China

China’s growth target - Quadrupling per capita GDP by 2020.

1 billion people will live in urban centres by 2030.

China will have 221 cities with more than 1 million + inhabitants by 2025.

40 billion m² of floor space will be built – in five million buildings

Demand on Resources & Environment

• Overtaken the United States in 2008 to become the world’s largest emitter of CO₂ (World Energy Outlook 2007)

• Water
  • In 2030, when the Chinese population grows to 1.6 billion people, domestic water consumption will reach 100 percent of water availability (WRI, 2007).
  • 70% of lakes and 5 out of the 7 largest rivers not suitable for human contact (SEPA, 2007).

• Waste, Environmental, Ecological & Health Issues.
Sustainable Planning Process

1. Vision and Sustainability Objectives
2. Targets & Performance Indicators
3. Strategies
   - Masterplan Concept
   - Technical Strategies
4. Sustainability Performance Evaluation - IRM / SPeAR
5. Optimised Masterplanning Options
Arup Approach

How to Develop
Attracting investors and managing risk

What to Develop
Getting a clear picture

Why to Develop
Strengthening the case for development to the Local Government, and defining the economic impact

ARUP
Integrated Urbanism - Holistic Thinking

- Sustainable Integrated Development
- Energy
- Economic Development & Planning / Tourism
- Master Planning & Urban Design
- Business Planning
- Civil Engineering & Transport
- Agriculture & Minerals
- Planning
- Cultural / Historical
- Environmental
- Flooding

AKUP
Develop **Project Vision & Objectives.**

Identify **targets** and/or any legislative requirements

Develop **KPIs** against which sustainability performance can be measured / monitored

Refining KPIs and targets and comparing them against ‘Business as Usual’ (BAU) approach.
Measuring Sustainability
Eco-Footprint, IRM & SPeAR
The amount of land required to provide a given population with all its resources and absorb all its waste, wherever that land might be.
Integrated Resource Management

Linking Master Plan to the input of technical disciplines and informing decision making
Qualitative assessment in understanding the dynamics and optimizing:

- Social
- Economic
- Natural Resources
- Environment
Project Integration

- Ensure KPI’s and targets decided upon at the start of the project are appropriately incorporated into the Master Plan.
  - Energy (& Carbon)
  - Water
  - Materials & Waste
  - Human & Environmental Health
  - Density & Housing
  - Mobility & Accessibility

- Selected technologies are suitable, locally available etc.

- Economically viable

- Implementable (regulatory plans, infrastructure providers, management etc.)
Tangshan Caofeidian International Eco-City

- Located to the north-east of China adjoining the Bohai Sea, The development area is 248 km², with 150 km² construction area and 98 km² ecological area.

- The existing coastal site currently consist of salt flats, wetlands, agricultural fields, fish ponds, oil fields, waterways and villages.

- Arup prepared the master plan and the sustainable development framework incorporating concepts such as Circular Economy, Ecological Value and Transit Oriented Developments.

- In conjunction with the urban design of the site, strategies for transportation, environmental, energy, water and waste were also developed.
Master Plan of Tangshan Caofeidian International Eco-City
Bird’s View of Tangshan Caofeidian International Eco-City
• Prepared a Conceptual Master Plan for the 40 ha start-up site in the Tianjin Eco-City area.

• Range of services included urban design, land use planning, transportation as well as initial strategies for energy, water, waste, environment and economics.

• The objectives included mixed-use, diversity and flexibility, vitality for businesses, a signature eco-landmark building, Transit Oriented Development and eco-transit connections through open spaces were all incorporated into the design.
Tianjin Eco-City

Master Layout Plan

ARUP
Following on from the Stage 1 Master Planning work, a set of Sustainable Urban Design Guidelines for the project as a whole and individual land parcels were prepared to guide design requirements for site engineering, buildings, landscape ecology, water, energy systems, waste, energy conservation, renewable energy requirements.

The intention was to prepare a set of low carbon zoning codes for each individual site that would be used as planning conditions for development, as well as technical basis for development control.
• This was the first time that the sustainability indicators and low carbon zoning codes of energy, water and waste parameters were experimented to be incorporated as part of the China statutory planning system.

• It is anticipated that this new approach will greatly improve the feasibility and the enforceability of implementing the low carbon planning concept in China.
The development aims to create an environment that fosters technological innovation and entrepreneurship similar to that of Silicon Valley in the United States and to provide "live-work" accommodation inspired by the Left Bank in Paris with strong emphasis on education, technology, culture, research and business incubation.

The project site (approximately 8.3ha) is within the KIC North Village sector of the KIC overall masterplan and is an integral part of this entire development. The mixed uses including educational, commercial, residential.

Incorporating sustainable guidelines (energy, water, waste etc.) and preliminary LEED ND assessment.
With a total site area of 50 hectares, this innovative design seeks to create a fully integrated transit oriented community on a podium above a new rail line in the city of Hangzhou.

The objectives of the project is to create a community which is:

- Green
- High Quality
- Well connected
- Economically viable

The resulting design resulted in a community that has seamless integration between the areas of live, work, play and travel.
Hangzhou Qibao Depot Design - Transit Oriented Community
What we are doing is not good enough!!

Current conventional master planning & urban design do not adequately address the wider picture and needs of sustainable resource utilization & climate change.

Integrate conventional master planning approaches with leading edge but implementable low carbon & resource efficient strategies.

Systems/ Integration/ Connectivity

When will sustainable development/ eco-cities be BAU?