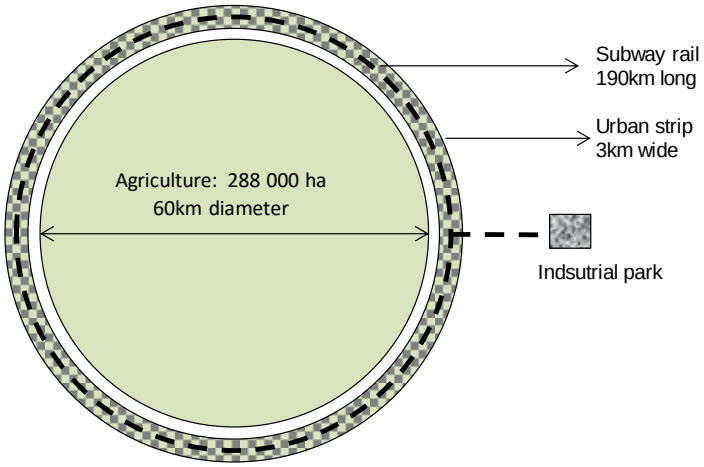
# INTERNATIONAL PARTY


## A practical approach to obtain green and more efficient cities

**(2018)**

**Summary**

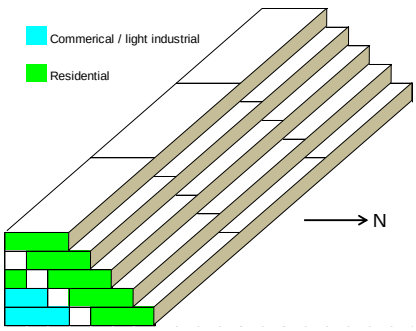
Given half the world's population is still rural, but urbanising at a fast rate, there is much potential for humankind to construct its new cities in a sustainable and green manner. Presented here is a new proposed way to build cities such that they are **more economical** in terms of transport, space usage, energy consumption, food production, aesthetic appearance, noise pollution, tranquillity and environmental footprint. Below is a simple picture of a **green-belt city** with an underground rail system (subway) as main transport method. More details follow, starting with the design of the buildings, the neighbourhoods and finally the city as a whole.

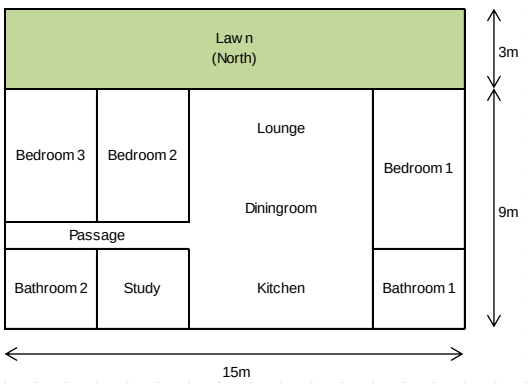



**Designing the apartment buildings:**

Multiple objectives can be attained by adopting **terraced-like** mixed-use residential-commercial buildings as basis for people to both live and work in. These terraced-buildings can be arranged in efficient **high-density** neighbourhoods. The advantage of a terraced building is that each apartment could enjoy its own lawn and garden on its front side. Below is a short description of the design and potential of such a terraced building:

1. Number of **storeys** (levels): 5 (5 apartments partially on top of each other, with commercial and light industrial space behind and below them.)




2. Size of each **apartment**: 135m$^2$ (15m x 9m). It is slightly larger than the average house size in Europe.

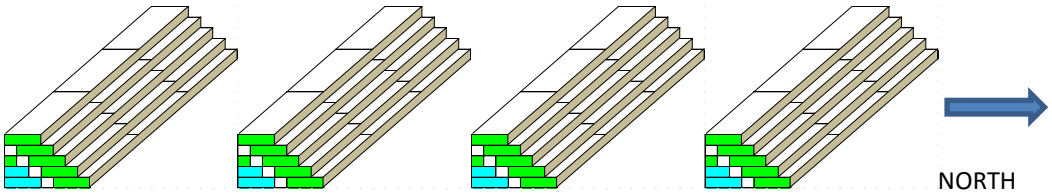
3. Smaller **studio units** (8m x 3m = 24m$^2$) and hotel rooms are also provided on the back side, for students, travellers, patients, etc.
4. Each building faces *north** and can be of any multiple of lengths. The cross-sectional width is 21m.
   *(*north is used in this document, but for buildings in the northern hemisphere south will be implied)*
5. Size of the **grass lawn** and garden in front of each apartment: 45m$^2$ (15m x 3m). It is built on the roof of the apartment below –made possible as a result of the stepwise structure of the terrace.
6. Floor space available for retail, schools, light industries (**places of work**), entertainment etc: 28% of the residential space available, in line with the building ratio in many countries.
7. With their places of work in the same building they live, the need for people to **commute** daily will be much less.

**Designing the neighbourhood lay-out:**

Many of the vices of today's modern cities stem from the **automobile**. These are vices such as noise and air pollution, urban sprawl and many traffic accidents. In general, middle class households spend around 20% of their income on private transport, thus working one day every week simply to own a car. Designing a city in such a way to allow for underground rail, bicycle roads and walkways (and sidestepping the need to own cars) could thus bring about:

1. Cleaner air,
2. A tranquil atmosphere (hearing birds and people talking instead of cars and rushing noise),
3. A 4-day work week (people save on private travel costs).

To **achieve** a high density and avoid the need for cars, the terrace-buildings could be laid-out in parallel rows of say 250m long, forming blocks of parallel streets for pedestrians to walk in.



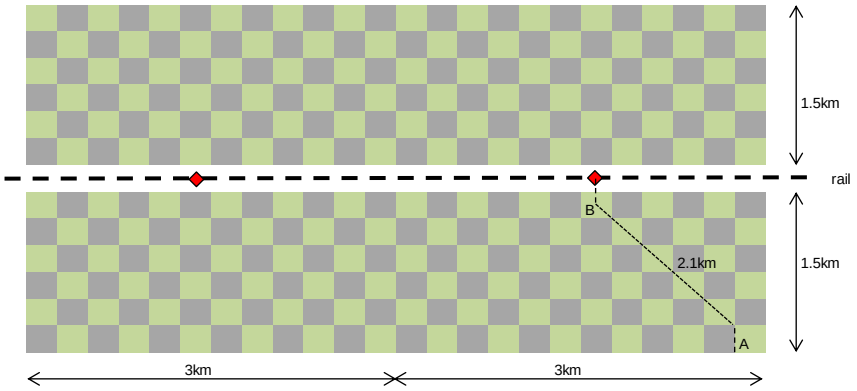

A hypothetical **estimate of the population** density can be made on the following assumptions:

1. Street length: 250m, allowing for 16 apartments next to each other.
2. Number of apartments per street: 80 (16 in a row by 5 storeys)
3. Number of studio units and hotel rooms per street: 30 (8m each fitting into 250m)
4. Average number of people per residential unit: 4 per apartment and 1.5 per studio, allowing for 365 people per 250m-street.
5. **Streets** are 25m wide, and buildings 21m wide, allowing for 6 buildings and 5 streets every 250m.
6. This would then constitute 660 residential units (6 x 80 plus 6 x 30) in every 250m x 250m block.
7. With an average of 365 people per street and 6 streets in a block, then **2190 people** can live in a block.
8. Allow an open space, such as a park or sports field, of equal size for each block
9. Then 8 blocks would fit into 1 square km, together with 8 parks of 250m x 250m each.
10. The population density per km$^2$: 17 520 (8 blocks of 2190 people each)
11. **Size** of a city for 10 million people: **571km$^2$** (this is small compared to London which is 1570km$^2$ for 8.3 million people).

**Designing the city lay-out:**

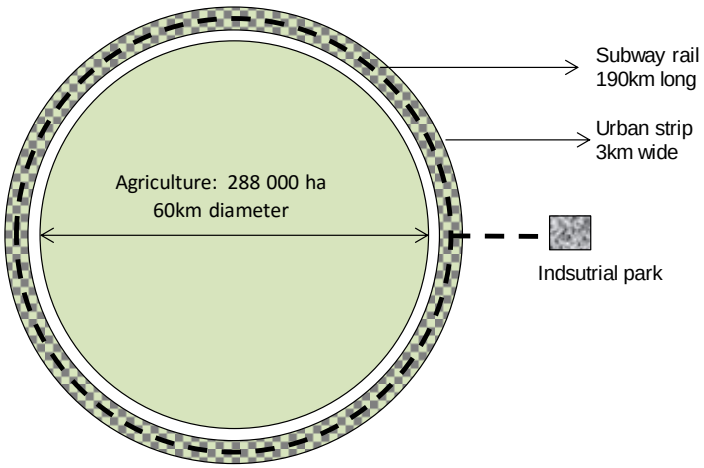
Ideally, all residential apartments should be within walking distance from a subway station. To estimate the ideal distance, consider the following arguments:

1. The **walking speed** for humans is roughly 5km per hour, or 12 minutes per kilometre.
2. The **walking distance** of the furthest apartment would roughly be twice as far as the average distance.
3. Build the neighbourhoods in **belts (strips) of 1.5km wide**, both sides of the subway, with a distance of 3km between each subway station:




4. In this case the **furthest** apartment will be 2.1km from any station, or 25 minutes of walking.
5. On average it will take a **commuter** 12.5 minutes to walk to a station of departure, and another 12.5 minutes away from the station of arrival.
6. This sums up to an average of 25 minutes of walking per commute (an acceptable level).
7. The person living in the furthest apartment and travelling to another furthest point will walk twice as long per commute (50 minutes). It's a long time, but still doable and no reason to buy a car.
8. In general, most people will **not have a need** to commute by subway every day, since their places of work will be in their own buildings and neighbourhoods.

An **efficient** way for a city of this design is to arrange the neighbourhood belts and subway in a **closed loop**. However, any form could be used, such as a belt along the coast. For a practical example, consider the circular form of diameter 60km:




For this example, the following properties apply:

1. A **subway rail** of 190km, the circumference of the large circle. (London has 420km of subway rail.)

2. A **station** every 3km implies 63 stations around the circle (London has 270 subway stations.)
3. There are no rail **crossings**, thus less accident risk and remarkably lower cost.
4. Each station serves nearly 158 000 people, reaching a high level of **scale advantages**.
5. Inside the large circular city will be a land area of 288 000 hectares that can be used for the intensive **agriculture**.
6. By practicing intensive agriculture, the city can supply 72% of its own food from within the 288 000 hectare inner circle. (Israel manage to feed 25 people a healthy diet from each hectare of arable land.)
7. By adding an outer ring of cultivated land which is 14km wide, the city would be able to feed itself completely (in a circle of diameter 77km).

**Advantages of such a belt city are:**

1. **No cars** are in sight, underground tunnels connect all neighbourhoods.
2. As result there is **no noise** pollution –the city will have a very peaceful and tranquil atmosphere to it.
3. **Higher safety** duo to fewer road deaths and car accidents as people will have to drive a lot less, and pedestrians will not have to cross roads.
4. The **saving** of time, energy and money as working, shopping and housing are very close together –making the economy more productive and efficient.
5. **Environmentally** friendly with all the grass lawns on the roofs. The building will appear green from above, thus the planet's green vegetated area is not sacrificed for the sake of human structures.
6. **Infrastructure** spending by municipalities will be much less on roads, street lights, storm water piping etc. All of this will lower the tax burden on citizens from the local authority.
7. **Self-sustainable**: Most of the food the city-of-10-million need can be produced within its own perimeters.

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