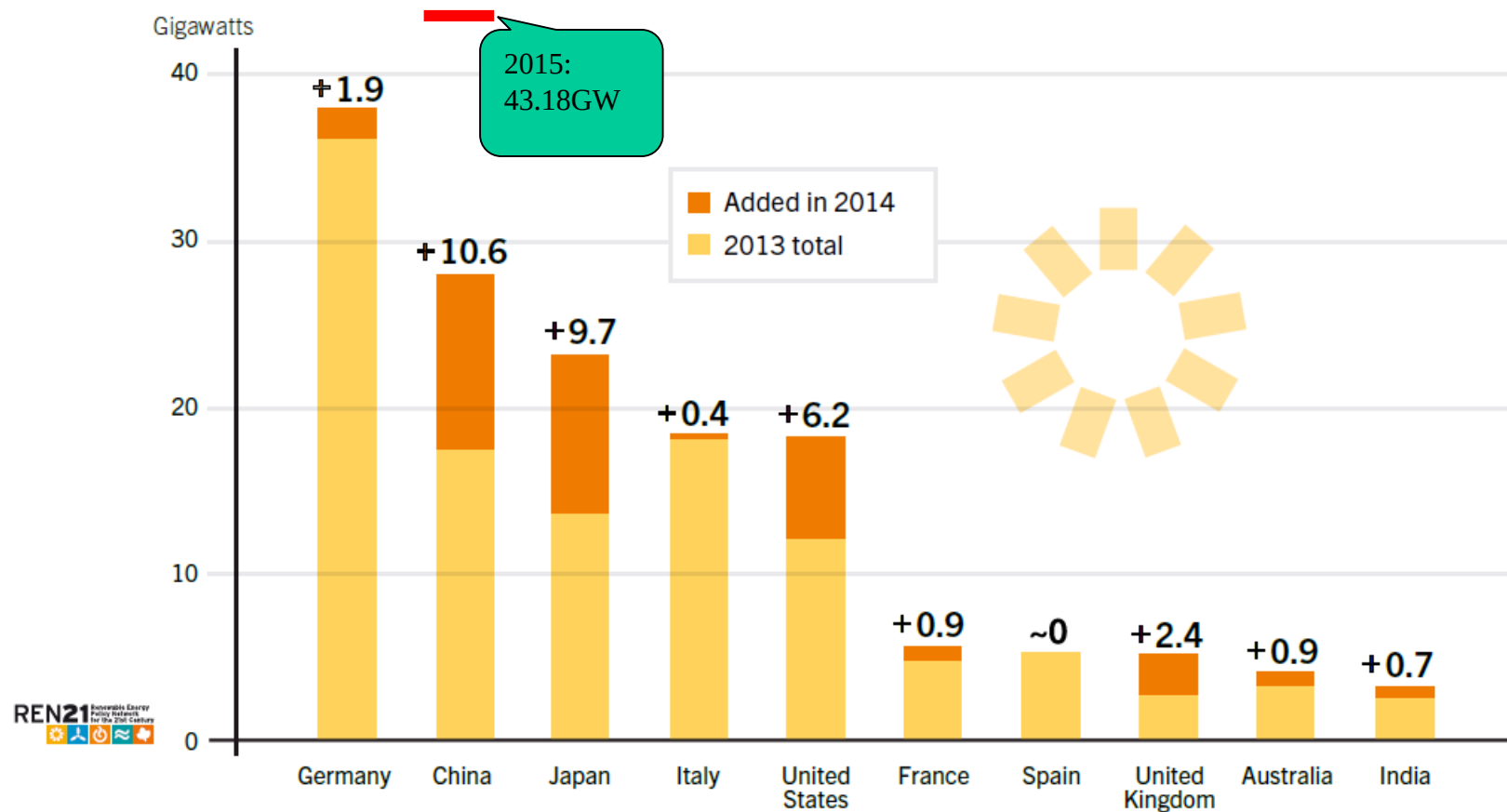
Figure 13. Solar PV Capacity and Additions, Top 10 Countries, 2013

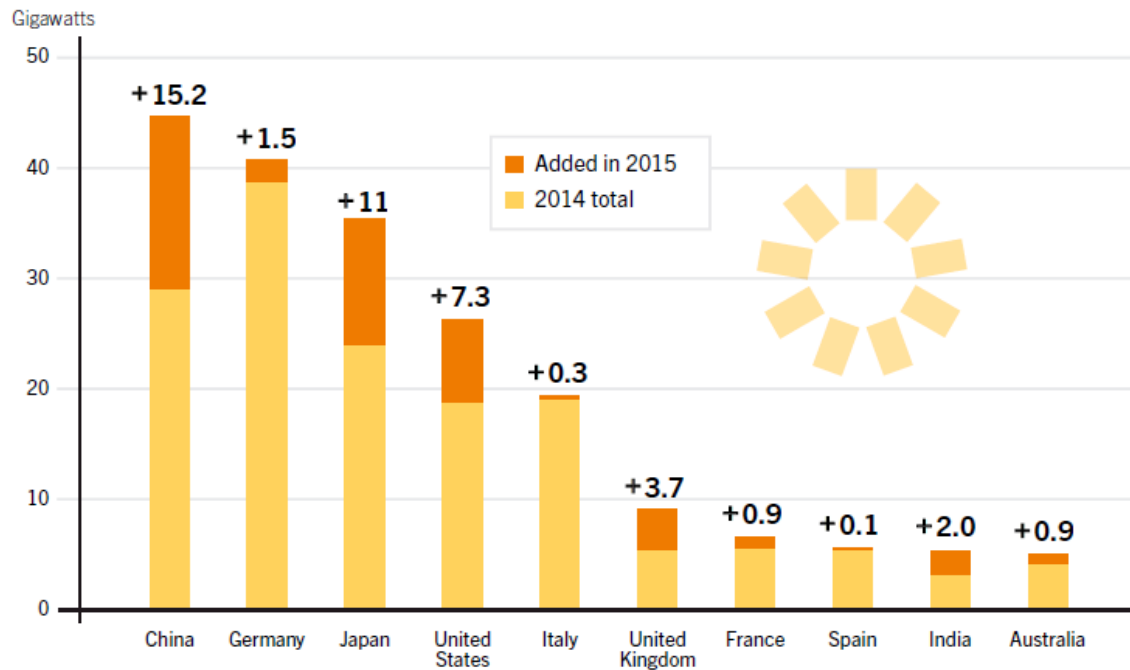




40 GW added in 2014

Solar PV Capacity and Additions, Top 10 Countries, 2014

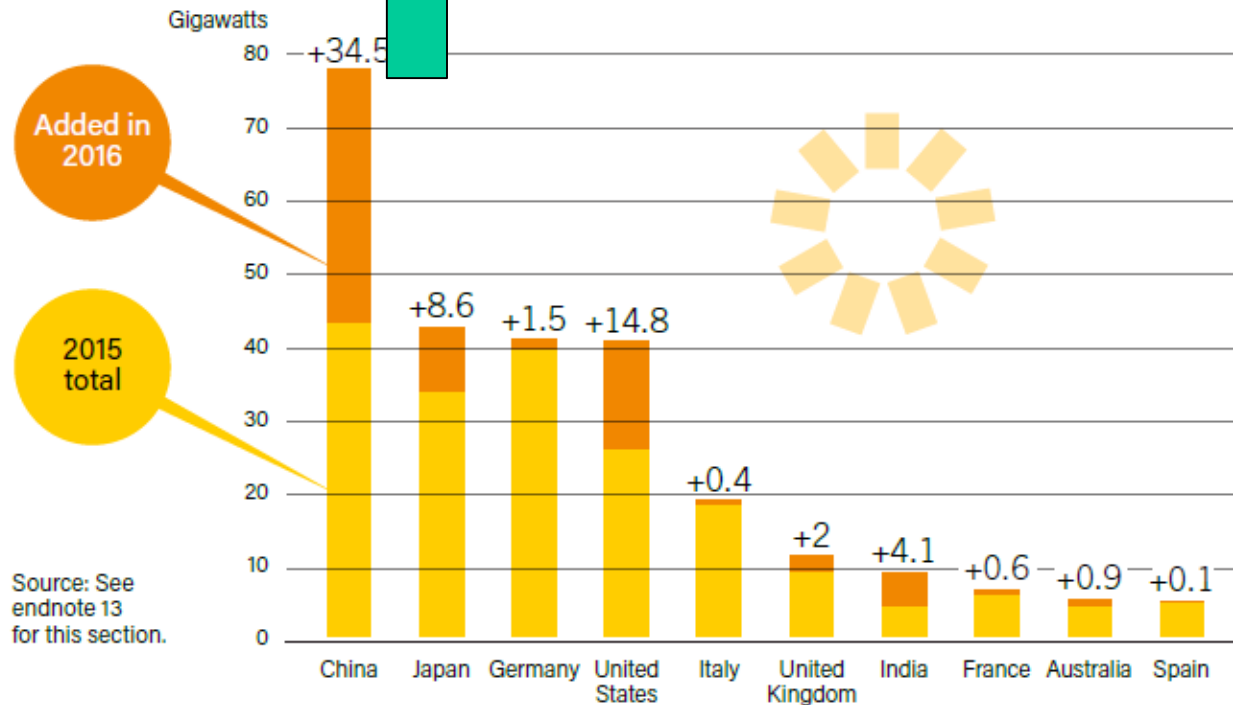




50 GW ADDED IN 2015

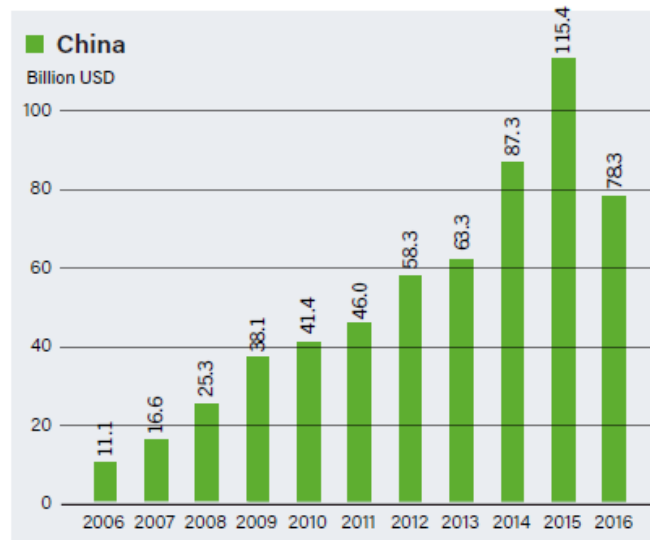
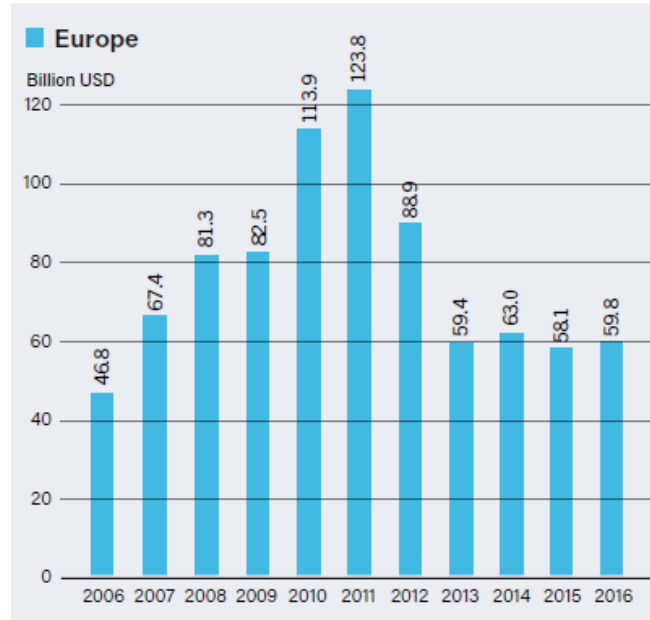
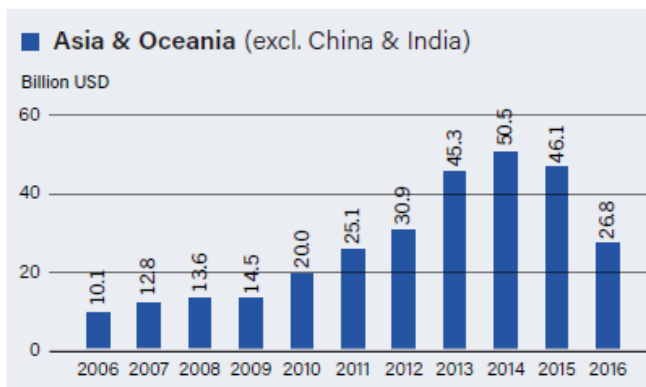
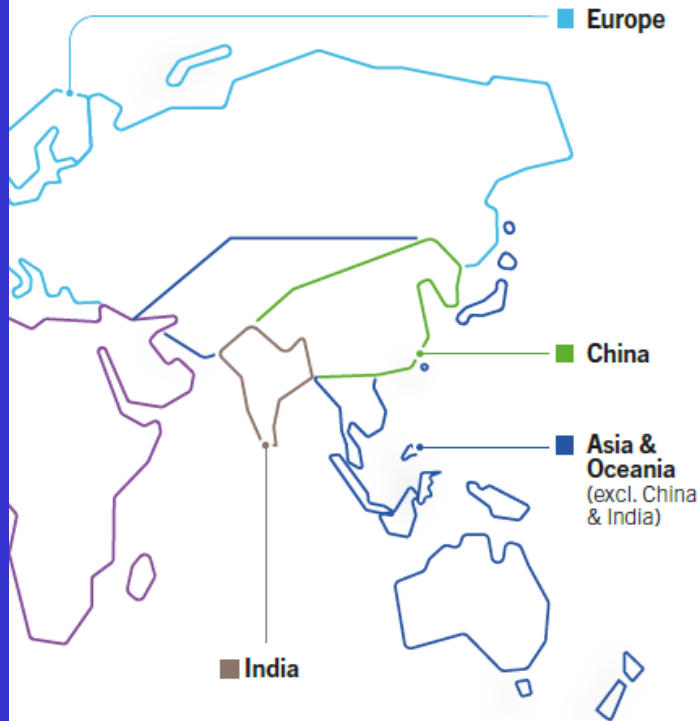
+24.5GW from Jan. to June 2017

Figure 17. Solar PV Capacity and Additions, Top 10 Countries, 2016



CHINA ACCOUNTED FOR
46% OF NEW CAPACITY.







NASA images show stunning progress of China's vast 850 MW Longyangxia Solar Park

2013

2017



Renewable Energy Planning: 2020

2008: 2GW of solar PV

2009: 20GW of PV

2011: 50GW

2012: 80GW

2013: 100GW

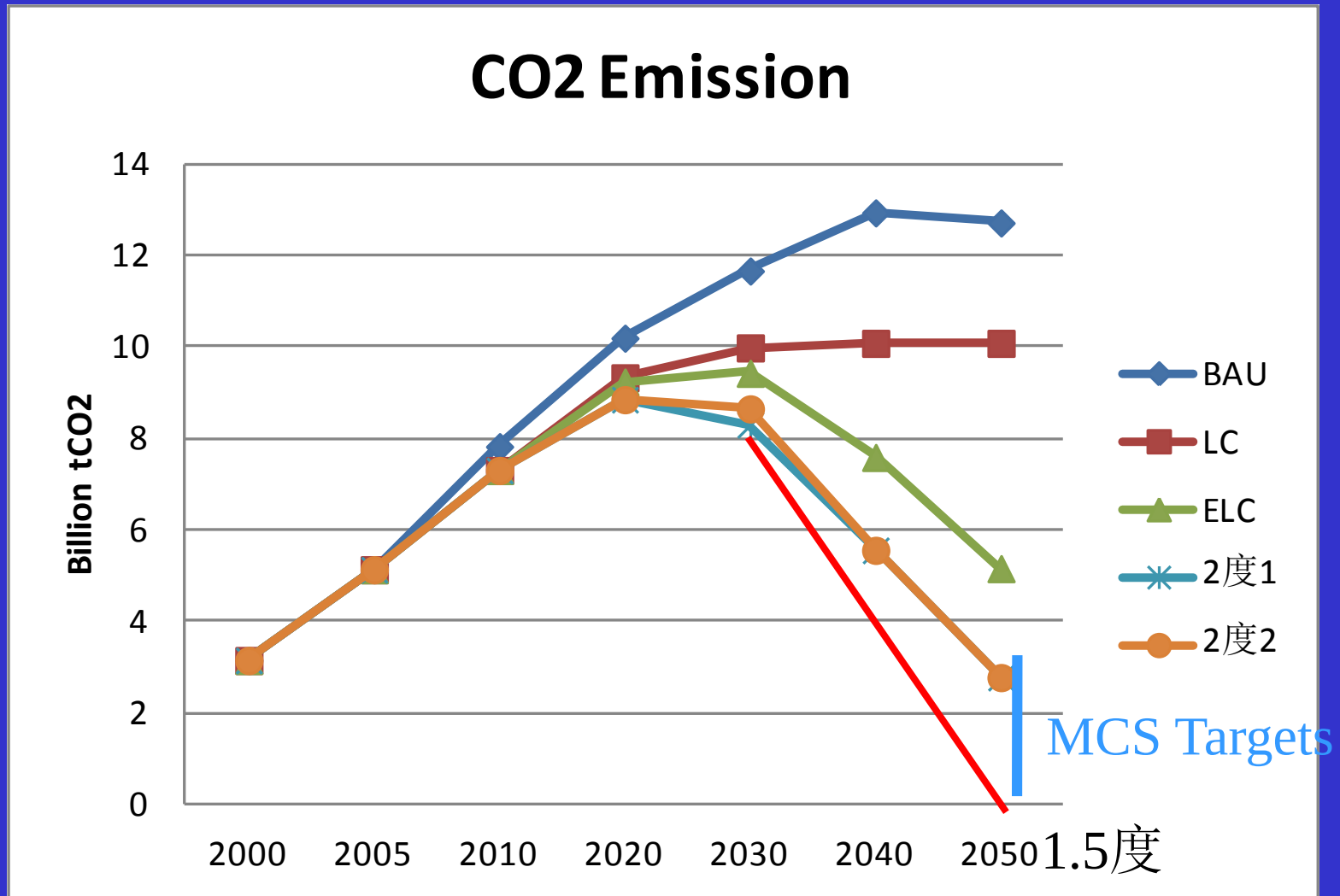
2015: 150GW

2016: 200GW

What Happened!!!

In 2017: 40GW newly installed in China, 50% of global total

China's MCS: a proposal



A 2 degree Asia: A good way to understand the global target

Scenario Analysis:

Japan
Korea
China
India
Thailand
Malaysia
Indonesia
Nepal
Vietnam
Cambodia
Laos
Philippine
Pakistan
Bangladesh





Kathmandu

100% electric bike, bus, taxi
by 2025



China's City

Shared Bike: a surprising story

