



Near-zero Carbon Zones in China: Policy background and case study

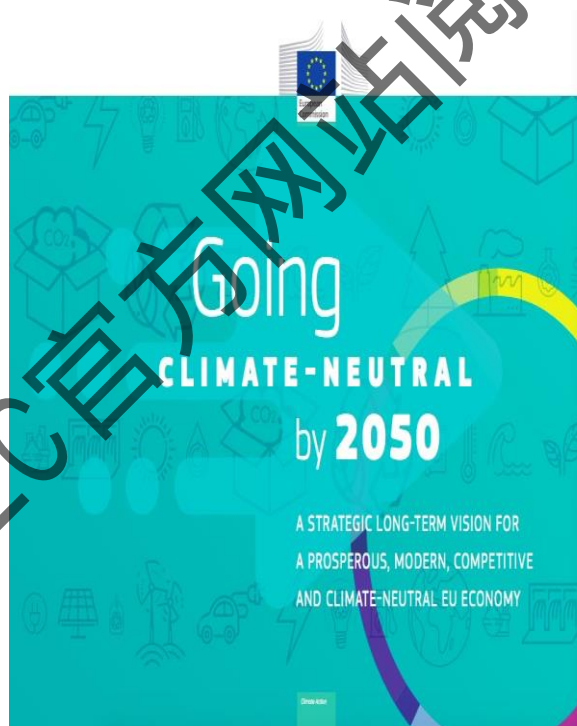


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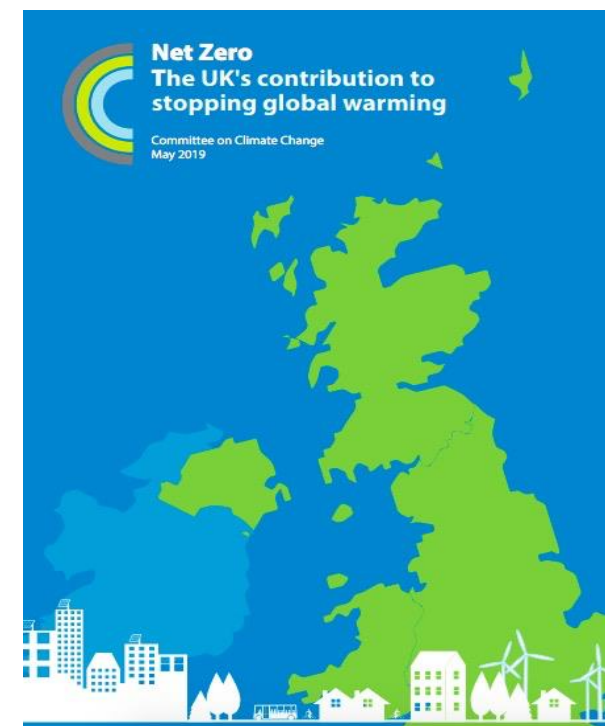
Net-zero carbon has become international recognized long-term development goals.

Following the 2015 Paris Agreement, "Achieving net-zero carbon emissions by 2050" has become a long-term goal for many countries, multilateral development banks, industry giants, and industry organizations. Among them, the EU is the first economy to propose a net-zero carbon emission target by 2050. UK, France, and Sweden have legally committed to net-zero carbon targets.

In recent years, the number of net-zero carbon development projects has been increasing continuously, such as Hazelwood Green Net-zero Energy Urban Development Project in Pittsburgh, United States, and SMA-ECO Harumidai Net-zero Energy Community in Sembei New Town, Sakai City, Osaka, Japan. Bo01 New District, Malmö, Sweden.



https://ec.europa.eu/clima/sites/clima/files/long_term_strategy_brochure_en.pdf



<https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf>

Near-zero carbon zone is first put forward in China's 13th five-year plan, as a pilot program of national low-carbon policy framework.

“Support optimized development zones to be the first to achieve carbon emission peaking. Over come barriers and implement Near-zero Carbon Zone pilot projects.”

The 13th Five-Year Plan for National Economic and Social Development

“Select development-restricted zones and development-prohibited zones, ecological function zones, industrial and mining areas, and cities, which are in favorable conditions, to carry out Near-zero Carbon Zone pilot projects, to select up 50 pilot projects by 2020.”

Work Program on the 13th Five-Year Plan of Greenhouse Gas Emission Control

Low-carbon Policy Framework: Urban Development Pilot sets

50 Near-zero Carbon Zone pilot projects by 2020

100 National Low-carbon Pilot Cities

80 National low-carbon Industrial Park Pilots

20 National Low-carbon Industry Demonstration Parks

1000 Low-carbon Community Pilots

100 National Low-carbon Demonstration Communities

Near-zero carbon zones supports the construction of ecological civilization and low-carbon development in China.

Near-zero Carbon Zones



Eco-civilization's values are oriented towards the following:

- 1) adhering to the basic principle of giving priority to resource conservation and environmental protection and relying primarily on the natural recovery of ecosystems;
- 2) adhering to the basic pathway of green, circular, and low-carbon development;
- 3) adhering to the approach of “making break-throughs in key areas while advancing at an overall level” with reform and innovation as the basic driving forces supported by the nurturing of an ecological culture.

--The Opinions on Accelerating the Construction of Ecological Civilization, 2015

The near-zero carbon development model emphasizes cost effectiveness. Instead of taking carbon emissions reductions as the only indicator, the near-zero carbon development model takes full consideration of costs and benefits. An ideal near-zero carbon goal should be able to reduce carbon emissions economically to close to zero. Referencing the new approaches and best practices of net-zero carbon development, which have helped push the boundaries of our knowledge and understanding of carbon reduction, near-zero carbon development can become more achievable and is ready to be scaled.

With the guide of national policy, local governments has taken active actions to develop Near-zero Carbon Zone projects

Province/City	Actions
Guangdong	In January 2017, Guangdong Provincial Development and Reform Commission released <i>near zero carbon zone project implementation plan and the guide for construction of near zero carbon zone demonstration projects (Trial)</i> . Four pilots is in progress.
Zhejiang	Zhejiang Province selected some regions to carry out near-zero carbon demonstration city/ community/ industry park/ transportation.
Beijing	Beijing Sub-center will achieve more than 40% of new energy and renewable energy utilization rate and build near-zero carbon zone.
Hainan	In June 2017, Haikou decided to set up Jiangdong new district in the east coast area, focusing on building a net-zero carbon city.
Yunnan	In March 2017, Yunnan Province issued the <i>13th five-year work plan for greenhouse gas emission control in Yunnan Province</i> . In the work plan, it proposed to select the restricted and prohibited development areas, ecological function areas, industrial and mining areas, and towns with mature conditions to carry out demonstration projects of near-zero carbon zones, aiming at three demonstration projects by 2020.
Shaanxi	In December 2016, the development and Reform Commission of Shaanxi Province issued <i>the notice on organizing pilot projects of near-zero carbon zones</i> , which proposed that during the 13th Five Year Plan mining area, agricultural park and civil buildings are key areas.
Shenzhen	By the end of 2018, Shenzhen completed <i>the construction guidelines for demonstration projects in near zero carbon zones in Shenzhen</i> , making clear the core concept, technical system and policy framework of the near-zero carbon zones.
Ningbo	Ningbo City has included "creating Meishan near zero carbon zone" in the main tasks list for high-quality development of Ningbo and has formulated and issued <i>the implementation plan for the establishment of Ningbo Meishan international near-zero carbon zone and the overall plan of Ningbo Meishan near-zero carbon zone</i> .

Based on research and practice, several institutes have brought forward the definition of Near-zero Carbon Zones

A near-zero carbon zone (NZC) project refers to a demonstration zone that rapidly reduces carbon emissions and gradually approaches zero through the integrated application of technology measures and innovative practices of management mechanisms in industries, energy, transportation, buildings, consumption, ecology and other fields.

—National Center for Climate Change and International Cooperation

A near-zero carbon zone (NZC) is an overall integration of low-carbon technology solutions, development models, human behaviors, and financial mechanisms within a certain scale area based on overall planning. It is guided by the advanced top-level design with various advanced technologies, circular economy, energy use methods. Based on sustainable and healthy economic and social development, NZC's total carbon emissions is continuously reduced and gradually approaches to zero.

--China Datang Corporation Science and Technology Research Institute

A near-zero carbon zone (NZC) refers to a region that is experiencing high-quality economic development, environmental sustainability, and improved quality of life, while reducing its region-wide carbon emissions toward zero. A NZC's economic growth is driven by emerging low-carbon industries, energy consumption is supplied by near-zero carbon energy sources, and buildings and transportation demands are met by smart low-carbon technologies. In the long-term, carbon emissions sources and sinks ultimately achieve balance (i.e., net-zero carbon).

--Rocky Mountain Institute

Near-zero Carbon Zone has advantages and innovations comparing with traditional urban development projects.

Energy Transformation

Near-zero Carbon Zone builds a clean, low-carbon, safe and efficient energy system in regional level, promoting energy production and consumption revolution.

High-quality economy

Near-zero Carbon Zone develops high-quality economy, exploring the path of decoupling economic development and carbon emission

Low-carbon technology

Near-zero Carbon Zone is an important carrier of advanced low-carbon technology and management mode.

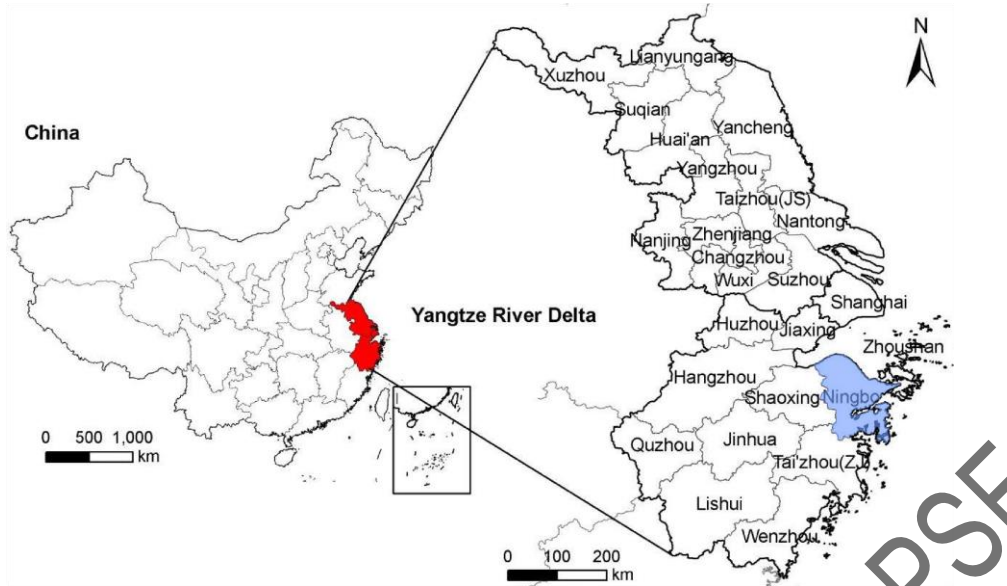
low-carbon development

Near-zero Carbon Zone explores urban low-carbon development mode from the whole process of planning, construction, operation and management.

Case study of Meishan Near-zero Carbon Zone

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Meishan is a complex urban development project with ambitious carbon goals, located in the city of Ningbo.



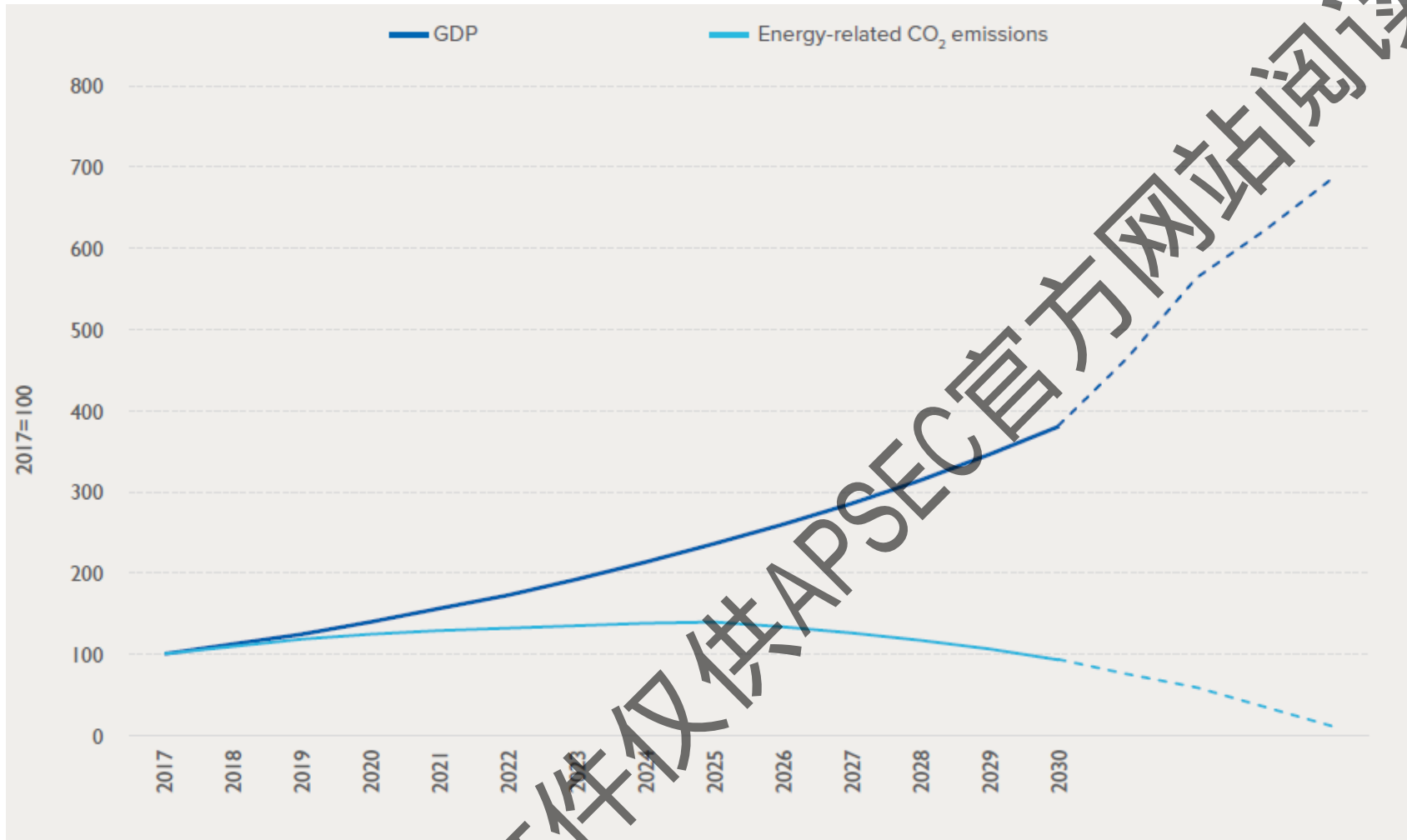
An emerging east coast economic center: Meishan district is located in the city of Ningbo, 270 km from Shanghai. Over the past two decades it has grown from a fisherman village to an emerging economic center on the east coast of China.

Unprecedented scale and complexity: Meishan is a large-scale “port+industry+city” integrated urban development projects, with site area of 330 km² and population of 300,000 people by 2030.

Ambitious carbon reduction and economic goals: Meishan’s ambitious carbon goal is setting the standard for low-carbon district-level projects.

	Area	Population
Meishan	330 km ²	300k (2030)

Meishan develops international leading near-zero carbon demonstration zone with green “Meishan mode”

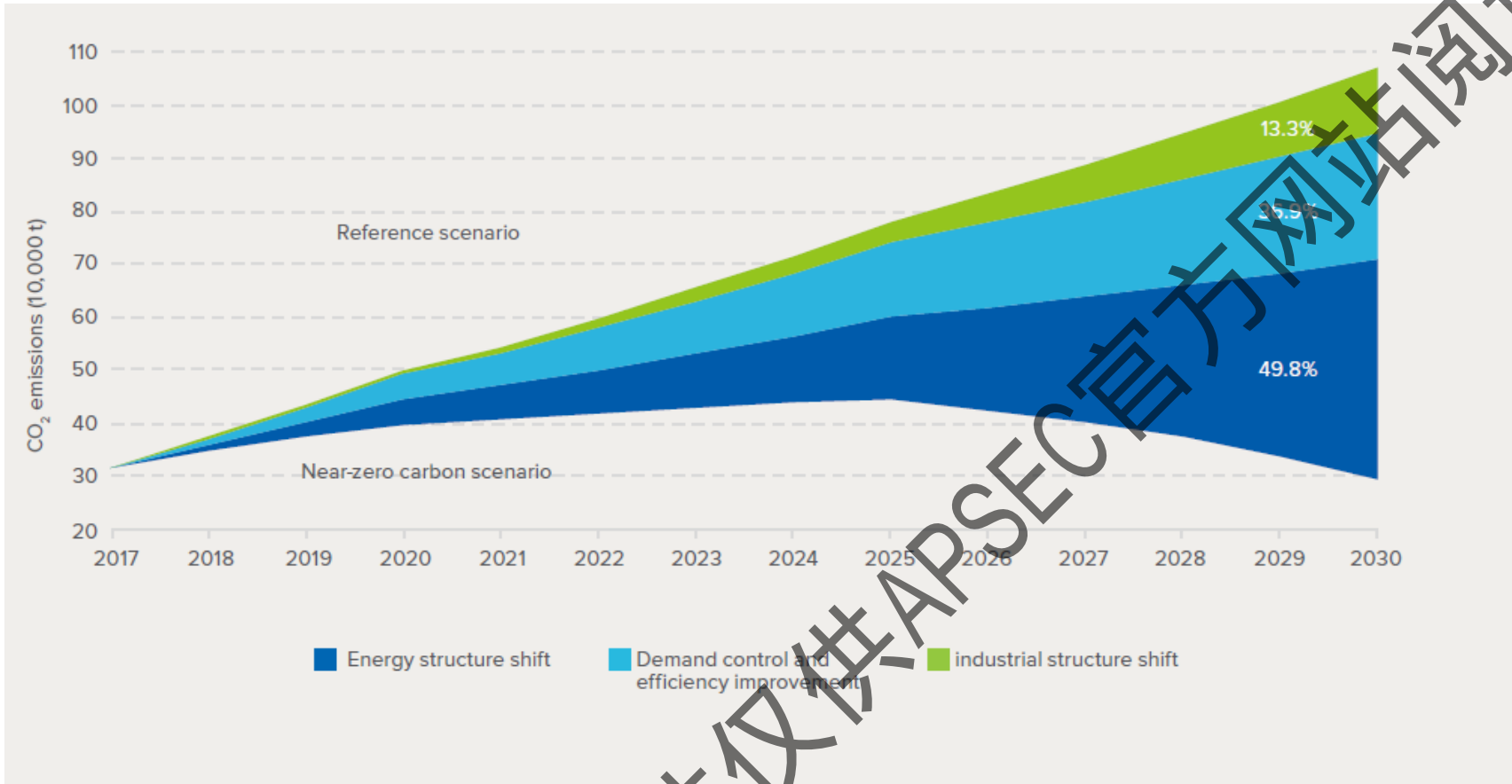


Meishan in 2030:

- Economy is expected to be 3.8 times higher.
- Population is 3.3 times larger.
- Per capita GDP is greater than \$40,000 (equivalent to leading higher-income countries).

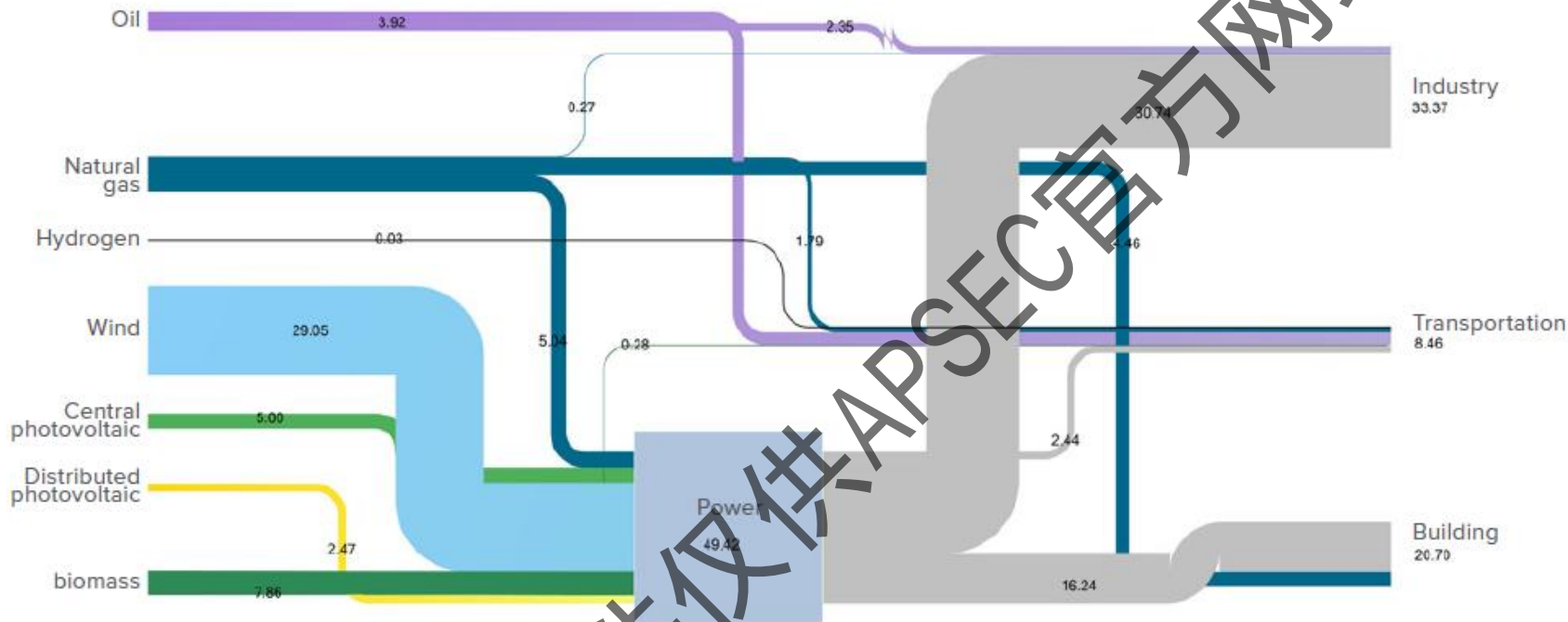
Total carbon emissions remain below 2017 levels.

Meishan accelerates the transformation of the industry and energy sectors and enhancing economic advantage



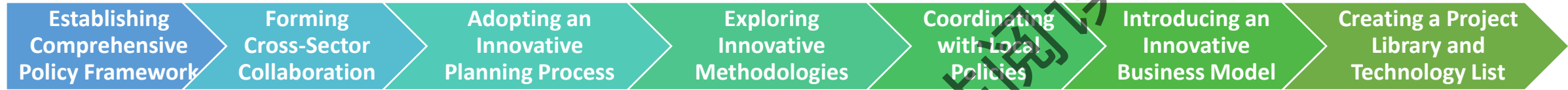
- **Energy structure shift: 49.8% contribution.** Energy supply in Meishan will be dominated by electricity and natural gas, with the aim to establish a coal-free city. Its electricity supply will come mainly from local renewable energy to form a near-zero carbon power system.
- **Demand control and efficiency improvement: 36.9% contribution.** Meishan is also widely utilizing advanced near-zero carbon technologies so that its energy efficiency and emissions reductions will reach or exceed global leading standards.
- **Industrial structure shift: 13.3% contribution.** Meishan's economic growth will be driven mainly by efficient, environmentally protective, low-carbon industries, building a green and low-carbon industrial system.

Meishan generates most of the energy with renewables and significantly increasing the electrification rate in energy end-users.



- By 2030, renewable energy in Meishan is expected to account for more than 71% of its primary energy consumption by 2030.
- Meishan's wind, solar, biomass, marine energy, and other renewable energy sources will account for 90% of its power supply.
- By 2030, the electrification rate of the end-use sector will be close to 80%, and the share of new-energy vehicles will be close to 30%.

Meishan demonstrates an effective way to develop a Near-zero Carbon Zone.



Setting ambitious goals is the first step for the success of a Near-zero Carbon Zone

Cross-sector collaboration is the way towards whole-system carbon reduction.

The innovation of planning process is the premise of integrated planning.

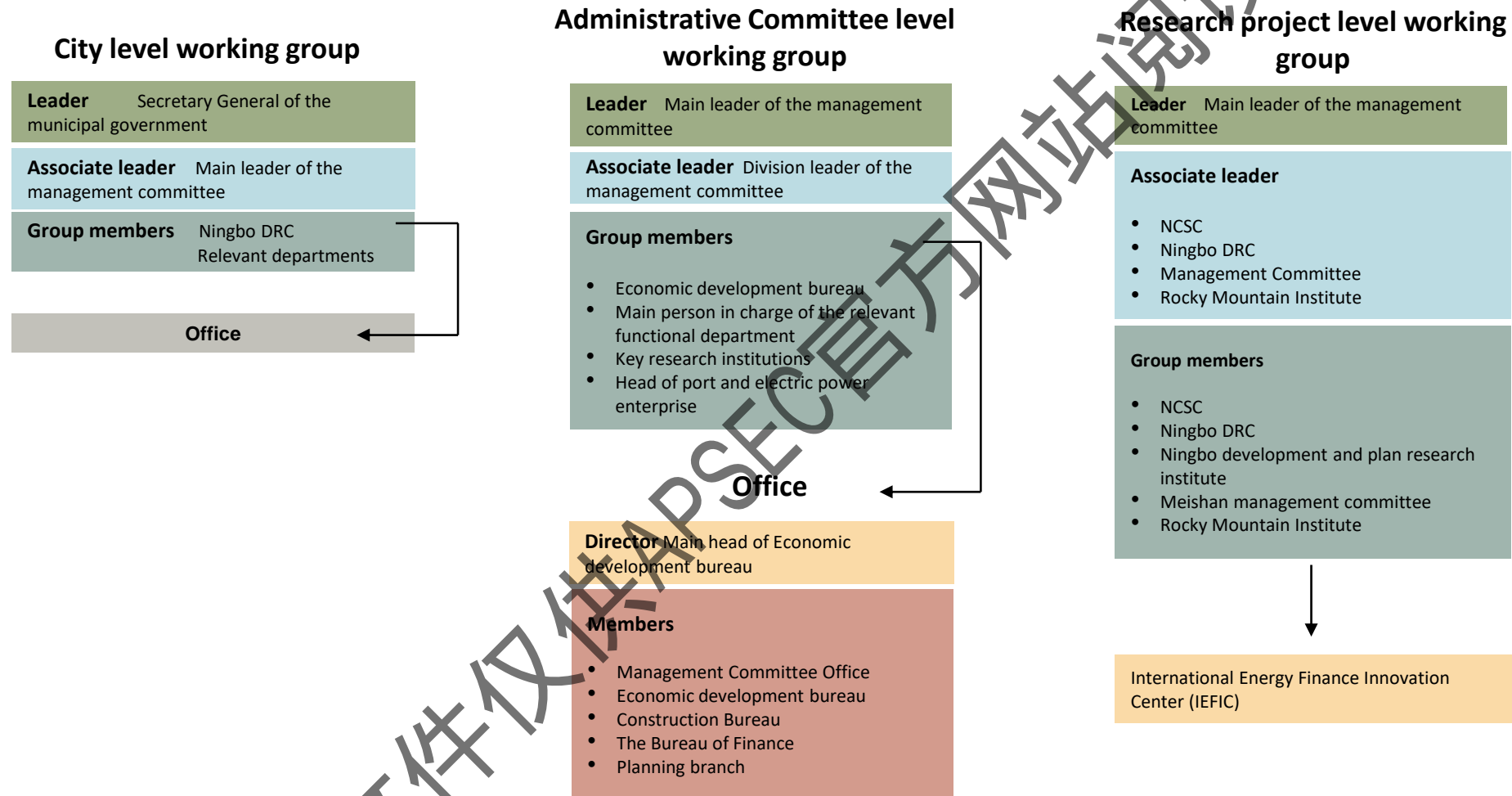
Innovative regional energy system analysis tool is the basis of quantitative analysis.

Making specific action plan is the guarantee to implement the overall goals.

Innovative business model, such as IESP (Integrated Energy Service Planning), ensures efficient implementation.

Project library and technology list are supportive policy tools.

Establishing an Integrated Organization Structure to Promote Cross-Sector Collaboration



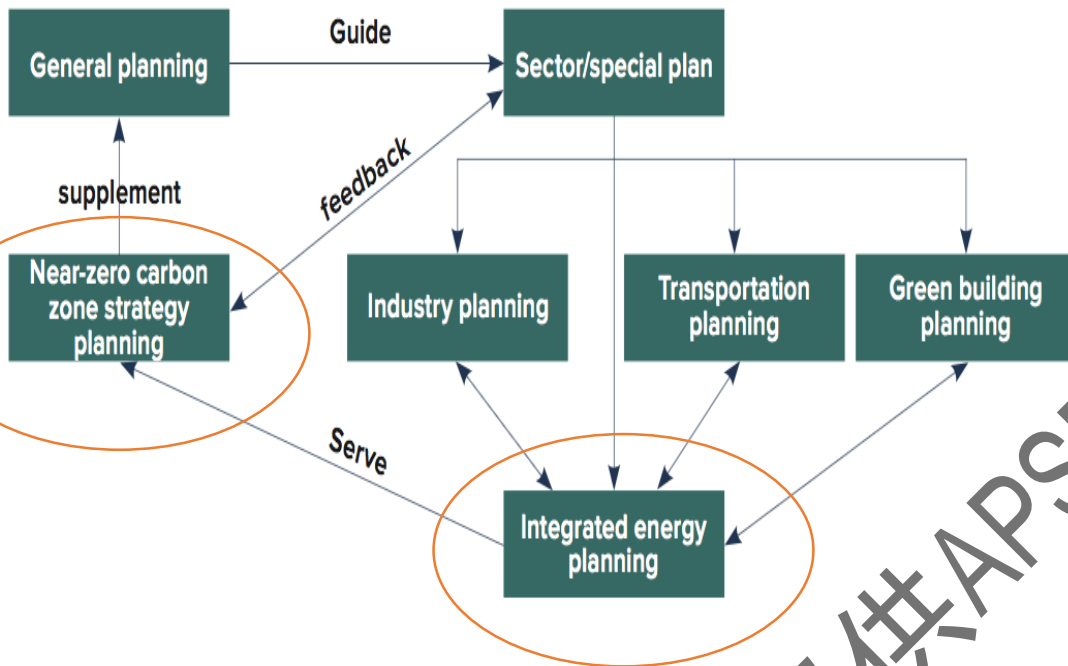
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Adopting Innovative Planning Process

An innovative planning process proposes to frontload whole-system strategic planning, conduct technical-economic analysis to support decision-making, and set a roadmap and goals before the urban planning document is completed.

As a complement to the master plan, the near-zero carbon zone strategic plan is made with full consideration of the region's development status and technical and economic studies. The near-zero carbon strategic plan clarifies the objectives of the near-zero carbon zone and specific sector targets with the support of quantitative analysis. Relevant policy recommendations are proposed based on the plan.

- The objectives of the strategic plan will be expressed as specific indicators and included in the master planning, and the relevant indicators will be used to further guide the sector-based planning, including industrial spatial planning, transportation network planning, green building planning, and integrated energy planning. It is important to carefully coordinate all sector-based planning to reflect the systematic nature of the regional energy system as a whole.



Exploring Innovative Methodology



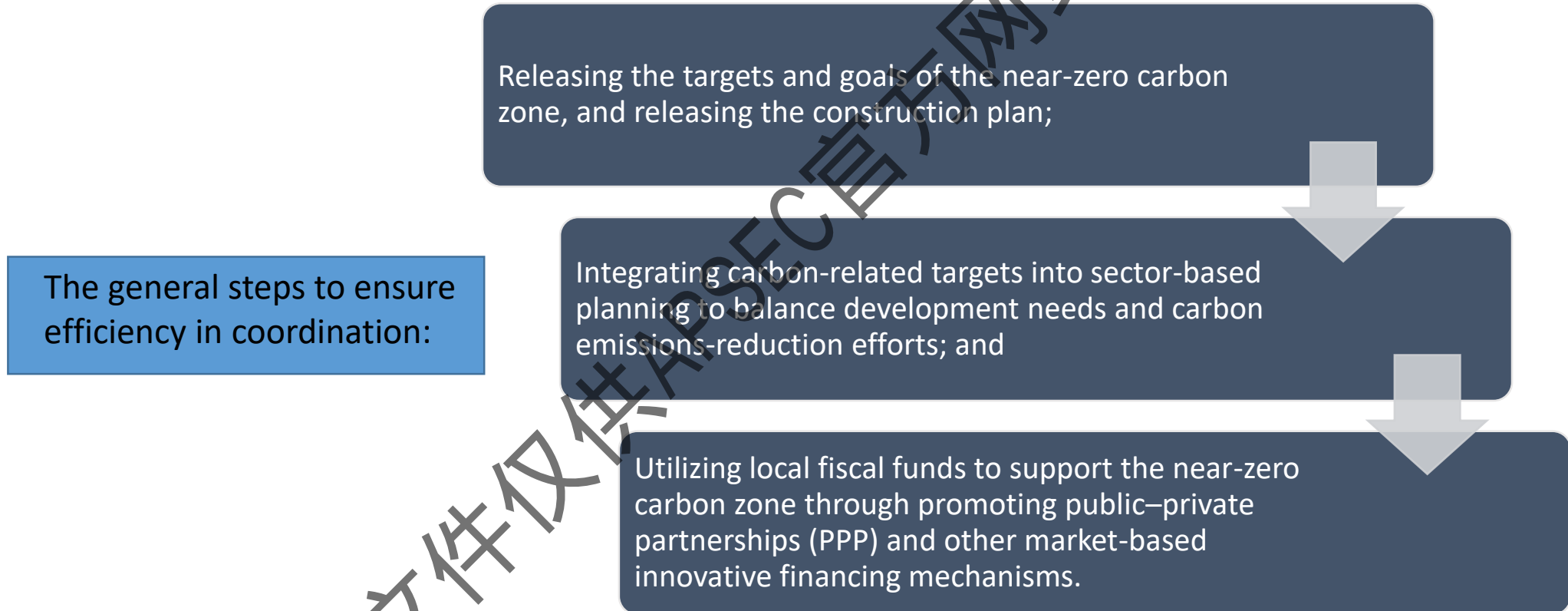
Introduction of ZERO (Zero Emission Reinventing Operator)

ZERO (Zero Emission Reinventing Operator), based on LEAP (Long-Term Energy Alternative Planning), is a model developed for analyzing the pathways for greenhouse gas emissions reduction. It simulates the process of converting primary energy to secondary energy and to different forms for end use. The model uses detailed techniques to describe the process of energy flow and logistics that can be used for both service-oriented and scenario-oriented analysis to estimate energy savings- and emissions reduction- potential in specific target years.

Innovative analytical tools are the basis for quantitative analysis for regional development. The energy system analysis tools are developed based on energy modeling that demonstrates the balance between energy supply and consumption and are also based on the collection of data needed to carry out a relevant scenario analysis. The energy model should be able to analyze the difference between the business-as-usual scenario and the near-zero carbon scenario based on an analysis of regional economic development, future economic goals, the status of renewable energy resources, and historical energy consumption. The goal of adopting an innovative energy model is to ensure quantitative targets that are both economically and technically feasible and are tailored to meet local needs.

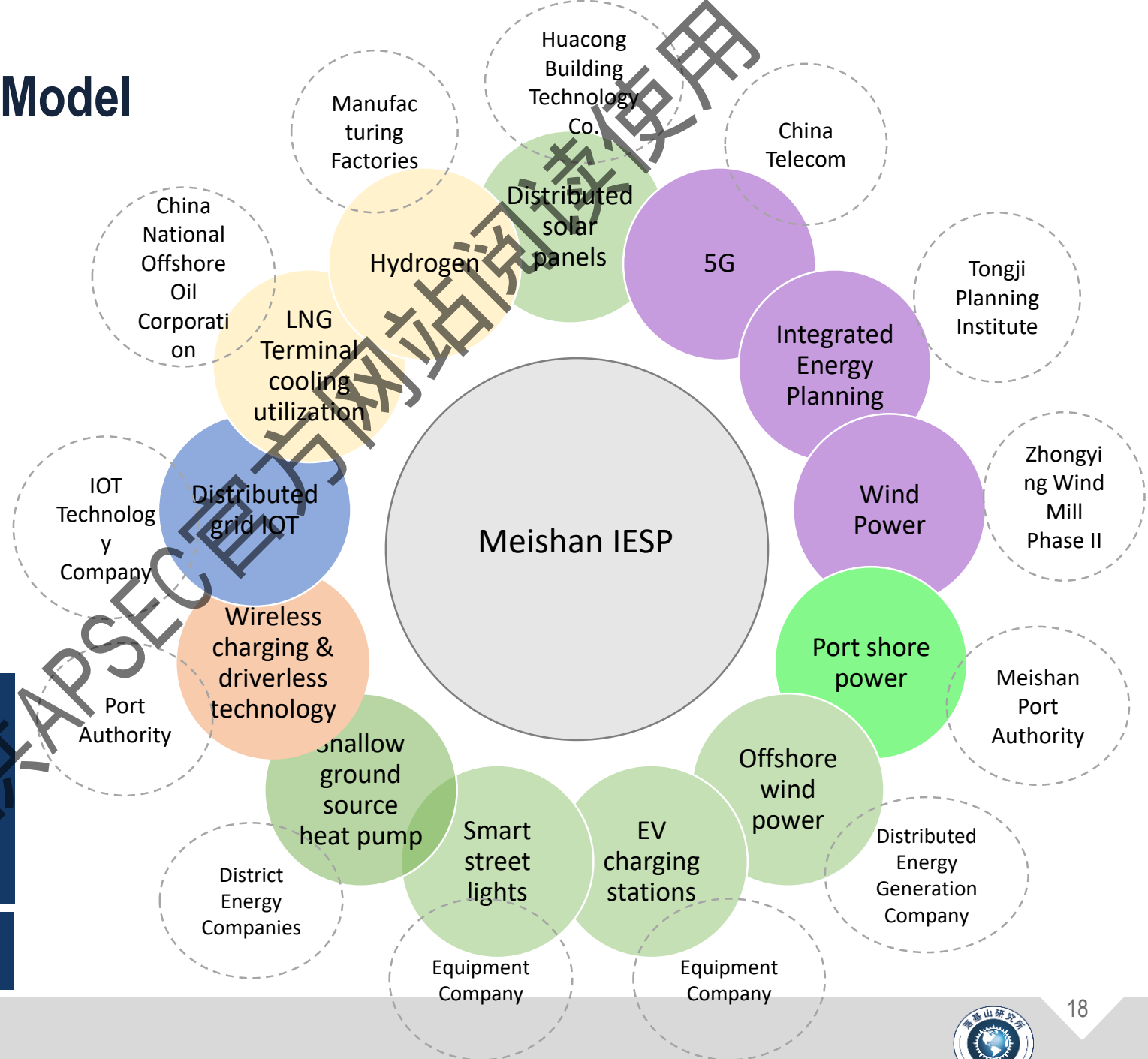
Coordinating with Local Policies

- The construction of a near-zero carbon zone is a complex process that involves all levels of government and covers all sectors in daily operations;
- Coordinating high-level planning with local policies is often critical to implementation.



Introducing innovative Business Model

- IESP Model Forms an Open Platform for Ecology
- IESP plays a key role in combine energy companies, internet companies, telecom companies, equipment companies, financial companies to incentive cutting-edge technology application.



Funding Sources:

Zhejiang Province IESP Company	Jili Car Group
State Grid Special program	Government and research fund
Major repairment program	Other

Implementing Entities

Creating a Project Library and Technology List

- A project library and technology list are policy tools to better support implementation by clarifying the technical and economical roadmap of the near-zero carbon zone.
- A project library is an important tool to coordinate a large-scale, complex project that requires cross-institutional collaboration.
- The technology list provides technical support for the entities that implement projects, demonstrating clear technical selection criteria and setting priorities to enhance project delivery.

Project library

Project name
Schedule
Scope
Stakeholder
Fiscal condition

Technology List

Building
Envelope
Cooling system
Heating system
Lighting
Equipment
Transportation
Industry
Energy



Thank You!

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