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Lifecycle——Practice and exploration of zero carbon rural areas

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先生们、女士们：

大家上午好，我是刘钊，专注于乡村振兴、文旅度假、零碳建筑的研究与实践，通过生态修复和乡村度假链接乡村与城市，为乡村寻找生态可持续的发展模式，为城市谋求健康幸福的生活方式。致力于通过生态环境、人际关系、自我内心三个层面的修复，促进人与自然的和谐共生、人与人之间的融洽相处和人们面向自己内心的自我对话与自我成长，结合乡村文旅度假形式推广零碳生活方式，推动从个人到全社会的碳中和行动。

近年来，新冠疫情、暴雨、洪涝灾害、台风、森林大火等极端天气与自然灾害频发，气候变化减缓刻不容缓，这些严峻的生态危机引起了全球的持续关注。

这些年中国经济快速发展，脱贫攻坚战已经收官，大国文化自信也在不断提升，但乡村面临的各种问题依然严峻，需要构建一个既能够修复乡村生态环境，又适合乡村生态可持续发展，同时还能支持人类与其他生命体和谐相处，共同在地球上可持续生存下去的乡村有机生命系统。这就是我们目前正在研究的零碳乡村有机生命系统——生命之环。

Ladies and gentlemen:

Good morning everyone, I'm Zoe. Focusing on the research and practice of rural revitalization, cultural tourism and zero carbon building; Connecting villages and cities through restoration of nature and tourism of rural areas; Looking for ecological, sustainable development ways for rural areas, and healthy, happy lifestyle for cities. Committing to the restoration of ecological environment, interpersonal relationship, and self-heart; Promoting the harmonious coexistence between human and nature, the harmonious coexistence between person and person, and people's inner self dialogue and self-growth. Promoting zero carbon lifestyle in combination with rural cultural tourism and promoting carbon neutralization actions from individuals to the whole society.

In recent years, COVID-19, rainstorms, floods, typhoons, forest fires and other extreme weather and natural disasters frequently occur. Climate change mitigation is urgent. These severe ecological crises have attracted worldwide attention.

In recent years, China's economy has developed rapidly, the battle to get rid of poverty has ended, and the cultural self-confidence of great country is also improving, but various problems faced by rural areas are still severe. It is necessary to build a rural organic life system that can not only repair the rural ecological environment, but also suitable for the sustainable development of rural areas, and support human beings to live in harmony with other lives and survive together on the earth. This is the zero-carbon rural organic life system that we are currently studying ——Lifecycle.

这个系统不是简单地融合乡村振兴与双碳目标，而是把整个乡村作为一个完整的有机生命体来看待，是一个活着的、有生命的、可以自平衡的生命系统。我们对其中涉及到的居住建筑、公共建筑、庭院、农田、农场以及里面所容纳的生活方式等多种因素结合起来进行深入研究，实现零能、零水、零废弃“三零”目标。零能指的是节能降碳与清洁能源补充，实现能耗的相对平衡；零水指的是减少市政用水，通过雨水收集、净化与循环利用，实现用水的自足；零废弃指的是通过垃圾分类与资源化再利用方式减少垃圾量，比如使用可食材料制作餐具、厨余堆肥或使用废弃物作为建筑或景观小品材料等方式，从源头降低垃圾的产生，把已产生的垃圾用创意的方式变成资源或原材料。

生命之环具有以下几个特征

1、冬暖夏凉，通过被动式太阳能建筑设计，解决保温、隔热、遮阳、自然通风、自然采光的需求，基本不需要空调设施解决冬季采暖、夏季降温，也不需要日间照明；被动式太阳能建筑设计技术主要包括优化建筑布局、加强保温隔热遮阳性能、提高建筑气密性、增加集热蓄热材料、附加南向阳光温室花园、采用自然通风与自然采光、结合外部环境等措施。

2、能源自给，电热水器、厨房电器、冰箱、洗衣机、夜间照明、办公用电等少量的能源需求通过太阳能光伏发电或风能发电提供，不需要市政管线供给能源。

This system is not a simple integration of Rural Revitalization and double carbon goals but treats the whole village as a complete organic life. It is a living and self-balancing life system. Our research base on the organic combining of the following factors: residential buildings, public buildings, courtyards, farmland, plants, and the lifestyles inside them, to achieve the goal of zero energy, zero water and zero waste. Zero energy refers to energy conservation, carbon reduction and clean energy supplement, to achieve a relative balance of energy consumption; Zero water refers to reducing municipal water consumption and realizing water self-sufficiency through rainwater collection, purification, and recycling. Zero waste refers to reducing the amount of waste through waste classification and reuse as resource, such as using edible materials to make tableware, kitchen waste compost or using waste as building or landscape materials, to reduce the generation of waste from the beginning and turn the generated waste into resources or raw materials in innovative ways.

Lifecycle has the following characteristic

1. Warm in winter and cool in summer, through passive solar building design, solve the needs of insulation, sun shading, natural ventilation, and natural lighting. There is basically no need any more for air conditioning facilities to solve heating in winter, cooling in summer, and daytime lighting. Passive solar building design technology mainly includes optimizing building layout, strengthening thermal insulation and sunshade performance, improving building air tightness, increasing heat collection and heat storage materials, adding south sunshine greenhouse garden, adopting natural ventilation and natural lighting, combining external environment and other measures.
2. Energy self-sufficient. A small amount of energy demand such as electric water heater, kitchen appliances, refrigerator, washing machine, night lighting and office power is provided through solar photovoltaic power generation or wind power generation, and municipal pipelines are not required to supply energy.

3、雨水循环，利用建筑屋面与室外庭院收集雨水，通过台地景观的水旱两生植物种植进行层层滞留、净化、下渗，最后汇入下沉花园中的生态鱼池。超出鱼池设计容量的雨水通过溢流装置进入地下储水系统，雨后泵送回台地顶端进行再次净化，然后泵送至厕所用于冲水和庭院用于洗车、花园植物浇灌等；也可以进行消毒处理后供应厨房用水。通过这个方式可以减少污水外排，涵养地下水，节约生活用水成本。此外，台地与下沉花园的微地形为场地内部土方平衡，无需土方外运，减少运输碳排放。

4、食物自给，可食用花园与生态农场的生态种植不仅可以通过种植降低大气中的二氧化碳浓度，同时也用最短的距离直接为使用者提供充足、新鲜的健康食材，就地供应可以降低交通运输成本与交通碳排放。

5、健康安全，可食用花园、雨水花园、屋顶花园、立体花园与生态农场等均采用生态种植方法，通过厨余堆肥、粪尿堆肥、病虫害的生物治理，拒绝化肥与农药的使用，保证土壤与食材的健康和安全。

3. Rainwater circulation, rainwater is collected from the building roof and outdoor courtyard, through the suitable plants in the platform landscape, rainwater can be retained, purified, and infiltrated, and finally flows into the ecological fishpond in the sinking garden. Rainwater exceeding the design capacity of the fishpond enters the underground water storage system through the overflow device, after the rain, it is pumped back to the top of the platform for re purification, and then pumped to the toilet for flushing and the courtyard for car washing, garden plant watering, etc. It can also be supplied to kitchen as drinking water after disinfection treatment. In this way, it can reduce the discharge of sewage, conserve groundwater and save the cost of domestic water. In addition, the micro topography of the terrace and sunken garden is the balance of earthwork within the site, so there is no need for earthwork outward transportation, to reduce the carbon emission of transportation.
4. Food self-sufficient. The ecological planting of edible gardens and ecological farms can not only reduce the concentration of carbon dioxide in the atmosphere, but also directly provide users with sufficient and fresh, healthy food in the shortest distance. Local supply can reduce transportation costs and traffic carbon emissions.
5. Healthy and safe. Edible gardens, rain gardens, roof gardens, three-dimensional gardens and ecological farms adopt ecological planting methods, refuse the use of chemical fertilizers and pesticides through kitchen waste compost, manure compost and the biological treatment of diseases and pests, ensure the health and safety of soil and food.

6、生物多样性保护，通过土壤修复与生态混合种植，模拟自然生物系统生存环境，构建生物群落的生存环境，促进生物的多样化修复与发展。

7、零废弃物，循环体系内部废弃物的处理方式遵循两个原则：源头控制、资源化无害化再利用。源头控制主要是倡导零碳极简生活方式，从源头减少垃圾的制造。资源化无害化再利用包括以下几个方面的考虑：一是厨余垃圾堆肥，减少有机垃圾数量，为植物生长提供有机肥；二是厕所堆肥，通过粪尿分离与分别发酵堆肥返田成为有机肥，无需再外排至污水处理厂处理。三是就地焚烧提供生物质供热，农场、果园、庭院里的果树剪枝、秸秆等农业有机废弃物以及经过压缩处理后的纸质垃圾可通过封闭式的暖炕、火墙火地、铸铁壁炉等进行就地密闭焚烧，采用生物质为建筑供热，同时焚烧产生的草木灰可循环用于粪尿分离厕所的覆盖物，并一起进入堆肥返田。四是不可堆肥、不能焚烧处理的垃圾，如塑料瓶、塑料桶、玻璃瓶、废弃轮胎、农膜等，可利用其热传导性低的特性，结合土壤的高蓄热性能，成为良好的建筑外围护材料、保温材料以及景观小品和景观构筑物的材料来源；五是通过废弃建筑的改造再利用，减少建筑垃圾的产生和新建建筑带来的碳排放。

8、成本可控，这个生命系统不仅要实现以上特征，同时还需要尽量降低成本，让大多数人能够轻松负担的起，才能让更多的人接受并推广零碳生活方式。比如尽量采用被动式太阳能建筑低科技技术而不是高昂的高科技技术降低能耗，与可食用花园结合生产健康食物，废物物的资源化再利用、雨水利用等，都可以大大降低建造成本。

6. Biodiversity conservation. Through soil remediation and ecological mixed planting, simulate the living environment of natural biological system, construct the living environment of biological community, and promote the diversified restoration and development of organisms.
7. Zero waste. The treatment of waste in the recycling system follows two principles: source control, recycling, and harmless reuse. Source control is mainly to advocate a zero-carbon minimalist lifestyle and reduce the production of waste from the source. Recycling and harmless reuse include the following considerations: First, compost kitchen waste to reduce the amount of organic waste and provide organic fertilizer for plant growth; Second is toilet compost, which is returned to the field to become organic fertilizer through feces and urine separation and fermentation respectively and does not need to be discharged to the sewage treatment plant for treatment. Third is provides biomass heating through waste incineration. Agricultural organic wastes such as fruit tree pruning and straw in farms, orchards and courtyards and paper waste after compression treatment can be burned in a closed manner through warm Kang, fire wall and fireplace, biomass can be used to heat buildings, at the same time, the ash generated by incineration can be recycled for the cover of excrement and urine separation toilet and enter the compost and return to the field together. Fourth, garbage that cannot be composted and incinerated, such as plastic bottles, plastic barrels, glass bottles, waste tires, agricultural film, etc. It can be used by its low thermal conductivity and high heat storage performance of soil as good source of building envelope materials, thermal insulation materials, landscape sketches and structures; Fifth, through the reuse of abandoned buildings, reduce the generation of construction waste and the carbon emission brought by new buildings.
8. Controllable cost. This system should not only realize the above characteristics, but also reduce the cost as much as possible so that most people can easily afford it, so that more people can accept and promote the zero-carbon lifestyle. For example, try to use low-tech technology of passive solar buildings instead of high-tech technology to reduce energy consumption, combine with edible gardens to produce healthy food, recycle waste, rainwater utilization, etc., which can greatly reduce the construction cost.

实现零碳乡村有机生命体——生命之环还需要很多内容的深入研究，我们任重而道远，还需要更多的时间扎根乡村、深入研究乡村、踏实服务乡村，为国家的双碳目标实现与乡村的全面振兴贡献一份力量。

非常感谢各位的聆听!

Realizing the zero-carbon rural organic life - the Lifecycle still needs a lot of in-depth research. We have a long way to go, and we also need more time to take root in the rural areas, deeply study them, and earnestly serve the rural areas, to contribute to the realization of the national double carbon goal and the all-round revitalization of the countryside.

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