

Economical Impetus for Sustainable Architecture in Undeveloped Site

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Abstract: To push forward eco-architecture in China encountered lots of resistances, not only economical but also political factors. Current status of low public awareness of sustainable development to Chinese makes no one would like to trouble themselves in introduce sustainable concept in their projects. This is a primary factor to resist eco-building to be constructed in China. But for undeveloped site, especially in a large scale of Dongtan District of Chongming Island, limited urban infrastructure reduces the speed of start-up project. In the mean while, eco-buildings, relies less on urban infrastructure, find a shortcut to be built and also financially feasible. Case study of collaboration project in Eco-farm on Dongtan district will show the impetus in encourage of sustainable development on economical viabilities and also could increase government's awareness on sustainable development theatrically to achieve maximum policy support. Thus sustainable become the only way for developer to develop their land.

Keywords: sustainable development, undeveloped site, economical impetus, eco-farm.

1. INTRODUCTION

Sustainable development is now a key word for China's development in all fields. Most fields in economical development are trying their best to reach a target which is environment friendly, energy efficiency, renewable, reusable and recycleable by existing technologies. But currently in the fields of architecture and urban development is still drop behind for a long way in doing sustainable.

Till now, it is still a flatulent concept in the field of urban development and architecture. In the period of fast developing in 10%GDP increase, how to develop land use, urban and buildings in sustainable way has been focused well attention by Chinese central government. Although the attention by Government and lots of policy support has been provided, the market still lack of impetus in sustainability but to choose traditional way instead.

Lack of impetus seems to comes from everywhere even sustainable develop is beneficial. This paper focused on these most important resistances and how to use sustainable for impetus in settling development problems in Dongtan District of Chongming Island in Shanghai.

2. PUBLIC AWARENESS

2.1 Architect and urban designer's awareness

Current architecture and urban design education still cast too much attention to the 3-D representation and visual impact. Academy in architecture and urban planning in China mainly educates students in the form and the function. Today young architects and urban designers always even wish to incline the balance between form and function to present the

form by designer to show their own "talent" and ignore the client's real requirement.

Lack of knowledge in the education of sustainable development, renewable energy and sustainability makes students care less for it. Sustainable design should only to considered all these factors at the beginning so that it will achieve its best result. Designers wish to hand in these problem to engineers to solve later, which has already bar a overall well considered design.

2.2 Land owner's awareness

In China, whatever land property it is, finally it is a national property and belongs to government. Land developer has the right to use and develop the land, but they are not the really owner. Most land owner either is a government department in land developing or has a government background.

In this case, while the central government has a good wish in sustainable development, the land owner has the responsibility to develop the land in a right way.

But as the matter of government background, the most important role for land owner is to development the land and bring along district development and economical mount up. To gain benefit directly from the land is a secondary way.

In this case, land owner seldom invest on project by themselves. Land owner will choose a better way to introduce investors to invest on the site and running the project by investors. Most land owner company will dismiss after the land is developed (as Shanghai Pudong development Co. was). It is obvious that land owner has a profound government background and does not go in for benefit from the land. Thus makes the landowner try their best to reach the government's anticipation. The result is

that hundreds of "sustainable town" has been referring to the central government to gain policy support.

Although the landowner wished to do sustainable, they are not the real investor's in invest projects. Investors seeking benefit and financial return, has different point of view.

2.3 Investor's awareness

In most cases land owner will seeking investor in land developing project. Landowner has the master plan as the guide line but the investor will have the net present value for account for each project. Usually it is hard to find investors who are really interested in sustainability because of their interests on financial benefit. In this case, landowner also need to catch the speed for the development, and might sacrifice sustainability.

Landowner could care less on financial factor but it is a must for investors. The NPV, pay back period is just a fiscal digital to decide whether or not to invest. As the public awareness to investor on sustainable is hard to understanding, they will just seek existing regulation in limiting their action in invest, and ignore the sustainability.

As the landowner would also like to develop the land ASAP, also there are no easy to executable content of code to act as guideline besides some building energy efficiency regulation emerged in the recent years. What is sustainable develop will still not easy to execute and cannot be used as a fair measure.

3. DONGTAN MASTER PLAN

Dongtan located on the east boundary of Chongming Island in Shanghai. There is an 86 km² land located just 50 km away north side of Shanghai city centre.

Land use for South part of Dongtan for urban developing and north and centre part for agriculture and wetland sightsee land. The entire site is undeveloped and has no local tenement. Geological condition for the land is very young. It just emerged from the sediment of Yangtze River within 50 years.

South part of Dongtan will be developed to be a new town. The schedule for the development still suspended at this moment. There are almost half part of Dongtan is agriculture land, it should have been used for agriculture production. But as recently Shanghai municipal government has changed their policy in reduce the percentage in agriculture because of lack of land to be developed for the increase of Shanghai city and the development for 3rd industry in Shanghai. Also, a new policy bring forward by Shanghai Agriculture Bureau, Shanghai Tourism Bureau and gained approval by Shanghai government in the developing agriculture tourism industry, the possibility in small-scale development in agriculture site become possible and important.

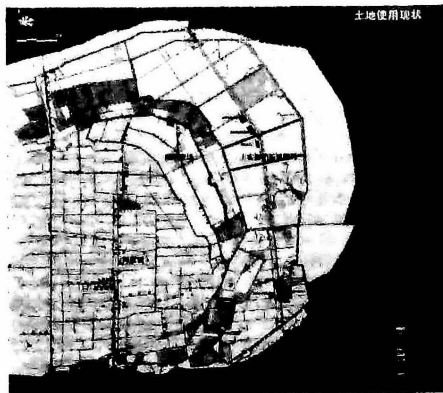


Figure 1: Dongtan Current land use map ^[1]

The north 26 km² agriculture site, as shown on the master plan, has already described to be eco-farming tourism site, to develop the land become a mission for SIIIC Dongtan Co.



Figure 2: Dongtan land use map for agriculture ^[2]

As the company's idea, the site can be developed step by step. It will start from some small scale which occupied around 0.3~1 km² for farmstead. Less than a couple of percent of land will be used for building facilities while others for farming land.

The farmstead then will include these functions:

- Demonstration for ecological farming methods
- Demonstration for eco-architecture
- Demonstration for eco-tourism

As start up project, lot's of topic of tourist attraction has been considered. Such as beer manufacture garden, grape wine manufacture farm, and pasture etc. has been selected.

The scale for the farmstead is not optimized in large scale of agriculture production, but optimized for demonstrate the procedure in the making of these productions and demonstrate of produce organic-food. Also, tourism attraction and accommodation facilities will also be considered. Eco-architecture is also an very important factor.

4. SEEKING INVESTORS

SIIC Dongtan will not directly invest to these farmstead projects but to work as partner. External investors are necessary for these projects.

As mentioned before, the land is entirely undeveloped. Currently the land is used for agriculture. Existing infrastructure cannot meet the requirement for large scale of tourism visiting. Requirement for sewage, electricity, gas supply should be solved.

It is different for the agriculture site to develop as a same way as urban development. Infrastructure construction will then cost lot to cover a wide range of land, especially at the start-up stage. Usually the developing for urban district to make a new town need to invest on infrastructure first then could start project. The cost for infrastructure will be displacing to project investor. As large scale infrastructure construction for urban district has a high-density, it is less expensive. But in Dongtan agriculture site, situation is different.

If the infrastructure will be employed, the cost will be too high for start-up project. And landowner will not willing to pre-invest on that because of unclear foreground for eco-tourism. Over invest on infrastructure on agriculture will be a burden to landowner.

In this case, there is another easy solution that is to persuade the investor to invest on sustainable and renewable energy facilities so that the energy consumption and waste will not exceed the limit for current infrastructure. On-site solution for waste treatment, electricity supply, and gas supply will cost less than to invest on infrastructures.

The landowner then only needs to use existing infrastructure or modify it to fit the use for project. Not too much invest will be cost. Due to the undeveloped site, the land use cost will deduce to a very low standard to ensure the investor will not suffer from sustainability.

Eco-architecture for tourism will then be built within an economical way.

5. WHY INVEST

To invest on these kind of projects might not be possible for invests to gain large benefit. But why do they invest? The fact is the land potential.



Figure 3: Road link map for Chongming Island^[9]

Due to the perfect location for Dongtan connected to Shanghai, there will be a road and railway link to link Chongming Island to Shanghai. It is the closest place for Shanghainess to seeking natural sightsee. The potential for Dongtan for the service as a backyard to Shanghai is obvious. To invest on a farmstead might not be beneficial at this moment, but might be beneficial after the road link is finished after year 2009. Transportation for Chongming Island to Shanghai mainly depends on boat now, after the road linked Chongming to Shanghai, transportation from Shanghai city centre to Chongming Dongtan will only cost less than 50 minutes.

The construction of sustainable buildings will help Dongtan to demonstrate eco-architecture, eco-tourism and eco-agriculture in the same time. It then will be a great sample for China in sustainable development. It will gain media attraction and also help the investor to gain uncountable AD benefits.

Last but not least, to gain the opportunity at the beginning could gain the trust from the landowner to the investor in order to gain more contracts from the landowner to develop at later time. It is a matter for both winning.

6. SUSTAINABILITY

In order to reach these targets, these guidelines for how to use on-site renewable energy and waste treatment need to be considered:

Drainage: Drainage system for human waster and agriculture waste treatment will need to be considered. Due to the site will also be employed by organic-farming method, waste water treatment do not need to treat complex waste. Such as reed bed system could handle the requirement.

Biogas: On-site biomass could be introduced to make into bio-gas. Agriculture crop waste is a good material in making methane for the supply of agriculture producing and support human activity. The solid waster after making biogas can still be able to compost and to use as organic- fertilizer to irrigate the farming land.

Electricity: electricity could generate, from wind turbine and photovoltaic. Dongtan has perfect wind and solar resource. In the winter, CHP system also can generate electricity.

Water: Rain water collect system can be used for grey water to fit human activity such as wash toilet. Drinking water can be import or use deep well water. Deep well water in Shanghai, around 300m deep in Dongtan, the 5th layer, is in drinking quality.^[4]

Building: All architecture should consider passive architecture wisely. It is necessary to simulate the climate in Shanghai condition to find the best solution for low energy consumption buildings. Such as shading, passive day lighting, passive cooling and heating technologies should be considered.

7. DISADVANTAGES

Although these benefits mentioned above, this kind of land developing has still some disadvantages and might be infected in the future.

The masterplan for Dongtan till now did not consider 2nd industry, but only 1st and 3rd industry. We have already encountered some kind of low density manufacturing requirement from the investors. Some eco-house and tourism might need warehouse to pre-assemble parts to saves time in on-site assembly. In the procedure, pollution might emerge.

Also, due to the sustainable treatment method is dedicated to specifically project, were the project changed its function later; the system might not be possible to meet the new demand. Either additional invest has to be made or pollution will be made.

Due to no regulation and official guidelines for some kind of technologies, design should be consider very carefully and must be made by authorised institute. It is hard to find qualified institute to do this job in China.

8. CONCLUSION

In Dongtan Site, because of it is an undeveloped site, it is easy to do some experimental activities on site. Because of the land is agriculture site, all possible infrastructure connection are far away and made the infrastructure investment to be a huge bill, it is possible to save the investment from the infrastructure to contracture on-site solution. It is an economical impetus for farmstead project and made

sustainable the only way. Based on the super potential of Shanghai tourism market, lots of investors will be willing to seize the opportunity to invest on Dongtan. This makes it possible for SII Co., as the landowner, to development at a real sustainable way. Also, based on the infrastructure limitation, sustainable development becomes a filter to choose investors to find these really qualified investors. While sustainable development is the only way, landowner will not be infected by investors to sacrifice sustainability. Eco-buildings, relies less on urban infrastructure, find a shortcut to be built and also financially feasible.

It is good for landowner and government to push forward sustainable develop strategies in a really fast way in using the economical impetus to increase, not to reduce the speeding in sustainable development.

This paper illustrated an immature concept in seeking impetus to push forward sustainable development. This kind of development strategies never executed in China before. Whether or not it will success still not sure. All kinds of problem are emerging at any process in collaboration between all parties. Because of the development just started, all possible collaborators and projects are under the process of discussing and negotiation, it still need time to see the effect.

At this moment, it seems to be doable, but nobody can guarantee if these systems will run successfully or vice versa, to made pollution.

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