

# Transformational Change for Rapid Decarbonization of Urban Development: China Experiences

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## China's Low Carbon City/Province Program

2011: phase I, 13 cities and provinces included

2013: phase II, 42 cities and provinces

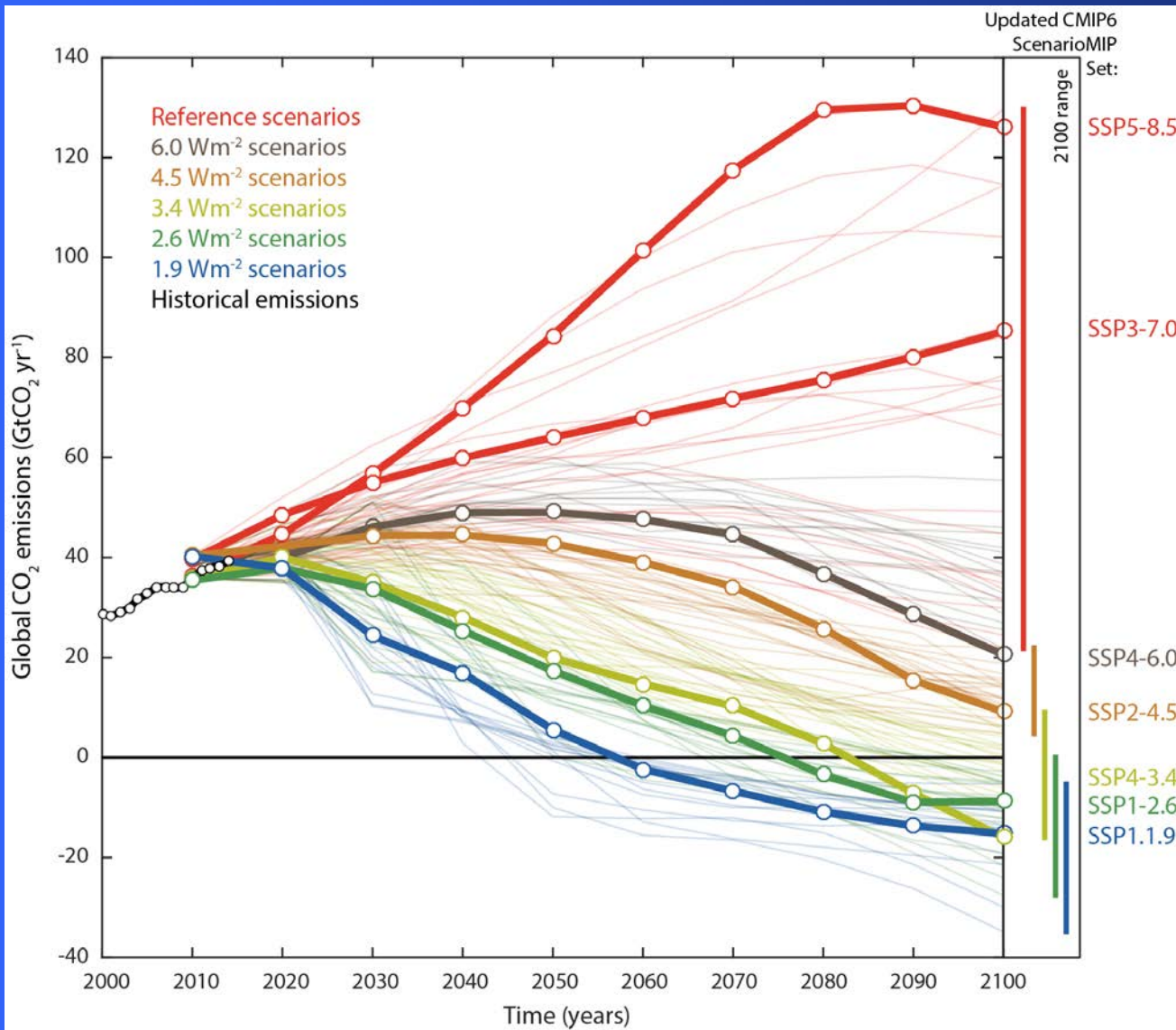
2016: phase III, 87 cities and provinces

Made low carbon planning, future emission planning

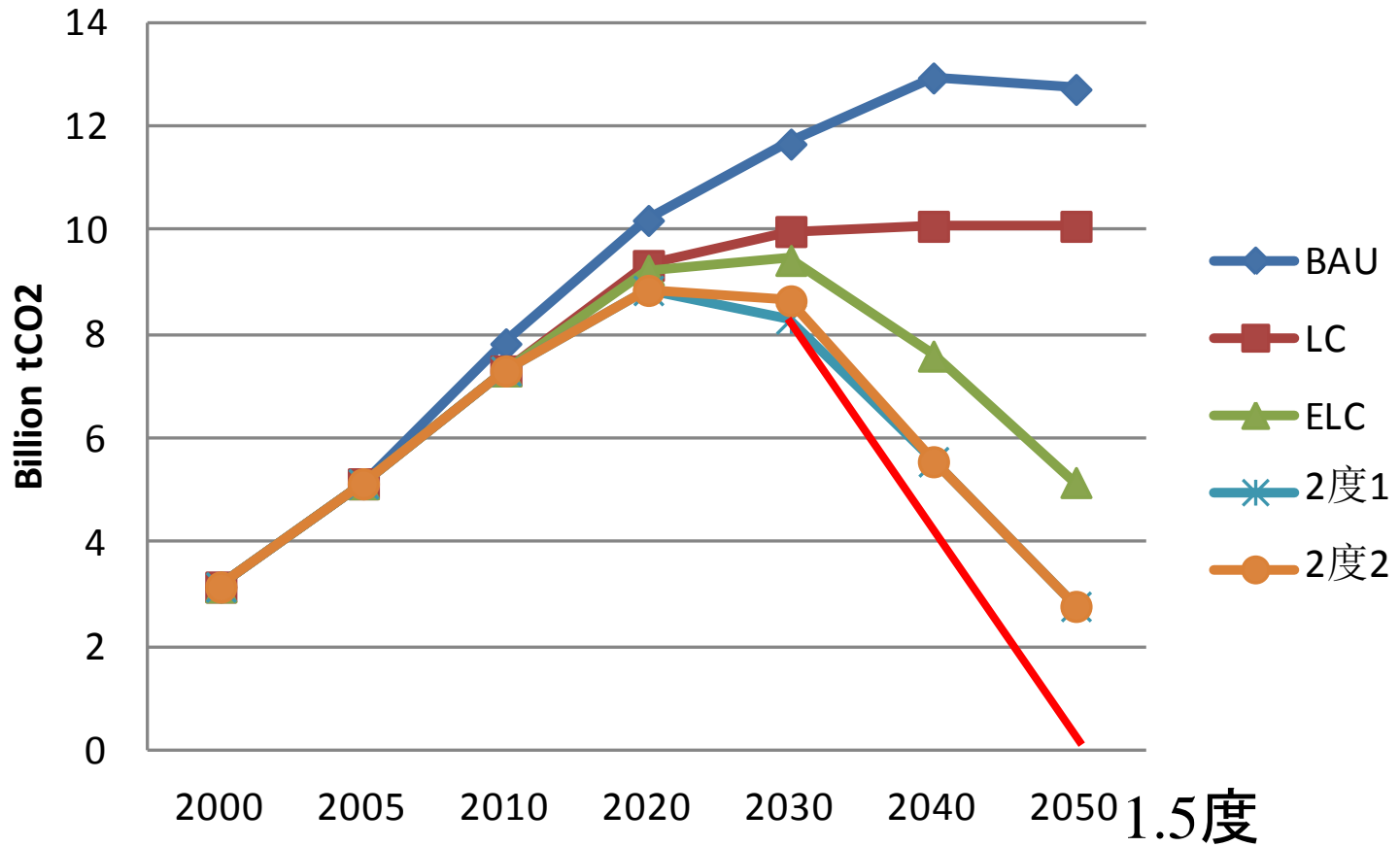
## China's Low Carbon City/Province Program

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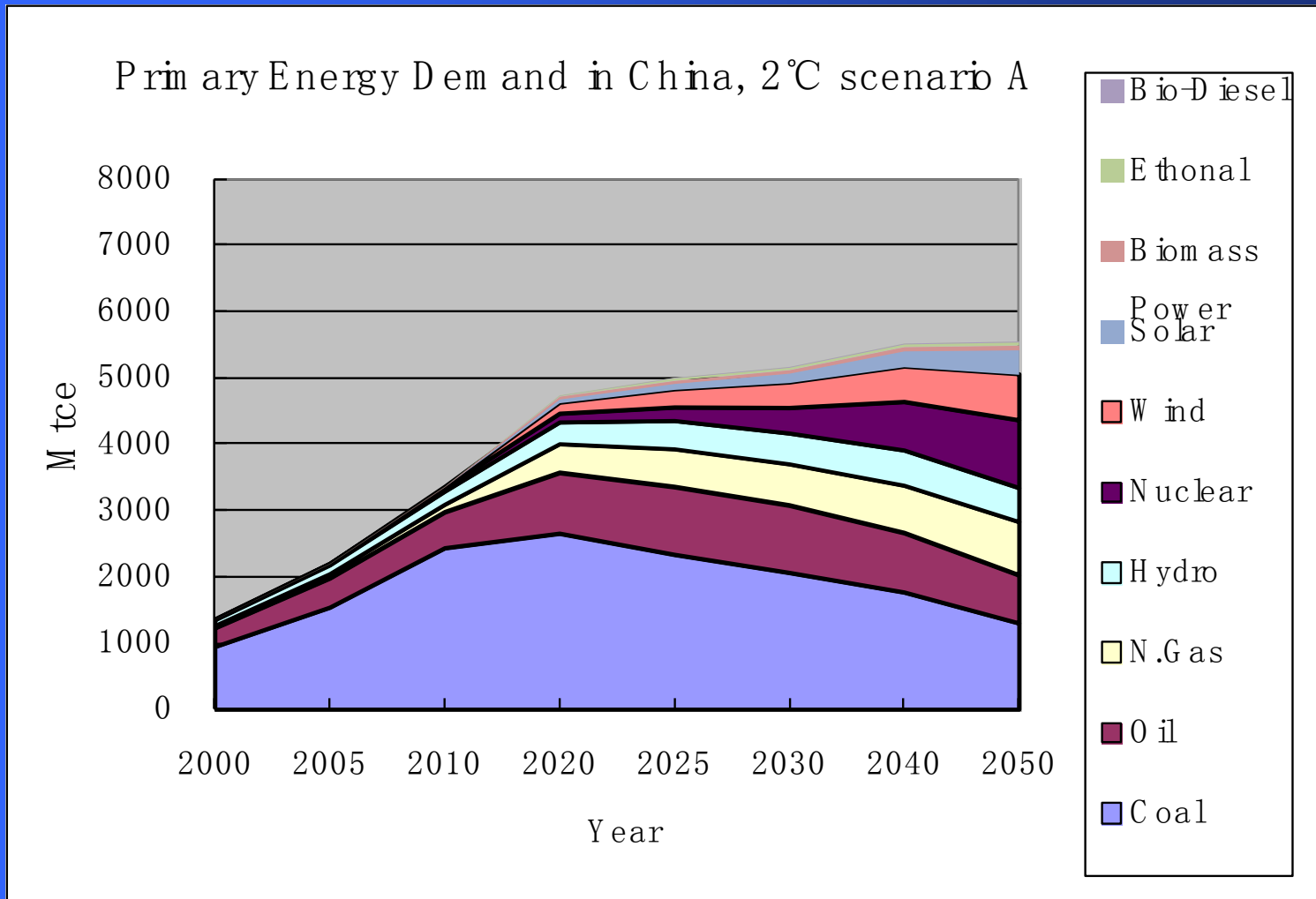
Nearly 100 cities have proposed their own Carbon Peaking Targets, among which 15 cities committed to peak around 2020. In early 2017, National Development and Reform Commission (NDRC) and Ministry of Housing and Urban-Rural Development (MOHURD) announced 28 cities as the National Adaptation Pilot, to explore the urban adaptive development model with enhanced climate resilience



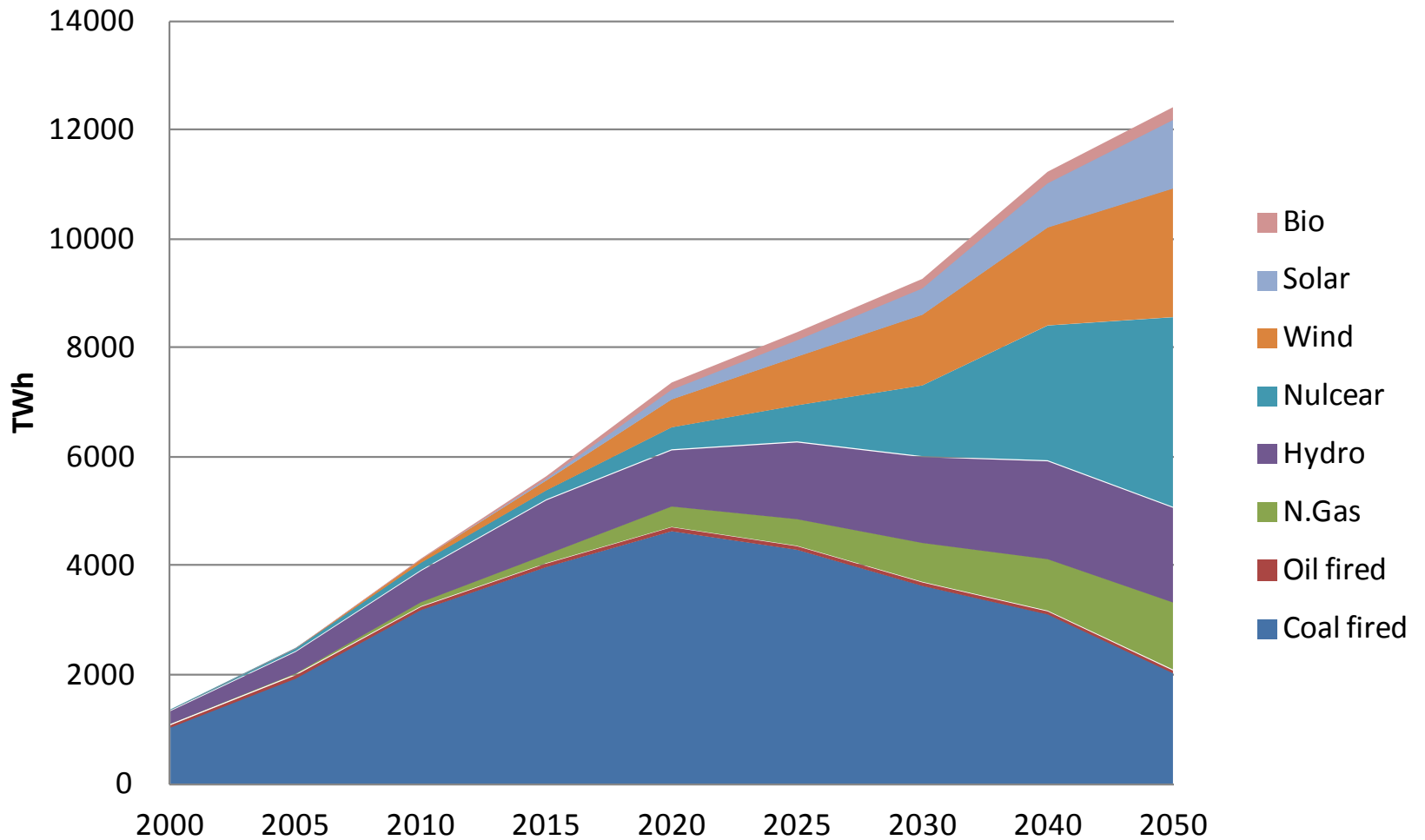
# CO2 Emission



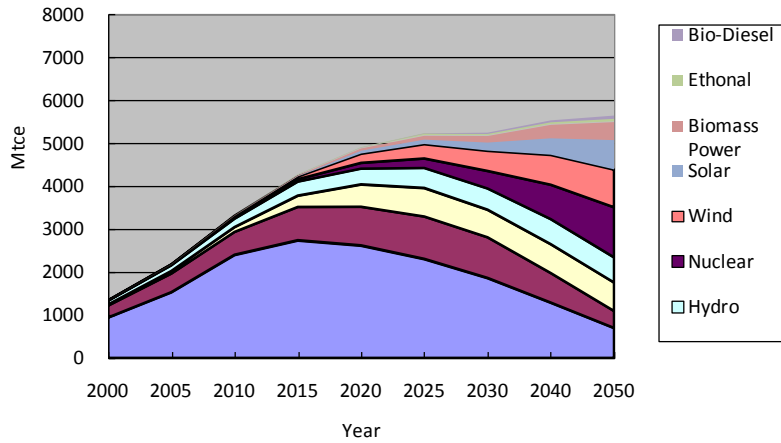
# We Need Rapid Transition : Put that into 13<sup>th</sup> Five Year Plan Primary Energy Demand



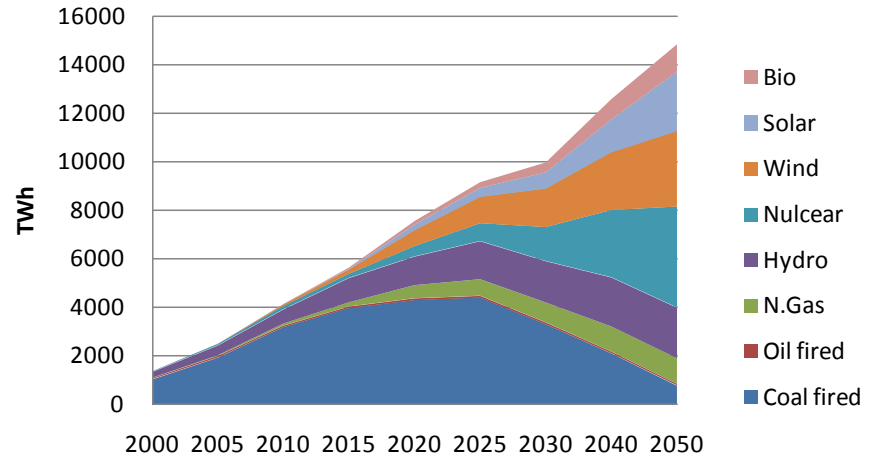
# Power Generation, 2°C Scenario A



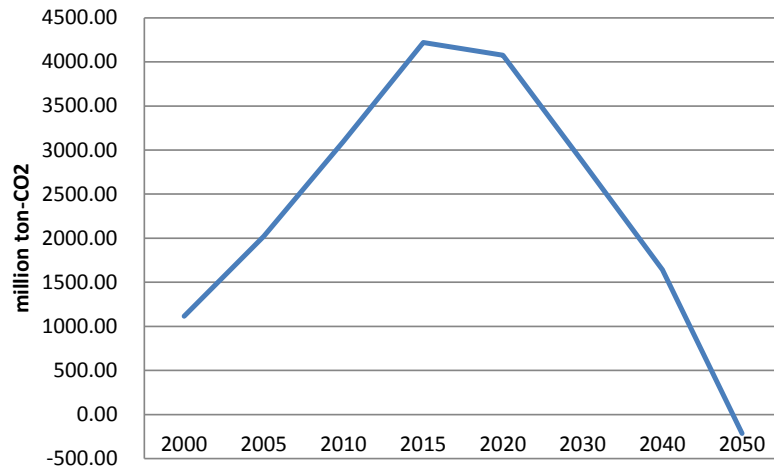
TPE, 1.5°C Scenario



Power Generation, 1.5°C Scenario



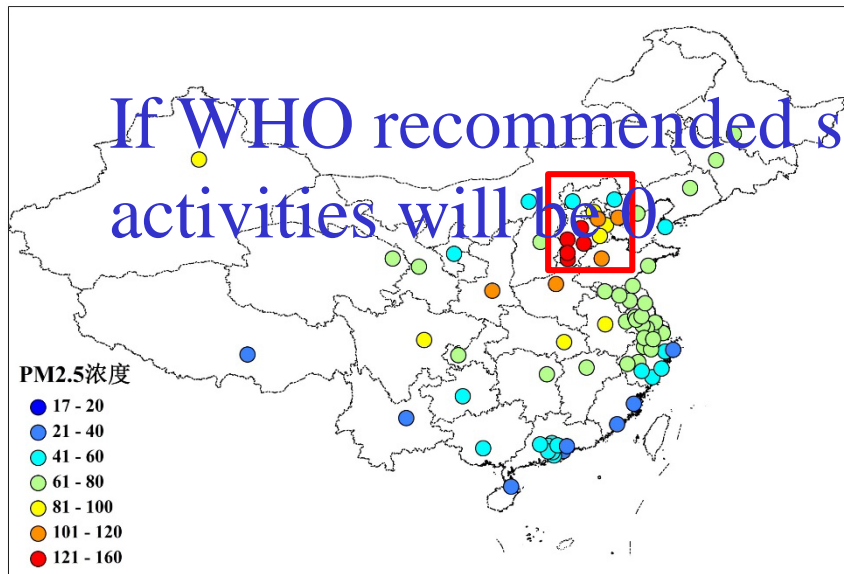
CO2 emission in power sector



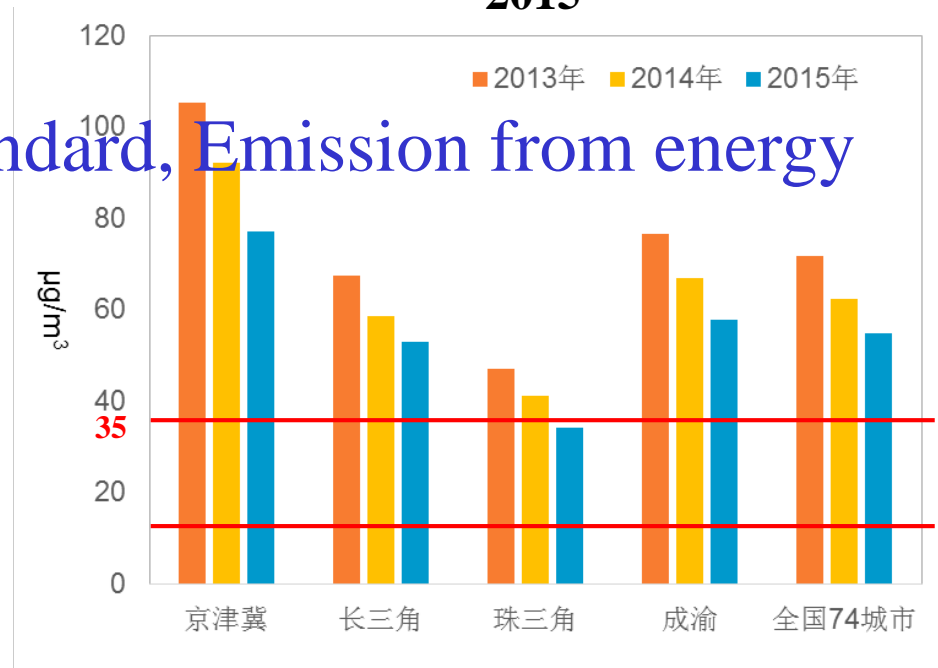


# PM<sub>2.5</sub> Concentration is much higher than standard

PM2.5 concentration of 74 cities in 2013



PM2.5 annual concentration from 2013-2015



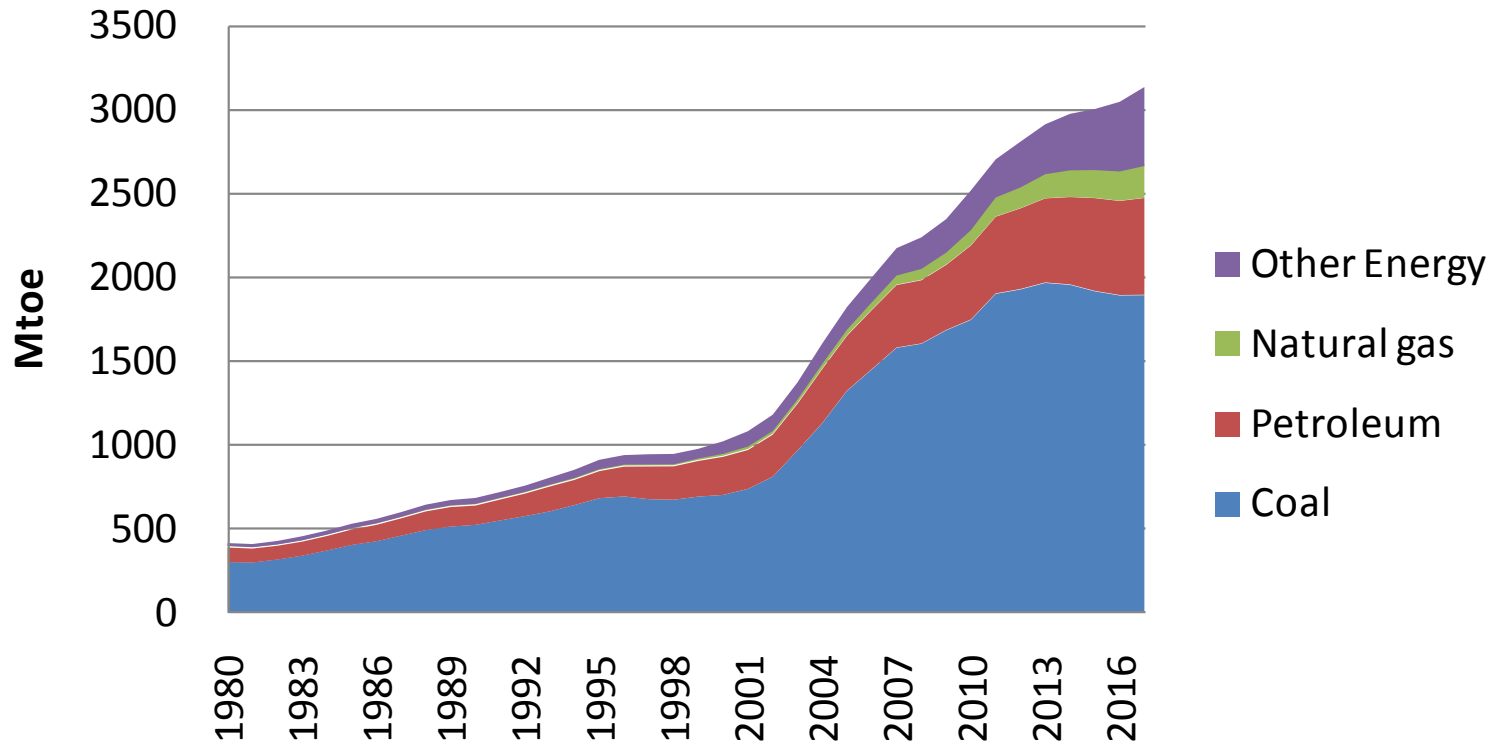
- 2013年京津冀地区所有城市PM<sub>2.5</sub>年均浓度均超标，区域内PM<sub>2.5</sub>年平均浓度达106µg/m<sup>3</sup>，虽2014、2015年空气质量有所改善，但仍大幅超过国家空气质量二级标准。



# SUSTAINABLE DEVELOPMENT GOALS



# Primary Energy In China

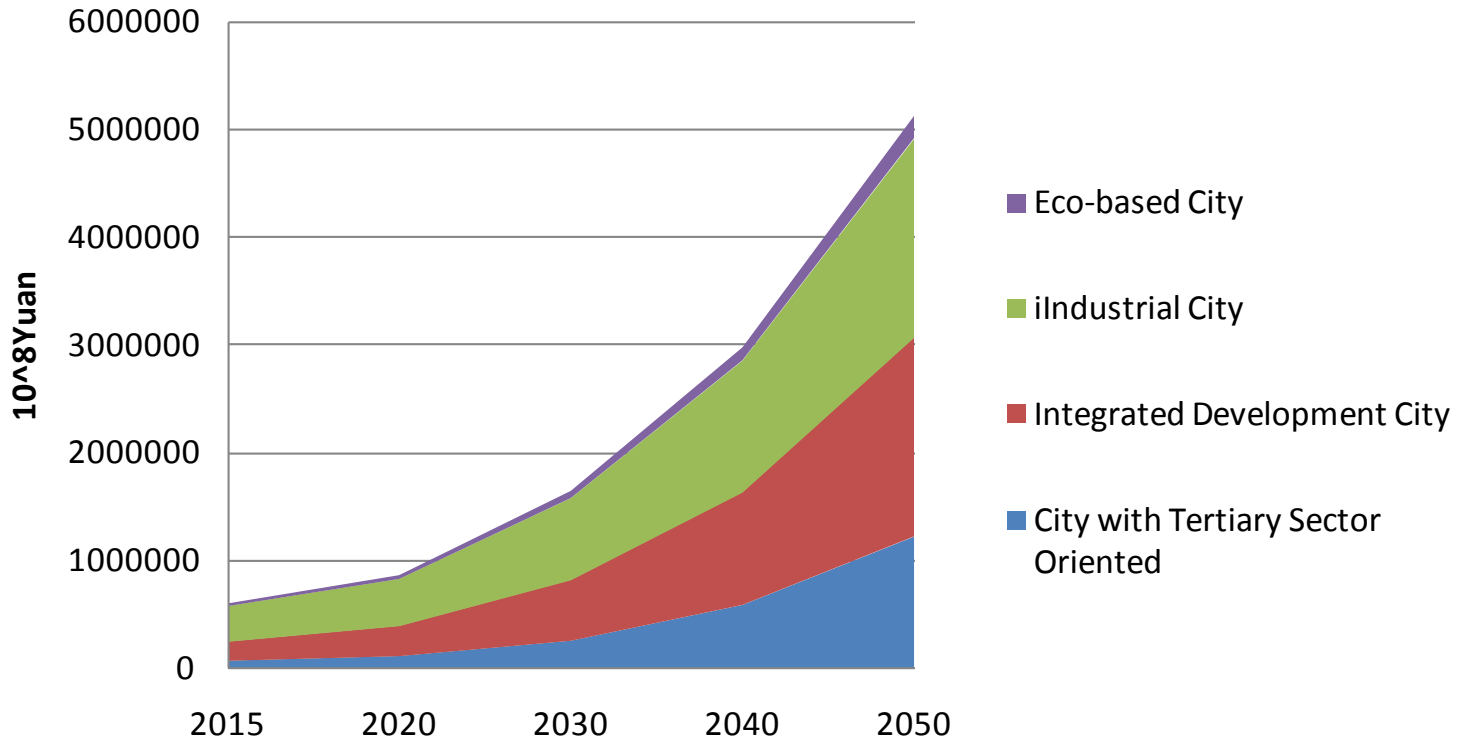


# Energy Policy Overview: National Strategy

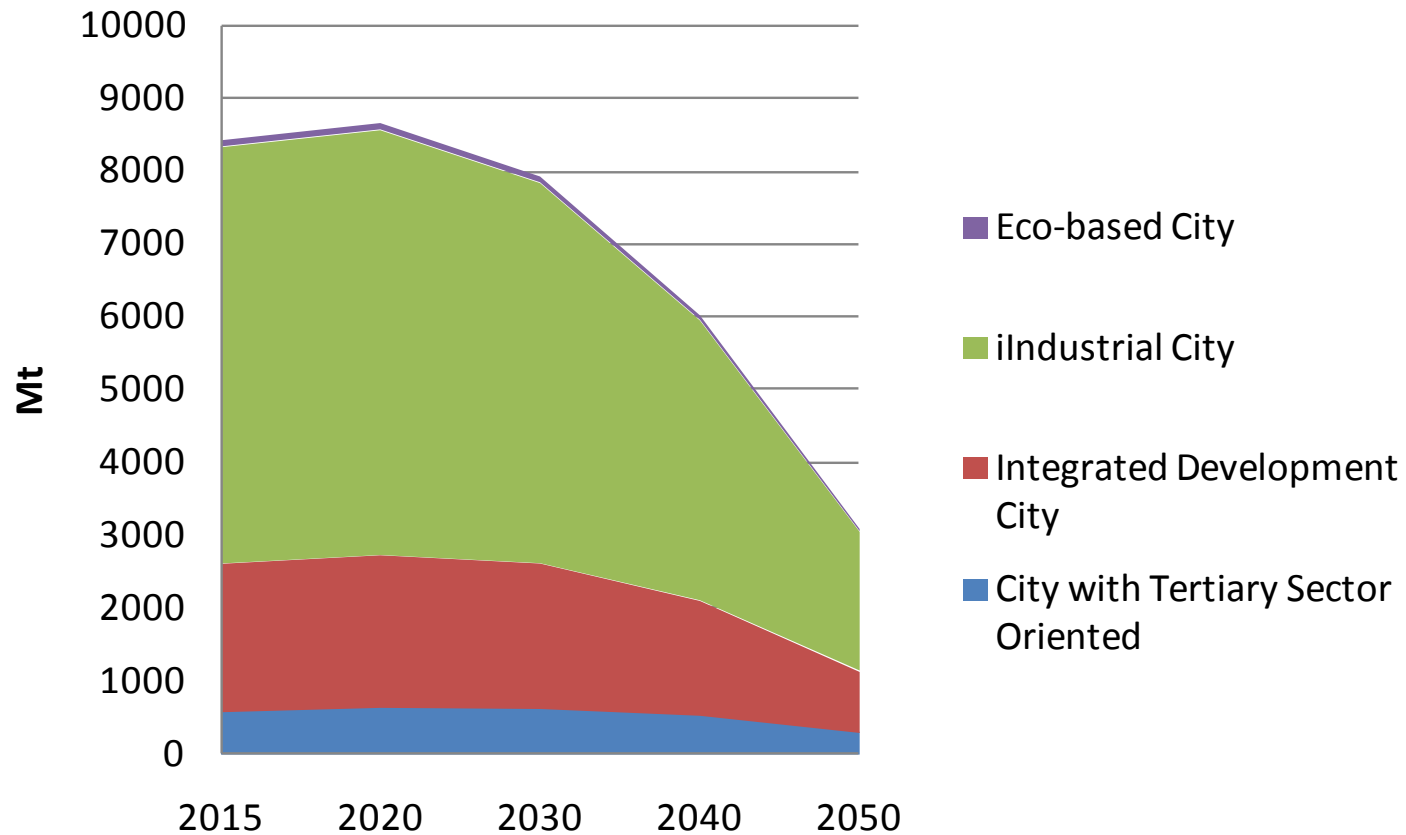
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- Energy Revolution
- Renewable energy development policy package
- Energy Reforming
- Clean Air Action Plan

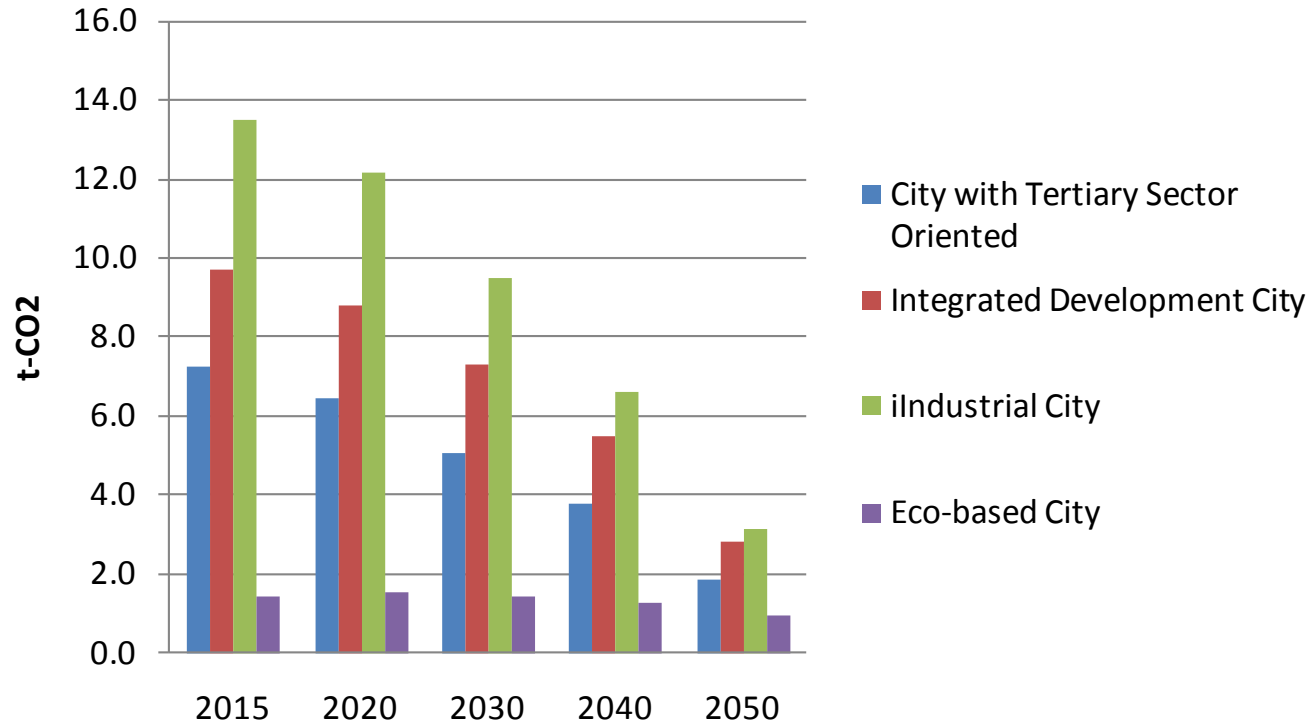
## GDP by Type of Cities



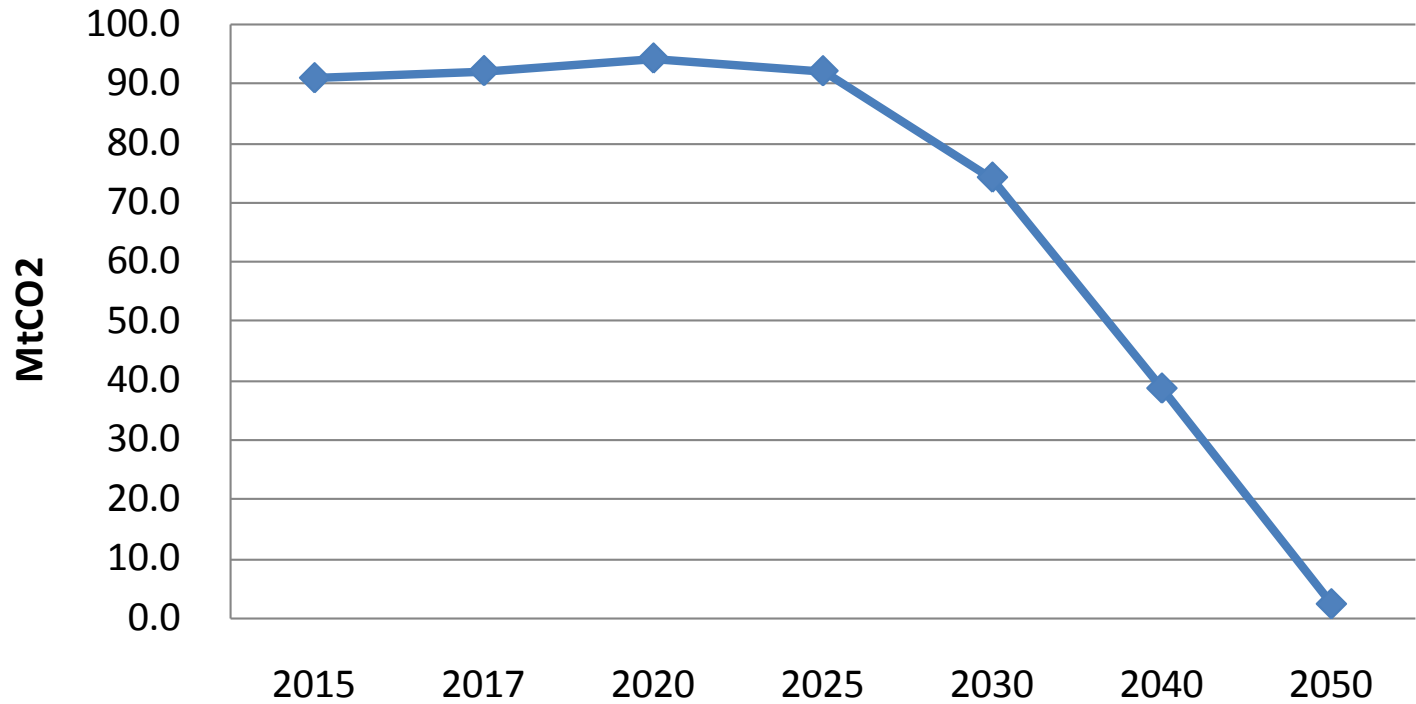
# CO2 Emission by Type of City



## CO2 Emission Per Capita

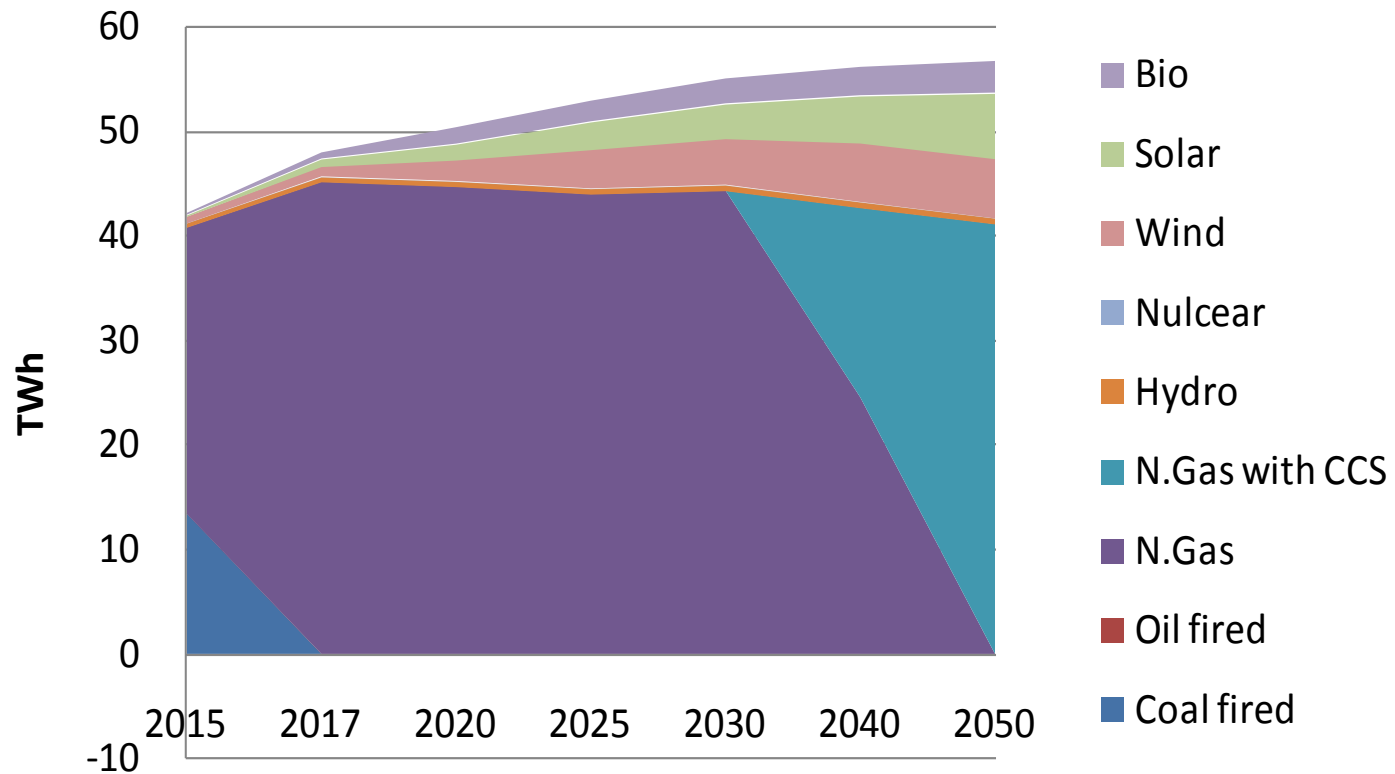


## CO2 Emission in Beijing

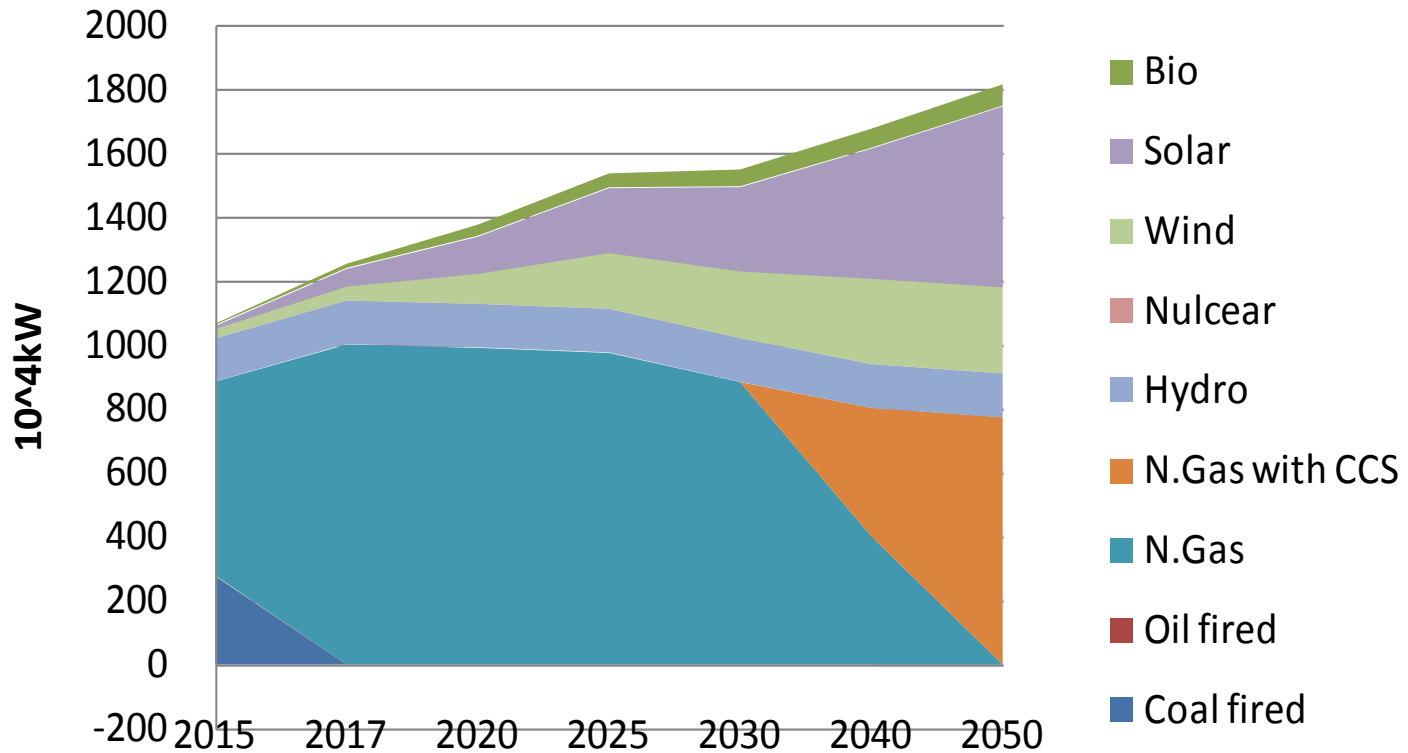




# Power generation in Beijing



# Installed Capacity in Beijing

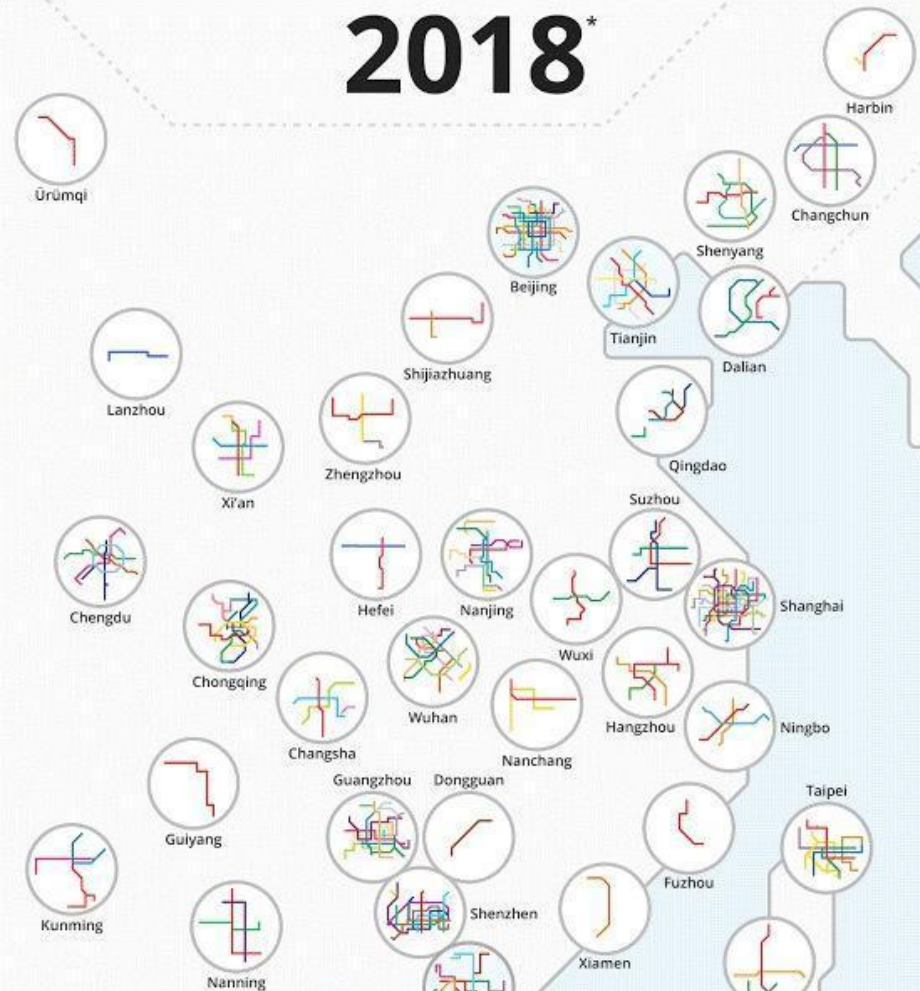


# Subway Development in China

2008

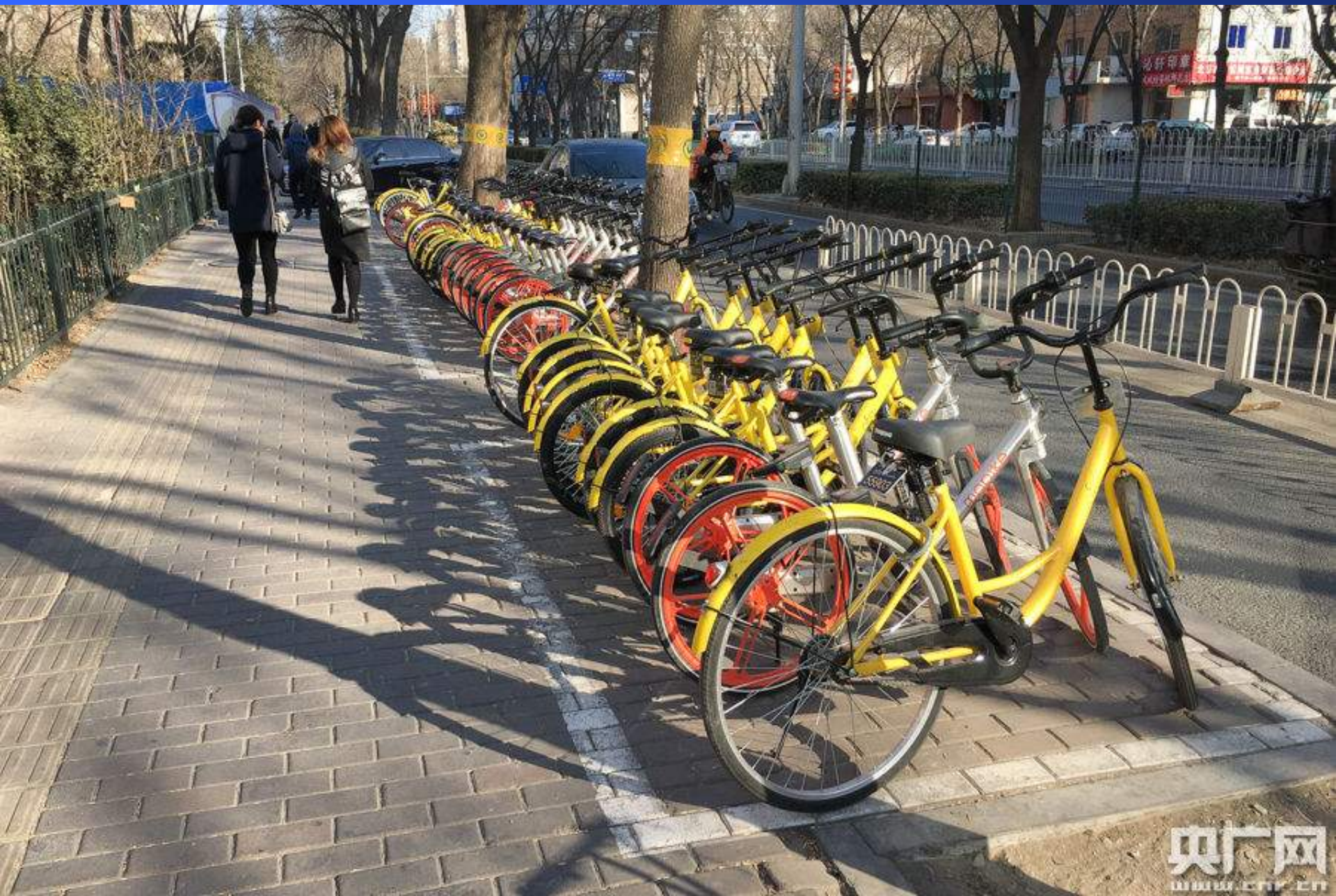


2018\*



# Stockholm: bicycle is coming back





By 2016, There are 260million electric bike in China



# 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
<b>电动汽车Evs</b>					
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
<b>先进汽油汽车ICE</b>					
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

# NOTE e-POWER

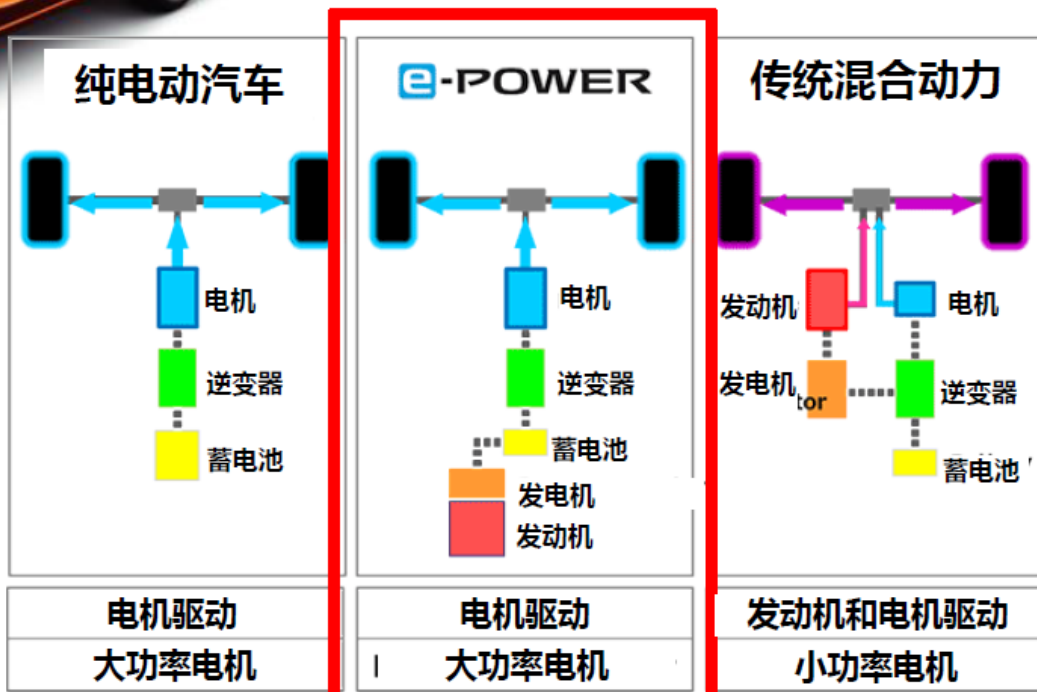


- 新型e-Power 总成
- 与EV具有较高亲和性

燃料消耗量

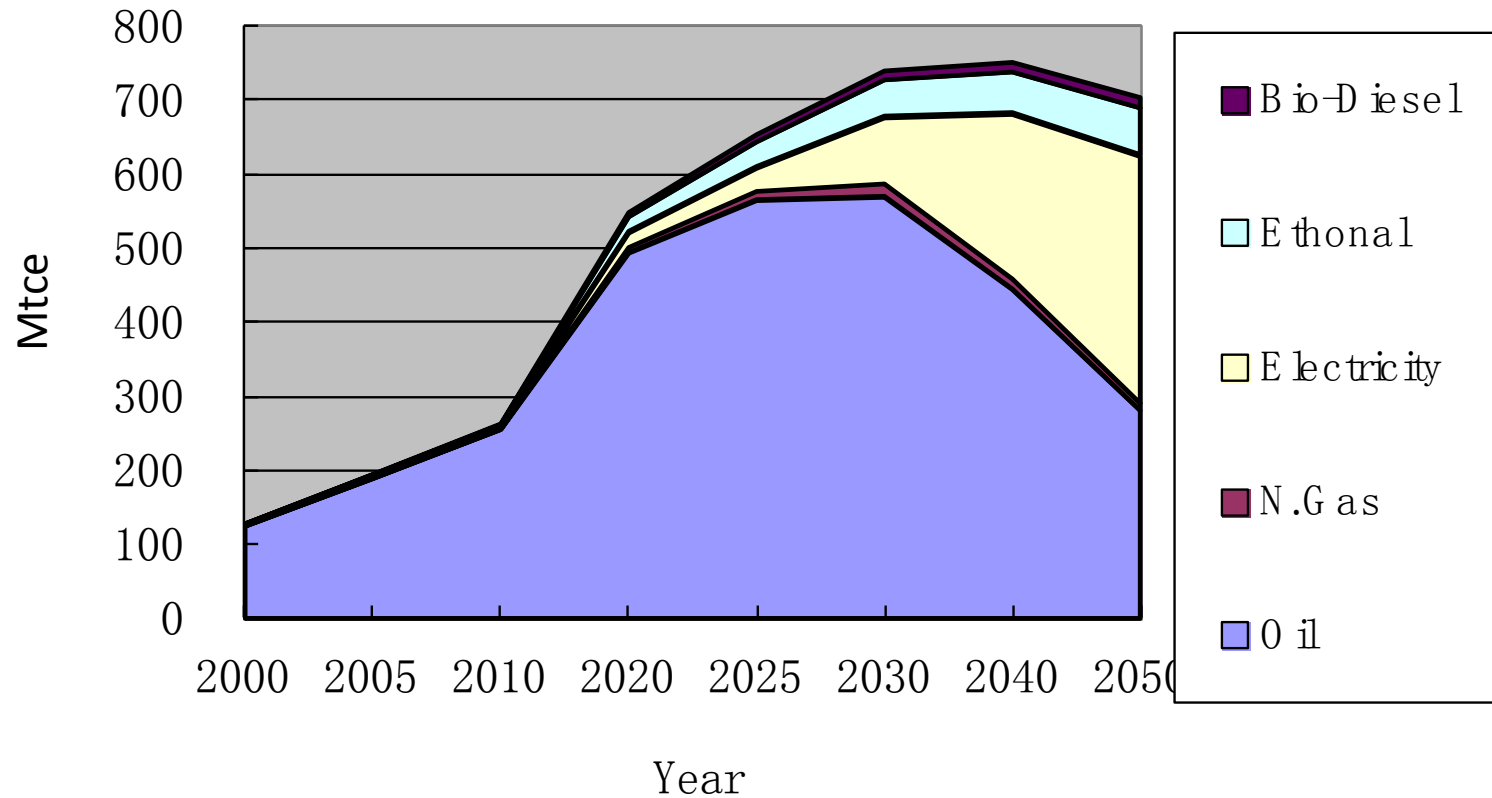
**37.2**

km/L (JC08)

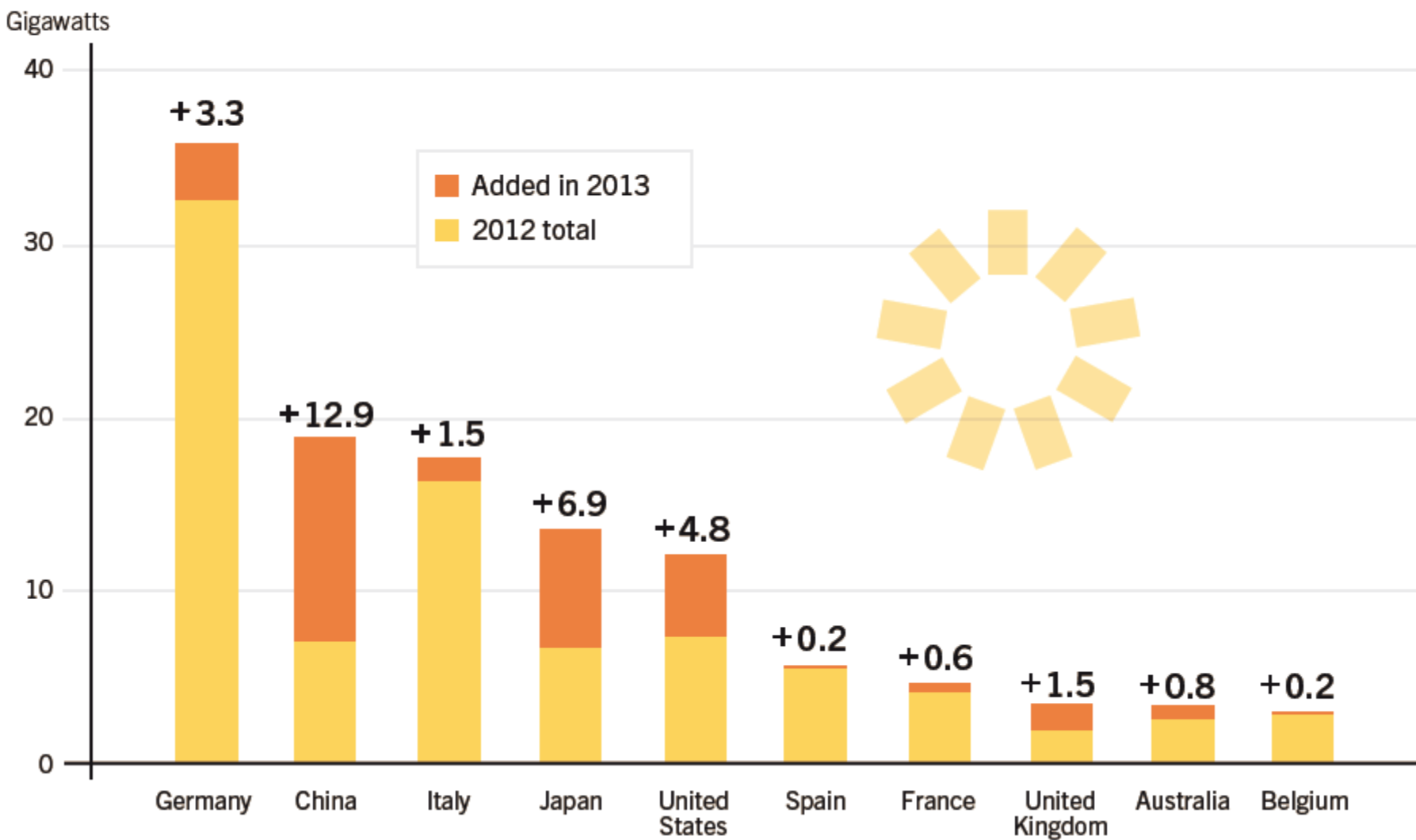




## Transport Energy Demand: 2 degree scenario



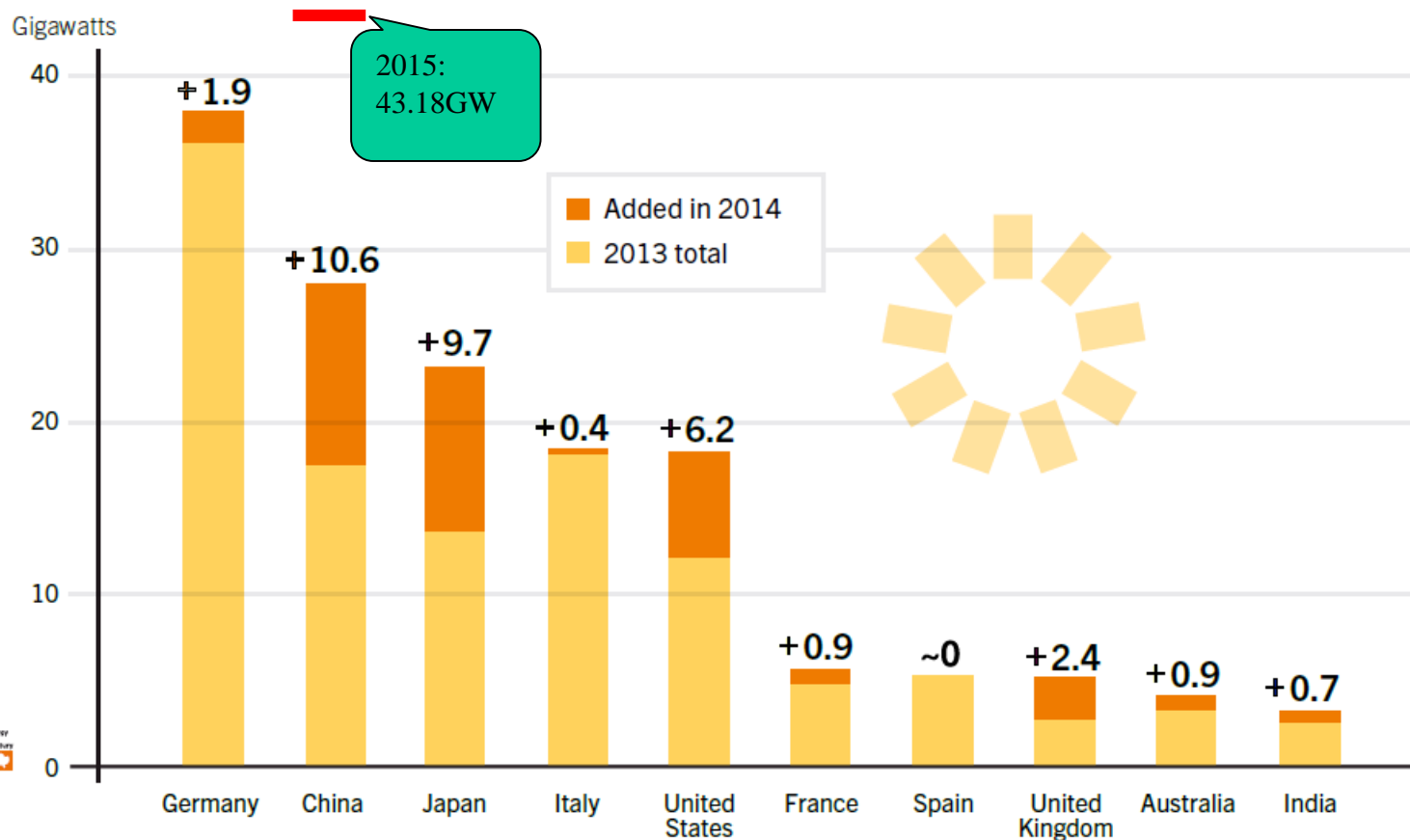
**Figure 13.** Solar PV Capacity and Additions, Top 10 Countries, 2013

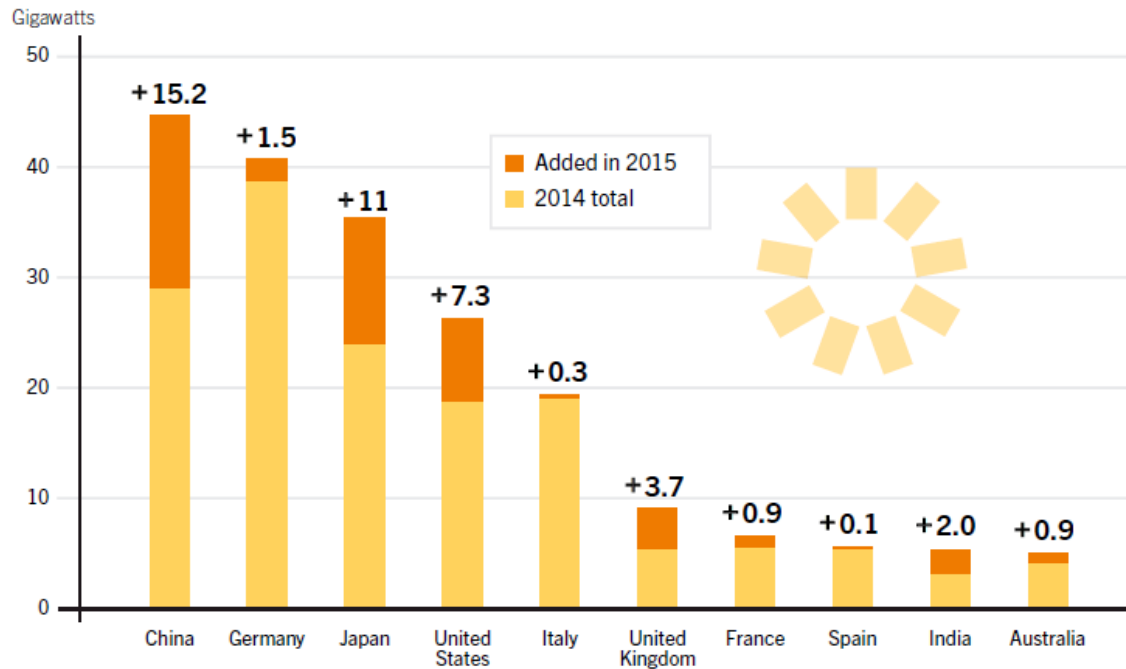




# 40 GW added in 2014

Solar PV Capacity and Additions, Top 10 Countries, 2014





**50 GW  
ADDED IN 2015**

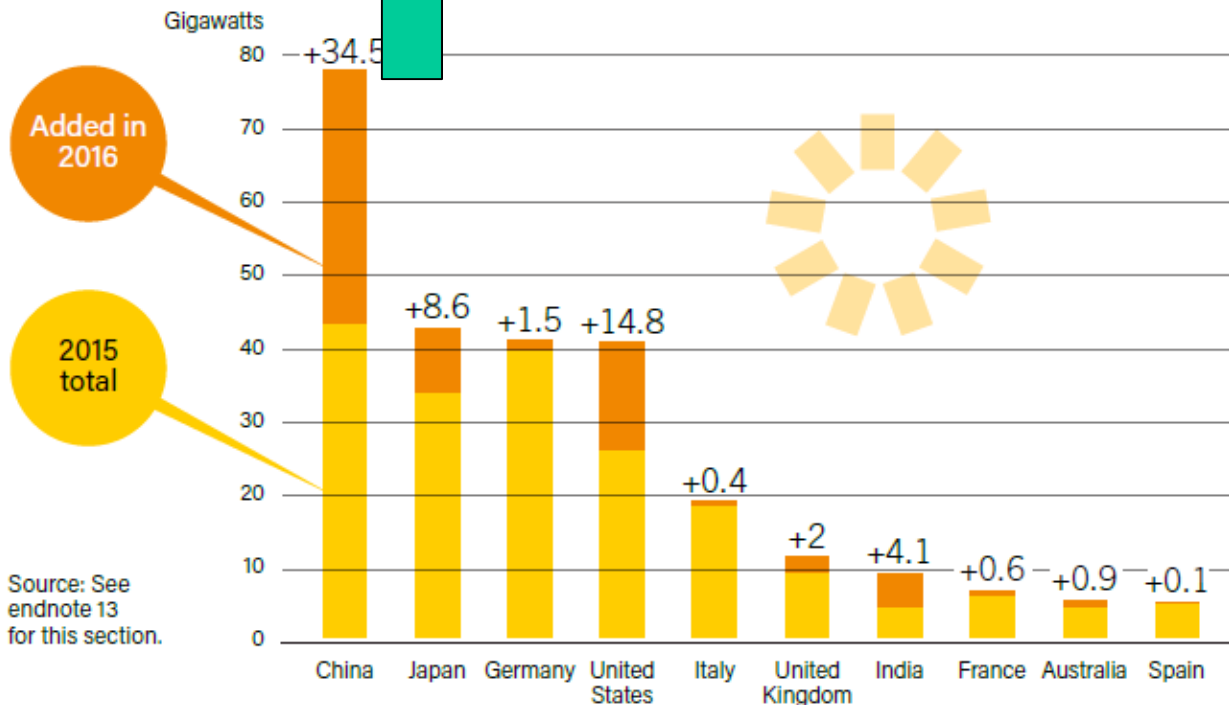
+14GW in second half 2018, expected

+24.3GW from Jan. to June 2018

+53GW in 2017

+24.5GW from Jan. to June 2017

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



Source: See endnote 13 for this section.

CHINA ACCOUNTED FOR **46%** OF NEW CAPACITY.



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

2013

2017



By Aug.21, 2018, Sanmen Nuclear Unit #1, the first AP1000 in the world, made full power generation

By 2030, cost of nuclear power will be lower than coal fired power in China



# 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

