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# Future of CCUS in China

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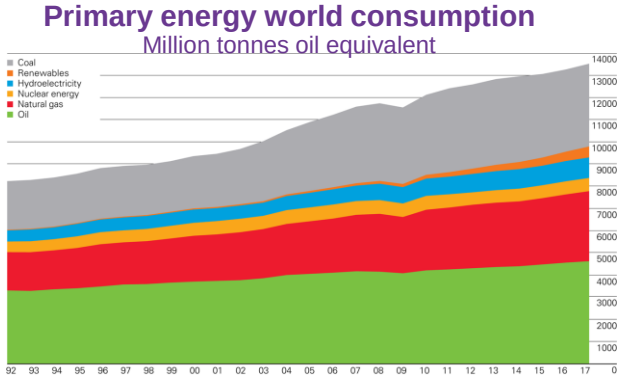
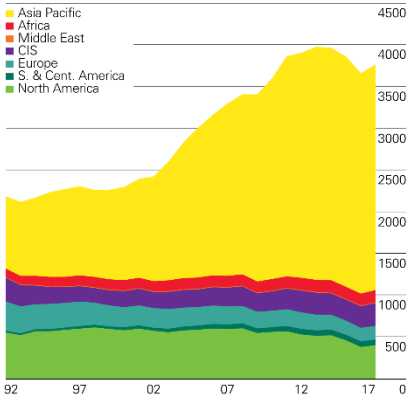
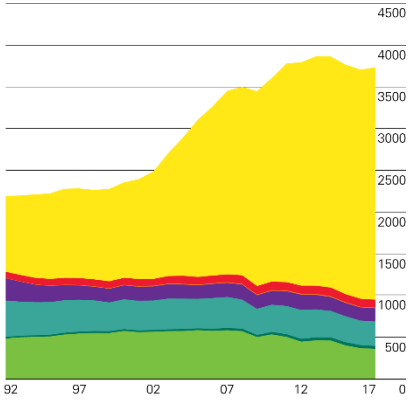
# I. Basic status and trends of energy and emissions

# 1. World energy consumption is still increasing.

- Primary energy consumption growth averaged 2.2% in 2017, up from 1.2% last year and the fastest since 2013.
- Carbon emissions from energy consumption increased by 1.6%, after little or no growth for the three years from 2014 to 2016.

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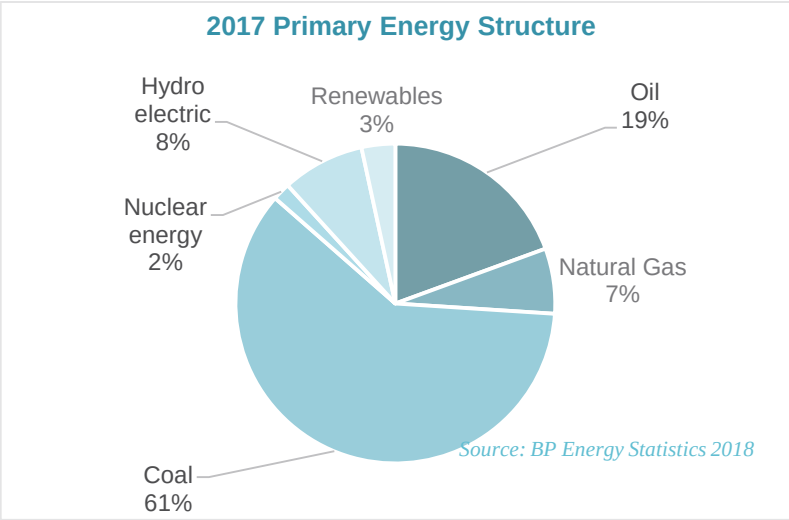
# 2. China Energy structure

- **Primary energy**
  - 2015, non-fossil energy 12%, coal 64.5%
  - 2017, non-fossil energy 13%, coal 61%

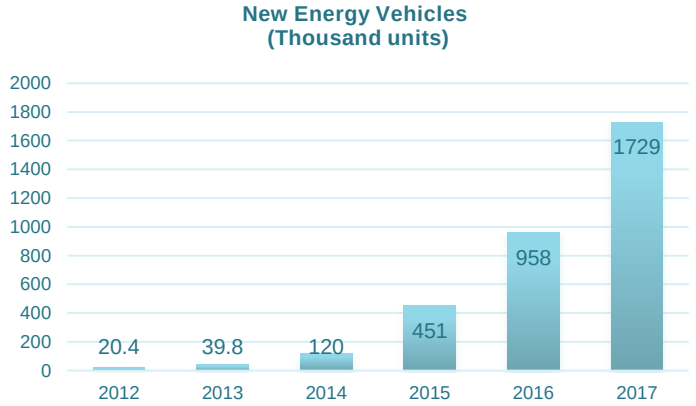
- **End use**
  - Industry sectors and power are major users and emission sources
  - Transportation & building
    - accounts for 2/3 emissions in developed countries,
    - will increase in China in the future.



# 3. China Energy – Electric Vehicle

- EV grows very fast now in China

- EV will be important part of future energy system, from both supply and consumption side.




EV＋RE＋Energy Storage

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# 4. Emission Management

- **CO2 Emission Peak**
  - Around 2030, try best to reach earlier.
  - Coal capping as earlier as possible
  - Non-fossil energy could fill the new demand after 2020
  - Enhance the share of electricity, natural gas in energy end use
- **Carbon Market**
  - Launched in Dec. 2017, Power industry included.
  - 6-7MW Power station will be included in,
  - 1700+ Power stations with 3 billion tons CO2 emission be covered.
  - Efficiency enhancement and/or structure change of power source
  - a potential tool for CCUS take off.

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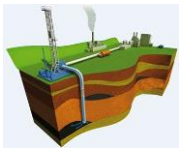
# The Future of CCUS, depends on:

- *How we define CCUS and its role?*
- *How could CCUS be integrated into the future energy system?*

# 1. CCUS vs Renewables

- Competing with renewables?
- Transitional option to a future RE world?

EV＋RE＋Energy Storage



EV＋Coal Power＋CCS

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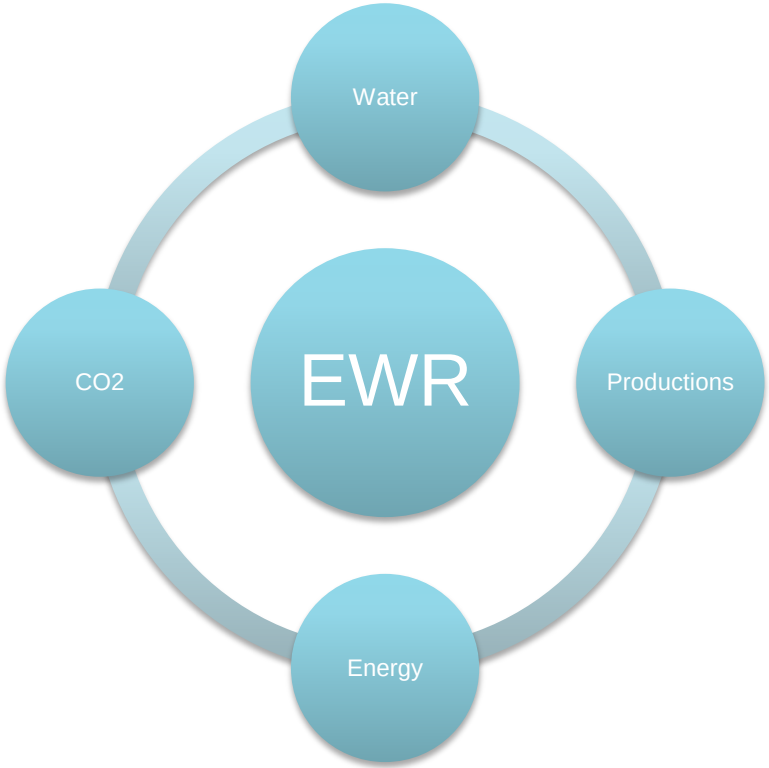
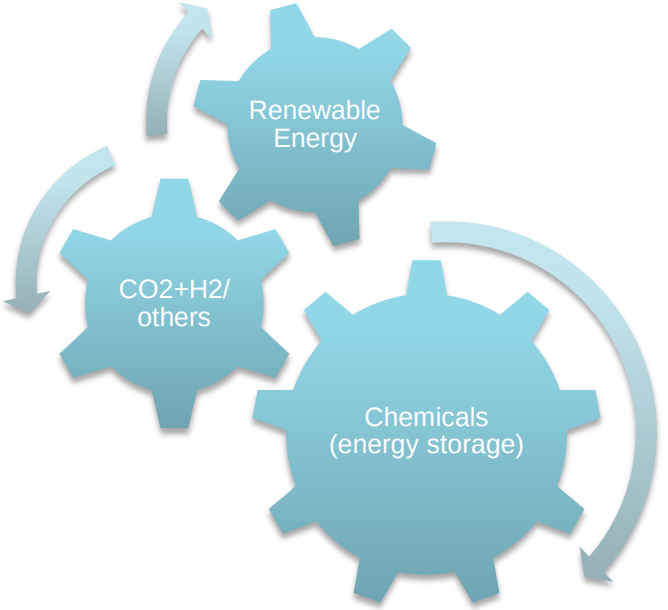
# 2. CO2 mitigation and MORE

- Beyond CO2 mitigation, there are many other goals
- Utilization
- Solve regional challenges
  - 80% coal reserves identified located in the West, while lack of water

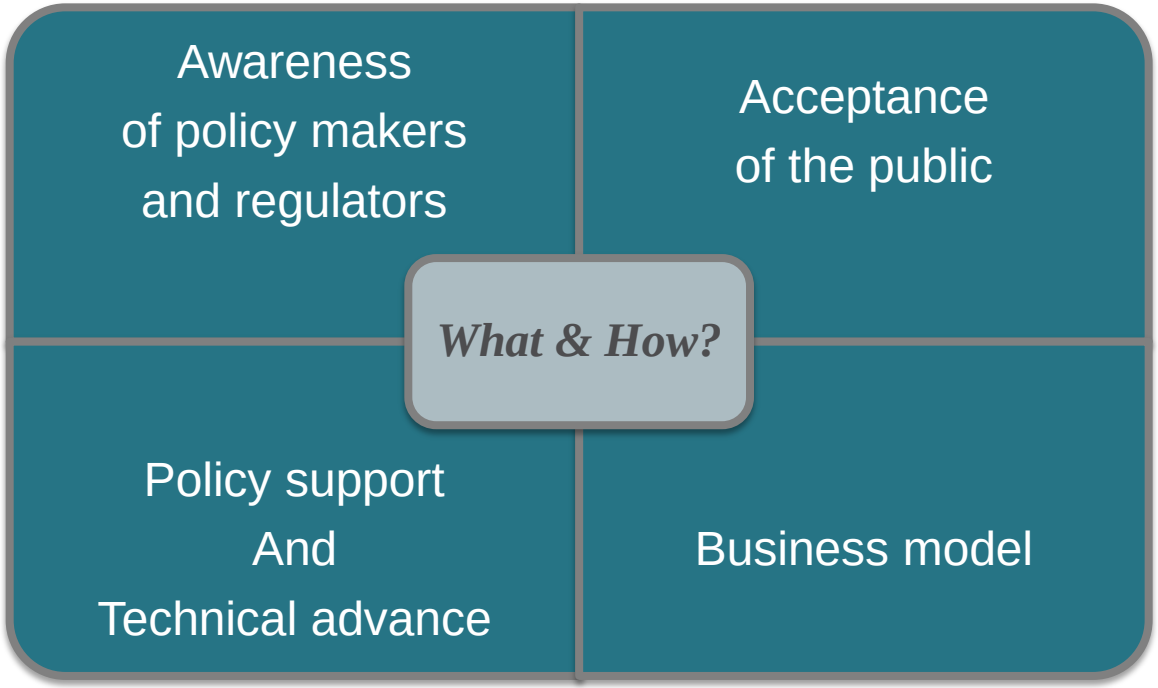


# 3. Integration to the future energy system

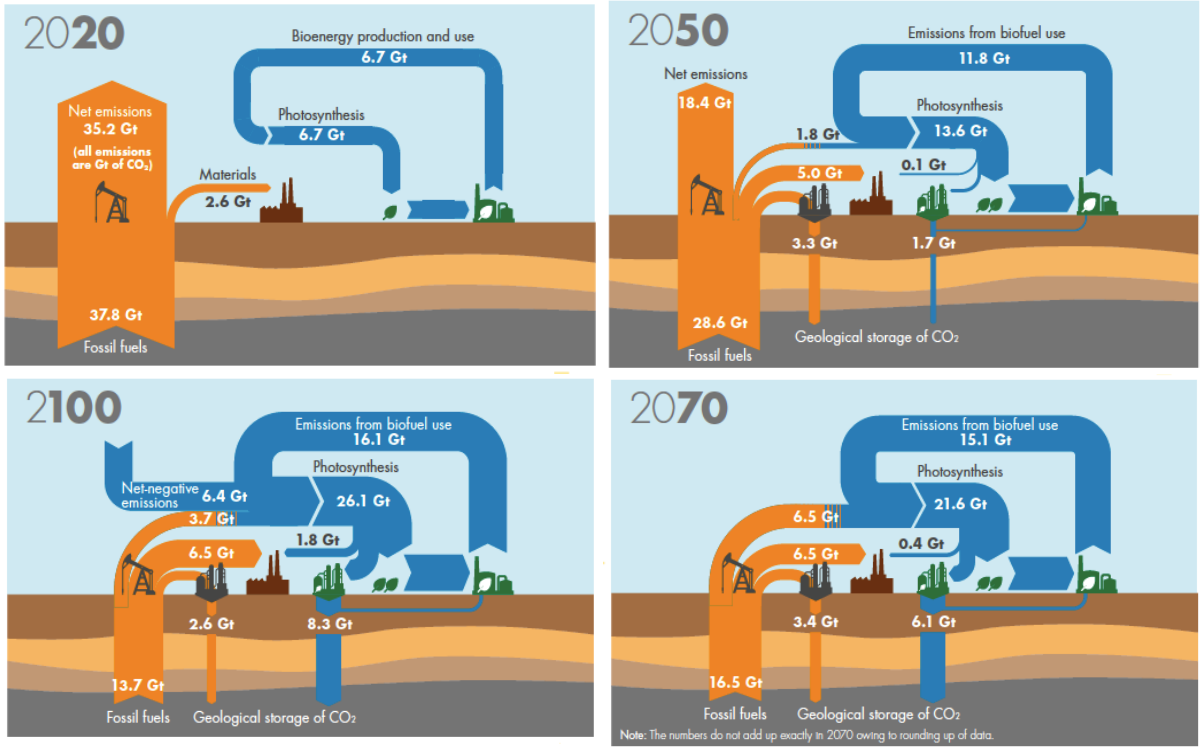
- further increase the techno-economic performance of CCUS
- integrate CCUS into the future energy system, not only acts in end-pipe field.
  - Manufacturing synthetic hydrocarbon fuels, displace the need for fossil hydrocarbons.
  - Manufacture of certain goods – e.g. building materials or plastics.



# 4. Non-technical environment



- U
- U+S
  - FeCCS
  - BeCCS




Source: Shell, meeting the goals of Paris Agreement

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# Conclusions

- CCUS is important, however future CCUS is what we want CCUS to be.
- Infusing innovative CCUS to future energy system.
- Capacity building is always crucial, especially in find an echo in the role of CCUS.
  - relations with Renewables,
  - safety issues, and
  - CO2 mitigation + other sustainable effects
- Storage and utilization are fundamental, which give outlet of CO2. Innovative and systematic approaches are key to the future deployment.
- Past pratices, infrastructure and collaborations need to be INTEGRATED
- Enhanced CAGS+ is highly recommended.

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# Thank You for Your Attention!

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