



A Collection of Primary Tools



Compact Urban Development

Tool CUD 1: urban form – density nexus

What this tool does:

This tool relates urban spatial configurations (urban design) to urban density. It establishes a relationship which city planners need to manage well if they want to achieve positive urban performance, and want to create benefits of low-carbon development. The underlying assumption is that compact urban development can reduce travel and transit requirements, makes more economic use of infrastructure and that it economises on scarce land resources.ⁱ

How does the tool work:

Five Key Policy Strategies for Compact Cities – 20 Sub-strategies

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|--|--|
| 1. Set explicit compact city goals | <ul style="list-style-type: none">• Establish a national urban policy framework• Encourage metropolitan-wide strategic planning |
| 2. Encourage dense and contiguous development at urban fringes | <ul style="list-style-type: none">• Increase effectiveness of regulatory tools• Target compact urban development in green-field areas• Set minimum density requirements for new development• Strengthen urban-rural linkage |
| 3. Retrofit existing built-up areas | <ul style="list-style-type: none">• Promote brown-field development• Harmonise industrial policies with compact city policies• Regenerate existing residential areas• Promote transit-oriented development in built-up areas• Encourage “intensification” of existing urban assets |
| 4. Enhance diversity and quality of life in urban centres | <ul style="list-style-type: none">• Promote mixed land use• Attract residents and local services to urban centres• Promote focused investment in public space and foster a “sense of place”• Promote a walking and cycling environment |
| 5. Minimise adverse negative effects | <ul style="list-style-type: none">• Counteract traffic congestion• Encourage the provision of affordable housing• Promote high-quality urban design• Encourage greening of built-up areas |

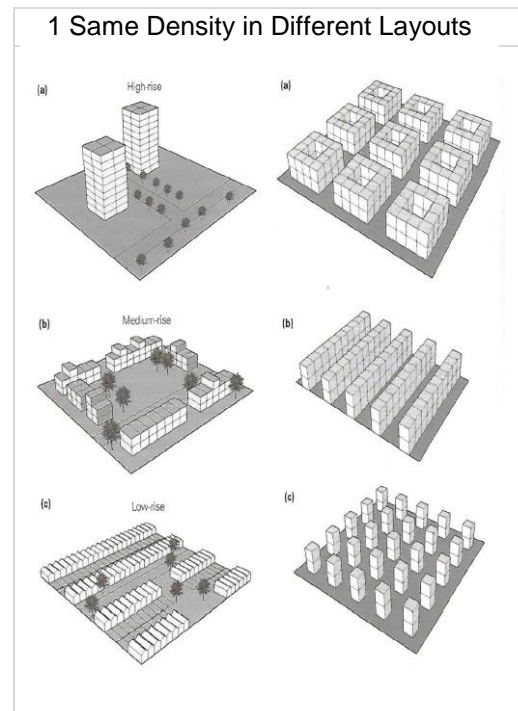


Definition of urban density:

Land use densities are commonly measured by population density, typically in residents per hectare / 1 ha = 100x100 meters, occasionally also in habitants per km². But since the floor area can vary a lot dependent on culture and housing cost, the calculation in 'residential density' – the number of dwellings on a given surface of land – is another important planning criterium. However, a given density level does not necessarily pre-determine the urban form, as the comparative graph illustrates:ⁱⁱ

Last but not least, The Floor Area Ratio (FAR) informs about how much floor space can be constructed on a piece of land of a given surface. Recommendations on FAR and other related measures are shown in Graph 2 on the following page.

It should be mentioned as well, that these tables are highly hypothetical and do not take into account the existing layout of the land, the topography and local culture. Furthermore, if applied mechanically, the resulting urban space can become very monotonous which a good urban designer tries to avoid. In this sense, the more flexible recommendations issued by UN-HABITAT[^].ⁱⁱⁱ



Summary Recommendations Concerning Urban Density According to UN-Habitat

- Small blocks and dense, well connected street patterns with at least 80 to 100 street intersections per sqkm.
- Adequate space for streets. Based on international benchmarks of efficient, inclusive and sustainable cities, the street network should occupy at least 30% of the land, and with at least 18 km of street length per sqkm.
- High quality public space.
- Good quality pedestrian connections such as sidewalks and street crossings.
- Traffic calming, traffic and parking management.
- Density levels over an 800-metre area within walking distance of a station depend on the magnitude of transit investments. Recommended densities of at least 15.000 persons per sqkm for sustainable neighbourhoods.
- Mixed land use that will attract occupants, create an attractive environment (services, amenities, public infrastructure, and design qualities), and produce substantial public transportation ridership – specific mix will vary depending on location in region, local context and connectivity.
- At least 40% of floor space should be allocated for economic use in a sustainable neighbourhood.
- Limited land use specialisation. This is to limit single function blocks or neighbourhoods; single function blocks should cover less than 10% of any neighbourhood.
- Social mix. The availability of houses in different price ranges and tenures in a neighbourhood should accommodate different incomes; 20 to 50% of the residential floor area should be for low cost housing and each tenure type should not be more than 50% of the total.

Development Standards Matrix as per the China Sustainable Cities Program

| | Mid-Rise Residential | High-Rise Residential | Tower Residential | Mid-Rise Commercial | High-Rise Commercial | Tower Commercial |
|--|--|------------------------|--|--|---|---|
| Maximum building Height | 10 storeys Max 46 m. | 20 storeys Max 91 m | 33 storeys Max 149 m | 16 storeys Max 96 m | 30 storeys Max 180 m | 50 storeys Max 300 m |
| Total Maximum FAR | 2.7 | 3.5 | 4.0 | 4.0 | 6.0 | 8.0 |
| Minimum/maximum Sidewalk Commercial / FAR | 0.12 / 0.4 | 0.12 / 0.4 | 0.12 / 0.4 | 0.3 / 0.65 | 0.5 / 1.3 | 0.5 / 2.0 |
| Building Coverage Max. | 40% | 40% | 40% | 65% | 65% | 65% |
| Green Coverage Min. | 30% | 30% | 30% | 20% | 20% | 20% |
| Street Frontage | Min. 70% facing East/West streets Min 60% facing North/South streets | | | Min. 70% facing all streets | | |
| Maximum and Minimum Street Front Setbacks | 0-2 meters @sidewalk commercial 1-3 meters @office 3-5 meters @ residential 0-1 meters @ within 15 meters of intersection | | | | | |
| Solar Spacing – all 'small blocks' | North side- Building height limited to adjacent street right of way dimension plus building setback Block interior – maximum 45 degrees from building to the bottom of the first residential floor of the building to the north | | | Building elements 7-16 stories must be placed to provide 45 degrees solar setback to any residential property lines to the north | | |
| Tower elements – Maximum Floor Plate | NA | NA | 400 square meters for tower element above 20 storeys | NA | 1,200 square meters for tower element over 16 storeys | 1,200 square meters for tower element over 16 storeys |
| Primary Pedestrian Entry | Primary entry must be located on and directly accessible to the most important public space or street. Multiple entries are encouraged. | | | | | |
| Parking Structure | Above grade structure must include sidewalk commercial use at ground floor where fronting street. Below grade preferred. | | | | | |
| Maximum Parking Ration | 1 space per dwelling unit. Other uses as per existing code. | | | | | |
| Parking Entry | No entry off major streets 50 meters or greater. No entry within 20 meters of intersection. | | | | | |

Source: The Energy Foundation - China Sustainable Cities Program (ed.). 2011. *Design Manual for Low Carbon Development*. p .46. <http://www.chinastc.org/en/research/34>

ⁱ Source: OECD. 2012. *Compact City Policies – A Comparative Assessment*. <http://www.oecd.org/gov/regional-policy/50524895.pdf>

ⁱⁱ Source: Ng, E. (ed.).2010. *Designing High-Density Cities for Social & Environmental Sustainability*. Earthscan. London, p. 10.

ⁱⁱⁱ Adopted from: UN-Habitat. 2012. *Economic Foundations for Sustainable Urbanization: A Study on Three-Pronged Approach: Planned City Extensions, Legal Framework, and Municipal Finance*. Nairobi. p. 43. <http://unhabitat.org/books/economic-foundations-for-sustainable-urbanization-a-study-on-three-pronged-approach-planned-city-extensions-legal-framework-and-municipal-finance/>