Low-carbon Energy Efficient Urban Environment

P l a n n i n g f o r t h e f u t u r e o f I n d i a

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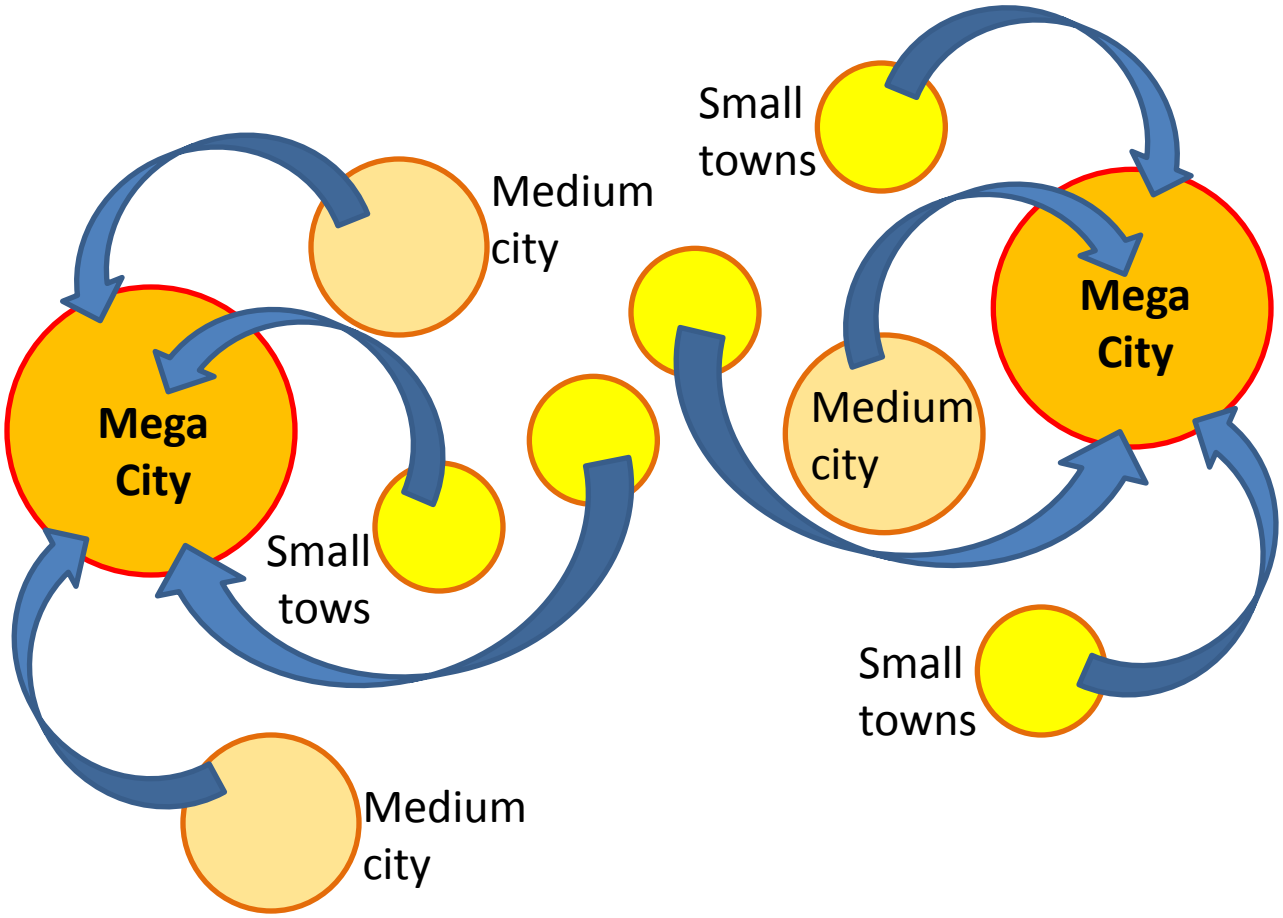
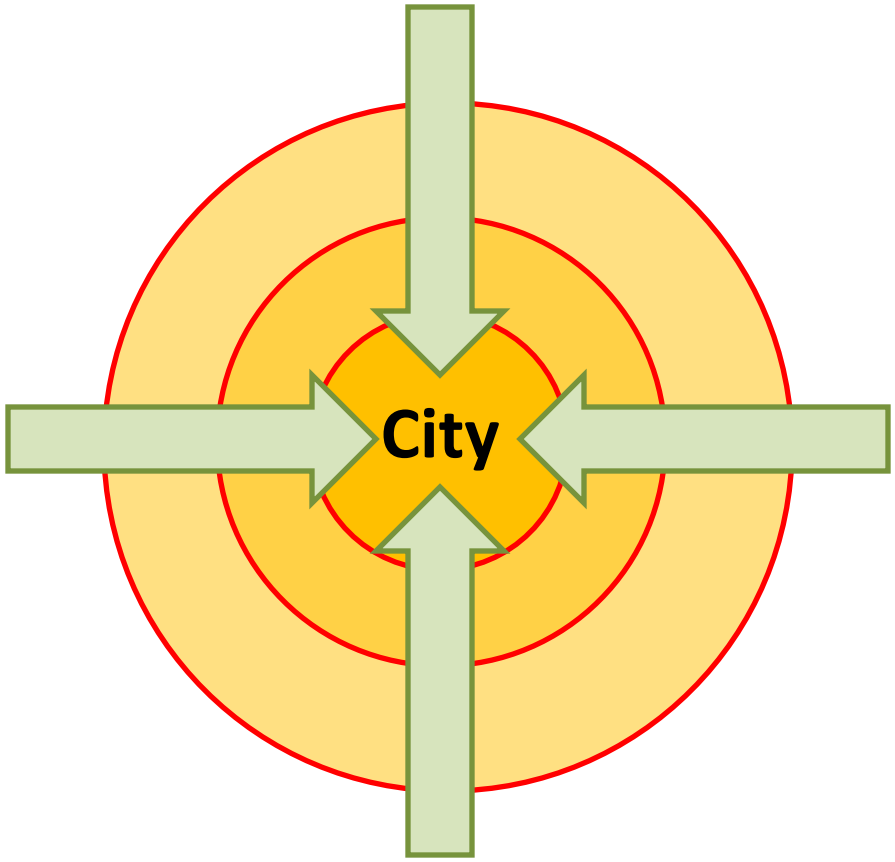
Cities are a systematic choice made by people who live there!

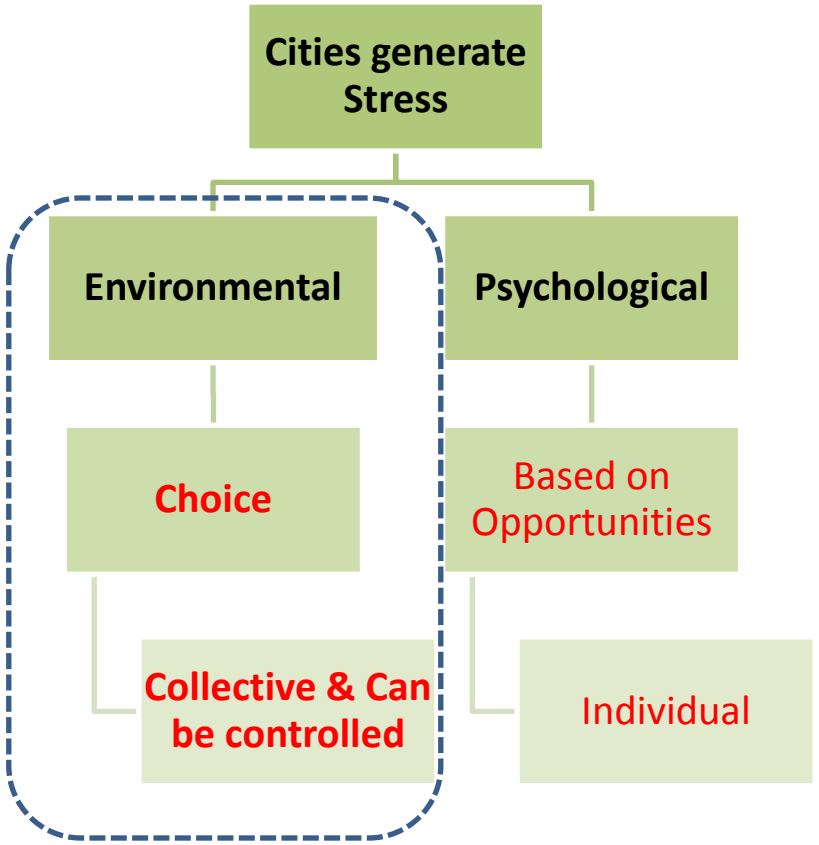
They **swell** due to migration



What are cities?



Cities are **Concentration of Activities**



Like many other developing countries India faces dual challenge of encouraging development and reducing GHG emissions

Questioning…….

- How do we want our future Cities to grow?
- Should we simply follow the usual steps of making roads and buildings?
- Can we adopt a new system of planning and functioning of our Cities?

Need of addressing Environmental Issues

Why we need the strategies:

1. Meeting India's **national goals** of reducing carbon emission by **20-25% of GDP by 2020**,
2. **Avoiding conflict** with natural pattern,
3. To optimize the **Natural Carrying Capacity** of the region,
4. To have positive affect on **microclimate**,

Objectives:

1. Effective use of **natural resources**,
2. Conserving and enhancing the **local ecosystem**,
3. Ensuring **long term sustainability** of the city,
4. Integrating the Human prosperity with **environmental sustainability,**
5. Creating environmental awareness through **strategic planning,**

Energy Efficiency - Vs - Energy Conservation

Use of energy efficient technology to have the same out put with less energy consumption

Issue can be addressed at **Micro and Macro level**

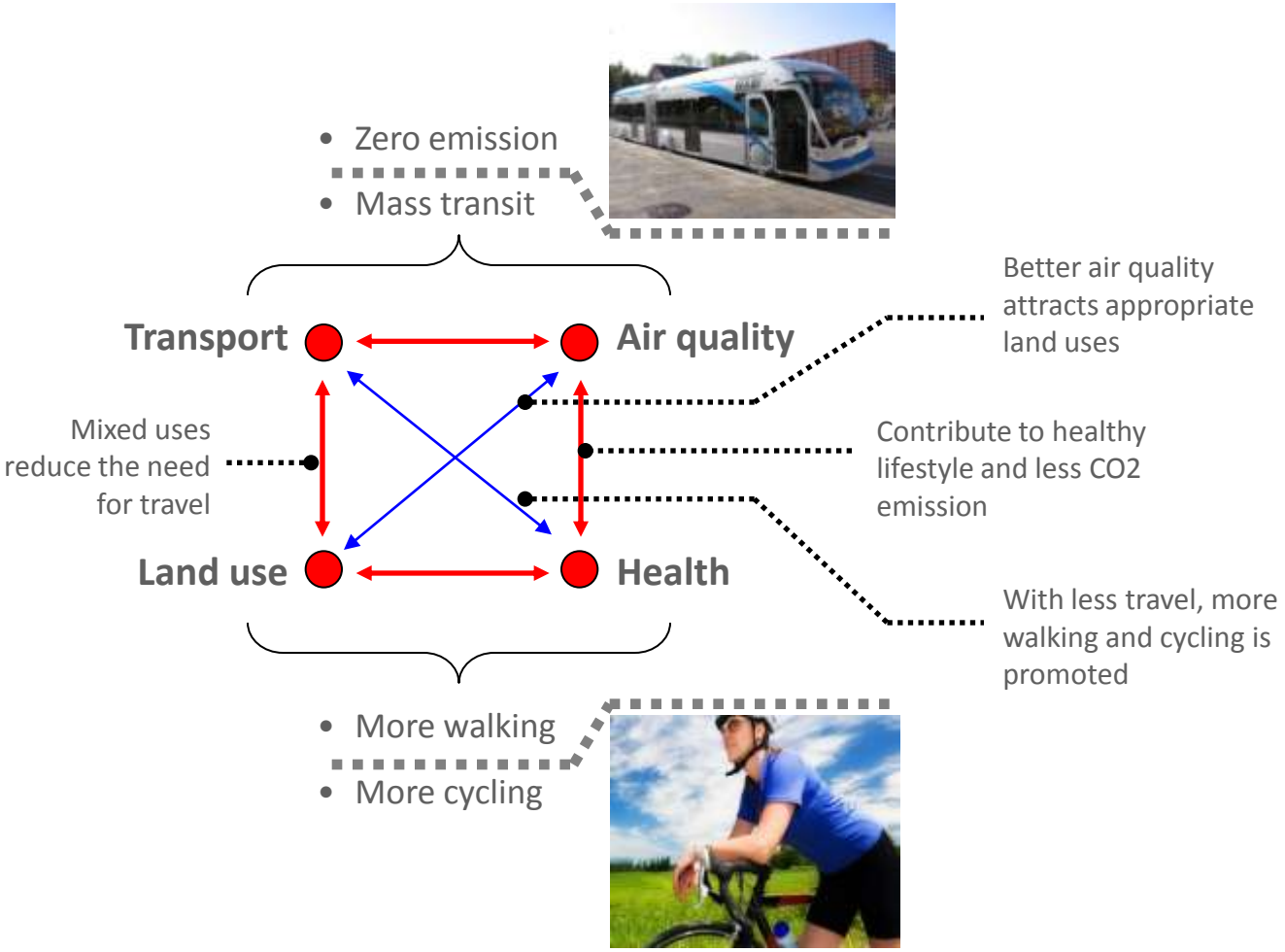
Implies reducing the use of energy

Issue should be addressed at **Macro level**

Achieving energy efficiency through Urban Planning

E c o - s m a r t C i t i e s

Resources Management Model

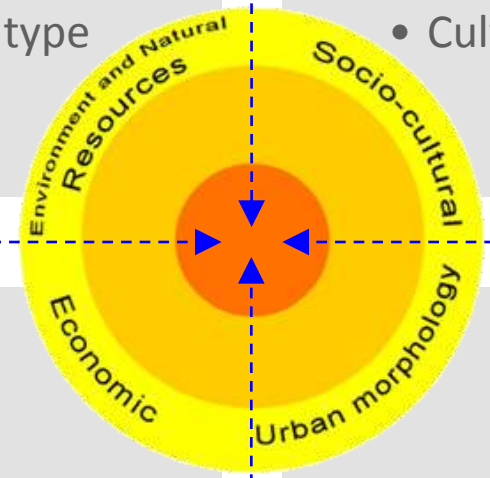


This mixed-use development model will ensure self-sufficiency of **Urban Clusters,** positively affecting the health and air quality**.**

Parameter of Eco-smart Cities

- Air quality
- Water & waste management
- Energy generation
- Transportation type

- Access to Amenities
- Social integration opportunity
- Health and safety
- Cultural & heritage



- Movement options
- Access to natural resources
- Land value assessment
- Employment options

- Land utilization
- Movement pattern
- Compatible built form
- Building material

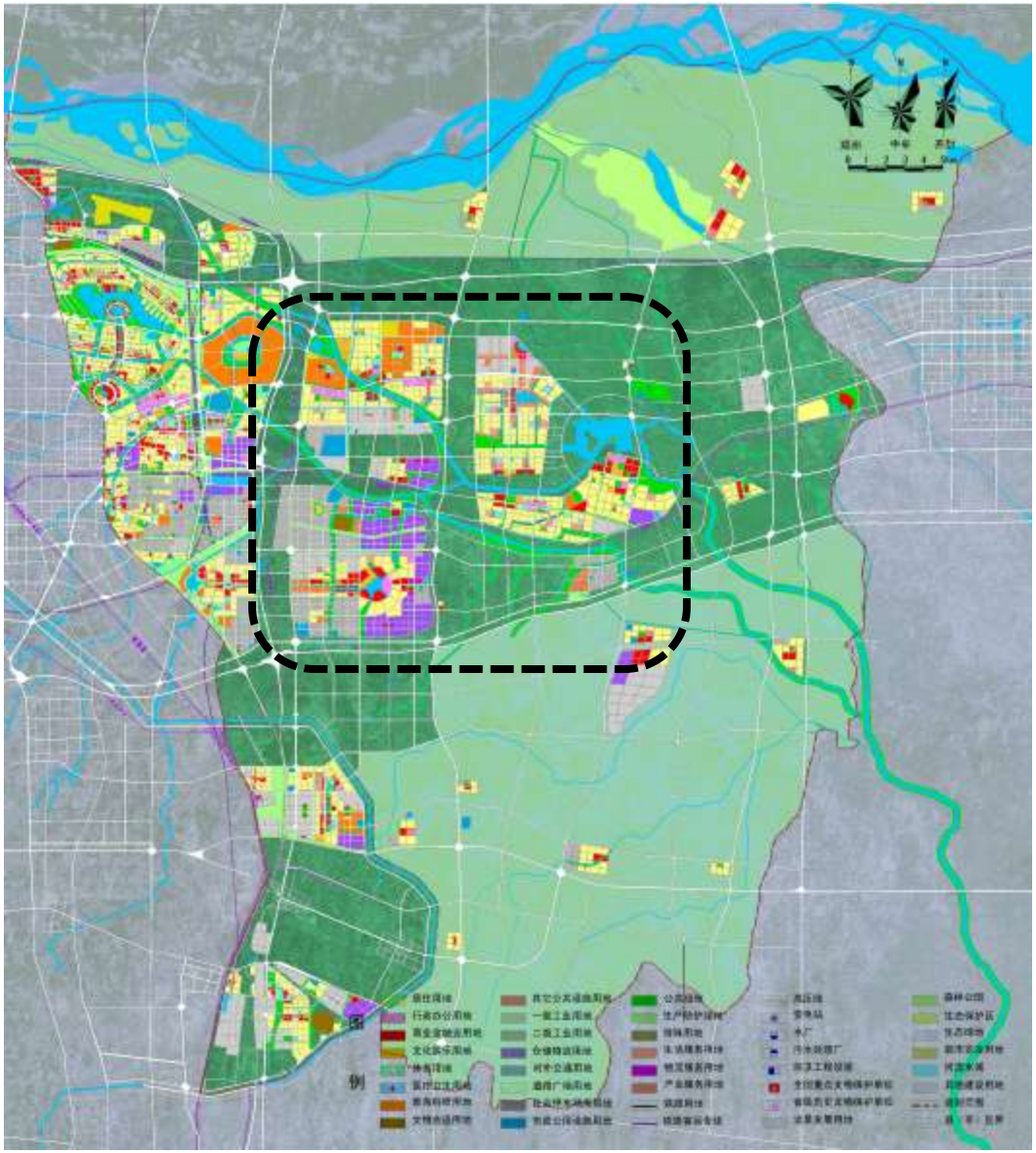
Land use Compatibility and Property Value

Land use compatibility and Property Value Determinants												
Sr. No.		Land uses / Determinants	Resi.	Office / Hotels	Mixed use	Local Commercial	High end retail / commercial	Institutional (Educational, Museums, etc.)	Tourism & leisure activities	Industrial (including warehouse)	Potential	Building Height
		Major determinants										
1	Natural & Green features	Greenways (along river, etc.)	●	◑	○	○	○	◑	◑	○	View and tranquility	Medium
2	Natural & Green features	Parks	●	●	◑	○	◑	◑	●	◑	View, wind and tranquility	High - Medium
3	Natural & Green features	Hill or other natural feature	◑	○	○	○	○	◑	●	○	View and tranquility	Low
4	Natural & Green features	Waterfront	◑	●	●	○	●	◑	●	○	View & wind corridor	High - Medium
5	Natural & Green features	Gardens	●	●	◑	●	●	◑	◑	○	Tranquility, children play area, etc.	Medium - low
6	Transportation & Accessibility	Mass transit Node	◑	●	●	◑	●	○	○	●	Compact / TOD	High
7	Transportation & Accessibility	Urban Corridor / Arterial Road	○	●	◑	○	●	◑	○	◑	Easy access to work area	High
8	Transportation & Accessibility	Mass transit route	●	◑	○	●	◑	◑	◑	◑	Low Carbon emission mode	High
		Other factors										
9	Amenities	Community Center	●	○	◑	●	○	◑	◑	○	It will advisable to club the community activities together in a residential area, with a traveling distance from 400m to max.600m. from the farthest point	High - Medium
10	Amenities	Recreational Facilities	●	◑	●	●	●	◑	●	○		Low
11	Amenities	Sports Facilities	◑	○	◑	○	○	●	●	○		Medium - low
12	Facilities	Health Facilities	●	●	●	●	◑	◑	○	○		Medium
13	Facilities	Municipal facility like police, fire, library	●	◑	◑	◑	◑	○	◑	○		Medium
14	Facilities	Parking Lot	○	●	●	◑	●	○	◑	○		High
15	Facilities	Municipal waste recycling & collection	○	○	○	○	○	◑	○	●	Use of incinerators	Medium - low

Value	Symbol
High	●
Medium	◑
Low	○

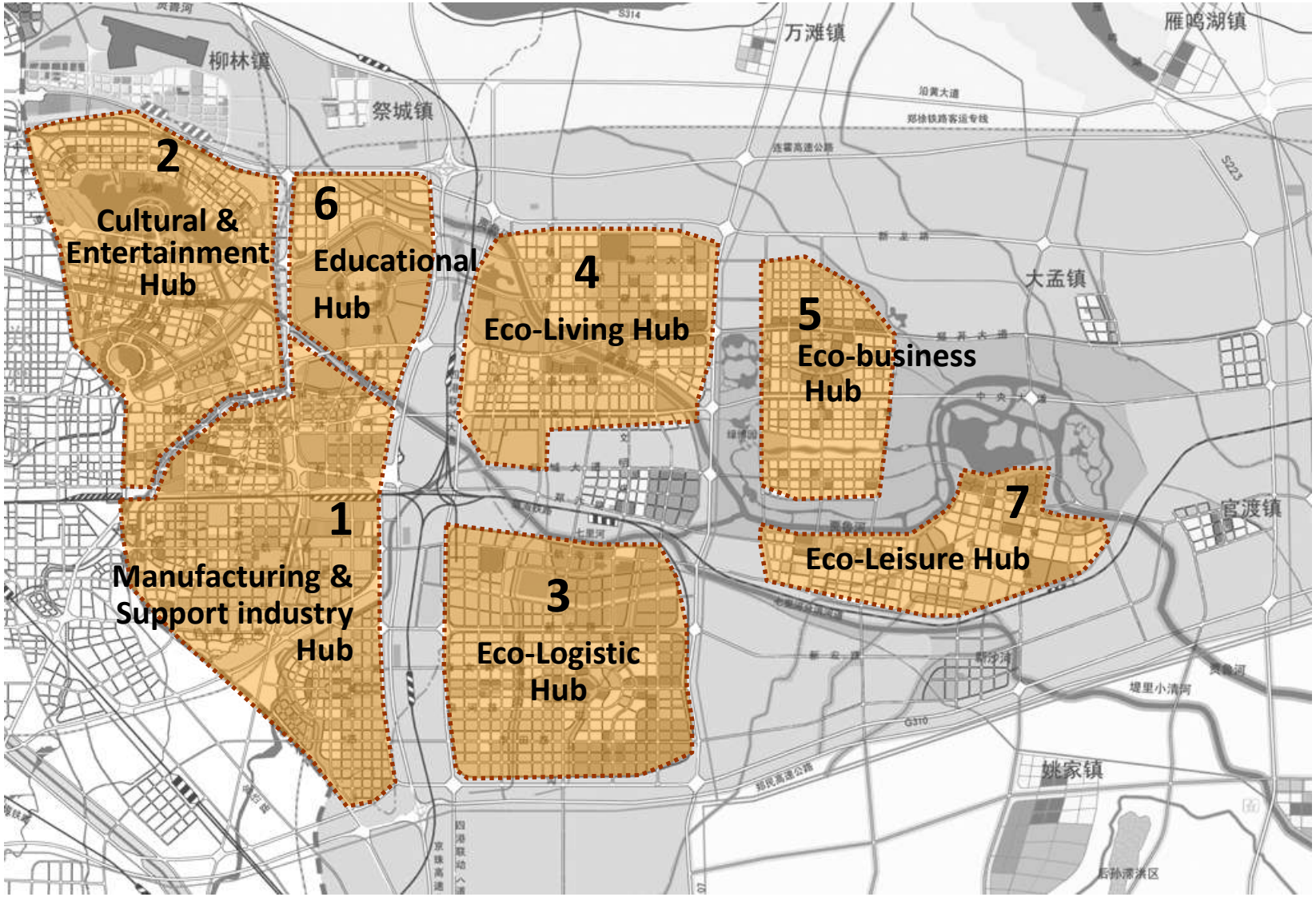
Planning of Zhengzhou New City

Zhengzhou New City, Central China



1. Area of new city around **1800Sq.km,**
2. Main function of the city was **Transportation Hub.**
3. Major challenge of the project was to integrate environmental aspects with land use planning and potential economic opportunities

Zhengzhou New City, Central China



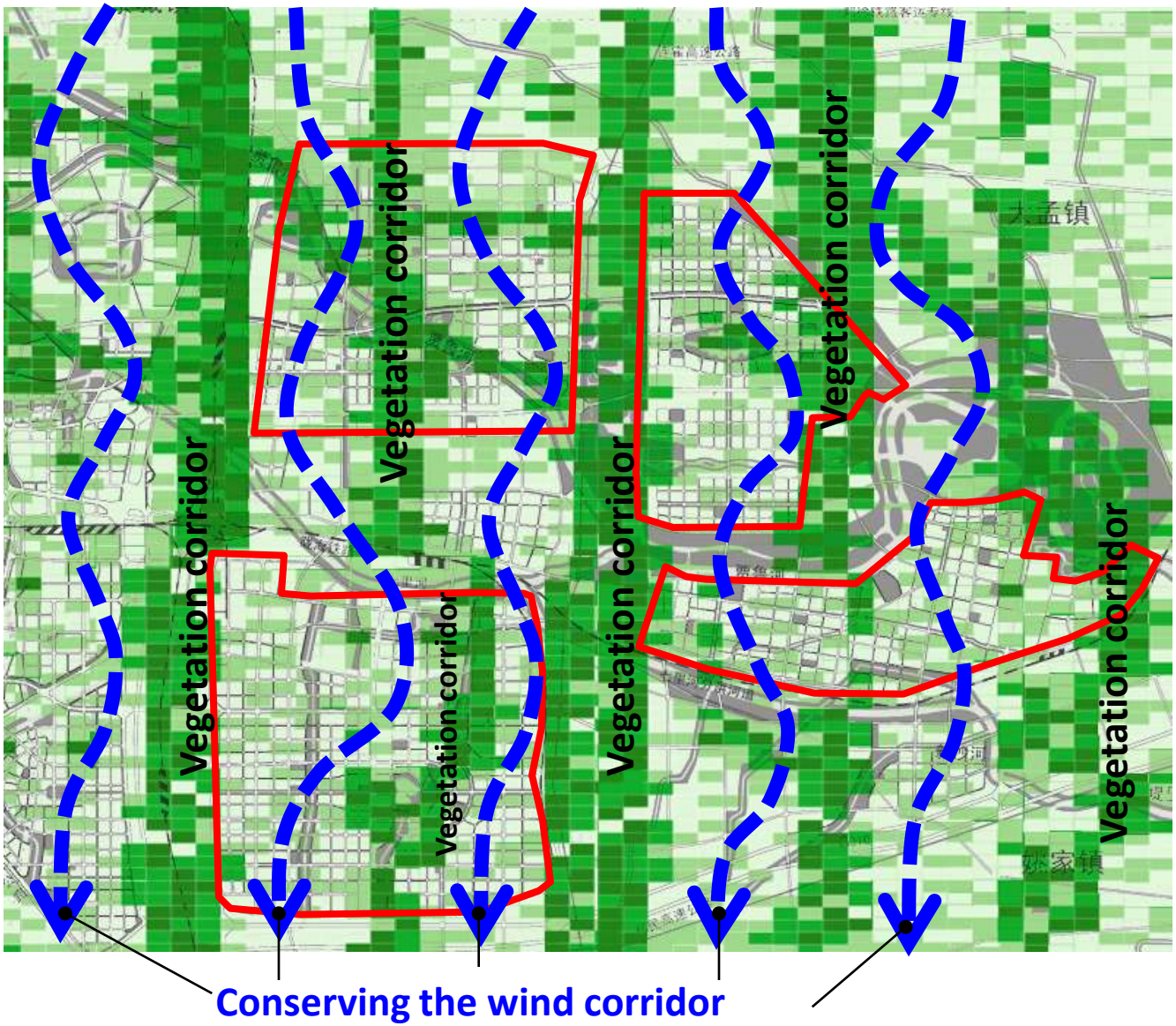
Zhengzhou New City, Central China

1. Decisions at primary level – generating urban form that responds the local climate and ecological pattern –
    - Maintain wind corridors that will help natural ventilation of the city at micro level (micro climate),
    - Maintaining flood paths, to protect the city from disasters,
    - High density cluster core with reduced density to the periphery,
2. Developing transportation hierarchy –
    - Connectivity between clusters by metro, buses (electric / bio-ethanol fuel based), taxis (hybrid technology)
    - Connectivity within the cluster by cycle, (including battery operated) or on foot.





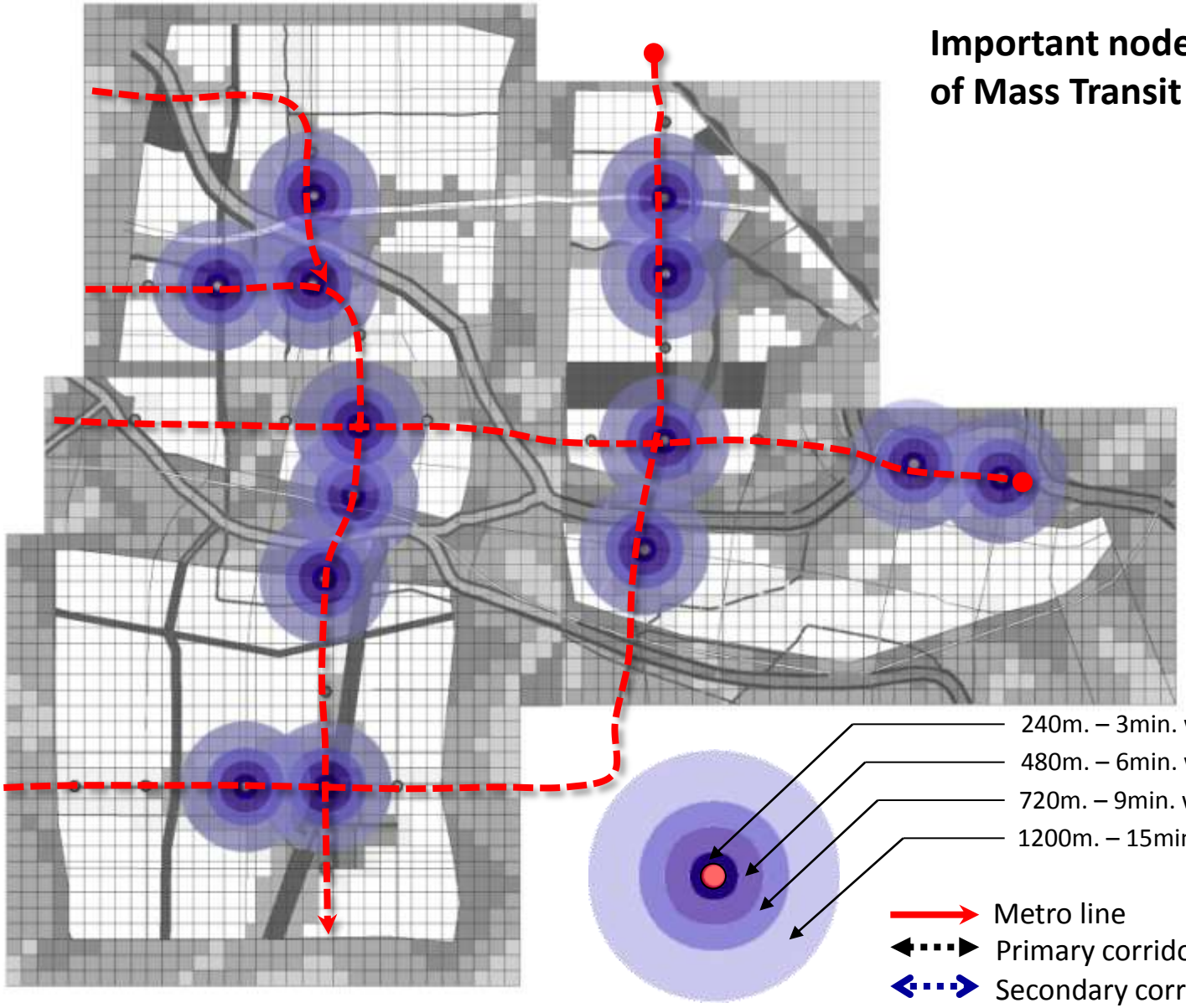

Conserving the natural corridors



The vegetation corridors are also the percolation area to recharge the ground water table

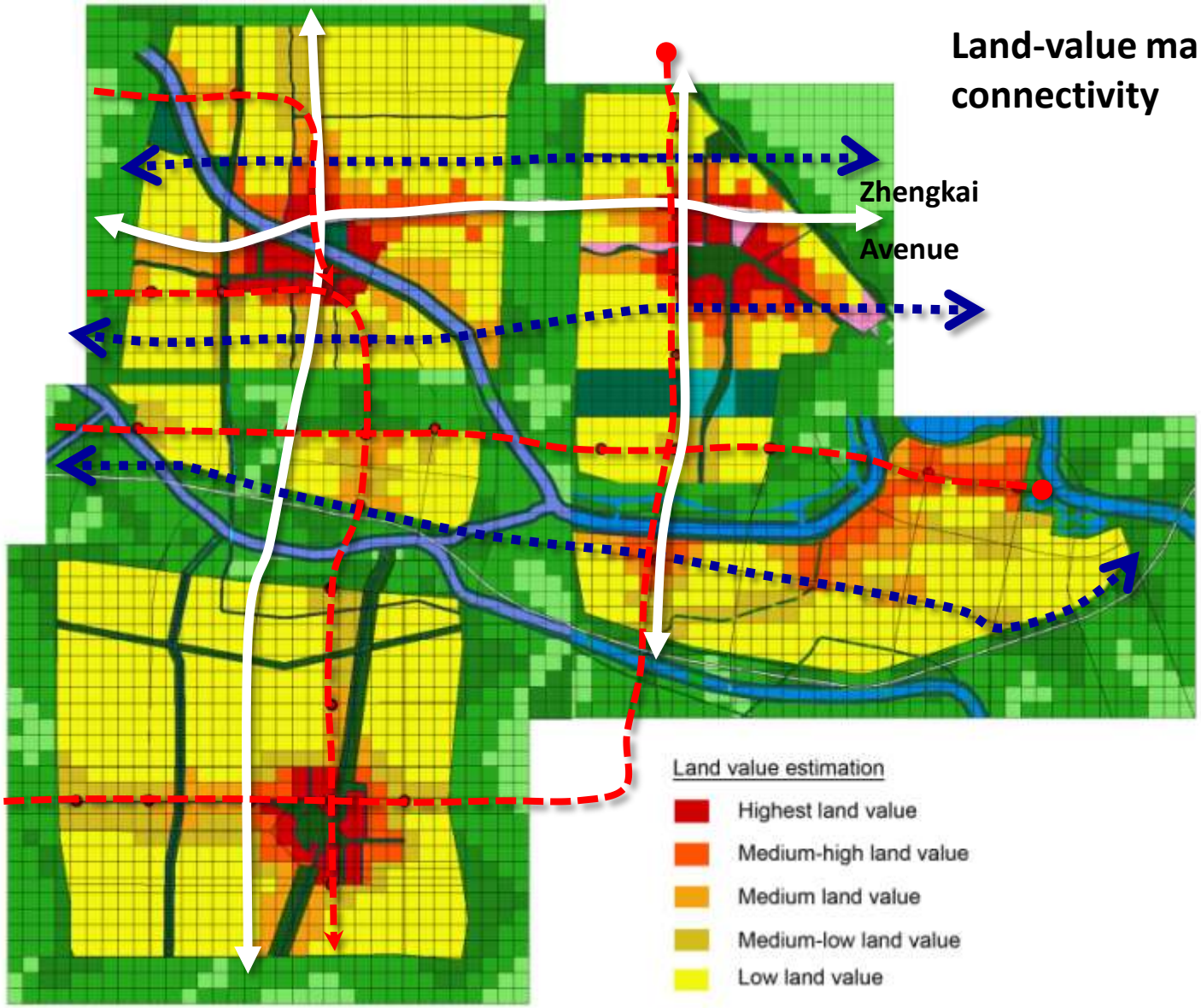
Zhengzhou New City, Central China

Important nodes based of Mass Transit System



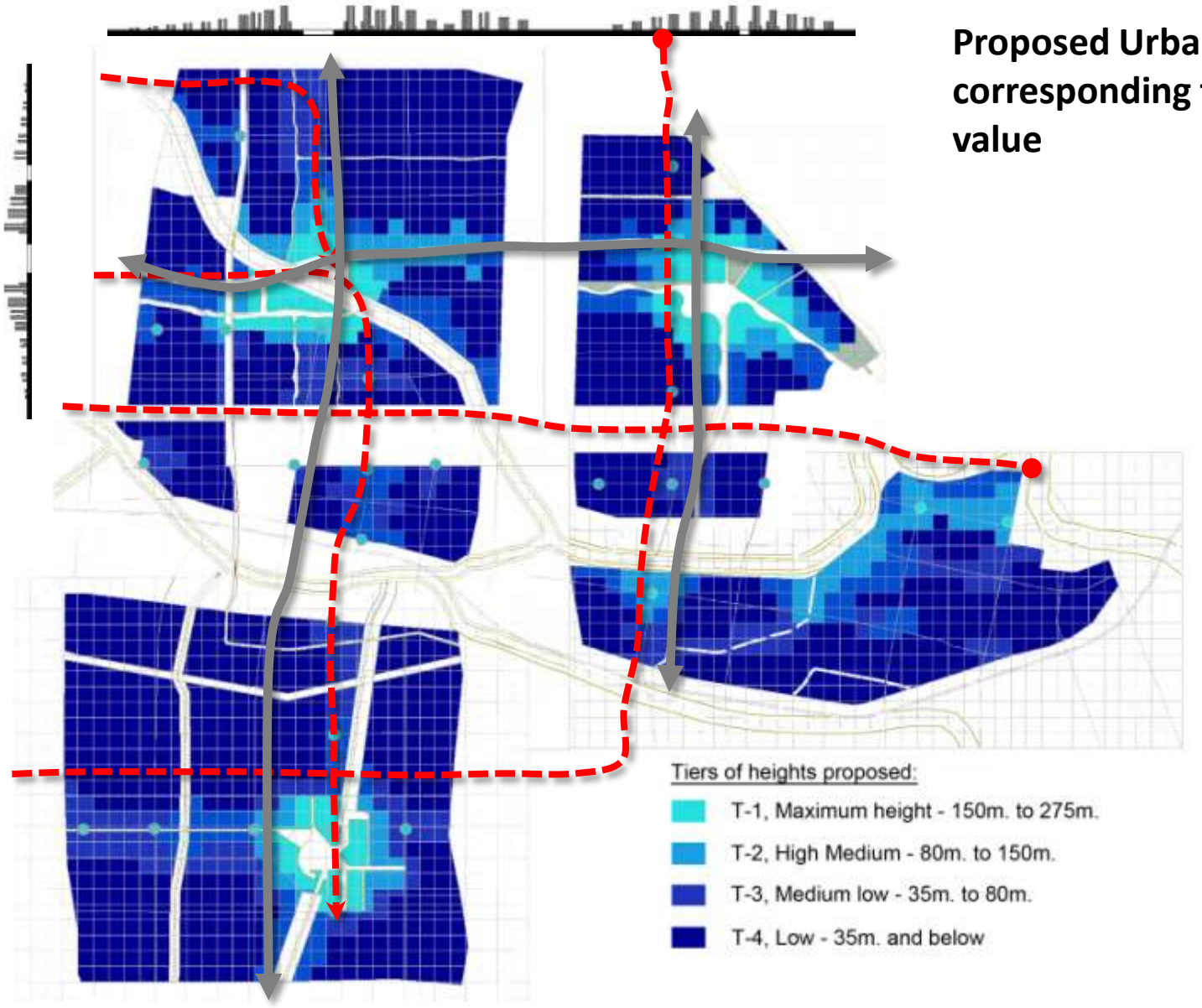
Zhengzhou New City, Central China

Land-value map based on connectivity



Zhengzhou New City, Central China

Proposed Urban-form – corresponding to land value



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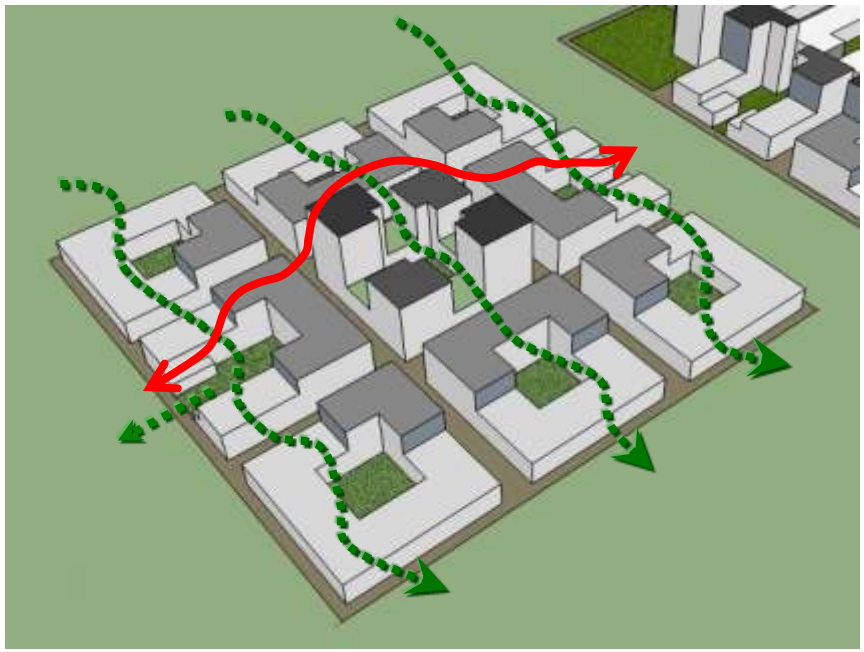
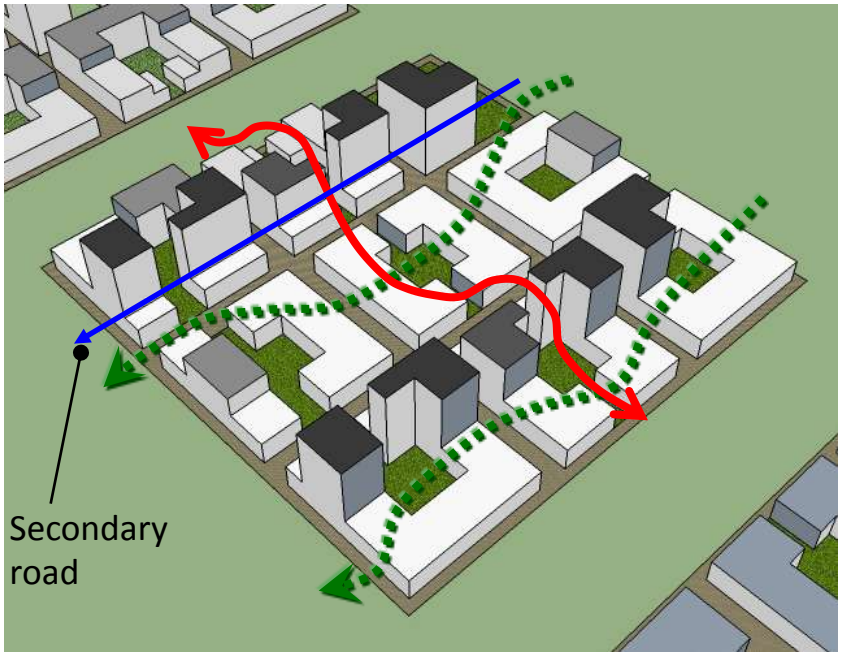
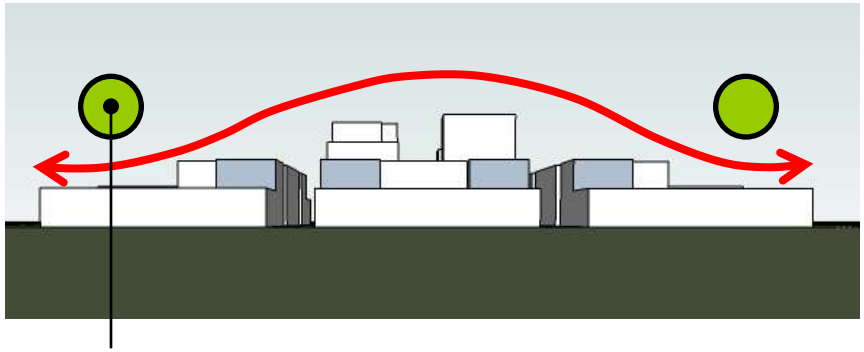
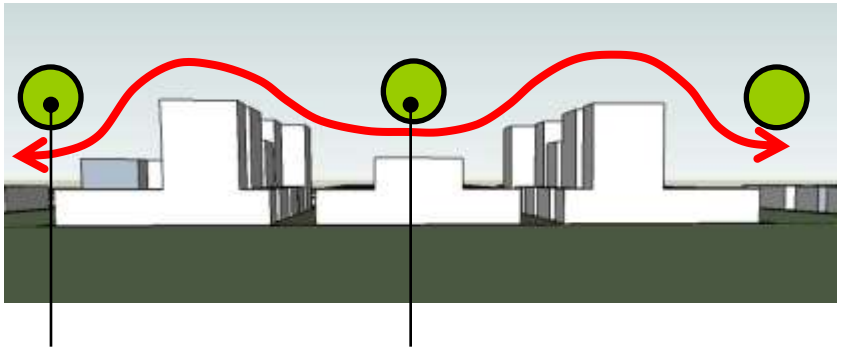


In residential quarter – higher center and lower periphery



Alternate built mass, accommodating retail on the secondary road – considering the pedestrian movement





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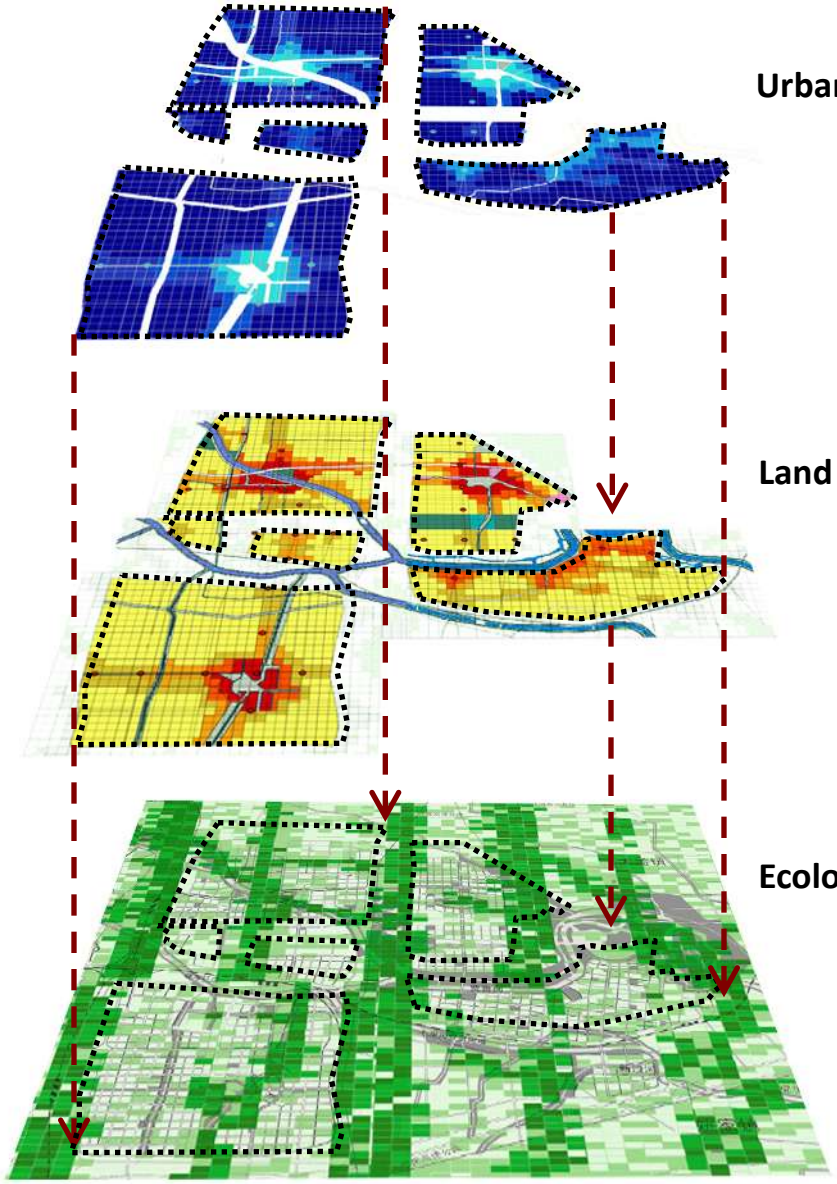


Zhengzhou New Urban-form

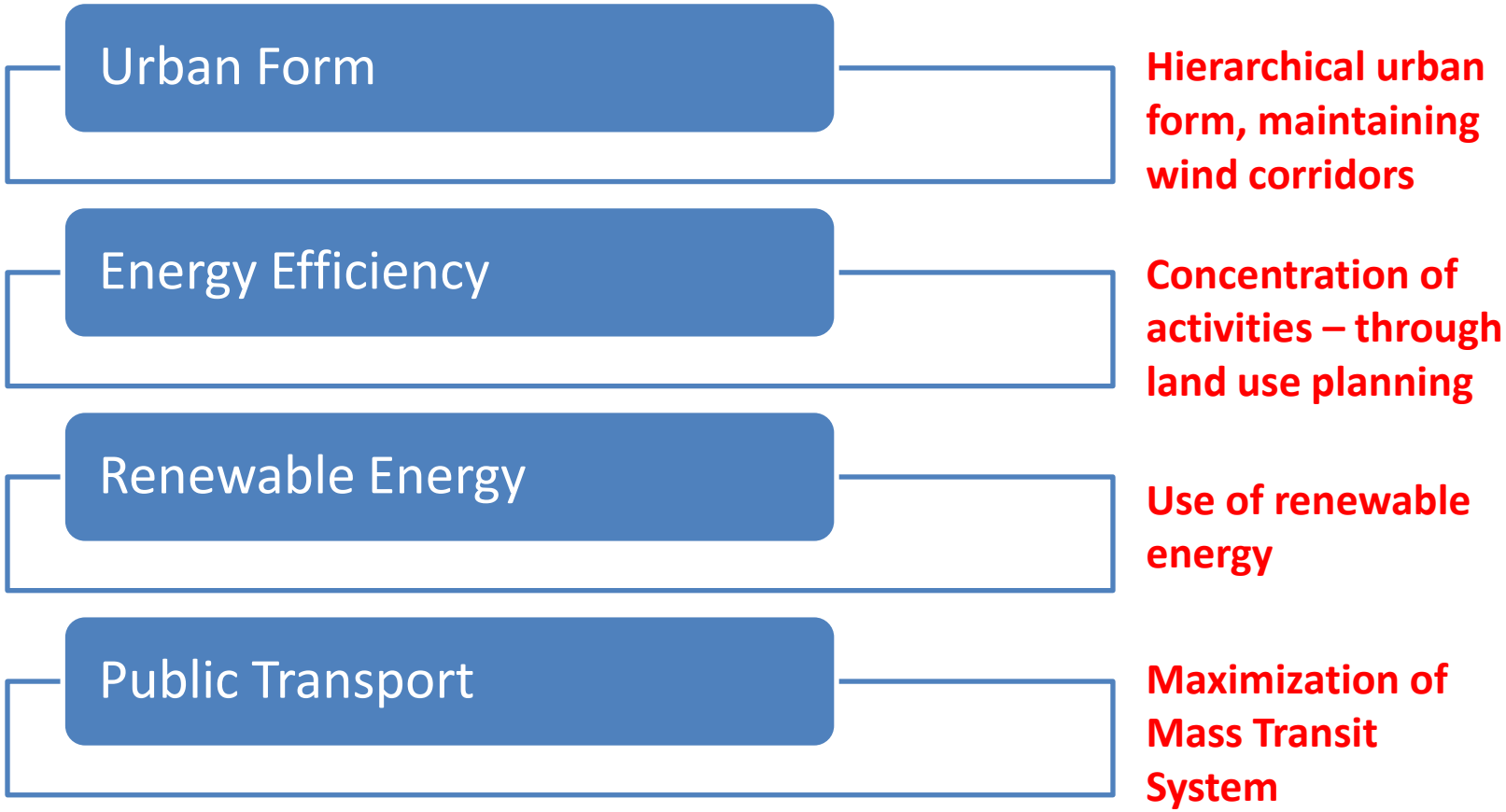
Superimposing the aspect of urban development, viz.

1. **Morphology** (and its corresponding)
2. **Land value**
3. **Ecological strategy,**

will give a comprehensive and optimum development pattern.

With this method there will equal justice given to every aspect.

Achieving **Low Carbon City** through **Strategic Planning**

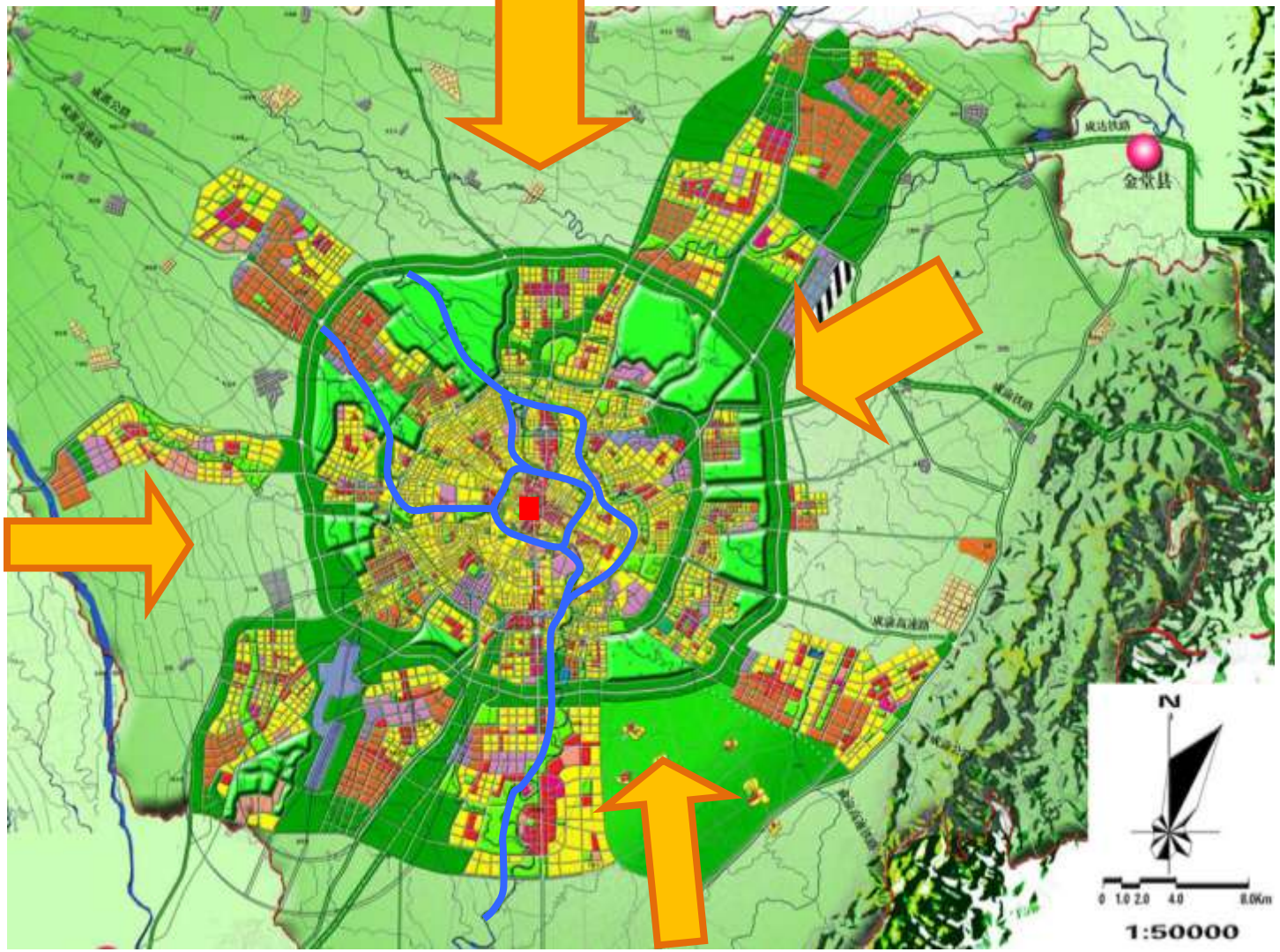


By systematic land use planning, land can be made available for Afforestation and Agriculture, thereby ensuring conservation of biodiversity and food security.

Planning of Jinjiang District, Chengdu, China

Chengdu, Central China

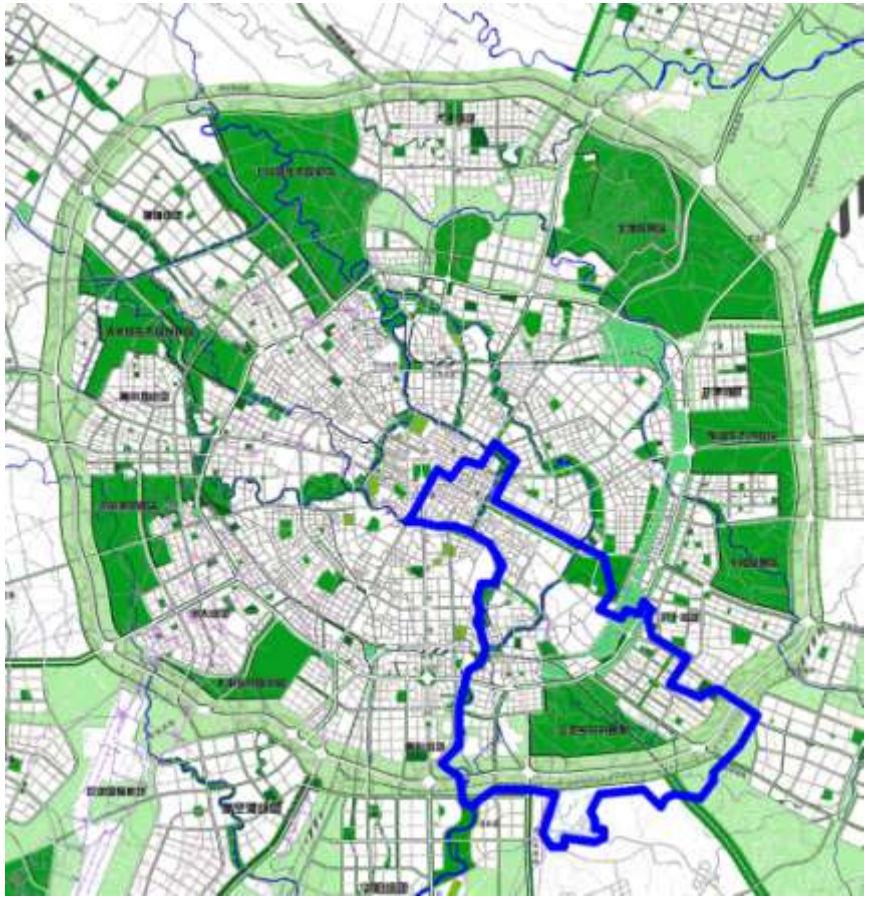
Predominant wind direction

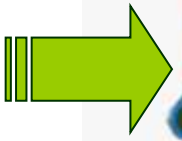


Gentle wind direction

Gentle wind direction

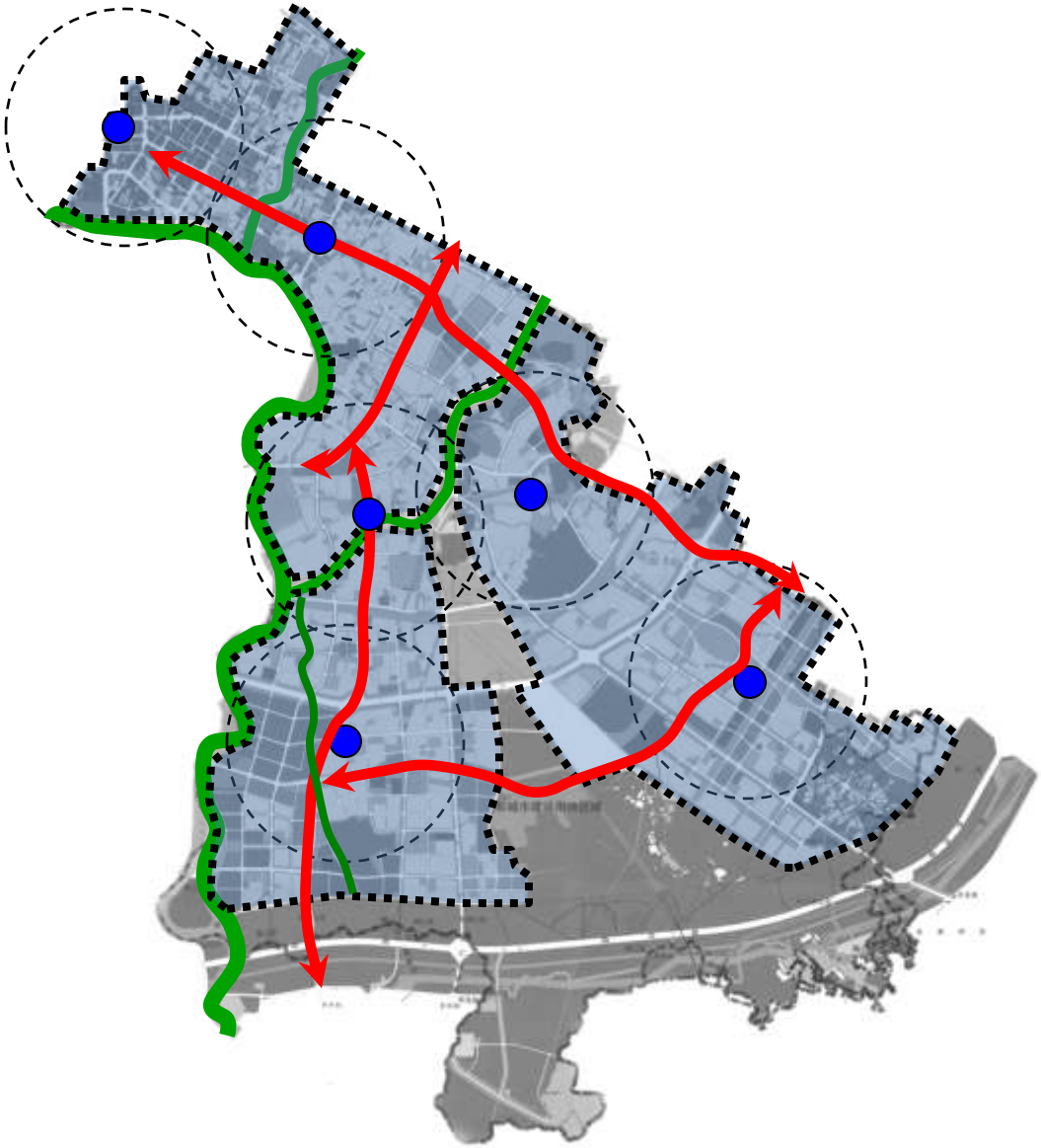
Jinjiang District, Chengdu, Central China

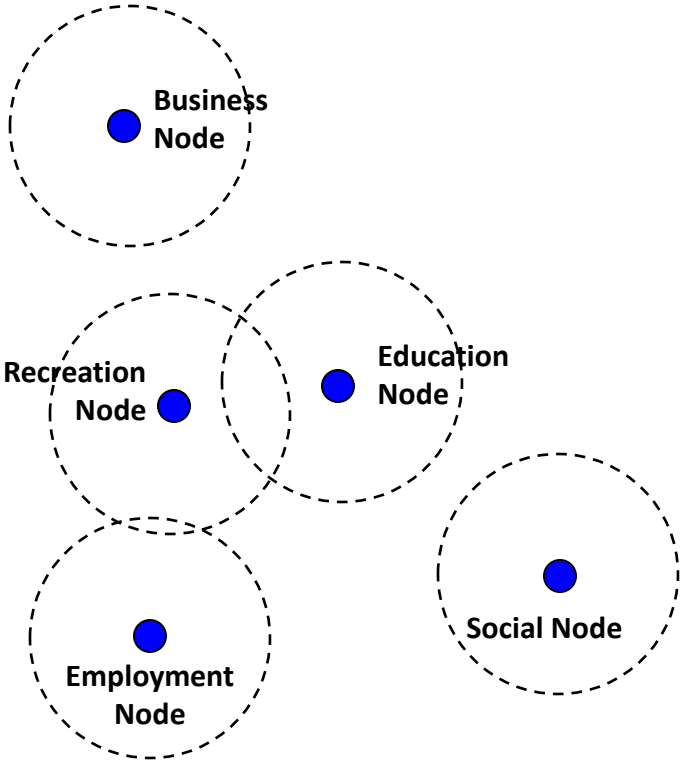




Jinjiang District, Chengdu, Central China

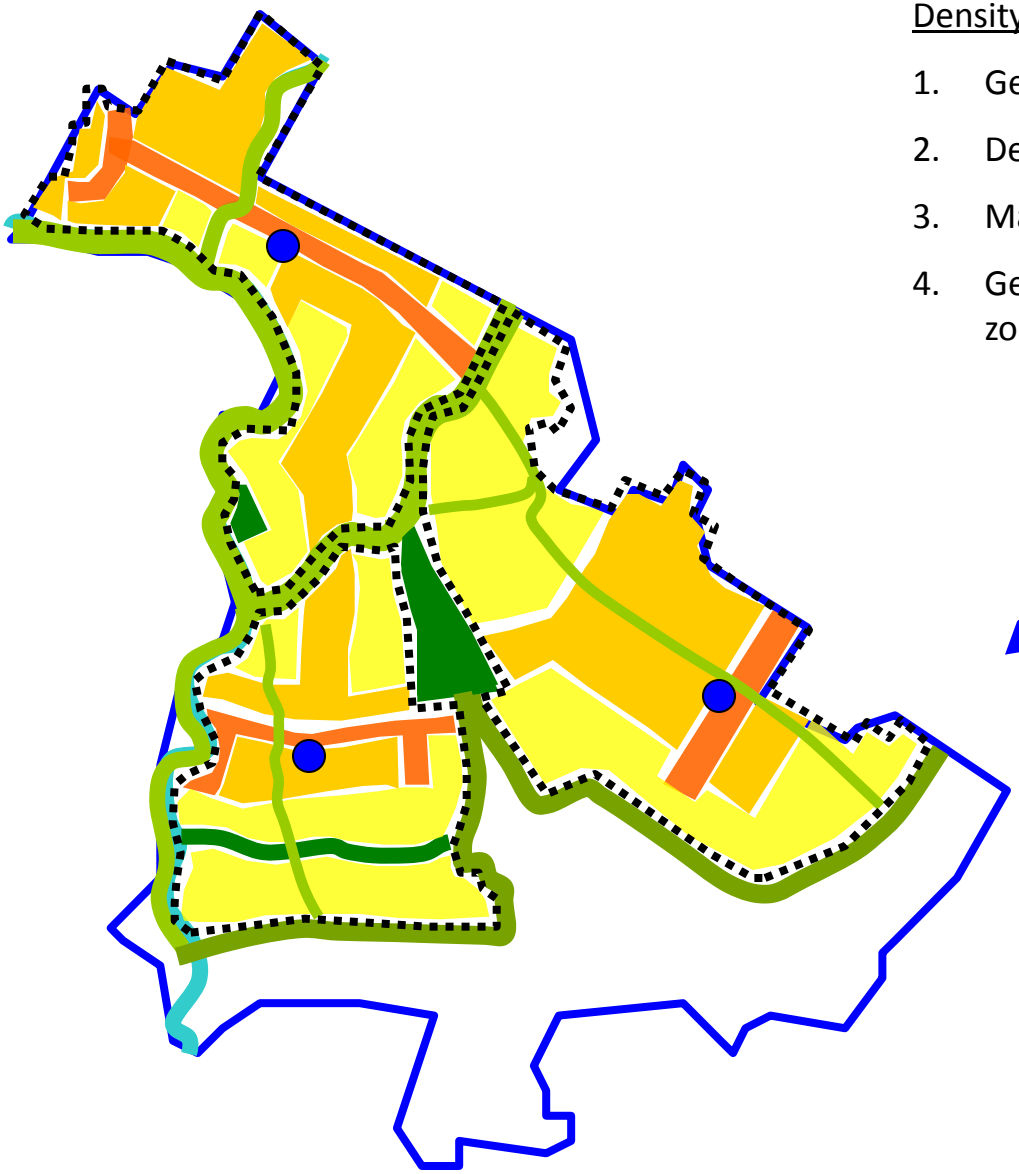
Major public circulation system of Jinjiang district:





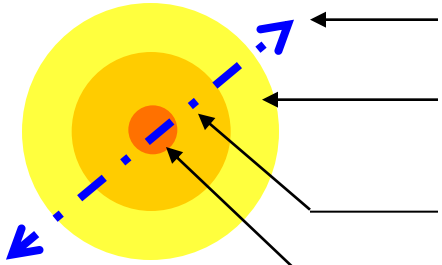
Jinjiang District, Chengdu, Central China

Proposed Density Pattern:



Density distribution pattern:

1. Generate urban vibrancy,
2. Determine focus,
3. Maintain low-key towards the river,
4. Generate distinct density character to each zone



High density development

Medium density development

Low density development

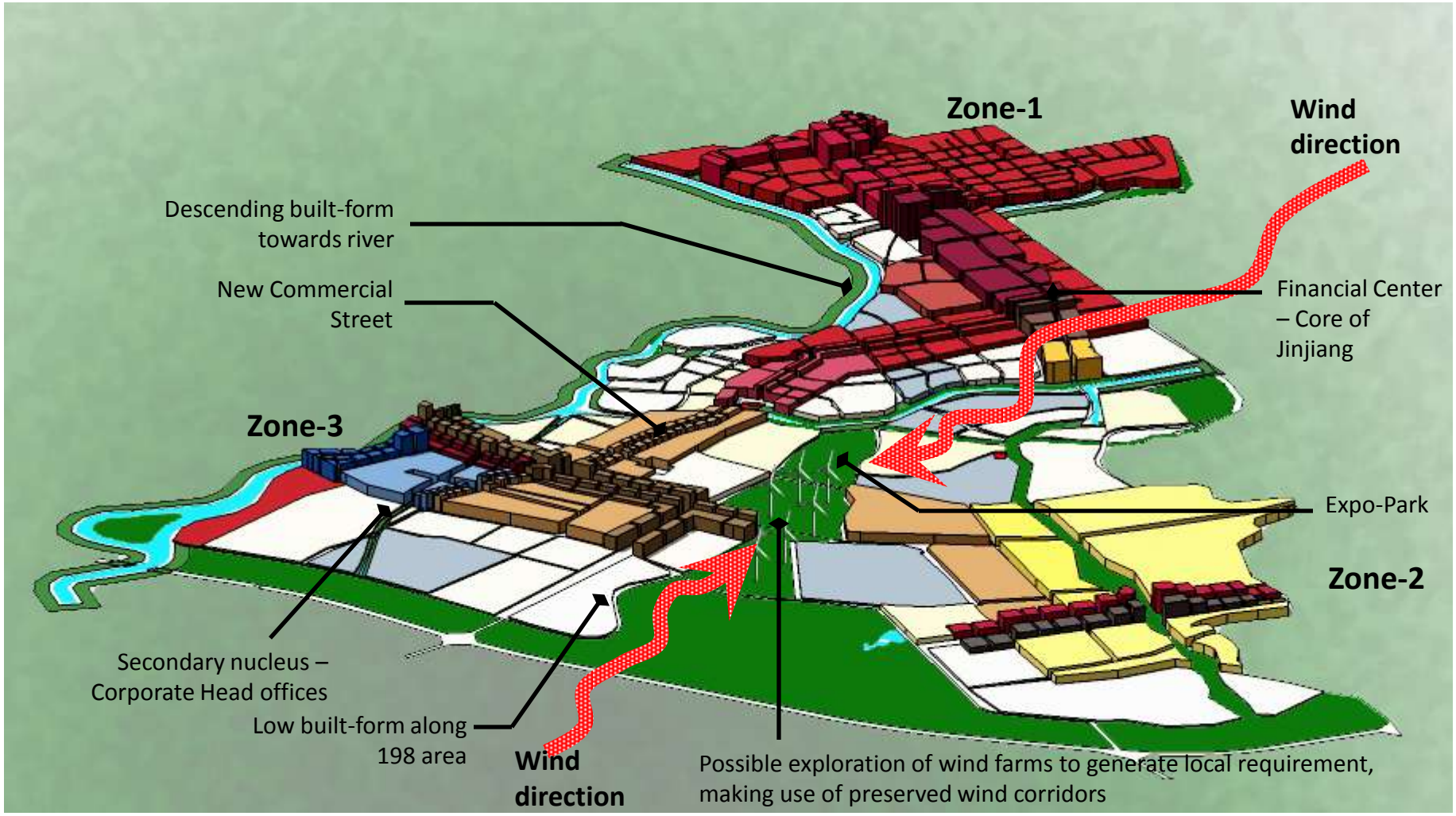
Green area

Green Edge

Transit Node

Jinjiang District, Chengdu, Central China

Proposed Density Pattern for Jinjiang District:



Chengdu, Central China

Principles for a Low-carbon, Energy Efficient City Planning

Key Principles

Networking & integrate natural resources

Mobility options

Manage consumption

Conserve Eco-habitat

Energy efficient building materials

Responsive urban form

As people have systematic choice to live in cities the government should also offer them a systematic choice of opportunities!

Thank you

Rahul Nawle

Managing Director, Eco-sketch Planners Pvt. Ltd.