

Productive Transforming of the Urban Traffic Space

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Organisers:



International Co-owners:



BACKGROUND



Organisers:



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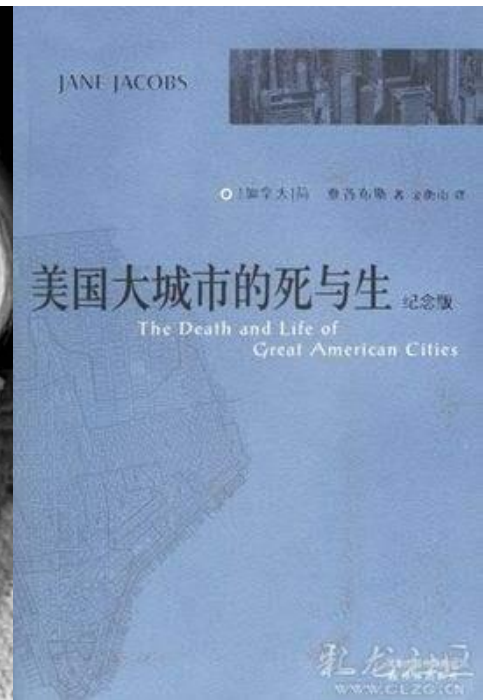
BACKGROUND

- Everyone will contact and feel the “third space” of a city —the influences of the urban transport environment on citizens are non-neglected.



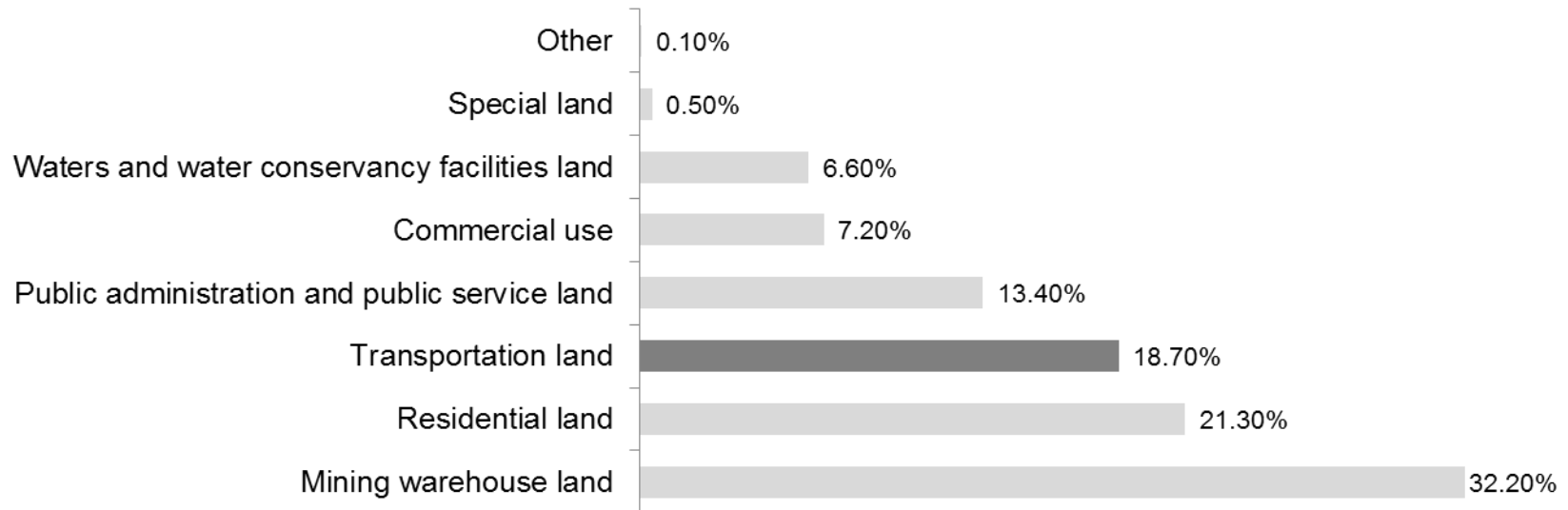
BACKGROUND

- *“A city sidewalk by itself is nothing. It is an abstraction. Streets and their sidewalks, the main public places of a city, are its most vital organs.”*



BACKGROUND

Transportation has taken as much as 7,942 thousand hectares of land (11.913 million acres)



Supply Structure of State - owned Constructions

Photo Source: drafted according to China National Land Resource Statistical Yearbook of 2012



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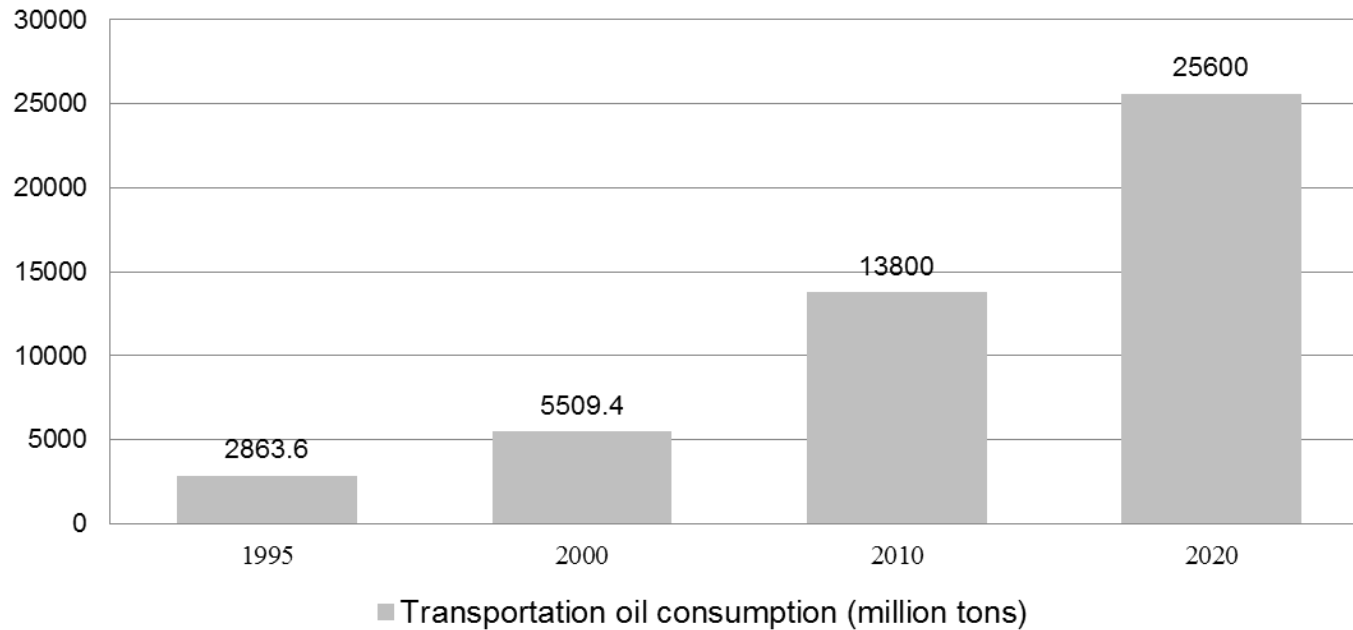


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BACKGROUND



Oil Consumption of Transportation Department

Photo Source: drafted according to China energy statistical yearbook



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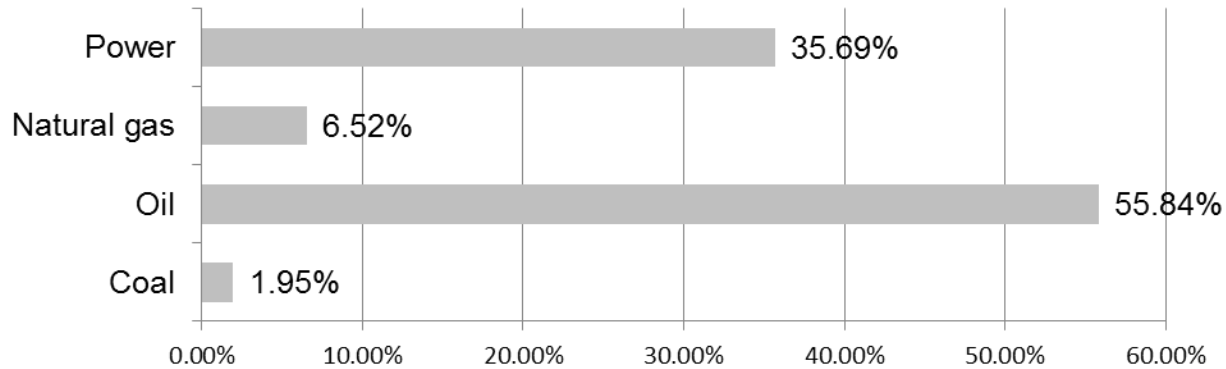
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BACKGROUND



■ Energy consumption for transportation accounted for the proportion of the total

Proportions of all types of energy consumptions of transportation in 2012

Photo Source: according to China energy statistical yearbook in 2013



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BACKGROUND

In a word, the environment of urban traffic is faced with many problems.

- The urban structure lacking the connectivity
- The constraint on urban vitality
- The huge energy consumption
- The low efficiency of land use

Urban Traffic + Productive City



Solar Panels Cover Bike Lane in South Korea
Source: Mila Luleva, Solar Panels Cover Bike Lane in South Korea



Chengdu people grow vegetables in a deserted road greening
Source: Sichuan News Net - Chengdu Business Daily
<http://cd.qq.com/a/20131021/002659.htm>

Productive City & Production



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PRODUCTIVE CITY& PRODUCTION

To change the problems by the current city's emphasis consumption and enable the city to achieve more sustainable development, the concept of productive is being emphasized once again and returns to city.



Urban Agricultural Sightseeing belt in Zhangzhou City

Photo Source: <http://www.officemyp.com/>



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PRODUCTIVE CITY& PRODUCTION

- Productive city is a new concept of urban sustainable development.
- The basic resources necessary for the survival of the people.
- Through the reform of the "supply side" of the urban ecological system, the potential productivity of the city is excavated and the comprehensive carrying capacity of the city is improved
- Realizing the sustainable future of human and nature



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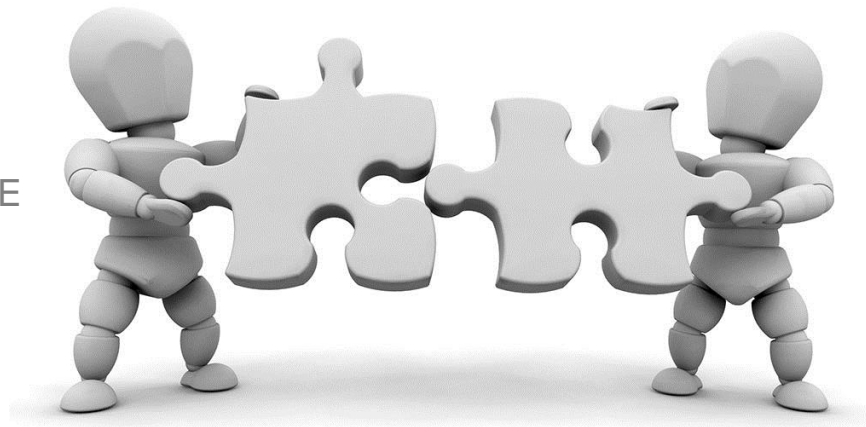


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PRODUCTIVE CITY& PRODUCTION

If the urban roads which have been neglected can be fully utilized for the production of space, energy and resource, it will create huge benefits for the sustainable development of the city.

PRODUCTIVE SPACE



ROAD TRAFFIC



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Classification of Production of Transport Space



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Classification of Production of Transport Space

The productive urban transport can be divided into three types:

- From the perspective that saving is a type of production, the efficient land use of transport is productive;
- The complex land use of urban transport space not only shortens the distance, but also improves the efficiency of land use;
- It is directly integrating the space of productive functions and transport spaces, which has become a completely new means of reforming the transport space.



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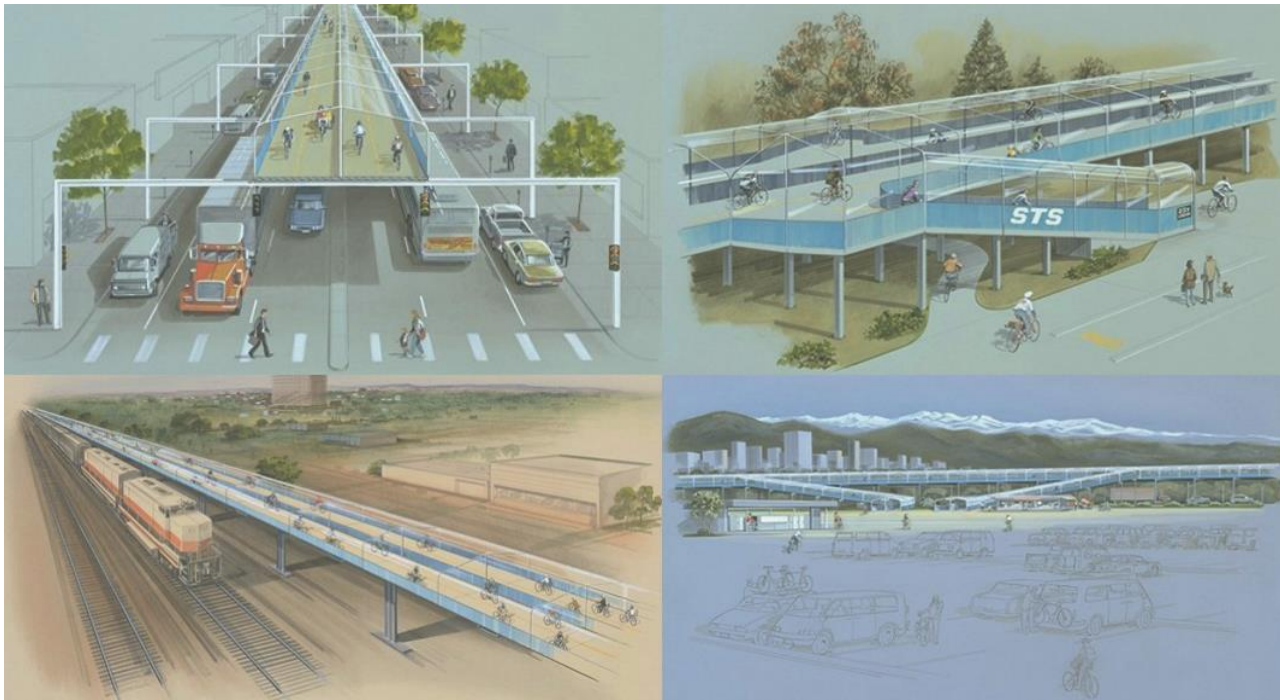


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Classification of Production of Transport Space

Efficient land use of transport itself



The TransGlide 2000™ Bicycle Transit System

(<http://www.biketrans.com/gallery.html>)



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Classification of Production of Transport Space

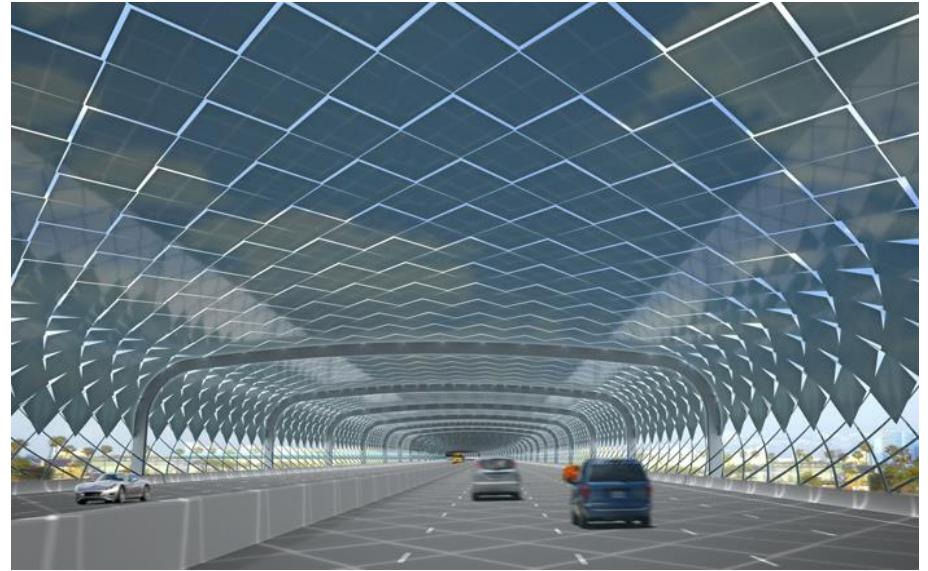
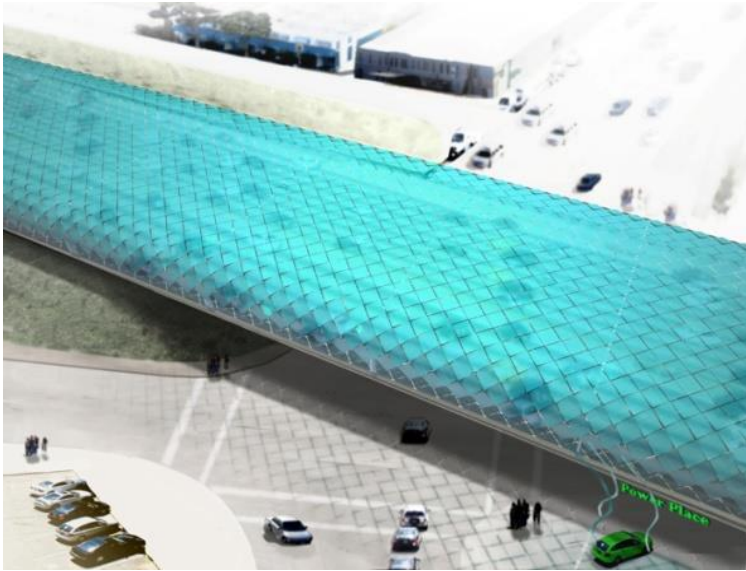
The mixed-function land use of transport



Concept of Future Airport (Alex Sutton, 2016)
<http://www.alexandersutton.co.uk/>

Classification of Production of Transport Space

The combination of transport and production

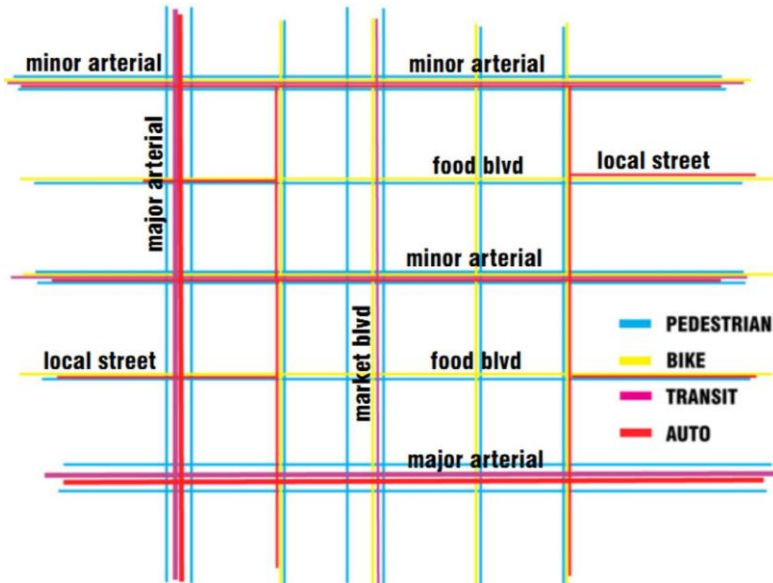


Solar Serpent (Mans Tham, 2010)

<http://www.manstham.com/>

Classification of Production of Transport Space

The combination of transport and production



The linear urban agriculture corridor in Food Urbanism

Andre Viljoen, Katrin Bohn. Continuous Productive Urban Landscapes (CPULs): designing urban agriculture for sustainable cities. Oxford: Architectural Press, 2005



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TECHNOLOGIES OF TRANSPORT PRODUCTION



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TECHNOLOGIES OF TRANSPORT PRODUCTION

Energy harvesting technologies from road infrastructure is a new research territory that encompasses technologies that capture the wasted energy occurred at pavements, accumulate and store it for later use.

Traffic Space	Energy Harvesting Technologies
Side Space	PV-Noise Barriers
Surface Space	Piezoelectric Sensors
	PV-V2G
	Induction Charging
	Nanomaterials
	Phase Change Materials
	TNO
Upper Space	PV Canopies
	Asphalt Solar Collector/Hydronic
	PV Bridge Roofs

Comparing the energy harvesting technologies applied to different traffic space
According to Andriopoulou S's research results.

TECHNOLOGIES OF TRANSPORT PRODUCTION

If divided from transport space's type, these technologies can be divided into three types: on two sides of the road, on the road's surface and over the road.

If fact, the spaces on two sides of the road and especially the large-area road buffered region or idle land can carry out more types of energy production technologies, including

- Renewable energy (solar energy utilization, wind energy utilization, biological energy and other renewable energy)
- Agricultural cultivation.



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CASE ANALYSIS



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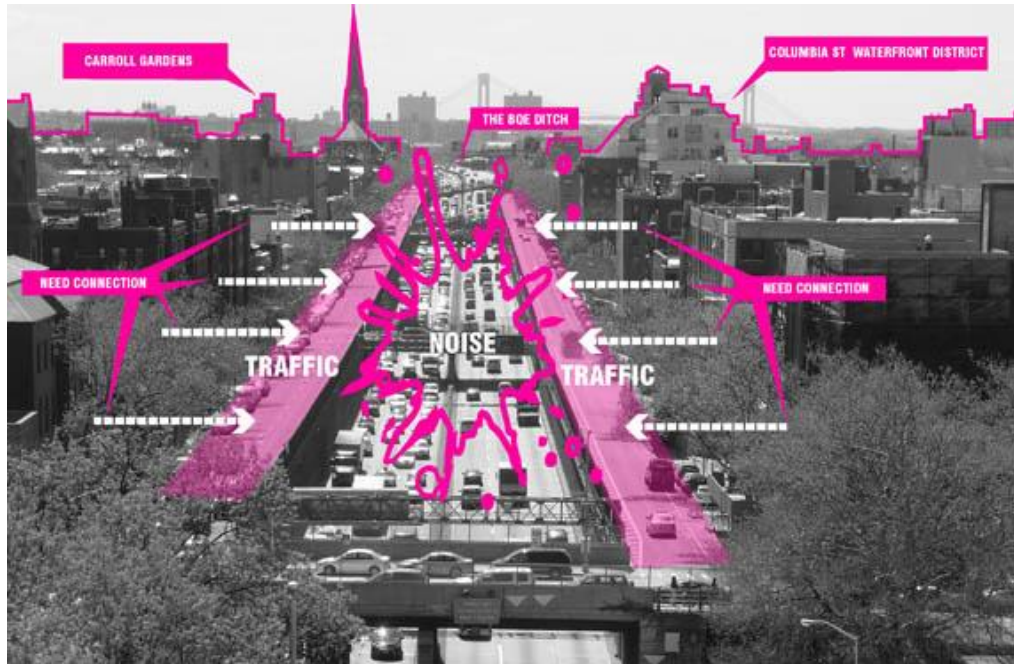


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CASE ANALYSIS

Brooklyn-Queens Expressway

Brooklyn-Queens Expressway(BQE) was completed in the 1950s. A lower groove was used to change the twisting lines at the upper layer, which could ease the traffic congestion at that time.



Existing problems of BQE

According to starrwhitehouse website
<http://www.starrwhitehouse.com/stormwater-management/bqe-enhancement/>

CASE ANALYSIS

New York landscape architects Starr Whitehouse came up with three concepts to improve the Brooklyn-Queens Expressway

Concept 1 Maximum Green



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Concept 2 Connections



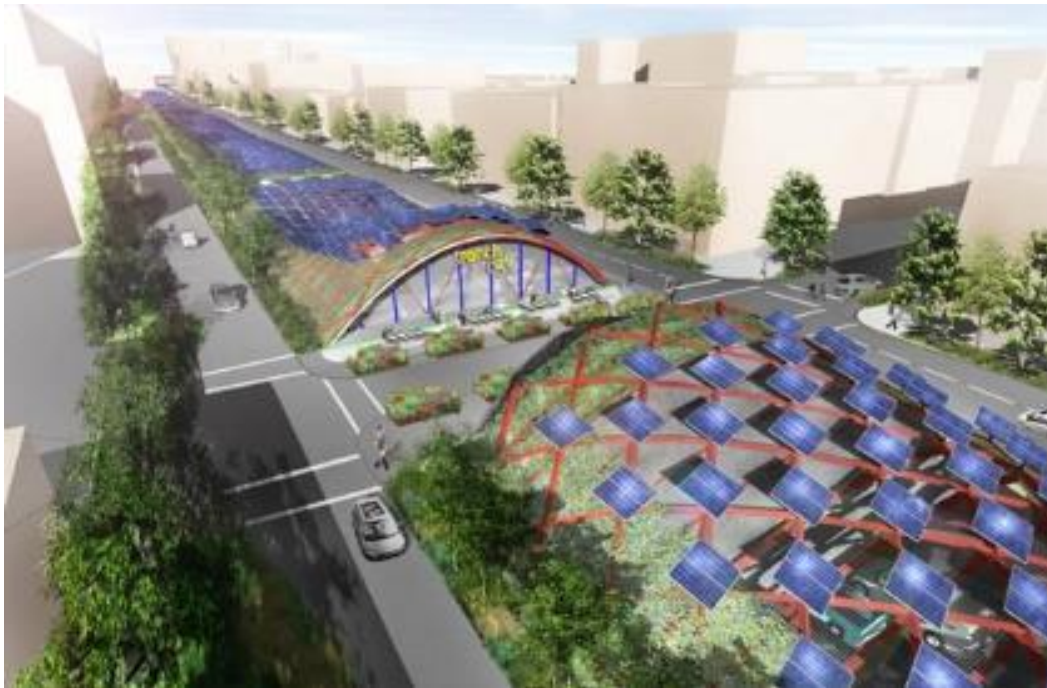
Concept 2 Connections

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CASE ANALYSIS

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Concept 3 Green Canopy



Concept 3 Green Canopy

According to starrwhitehouse website
<http://www.starrwhitehouse.com/stormwater-management/bqe-enhancement/>

CASE ANALYSIS

Concept	Benefites	Drawbacks
 <p>Concept1 Maximum</p>	<ul style="list-style-type: none"> ● Slow traffic ● Shortens crossing distances by 11 feet ● Adds 6500 square feet of pedestrian space ● Adds nearly 1 acre of plantings and 412 new trees ● Employs innovative storm water capture and reuse system ● Optional to reduce noise at street level. 	<ul style="list-style-type: none"> ● Limited noise reduction ● Does not increase accessibility ● Parking would be substantially limited and would require heavy enforcement
 <p>Concept2 Connections</p>	<ul style="list-style-type: none"> ● Reconnects severed cross streets ● Increases connectivity for neighborhood ● Slows traffic ● Adds plantings, trees, and storm water management system ● Optional to add up vines ● Potential for solar cells income 	<ul style="list-style-type: none"> ● Limited noise reduction on Hicks Street ● Expense of each bridge
 <p>Concept3 Green Canopy</p>	<ul style="list-style-type: none"> ● Visually screens the highway ● Adds 100000square feet of vines ● Reduces noise by 9 decibels at street level ● Potential for income from photovoltaic panels ● Reconnects severed cross streets ● Slows traffic and manages storm water 	<ul style="list-style-type: none"> ● High cost ● Major construction on Hicks Street

Comparative Analysis of Three Concepts

According to starrwhitehouse website <http://www.starrwhitehouse.com/stormwater-management/bqe-enhancement/>

CONCLUSION



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CONCLUSION

The research on the transport space's production can play a certain role in promoting the society, economy and environment.

•The renewable energy production

- easing the shortage of power supply
- not exhaustible, huge reserve and clean production
- reduce the use of fossil energy and air pollution
- can integrate with the urban power grid

•The agricultural production

- infusing new vitality to the dense urban space
- easing the over-concentrated function of urban space, tackle the traffic congestion and reduce the urban pollution
- plants can also improve the urban micro-climate and ecological environment



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Thank you



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