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The energy policy outlets for community acceptance of ecological investment in China☆

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ABSTRACT

Policy implication about satisfactions of energy use and housing are much sensitive to social discount rate changes, which can increase the dissatisfaction of residential happiness because of an increasing price mechanism when '*per capita*' resource faces to decline. We thus estimate the private expected rates of return on ecological investment to improve urban and peri-urban environmental infrastructures are about to 7.54% and 18.37% respectively. The endogeneities of income and saving rise can increase the uncertain part of private discount rate up to a higher estimated subjective social discount rate about 14.46% for urban or 8.86% for peri-urban environmental infrastructures improvement. The estimated time preference rate can be raised from 1‰ to 1.72‰. The prediction of these estimated private discount rate can ease at least 20% of the dissatisfaction to energy use and 10% of the dissatisfaction to housing conditions. Therefore, we suggest opening the landscape rights to individual willingness-to-invest, and providing options to let people pay a part of their pensions for temporal permits to living in some well-served villages where are close to the places with advanced environmental amenities and being supported by central planning policy *via* the crowdfunding operation for improving environmental quality.

1. Introduction

Before this paper written, COP21/CMP11 at Paris 2015 proposed a much more flexible plan for multilateral cooperation of emission mitigation. It presents a bottom-up framework design reflecting the initiative 'acceptance' of emission mitigation in every participating country. This logic is clear that a bottom-up scheme has an initial level in a country. However, it is uncertain that sub-national regulations and individual choices for ecologically friendly behaviors.

The initiative 'acceptance' of emission mitigation at sub-national level highly likely contains more uncertainties. Unlike the legislations and regulations are always top-down implements, community acceptance of cleaner goods usually falls to a sticky situation when residents would get a more expensive bill of living expense. On the one hand, environmental conservation responsibility is regulated in a blurry way in laws and ordinances of some developing countries which are usually too broad to be implemented because mixed regulations of environmental governance at different ranks of administrative hierarchy are expressed in a manner of "what should be" rather than "what in fact". The planning laws that try to fix this gray gap between "should be" and "be in fact", but on the other hand, regional cooperation for environmental conservation usually is very hard to be financed. Especially,

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market solutions for five key industries: manufacture, transportation, agriculture, tourism, and renewable energy are still seeking policy outlets of cleaner production for green growth. Thereby, environmental justice is stressed as the kernel concept of natural law by current academic community.

Intergeneration and intrageneration equality issues present environmental justice which is usually argued by social or private discount rate. Weitzman (1994) proposed an "environmental" discount rate to show that the social discount rate "ought to be" lower than the private discount rate because an increasing environmental payment would occur in the future. However, some empirical estimations disobey this theoretical results. Social discount rates (8–15%) in developing countries in general are higher than that in developed countries (3–7%), while private discount rates by survey estimates are much lower (1–3%) in all countries (Zhuang et al., 2007; Harrison, 2010). Environmental economists try to figure out this gap by valuing natural asset and seeking policy outlets of renewable energy, and aim to provide investment choices for heterogeneous demands at lower level of social structure, such as at community level, because heterogeneous groups may impede the energy policy being implemented uniformly (Bauwens, 2016). Researchers currently prefer to estimate a willingness-to-pay (WTP) for initiative choice to renewable energy in Asia countries (Lee and Heo, 2016). Moreover, such like China engages an ambitious agenda of urbanization which will bring a huge government investment on infrastructures, and force structural reformation in industrial structure, land use structure, resources and energy use (Forman and Wu, 2016). Facing these gaps, we do not only need time, but tremendous investments to support economic growth, thus where are the energy policy outlets for community acceptance to invest and consume low-carbon choices?

1.1. China's legislations on environmental conservation and energy use

The People's Republic of China Environmental Impact Assessment Law was firstly promulgated on October 29th in 2002 right after the sixth Environment Action Programme of the European Community was implemented,[3] which clarified in the first of 38 articles that "in order to implement the strategy of sustainable development, to prevent the adverse effects on the environment after the planning and construction project implementation, and to promote the economic, social and environmental coordinative development, this law is enacted." Contemporaneously, rural-urban transforming construction has been vigorously developed, which is so called the plan of "village-dismission and town-combination". During 1985–2007, there were 68062 revoked townships (*Xiāng*) and 411 revoked counties, but established 11293 town (*Zhèn*) governments. This national transformation induced many planning issues and environmental degradation. China's central government took actions to promulgate The People's Republic of China Renewable Energy Law on February 28th in 2005, and The People's Republic of China Energy Conservation Law and The People's Republic of China Urban and Rural Planning Law on October 28th in 2007. These legislations regulate land management, natural resource exploration, environmental conservation, and energy use; and encourage scientific innovation and private investment to advanced technology in these aspects. While, urbanization successively brings about intense energy use and regional environmental degradation. National Bureau of Statistics of China reported that *per capita* energy consumption of daily living in mainland China was about 346.1 kg of standard coal in 2014, while this number in Beijing is about 705.3 kg of standard coal in 2014. The People's Republic of China Environmental Protection Law was implemented on January 1st in 2015 which further claims 70 articles to push environmental and economic coordinative development for a new type of urbanization. The 35th article firstly mentions rural-urban construction should rely on geological characters to protect vegetation, water area, and natural landscape, and enhance construction and management of urban parks, greening land, and historical scenic spots. The laws also encourage individuals, firms, and other organizations invest on renewable energy, recycling products, waste reduction processing, and transboundary pollution management for environmental conservation, and The People's Republic of China Energy Law still being discussed in draft until 2016.

There are two main challenges of renewable energy use in China. The first is high cost of transformative technology, and the second is community initiative acceptance of expansive energy bill in cities. Moreover, Moriarty and Honnery (2016) examined global renewable energy use during 2004–2014 and found renewable energy development may also induce environmental degradation because of lower investment on conservation technology. Some private investments also confront some discomfiture of lower profit return on renewable energy technology. Advanced innovative technology of renewable energy can enter market only relying on government subsidy and administrative regulation in China (Cao et al., 2016). On the positive side, fiscal policy stimulates high-tech firm establishment; on the other side, some inefficient innovation lead to financial losses (Huang et al., 2012). Furthermore, environmental pollution control payment is getting large. While, environmental pollution risk has been also getting higher in the past decade since The People's Republic of China Environmental Impact Assessment Law implemented in 2003 (Wang et al., 2016b). Thus, how long and how much can government afford this increasing payment? Especially, when the declining economic growth are expected views, quantitative easing may not work out this trap. Investment transformation implies a brighter future, but ultimately consumer is the judger.

Carbon sequestration market may not satisfy current China's emission demands due to uncertainties (Ang et al., 2016; Chen et al., 2013; Zhou and Wang, 2016). Zhang et al. (2017b) found that government policies for increasing energy efficiency in fact are always lagged behand carbon emission reduction in China. It infers that initiative mitigation of Greenhouse Gas (GHG) emission at provincial level is more efficient than that at national level policy *via* a promising carbon trade mechanism (Zhou et al., 2014; Zhang, 2015). However, it is questionable that whether a promising financial system can efficiently allocate the uncertainties of climate changes to lower the risk of carbon market. Zhang, Jiao & Chen (2017) introduced the demand-side energy management framework in China which directs to a firm level implementation for absorbing private investment to advanced innovations. However, those policies are highly likely neglected by private firms due to lower profit return rate. Some phenomena have occurred. For instance, if there is a high-teach company received an angel investment for cleaner production technology, instead of being

[3] Recall a milestone on the 1972 Paris summit, European Economic Community (EEC) at the first time proposed the environmental policy framework. This historical mark stated that economic growth *per se* is not the ultimate target of economic development, instead, it should improve the living standard and healthy life quality, narrow down the income disparity in priority, and pay attention to intangible value of indigenous knowledge and environmental conservation for better serving humanity. During the thirty years of 1972–2002, EEC successively set up six Environmental Action Programs which pushed the establishment of European Union (EU) formed in 2002. The first programme stressed technology innovation for responding to natural hazards. The second programme focused on regulations to the standards of air, water, soil, and materials processing. The third programme further stressed the Best Available Technique (BAT) for coastwise protection, noise reduction, and transboundary pollution mitigation. The fourth programme encouraged four special sectors (agriculture, industry, transportation, and energy) transformed to more ecologically friendly actions, and put forward to the standardized planning instrument (physical planning). The fifth programme postulated a principle of sustainable development is a compatible target of economic and ecological objectives, and directed to environmental quality standards rather than emission standards. During 2002–2012, the six programme advocated stricter legislations and regulations of environmental quality for benefit to stockholders, which pointed out seven strategic aspects including air pollution, marine environment, renewable energy, waste recycling, sustainable pesticide, soil catena, and urban environment, and further push land use planning and individual choices being involved into behavioral changes.