Sustainable Urbanisation in the Context of Economic Transformation and Climate Change: Sustainable and Liveable Cities and Urban Areas
Europe-China Joint Call for Proposals

Full Proposal: Consortium, General and Financial Information

1. Project Overview

Project Short Title/Acronym: Financing clean air
Project Full Title: The potential of Land Value Capture to secure sustainable urban development supporting air quality enhancement
Project Coordinator/Main Applicant: University of Liverpool, UK
Topics: (tick the relevant topic(s)) ☒ Topic 1. Climate change and new urban economies ☐ Topic 2. Transformation of energy systems and strengthen urban circular economies ☒ Topic 3. Urban public administration and services innovation ☐ Topic 4. Integrated urban data management
Keywords (max. 5): Land value capture, urban infrastructure, air quality, housing, transport

Overall project type: (mark the relevant category/categories with X [for weaker dominance] or XX [for higher dominance])

X	XX	
Fundamental research	Applied research	Innovation and implementation

Total Project Costs in EUR:	1,578,754	Requested funds in EUR:	942,107
Duration of the Project in months (max. between 36 and 48 months)[1]:	36	Expected start:	03.2019
Total Effort in Person Months:	244	Expected end:	02.2022

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[1] Please check page 16 of the Call Text, and Annex A of your funding agency to see which maximum duration applies.

2. Abstract (200 words or fewer)

Goal: To enhance the financial capacity of urban governments to improve air quality through land value capture. We will do this by identifying the dynamic relationship between varying approahes to land value capture as mechanisms to finance sustainable transportation and environmentally-responsible housing to improve air quality.

Content: The adaptation of urban environments in China and Europe is necessary to enhance air quality as a mitigating factor in climate change and improve livability. Housing and transportation are major contributors to urban air quality, yet environmental adaptations to reduce air pollution can be costly. Land value capture (LVC) is one attractive possibility for governments to fund these adaptations and enhance the economic, social and environmental sustainability of cities. The uplift in land values achieved through planning consent, infrastructure provision and the effects of economic growth may be captured by the state using an array of LVC mechanisms. Focussing on housng and transportation improvements, we will explore how varying approaches to LVC can be attuned to varied economic, cultural and natural conditions in China and Europe to improve air quality and support sustainable development and urban renewal.

3. Summary for the general public (100 words or fewer)

Poor urban air quality is a significant threat to human life. More sustainable transport and housing promises to enhance air quality but this requires investment. Capturing a proportion of land values in the development process offers an innovative way of improving housing- and transport-induced poor air quality through investing in urban environments. To do this we will explore two issues in China, the Netherlands, France and the UK:
- the impact of air quality on economic activity and quality of life
- the impact of alternative land value capture mechanisms for enhancing housing and transportation

4. Project Consortium

	Organisation	Type of organisation[2]	Country	Coordinator Europe / China[3]	Contact Person (first name and family name)
Project Coordinator/Main Applicant	University of Liverpool	RO	UK	X	Professor Alexander Lord
Project Partner 2	Centre National de la Recherche Scientifique (Géographie-Citiés)	RO	FRANCE		Professor Natacha Aveline
Project Partner 3	Université Paris-Est, Créteil (Lab Urba)	RO	FRANCE		Professor Sonia Guelton
Project Partner 4	Radboud Univeristy, Nijmegen	RO	THE NETHERLANDS		Professor Erwin van der Krabben
Project Partner 5	Tongji University	RO	CHINA	X	Professor Ye Li
Project Partner 6	Xi'an Jiaotong Liverpool University	RO	CHINA		Professor Joon Sik Kim
Project Partner 7	Royal Town Planning Institute	OTH	UK		Richard Blyth
Project Partner 8	Wei Yang and Partners	SE	UK		Dr. Wei Yang

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[2] Type of organisations: SE = small enterprise; ME = medium-sized enterprise; LE = large enterprise; RO = research organisation, OTH = other type of organization. With regard to the size of companies, the current definitions of SMEs given in the EU competition law are applied (definition of small and medium-sized enterprises and of independent businesses in accordance with recommendation 2003/361/EC of the Commission dated 6 May 2003, [ABl. L 124 of 20.5.2003, pp. 36-41]; cf. http://ec.europa.eu/DocsRoom/documents/15582).

[3] Mark the respective organisation with X.

5. Quality of Work, Project Objectives and Targets (max. 4 pages including table 5.1)

5.1 Project objectives and targets

Project situation: Cities are both major contributors to pollutant emissions and the patients of poor outdoor air quality (World Bank, 2010). Poor air quality has a direct negative impact on the environment and on human health which has consequences for economic growth and social care. The World Health Organization estimates that 80% of urban residents will be exposed to pollution above acceptable levels in 2018 (WHO, 2018). Whilst the causes of poor urban air quality vary by context some issues are widespread; in Western Europe 40% of the urban pollution is caused by transport and domestic fuel burning, whilst in China this figure is between 30 and 39% (Karagulian et al., 2015). Decreasing the pollutants from housing and transport is therefore a key priority for cities (Un Habitat, 2015), yet retro-fitting cleaner energy provision to houses and supporting alternative urban transport infrastructure can be both financially costly and limiting to short term economic growth. Urban governments, therefore, need to consider policy and finance mechanisms to both fund and adapt urban housing and transport to limit localised air pollution.

Successfully meeting the two topics of this call: 'reduction in adverse environmental impact of cities'; and, 'the provision of safe, affordable and sustainable housing, transportation and basic services', is contingent upon creating a dynamic and responsive relationship between taxation and funding the urban adaptations and service provision. **Land value capture** (LVC) promises to be a highly efficient and effective urban policy to enable the recovery and reinvestment of value arising from government enhancements to urban sustainability and livability, in particular improving air quality.

LVC mechanisms are extremely diverse, from the active land assembly of municipalities in the Netherlands, to the use of auctions in China and the negotiated agreement of discretionary obligations in England. Each mechanism attempts to capture a proportion of the uplift in land value from state action (whether assembly, infrastructure provision or planning permission) to reinvest in social and environmental public goods. Yet, each system has been criticized for failing to meet the demands of the 21st century's most pressing issue of delivering economic growth within a context of climatic instability (see e.g. Crook et al., 2016). A common counter-argument to diminish the validity of LVC case studies is that the institutional context or the infrastructure type provided is distinctive and, therefore, not applicable in a national or specific city context.

Goal: To enhance urban governments' capacity to improve air quality through LVC. Identification of the forms of dynamic relationship between LVC mechanisms and the adaptation and supply of sustainable transportation and environmentally responsible housing in improving air quality.

Objectives: To define the impact of different Sino-European LVC mechanisms and identify the necessary institutional conditions for alternative LVC models to enhance air quality through housing and transportation adaptation. To share best practice in using LVC to enhance air quality. To inform guidelines for Sino-European governments in the creation and adaptation of LVC models to enhance air quality whilst simultaneously supporting sustainable and livable cities and urban areas.

Research Questions:
1. How does air quality impact on quality of life and economic growth in diverse urban environments?

2. What LVC mechanisms for enhancing air quality are considered successful in Sino-European countries and what are the necessary institutional conditions for their success?
3. How can LVC mechanisms secure sustainable transport improvements in diverse urban environments, and will they result in enhanced air quality?
4. How do alternative LVC mechanisms interact with sustainable housing provision in diverse urban environments, and will they result in enhanced air quality?
5. What LVC policy recommendations may be derived from assessing the effects of alternative LVC mechanisms on sustainable and livable cities and urban areas?

Planned Results: This project will result in three substantive research outputs to enhance the capacity of urban governments to improve air quality through LVC.
1. A toolkit to identify the nature of existing LVC mechanisms;
2. A toolkit for statistically modelling and simulating the effect of LVC mechanisms on air quality and sustainable urban environments; and
3. A LVC policy toolkit to support urban government's analysis of potential LVC policies.

Conceptual Approach and Innovation: Recovering some of the uplift in land values entailed by the granting of planning consent for new development, land assembly or infrastructure provision, is a core aspect of urban planning internationally. The point at which this question is crystalises varies between planning contexts. For example, those settings where land is typically state-held, such as China, can operate various forms of competitive tendering, such as auctions, that price 'planning gain' at the earliest moment. Elsewhere variations on LVC exist that push the issue later in the process. Whitehead (2016) identifies three alternative types: taxation of development following completion (sometimes used in France); statutory acquisition of land at existing use value prior to the provision of infrastructure and planning permission as a precursor to sale on the open market (often used in the Netherlands), and; the imposition of a planning obligation, such as a levy or negotiated settlement, at the point of permission (routinely used in the UK).

To an extent what LVC can achieve is determined by market conditions. In those high demand settings where development viability is conspicuous, planning control may be able to exact significant developer contributions through whatever allocation mechanim is favoured (auction, negotiation, levy or some combination). This secures investment in community benefits and infrastructure which, in turn, enhances the case for further development. However, this 'virtuous circle' of demand > LVC > infrastructure investment > greater demand brings with it social and environmental costs that are uniquely urban in character. As the urban population grows some services and infrastrucure grow to capacity, such as public transport, and negative environmenal effects emerge, such as declining air quality as a function of the increased use of unsustainable forms of domestic heating.

However there is evidence that LVC is not solely a function of existing market conditions. Instead, we can identify variations in outcomes in relation to the behaviour of participants in the development process (Dunning, Ferrari and Watkins, 2016). In this way the geography of the economic path that serves to define an area is understood to be shaped by the agnecy of the human actors who populate the institutions (regulatory planning/the development industry) that play the "Planning Game" (Lord, 2012) in any context. We need to understand not just the design of the LVC policies in place but, critically, to investigate the manner of their implementation. This 'behavioural insights' approach allows us to pick up Martin and Sunely's (2006) challenge to explore "In what ways is path dependence intentionally created by actors, or an unintentional emergent effect at system level? How do agents interact with, reproduce and transform the path dependence structures within which they are embedded? How do agents create new paths?" (Martin and Sunely, 2006: 404).

We will explore the degree to which the implementation of different types of LVC mechanism might establish a virtuous circle of growth that is explicitly accompanied by investment in measures to improve air quality (Figure 1). Our proposal is perhaps best understood as a 'behavioural insights' development within the 'Institutional' tradition, exploring how human agency within state-market interactions can be re-imagined to encourage progressive outcomes (for example, North, 1990; Ostrom, 2005).

Figure 1: The Virtuous Circle: Using LVC to encourage progressive economic development (source: authors, 2018)
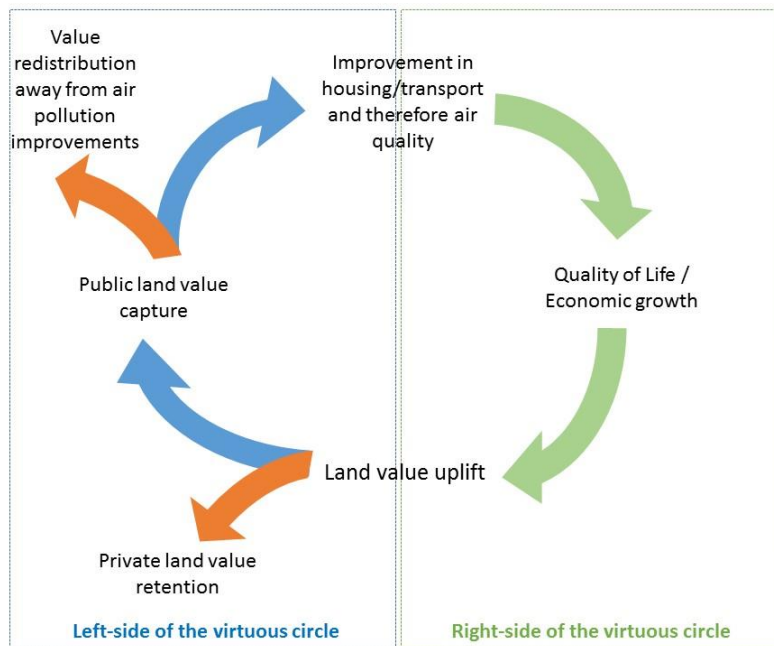
Comparing between Contexts: China and Europe

The approach advocated above is explicitly context-specific. Our goal is to conduct new empirical research in both China and Europe to explore how variations in the enactment of LVC policies can be attuned to local circumstances to achieve sustainable urban development. However, because our proposal is so clearly policy relevant, a fundamental aspect of our research design is to share best practice between China and Europe, develop mutual learning and share our findings with policy makers. These objectives will require the use of a mixed methods approach.

5.2 Overall project type

The research combines *Fundamental Research* and *Applied Research*. First, as *fundamental research*, we will address the substantive gap in the theory of virtuous relationships between LVC and air quality enhancement through rigorous empirical evaluations, drawing upon advanced multi-scale spatiotemporal models and simulation methodologies. Second, as *applied research*, we will provide two essential and open-source toolkits through the project website and urban government outreach meetings in Europe and China. One toolkit will support the identification of key variables in LVC mechanisms to typologise existing mechanisms. The second toolkit will identify potential LVC mechanisms depending upon the institutional context. The use of these online toolkits will be

exemplified through real world case studies providing both analysis of extant mechanisms and describing LVC recommendations for those urban governments.

5.3 Results from other projects

Table 5.1: Existing results and deliverables obtained from publicly funded projects which provide the basis of or feed into the proposed project

Funding provider	Project number	Title	Description of results already obtained and relevant deliverables (verifiable results / products of R&D work) in terms of the basis for / differentiation from the proposed project	Location and type of documentation (e.g. link to homepage, publication, conference proceedings, interim report, final report, …)
Ministry of Housing, Communities and Local Government, UK		The incidence, value and delivery of planning obligations and community infrastructure levy in England 2016-17	This piece of work was undertaken by a UK consortium led by Lord and involving Dunning from the University of Liverpool. The work represents both an evaluation of all LVC policies in England (£6bn) and a qualitative assessment of the drivers of/barriers to successful implementation of LVC policies.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685301/Section_106_and_CIL_research_report.pdf
JPI Urban Europe	ESRC	SIMS City: Testing new mechanisms for Value Capture	This project is still in operation (closing dates of December 31st 2018) but has met all its deliverables related to specific work packages. This includes the publication of a popular document on land value capture in the Netherlands which has been enthusiastically received by policy makers and a range of academic publications such as: Lord, A. D. and Gu, Y. (forthcoming) Can the market be tamed? A thought experiment on the value(s) of planning. *Environment and Planning A: Economy and Space*.	https://jpi-urbaneurope.eu/project/simscity-valuecap/
ESRC	GCRF	Dynamics of Health & Environmental Inequalities in Hebei Province, China	This project is still in operation (closing dates of January 2019) but has met most of its deliverables related to specific work packages. This includes the development of advanced statistical models that can be applied and further extended to investigate complex relationships between LVC, air quality and quality of life. Dong, G P, Nakaya T and Brunsdon C. (2018). Geographically weighted regression models for ordinal categorical response variables: an application to geo-referenced life satisfaction data. *Computers, Environment and Urban Systems* 70: 35-42. Dong, G P, Ma, J and Kwan M-P. (forthcoming) Multi-level temporal autoregressive modelling of daily activity satisfaction using GPS-integrated activity diary data. *International Journal of Geographical Information Science*	http://gtr.ukri.org/projects?ref=ES%2FP003567%2F1

6. Key activities (work programme)

i)   Describe the overall strategy of the work plan (max. 1 page)

To understand the virtuous circle of "air quality enhancement > economic uplift > land value capture > urban infrastructure improvement" requires a large and multi-faceted proposal with expertise from across urban economics, air quality, housing and transportation improvements, and land valuation and taxation. As such the research team and requirements are multi-disciplinary. To identify the constituent components it is helpful to identify three distinct phases in the work plan.

Phase A will create the necessary theoretical tools and explore cross-linguistic precision in terminology to set the framework for Phases B and C. This will be undertaken in WP1.

Phase B is the empirical component of this fundamental research, it will involve exploring both sides of the virtuous circle. WP2 will consider the evidence for the right hand side of the relationship: urban air quality > economic growth > land value uplift. WP3 and WP4 will explore the evidence for the left hand side of the relationship: land value capture > urban enhancement > air quality improvement, for transportation and housing respectively.

Phase C involves the synthesis of research findings and translation of comparative analyses into national and cross-national contexts for urban transitioning. WP5 will provide a synthesis model of the virtuous circle and WP6 will support dissemination and impact from the research findings in each partner country and further afield.

In order to successfully complete these three phases there are six work packages:
1) Coordination and comparative LVC Mechanisms;
2) The impact of air quality on sustainable and liveable cities;
3) Alternative LVC mechanisms to support air quality enhancing sustainable transport;
4) Alternative LVC mechanisms to support air quality enhancing sustainable housing;
5) The interconnections between air quality enhancement, LVC and sustainable and liveable cities;
6) Cross national learning on LVC and air quality.

Each academic project partner institution is responsible for one Work Package in order to distribute the workload and support timing of work and enable specialist support (for example investigator time) to be applied to particular components of the research (see table 6.1 for distribution). Each academic partner will also play a supporting role on another Work Package to help build team relationships, enhance international cooperation opportunities and support critical comparative scholarship (see table 6.4 for distribution).

A core component of this proposal is the support and participation of non-academic project partners. Their role is at the heart of project governance through an Advisory Board including important non-academic stakeholders from each participating nation. The inclusion of the Board will support the project's wider agenda of having an impact on policy and encouraging cross-national engagement opportunities. As such the Board will play an important governance role throughout the project but will also play a specific dissemination role with respect to Work Package 6 in supporting both within and between country learning on air quality and LVC.

There are eighteen Deliverables across the six Work Packages and there are two Milestones. The timings of these and how they relate to an indicative distribution of work across Work Packages may be found in the next section.

ii)   *Show the timing of the different WPs and their components (Gantt chart or similar)*

The below Gantt chart shows the timing of WP's, deliverables for each WP and the two milestones for the project. We provide an indicative intensity of work for each Work Package by shading (with lighter being less work and darker being more work).

Table 1: Gantt chart showing timings of Work Packages, Deliverable and Milestones

Work Package	Mar-Jun 2019	Jul-Sep 2019	Oct-Dec 2019	Jan-Mar 2020	Apr-Jun 2020	Jul-Sep 2020	Oct-Dec 2020	Jan-Mar 2021	Apr-Jun 2021	Jul-Sep 2021	Oct-Dec 2021	Jan-Feb 2022
1	1.4; 1.5	1.4; 1.5	1.1	1.2; 1.4; 1.5	1.4; 1.5	1.3; 1.4; 1.5		1.4; 1.5	1.4; 1.5		1.4; 1.5	1.6
2						2.1		2.2				
3								3.1			3.2	
4								4.1			4.2	
5					5.1						5.2	
6						6.1				6.2	6.3; 6.4; 6.5	
Milestone						1				2		

iii)   Provide a detailed work description broken down into work packages:

Table 6.1:   Work package list

Work package No[4]	Work package title	Lead project partner No[5]	Lead project partner short name	Person-months[6]	Start month[7]	End month
One	Coordination and Comparative LVC Mechanisms	1	University of Liverpool	32	03.2019	02.2022
Two	The impact of air quality on sustainable and liveable cities	7	Xi'an Jiaotong Liverpool University	36	01.2020	12.2021
Three	Alternative LVC mechanisms to support air quality enhancing sustainable transport	2	Centre National de la Recherche Scientifique (Géographie-Cités) and Université Paris-Est, Créteil (Lab Urba)	48	01.2020	12.2021
Four	Alternative LVC mechanisms to support air quality enhancing sustainable housing	5	Tongji University	48	01.2020	12.2021
Five	The interconnections between air quality enhancement, LVC and sustainable and liveable cities	5&6	Tongji University & Xi'an Jiaotong Liverpool University	46	01.2020	12.2021
Six	Cross national learning on LVC and air quality	4	Radboud Univeristy, Nijmegen	34	04.2020	02.2022
			TOTAL	244		

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[4] Work package number: WP 1 - WP n.
[5] Number of the project partner leading the work in this work package.
[6] The total number of person-months allocated to each work package.
[7] Measured in months from the project start date (month 1).

Table 6.2: Deliverables List

Del. no.[8]	Deliverable name	WP no.	Delivery date[9]
1.1	Project overview report	1	6
1.2	Policy overview of LVC contexts regarding planning, taxation and political economy	1	11
5.1	Framework for modelling alternative LVC mechanisms	5	15
1.3	Project Tool to identify the nature of LVC mechanisms	1	17
2.1	Evidence review of the impact of air quality improvements on quality of life and sustainable economic growth	2	17
6.1	Online project and LVC knowledge exchange platform	6	20
2.2	Best practice examples and relationship to context of Project Tool (1.3)	2	23
3.1	Test the 'project tool to identify the nature of LVC mechanisms' (1.3) against best practice transport improvements in Europe and China	3	27
4.1	Test the 'project tool to identify the nature of LVC mechanisms' (1.3) against best practice housing improvements in Europe and China	4	27
6.2	Case studies report	6	27
1.4	Project Meetings	1	32
1.5	Early career researcher exchanges	1	32
3.2	Model of the impact of alternative LVC mechanisms on transport derived air quality improvements in Europe and China	3	32
4.2	Model of the impact of alternative LVC mechanisms on housing derived air quality improvements in Europe and China	4	32
5.2	Synthesis model of alternative LVC virtuous circles for air quality enhancement in each international context	5	32
6.3	High-profile event for policy audience (Europe)	6	32
6.4	High-profile event for policy audience (China)	6	32
6.5	Six local LVC toolkit audits	6	32
1.5	Final Project Report	1	35

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[8] Deliverable numbers in order of delivery dates. Please use the numbering convention <WP number>.<number of deliverable within that WP>. For example, deliverable 4.2 would be the second deliverable from work package 4.

[9] Measured in months from the project start date (month 1).

Table 6.3:   **List of milestones**

Milestone number	Milestone name	Work package(s) involved	Expected date [10]
1	Completion of LVC project tool and conceptual framework for air quality induced quality of life and economic enhancement	1 and 2	17
2	Completion of alternative LVC mechanism modelling for housing and transport	3, 4 and 5	27

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[10] Measured in months from the project start date (month 1)

Table 6.4:   Work package description (max. 1 page per work package)

Work package number	One		Start date or starting event:			03.2019	
Work package title	Coordination and Comparative LVC Mechanisms						
Project partner number	1	6	2	3	4	5	
Project partner short name	Liv	XJTLU	CNRS	PaEs	Rad	Ton	
Person-months per applicant:	12	12	2	2	2	2	

Objectives: To coordinate the project, create the theoretical framework for analysing alternative LVC mechanisms for enhancing air quality and produce policy recommendations for each country

Description of work:

Theme: The range of approaches to LVC are many and varied, with alternatives in each of the four partner nations that comprise this consortium: from the Chinese approach which in many cases employs a traditional auction to the Dutch land readjustment trials, the French transit-orientated approach and the UK's hybrid of, in some cases, pairing both a formal levy with a negotiated settlement. This work package will provide the initial theoretical context and national institutional description for the project through tasks 1, 2 & 3 as well as coordinating the project (task 4) and responsibility for the overall research report.

Tasks: *Lead partner in bold, supporting partners in standard font*

1. Write a project overview for dissemination and advertising the research (**Liv**; XJTLU; CNRS; Rad)

2. Identification of succesful LVC models (**XJTLU**; Liv; CNRS; Rad; Ton; SYS; PaEs)

3. Project tool (**Liv**)

4. Project coordination and connection enhancement meetings – each partner to be responsible for meeting in their own city (**Liv**; XJTLU; CNRS; Rad; Ton; PaEs)

5. Early career researcher echange programme (**Liv**; XJTLU; CNRS; PaES; Rad; Ton)

6. Final report and policy recommendations (**Liv**; XJTLU)

Deliverables (brief description and month of delivery)

1.1. Project overview report (English, French, Dutch and Chinese) – a four page booklet explaining the project which can be distributed to stakeholders in each country. [October 2019]

1.2. Overview of LVC 'successes' and contexts (e.g. planning, taxation and political economy) [March 2020]

1.3. Project tool to identify the nature of LVC mechanisms [September 2020]

1.4. Project Meetings: Liverpool [April 2019]; XJTLU [September 2019]; Tongji [January 2020]; Nijmegen [April 2020]; Tongji [September 2020]; Paris [January 2021]; XJTLU [April 2021]; Liverpool [September 2021]. Each project meeting will include a project management session, a symposium on a main theme of the research in relation to WP lead and round table discussions with policy makers and practitioners. Week long early career researcher exchanges will also take place to coincide with the project meetings.

1.5. Policy Recommendations and Final Project Report (English and Chinese) [February 2022]

Work package number	Two	Start date or starting event:			01.2020	
Work package title	The impact of air quality on sustainable and liveable cities					
Project partner number	6	4	5	1	2	3	
Project partner short name	XJTLU	Rad	Ton	Liv	CNRS	PaEs	
Person-months per applicant:	24	4	2	2	2	2	

Objectives: To provide a critical state of the art evidence review of the impact of air quality improvements on quality of life and sustainable economic growth, including best practice examples in divergent urban contexts.

Description of work

Theme: This work package aims to answer research question 1: How does air quality impact on quality of life and economic advancement in diverse urban environments?

Dealing with poor air quality has been an issue for most advanced industrial nations. In London 'fogs' (a euphemism for air pollution) were a common feature of daily life during the late nineteenth and early twentieth centuries culminating in an estimated 12,000 deaths during 1952 as a direct result of air pollution (Davis, 2002). The Clean Air Act of 1956 ultimately formed the basis of the UK response to this issue, creating new standards for domestic heating, but it took decades for the transition of most households from coal as the principal source of domestic heat to other, cleaner fuels. In each country context poor air quality has a negative impact on quality of life and economic growth, but the extent and impact of this link is not clear.

Tasks: *Lead partner in bold, supporting partners in standard font*
1. To undertake a systematic review of the extant evidence of the relationship between air quality and quality of life/economic growth indicators (**XJTLU**; Rad; Ton)
2. To provide comparable date on the core institutional variables for each case study city (**XJTLU**; Liv; CNRS; Rad; Ton; PaEs)
3. To create a model of the 'right hand relationship' applied to the six case study cities (**XJTLU**)
4. To provide an overview of best practice examples and the relationship to the contexts described in the project tool (**Rad**; Ton)

Deliverables (brief description and month of delivery)

2.1 Evidence review of the impact of air quality improvements on quality of life and sustainable economic growth [September 2020]

2.2 Best practice examples and relationship to context of project tool [March 2021]

Work package number	Three	Start date or starting event:		01.2020			
Work package title	Alternative LVC mechanisms to support air quality enhancing sustainable transport						
Project partner number	2	3	5				
Project partner short name	CNRS	PaEs	Ton				
Person-months per applicant:	18	18	12				

Objectives: To provide best practice examples of transport LVC mechanisms in divergent urban contexts and to model the potential impact of alternative LVC mechanisms on transport derived air quality improvements.

Description of work

Theme: This work package will answer research questions 2 and 3: 2. What LVC mechanisms for enhancing air quality are considered successful in Sino-European countries and what are the necessary institutional conditions for their success? 3. How can LVC mechanisms secure sustainable transport improvements in diverse urban environments, and will they result in enhanced air quality?

It will explore how LVC mechanisms might be employed to finance this specific issue of associating LVC with investment in all aspects of transport infrastructure. This will include case-studies of transit-centred LVC experiments in France (e.g. Grand Paris Express), in the UK (e.g. CrossRail) in the Netherlands (e.g. The Dutch Eurostar) and China (e.g. the development of the new high speed rail connection between Beijing and Shanghai) from across metro, rail, shipping and air. It will consider the economic efficiency (cost recovery, risk sharing, timescale, etc) social acceptability, long-term sustainability, political and administrative feasibility of the variant LVC mechanisms and air-quality improving infrastructural enhancements.

Tasks: *Lead partner in bold, supporting partners in standard font*
1. To undertake a systematic review of the extant evidence of the 'left hand relationship' between land value capture – transportation improvements and air quality enhancement (**Ton**)
2. To provide an overview of best practice examples and the relationship to the contexts (**CNRS**; PaEs)
3. To test the efficacy of the project tool (deliverable 1.3) against best practice (**PaEs**; Ton; CNRS)
4. To create a model of the 'left hand relationship' for transportation applied to the six case study cities (**Ton,** PaEs; CNRS)

Deliverables (brief description and month of delivery)

3.1 Test the 'project tool to identify the nature of LVC mechanisms' (deliverable 1.3) against best practice transport improvements in Europe and China [July 2021]

3.2 A toolkit to model the impact of alternative LVC mechanisms on transport derived air quality improvements in Europe and China [December 2021]

Work package number	Four	Start date or starting event:		01.2020			
Work package title	Alternative LVC mechanisms to support air quality enhancing sustainable housing						
Project partner number	5	1	4				
Project partner short name	Ton	Liv	Rad				
Person-months per applicant:	24	12	12				

Objectives: To provide best practice examples of housing enhancement LVC mechanisms in divergent urban contexts and to model the potential impact of alternative LVC mechanisms on housing derived air quality improvements

Description of work

Theme: This work package will answer research questions 2 and 4: 2. What LVC mechanisms for enhancing air quality are considered successful in Sino-European countries and what are the necessary institutional conditions for their success? 4. How do alternative LVC mechanisms interact with sustainable housing provision in diverse urban environments, and will they result in enhanced air quality?

Tasks: *Lead partner in bold, supporting partners in standard font*
1. To undertake a systematic review of the extant evidence of the 'left hand relationship' between land value capture – housing improvements and air quality enhancement (**Ton**)
2. To provide an overview of best practice examples and the relationship to the contexts (**Rad**; Ton)
3. To test the efficacy of the project tool (deliverable 1.3) against best practice (**Ton**; Liv)
4. To create a model of the 'left hand relationship' for housing applied to the six case study cities (**Ton**; Liv; Rad)

Deliverables (brief description and month of delivery)

4.1 Test the 'project tool to identify the nature of LVC mechanisms' (deliverable 1.3) against best practice housing improvements in Europe and China [July 2021]

4.2 Model the impact of alternative LVC mechanisms on housing derived air quality improvements in Europe and China [December 2021]

Work package number	Five	Start date or starting event:			01.2020	
Work package title	The interconnections between air quality enhancement, LVC and sustainable and liveable cities					
Project partner number	5	1	6	2	3	4
Project partner short name	Ton	Liv	XJTLU	CNRS	PaEs	Rad
Person-months per applicant:	24	10	6	2	2	2

Objectives: To model a synthesised alternative virtuous circles for air quality enhancement within each international case study context

Description of work (possibly broken down into tasks) and role of applicants

Theme: This work package will answer research question 5: What LVC policy recommendations may be derived from assessing the effects of alternative LVC mechanisms on sustainable and livable cities and urban areas?

As identified in the preceding work packages there is significant variation between the nature of LVC mechanisms, transport and housing interventions and air quality. This work package will synthesise the three models in work packages 2, 3 and 4 into a single critique of the potential of LVC to create a virtuous circle in each of the six case studies and define what LVC mechanisms might be appropriate. It will provide insights into 'what works' and how cross national variations in practice might provide lessons for policy makers on how to further develop LVC approaches.

Tasks: *Lead partner in bold, supporting partners in standard font*
1. To map the conceptual connections between institutional variables and a synthesis model (**Liv**; XJTLU)
2. To create a synthesis model of virtuous circle applied to the six case studies (X**JTLU**; Liv)
3. To collate model feedback from non-academic partners and to critique the model results (**XJTLU**; CNRS; PaEs; Liv; Rad; Ton)

Deliverables (brief description and month of delivery)

5.1 Create a framework for modelling alternative LVC mechanisms [July 2020]

5.2 Synthesis model of alternative virtuous circles for air quality enhancement in each international context [December 2021]

Work package number	Six		Start date or starting event:		04.2020	
Work package title	Cross national learning on LVC					
Project partner number	4	5	1	2	3	6
Project partner short name	Rad	Ton	Liv	CNRS	PaEs	XJTLU
Person-months per applicant:	12	13	2	2	2	3

Objectives: To organise and encourage international knowledge exchange with regard to the effective use of LVC mechanisms as part of municipal finance for enhanced urban air quality.

Description of work

Theme: As the range of LVC mechanisms that might be employed is broad and the social, cultural and political contexts within which they are enacted can have a significant bearing on their effects it makes sense to encourage cross-national learning. This work package will systematically incorporate this process of knowledge exchange into the work. Though best practices of successful LVC mechanisms can be found in many places around the world, the policy transfer of these tools often is not without problems, due to contextual (cultural, institutional) differences. The aim of this work package is therefore not only to identify and describe successful LVC mechanisms, but also to critically assess the applicability of these mechanisms that have proven to be successful in one country in other jurisdictions.

Tasks: *Lead in bold, supporting partners in standard font*
1. Identification of best practice case studies through online platform, academic dissemination and public policy events in Europe and China (**Ton**; Rad)
2. Create guidelines for international policy transfer and identify 'pitfalls' (**Rad**; Ton)
3. Audits of local LVC policies and tools in six cities (three in Europe; three in China; site visits will be combined with regular project meetings). For each audit a team of local and international experts will assess to what extent current LVC mechanisms have been effective in contributing to the (public) costs of sustainable urban development, how these LVC tools relate to broader municipal finance, and how alternative LVC mechanisms may be helpful to increase effectiveness. Municipal policy advisors of the six cities will be invited into the discussion. (**Rad**; XJTLU; Liv; CNRS; PaEs; Ton)

Deliverables (brief description and month of delivery)

6.1 Online project and LVC knowledge exchange platform [December 2020]

6.2 Case studies report [July 2021]

6.3 High-profile event for policy audience (Europe) [December 2021]

6.4 High-profile event for policy audience (China) [December 2021]

6.5 Six local LVC toolkit audits [December 2021]

iv)   *Describe any significant risks, and associated contingency plans (max. 1 page)*

Risk Type	Risk Description	Contingency plan
Data	Data limitations for LVC mechanism identification	The *Work Package Coordinator* will produce a written report for the *Advisory Board* to consider alternative identification procedures. If meaningful identification remains impossible the reasons for this will be fully explored in a report produced by the *Work Package Coordinator*, which will require approval from the *Continent Consortium Coordinators* and *Advisory Board*.
	WP2, 3 & 4 data limitations	The *Work Package Coordinator* will produce a written report for the *Advisory Board* to consider alternative data. If modelling remains impossible the reasons for this will be fully explored in a report produced by the *Work Package Coordinator*, which will require approval from the *Continent Consortium Coordinators* and *Advisory Board*.
Modelling	Outcomes of modelling are insufficient for a meaningful synthesis	The *Work Package Coordinator* will produce a written report for the *Advisory Board* to consider alternative modeling inputs and forms. If meaningful synthesis is not possible the reasons for this will be fully explored in a report produced by the *Work Package Coordinator*, which will require approval from the *Continent Consortium Coordinators* and *Advisory Board*.
Administrative	Conflict between project partners.	One of the *Continent Consortium Coordinators* will assess the nature of the conflict and produce a report and recommendation; this will be discussed by the partners involved. If unresolved, the outcome will be determined by the *Consortium Manager* after consultation with the *Advisory Board*.
	Project partner administrative disorder	If administrative disorder impacts only a single task, it will be re-assigned to the *Work Package Coordinator* (or alternative in the case of a conflict) with the approval of the *Consortium Manager*. If administrative disorder impacts more than one task the *Project Manager* will determine the outcome after consultation with the *Advisory Board*.
	Project disorder	If project disorder occurs the *Advisory Board* will request the *Consortium Manager* to notify the funding bodies and suspend the project. After suspension if no solution is found within three months the project will be terminated at the agreement of the funding bodies.

7. Ethical and regulatory considerations (max. ½ page)

The project will seek full ethical approval from the host institutions in the UK and in China if funding is approved. The University of Liverpool will lead on the ethical and regulatory considerations and be responsible for ongoing assessment of best practice. This review meets the ESRC's Framework for Research Ethics and all research will be conducted according to the RCUK *concordat to support research integrity*. This will include both a 'lay' reviewer and experienced 'academic reviewers'.

The research will involve direct participants therefore all research staff will ensure that any contributors to the project are fully informed about the rationale, methods and potential outputs from the project, in line with the full ethics review. Where direct participation (e.g. interviews with policy makers) supports the key tasks the Work Package Coordinator will be responsible for writing an information sheet and consent form and will verify this through the University of Liverpool's ethics committee prior to participation. All consenting participants' transcripts and written responses will be stored securely (see data management plan).

The majority of the work packages will be conducted solely with secondary data collection and modelling. These secondary datasets (discussed further in the data management section) do not contain personalised information and will only be used within the terms and conditions of the data source.

All information collated will be treated in the confidence with which it is derived. Secondary data and primary anonmyised data may be made available to the public where it does not conflict with the confidentiality or requested anonymity of individuals as agreed by the University of Liverpool's ethics committee.

8. Added value of international co-operation (max. 1 page)

Initiating research and lasting Sino-European co-operation is paramount to the long term success of understanding the capacity of urban governments to fund, create and adapt housing and transport to enhance urban air quality through identification of the dynamic relationship between LVC mechanisms, air quality and sustainable urban life. To specifiy the specific significance of international co-operation we define the contribution below according to our three objectives:

(a) To define the impact of different Sino-European LVC mechanisms and identify the necessary institutional conditions for alternative LVC models to enhance air quality through housing and transportation adaptation.

Land value capture mechanisms have distinctive variations between institutional and policy regimes and have divergent potentials for funding societal needs for sustainable urbanization. It is vital that research conclusions and best practice examples are understood within their institutional constructs. The policy and practice identification tool will benefit extensively from the alternative structures for LVC in China, France, the UK and the Netherlands. Whilst further institutional contexts could be explored, within the confines of this call we have limited the number of contexts to be able to provide detailed analysis of the institutional issues which prevail on LVC. The toolkits will support identification of LVC type beyond the four countries involved in this research. We have prioritized partners with an intimate knowledge of housing and transportation, air quality and land value capture, and ensured that each country has experts represented on their own socio-economic, political and planning context to ensure national factors are well represented. The team brings together world-leading researchers from across planning, real estate taxation, housing, transport, environmental quality and urban management into one team, without transnational Sino-European collaboration this would be impossible.

(b) To share best practice in using LVC to enhance air quality.
No city has all of the answers to using LVC to enhance air quality and few have reliable evidence of alternative mechanisms. As such, it is imperative that we work internationally to share experiences, both through the provision of best practice examples and through the networking opportunities presented through the partner meetings and case study site visits for policy makers and researchers.

(c) To inform guidelines for Sino-European governments in the creation and adaptation of LVC models to enhance air quality whilst simultaneously supporting sustainable and livable cities and urban areas.
The inclusion of non-academic partners from both China and Europe in our Advisory Board is a distinctive advantage of this proposal. Appropriate application of transnational lessons for urban governance and planning rely on both universal comparative principles and national insights. The inclusion, therefore, of policy makers and stakeholders, such as the *Royal Town Planning Institute* (UK), *Institut d'aménagement et d'urbanisme de la région d'Île-de-France* (France) and the EU COST action 'Public Value Capture of Increasing Property Values' will contribute greatly to both research definition and support the translation of research findings. No single country could replicate the comparative and cross-fertilized learning between academic or non-academic partners without this significant international co-operation.

9. Relevance – Contribution of the project to the goals of the call (max. 1 page)

This project has been constructed to explicitly achieve the multi-tiered goals and objectives of the *Sustainable and Liveable Cities and Urban Areas* pilot call on *Sustainable Urbanisation in the context of Economic Transformation and Climate Change*. In particular the dual NSFC and JPI Urban Europe partnership objectives identified in the call:

1. Enhance cities' and urban areas' capacities for sustainable urbanization and the required urban transition processes
We will contribute to this objective by answering Research Question 5: *What LVC policy recommendations may be derived from assessing the effects of alternative LVC mechanisms on sustainable and livable cities and urban areas,* through deliverables 1.3, 1.5, 6.3, 6.4 and 6.5.

Sustainable urbanization is an ongoing process for cities in all countries. This project will provide both research findings to support urban government decision making in relation to LVC and enhancing air quality, quality of life and economic potential. It will also provide learning opportunities for policy makers and practitioners through the project meetings, site visits and best practice examples. The high-profile events for policy audiences in China and Europe as well as the online knowledge exchange platform will ensure that these results will be made available for city and urban governments. Accordingly, cities and urban areas will be able to identify the outcomes from LVC funded housing and transport improvements and use the policy tool to identify their optimal LVC mechanism, enhancing their capacity for sustainable urbanisation.

2. Create knowledge and evidence for feasible urban transition pathways under different regional and local conditions
We will contribute to this objective by answering Research Questions 1-4: 1. *How does air quality impact on quality of life and economic growth in diverse urban environments? 2. What LVC mechanisms for enhancing air quality are considered successful in Sino-European countries and what are the necessary institutional conditions for their success? 3. How can LVC mechanisms secure sustainable transport improvements in diverse urban environments, and will they result in enhanced air quality? 4. How do alternative LVC mechanisms interact with sustainable housing provision in diverse urban environments, and will they result in enhanced air quality?* Deliverables 1.2, 2.1, 2.2, 3.2, 4.4 and 5.2 will directly meet this objective.

This research is inherently comparative and as such adequate identification of the key institutional factors in the success of alternative LVC mechanisms is paramount. The four partner locations inhabit very different urban contexts and pathways of development. As such the project is in the unique position to both identify and theorize the alternative outcomes of LVC mechanisms in divergent scenarios, presenting modelling analysis and a policy toolkit based on alternative conditions permutations.

Overall, our vision for this project is that the results will meet the objectives of the joint NSFC-JPI UE initiative to enhance cities and urbans areas' capacities for sustainable urbanization and to create the knowledge and evidence for feasible urban transition pathways through directly support a **reduction in the adverse environmental impact of cities on air quality** and **enhance their access to safe, affordable and sustainable transportation and housing**.

10. Impact of the project (max. 2 pages)

10.1 Expected impacts

Our research has extensive community, government and commercial relevance. It is both of applied and fundamental significance, as such its impact will be upon both policy making within urban contexts and upon the academic community.

In terms of applied research impact; urban governments across China and Europe require novel policy opportunities to both directly mitigate against poor air quality and to provide significant, but sustainable, funding to undertake this mitigation. The project is directly relevant for these urban governments and will provide both an evidence base and policy tool to aid in the design of LVC mechanisms.

The identification of international 'best practice' examples and their reporting throughout the project will also support the applied impact of the project by improving local governments' evidence base and providing a compelling rationale for citizens to encourage substantive housing and transportation enhancements to air quality. As such the research findings will have value for transportation and housing providers (both public and private) as well as strategic urban planners and relevant government departments (e.g. in the UK the Department for Transport and National Infrastructure Commission are both concerned with this research).

Whilst the empirical analysis is confined to China and Europe, the mechanisms for modelling the virtuous circle are likely to have international relevance, and as such may constitute broader geographic impact globally.

The substantive expertise of the Advisory Board, as well as the specialist academic inputs from Radboud University and the Heseltine Institute (University of Liverpool) will ensure that there is sufficient expertise within the team to provide high quality public policy impact.

The project is equally significant in its impact as fundamental research. There is a substantive gap in the academic literature on path dependency and urban form, which will be addressed through consideration of the shift in LVC mechanisms. The project will have impact upon research insights directly for LVC and urban governance, but will also contribute towards the requisite data to understand air quality's impact on economic and quality of life indicators (right side of the virtuous circle) and the potential for LVC-defined alterations in housing and transportation to support air quality enhancement (left side of the virtuous circle).

In response to the pilot call there will be direct impact through the creation of long term collaborative partnerships through this project and increasing connections between Chinese and European researchers and policy makers. The project directly supports early career researchers in the establishment of both contingent and independent research connections through the ECR exchange programme.

10.2 Dissemination and/or exploitation of project results, and management of intellectual property

Dissemination and cross-national learning is one of the key components of this project. We have brought together policy-makers, stakeholders and interest groups as an integral component of the project through an Advisory Board in order to maximize the opportunities for co-learning and

knowledge exchange. A core component of the regular project meetings will be providing opportunities for mutual engagement between the advisory members, the project research team and local and national stakeholders (e.g. when the meeting is held in Liverpool representatives from Liverpool City Council, Liverpool City Region and the Local Enterprise Partnership will be invited to contribute to round table discussions and project presentations). These meetings will involve site visits and project specific interest groups to ensure that local and national relationships between partners and relevant interest bodies are developed. As such policy makers and local and national practitioners will play a core role in the formation and dissemination of knowledge created in the research.

To ensure a wider reach for dissemination we have a joint web and media strategy. A project website, with content in English, French, Dutch and Chinese will provide a platform for access to information about the project and will act as an open access repository for papers and data in relation to each of the work packages. To ensure that the project website (and relevant data and outputs) are widely known, we will undertake regular media engagement through the project partners and Advisory Board members' substantive media reach. This will include both traditional media press releases to local, national and international media outlets and through bespoke (project level) social media engagement, in particular accounts will be created for Twitter and Weibo.

In addition to the applied research dissemination we will also establish strong academic outputs to promote our fundamental research. We envision a significant contribution to conferences such as the Association of European Schools of Planning annual meeting; *Le marché international des professionnels de l'immobilier* (MIPIM) and the International Conference on China Urban Development will run in tandem with a minimum of four journal articles and one edited volume. Comprehensive journal articles will be submitted, relating to Work Packages 2, 3, 4 and 5, to internationally excellent journals in the field such as the *Journal of Economic Geography, International Journal of Urban and Regional Research* and *Urban Studies*.

The proposed edited book title is *The virtuous relationship between air quality and land value*. We will seek a publisher committed to producing the volume (ca. 60-70,000 words) in both English and Chinese. Professor Lord and Dr Dunning will act as editors, with indicative chapters covering:
1. an introduction;
2. the theory of the virtuous circle and path dependency in the context of urban environments and economies;
3. the theory of the 'right side' of the virtuous circle (air quality–economy–land value relationship);
4. the theory of the 'left side' of the virtuous circle (land value capture–urban improvement–air quality enhancement relationship)
5. best practice examples of the 'right side' of the virtuous circle
6. empirical modelling of the 'right side' of the virtuous circle
7. best practice housing examples of the 'left side' of the virtuous circle
8. best practice transport examples of the 'left side' of the virtuous circle
9. empirical modelling of housing from the 'left side' of the virtuous circle
10. empirical modelling of transport from the 'left side' of the virtuous circle
11. synthesis modelling of the virtuous circle
12. conclusion

Whilst there may be some overlap in the content between the journal articles and the book, this conforms to normal practice and where necessary we will seek permission prior to publication.

11. Project consortium and management, multi-actor and trans-disciplinary collaboration, co-creation

11.1 Management structure and procedures (max. 1 page)

In order to provide a coherent reporting structure between partners in this Sino-European consortium all personnel on the project will subscribe to the following management structure:
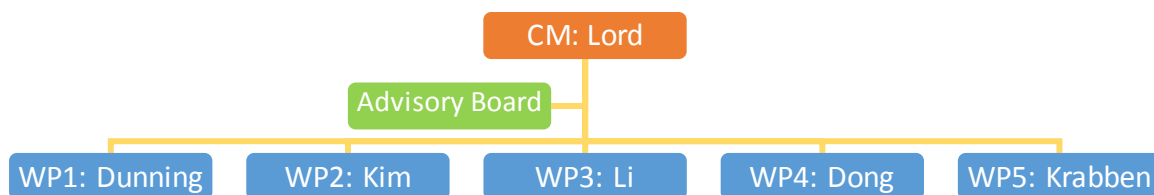
Consortium Manager (CM): Professor Alex Lord (Liverpool) will be responsible for the overall management of the project. Professor Lord has experience of leading international research and complex consortium research projects with high policy impact.

Work Package Coordinators (WPx): Dr Dunning (Liverpool), Professor Kim (SJTLU), Professor Li (Tongji), Dr Dong (Liverpool) and Professor van der Krabben (Radboud) will be responsible for ensuring all tasks and deliverables within their Work Package are completed on time and to standard. They will inform the Continent Coordinators in a timely fashion of any issues arising within the Work Packages and will represent their institution in the consortium.

Advisory Board: The board will initially comprise of the Royal Town Planning Institute (UK); Institut d'aménagement et d'urbanisme de la région d'Île-de-France (France), the EU COST Action (CA17125) 'Public Value Capture of Increasing Property Values' (Netherlands); and Wei Yang and Partners (UK). Other members will be added as they engage with the research at the behest of the Consortium Manager. Members will be invited to a special session during all project meetings to provide critical feedback on the project design and policy outputs. The board will also act as advisors should their support be necessary under the risk contingency plan.

International Collaboration: In addition to a clear management structure it is also important to ensure that the collaboration between international partners is well organized. We have designed each work package to support inter-continental partnership and will seek alternative continental critique for each of the case studies. In addition to support early career international collaboration, each partner institution will host a junior member of staff for one week from each partner institution throughout the course of the project. These exchanges will be thematically linked to the research project but their primary focus will be on international network building. Where feasible these junior exchanges will take place prior to partner meetings in order to minimize costs.

11.2 Individual project partners

<u>Project Partner 1:</u> **University of Liverpool, UK**

<u>Legal Entity Description:</u> Public University

<u>Main Tasks Attributed:</u>
Lead: *Work Package:* One   *Tasks:* 1.1; 1.3; 1.4; 1.5; 1.6; 5.1
Support: *Tasks:* 1.2; 2.2; 4.3; 4.4; 5.2; 5.3; 6.3

<u>Previous experience of tasks attributed</u> (including brief CV and main publications): The team at Liverpool has extensive subject specific expertise and experience of managing large projects such as this. The lead applicant, Professor Lord, has led research on land value capture for the UK Government working closely with Dr. Dunning (Lord et al., 2018). He is also an existing JPI grant holder (with Professor van der Krabben, also part of this proposal) on the 2014-2018 project: SIMS Cities: Testing new mechanisms for value capture. His work has had a significnat impact on policy and practice. Evidence of this can be seen in the ongoing relationship with the Royal Town Planning Institute who are both part of this proposal and have directly funded work done by Lord on the related issue of land assembly (Lord et al., 2015). Dong has an extensive network in China and has published international articles on environmental quality and quality of life (Ma et al. 2018). An indicative list of recent projects below demonstrates the expertise and experience of the team at Liverpool:
-   Valuing the delivery of Planning Obligations and Community Infrastructure Levy in England in 2016-17 (2018) Ministry of Housing, Communities and Local Government, Prof Lord & Dr Dunning
-   Land: Value to Capture? (2018) Royal Institution of Chartered Surveyors, Dr Dunning
-   Simulations for Innovative Mechanisms for the Self-organising City (2014-17) JPI Urban Europe/ESRC; Prof Lord.
-   Putting a price on planning? A cross-national investigation into the behavioural economics of managed development (2015-16) Royal Town Planning Institute; Prof Lord.
-   The Impact of the New Homes Bonus on Attitudes and Behaviour (2014) Ministry of Housing, Communities and Local Government; Dr Dunning:
-   Attitudinal research on financial payments to reduce opposition to new homes (2014) Ministry of Housing, Communities and Local Government; Dr Dunning

<u>Staff Profile:</u>
Alex Lord is the Head of Planning in the Department of Geography and Planning. His recent research has informed planning policy in the UK at both national and local scales and has made substantive contributions to the theory of planning systems using behavioural, game and institutional insights.
Richard Dunning is Lecturer in Planning at the Department of Geography and Planning, he is currently undertaking research on alternative LVC mechanisms within the UK.
Yiquan Gu, Senior Lecturer in Economics, is a recognized expert in the application of experimental and econometric techniques to understanding complex markets.
Guanpeng Dong is Lecturer in Geographic Data Science in the Department of Geography and Planning and has expertise in advanced applied quantitative methods for policy analysis.
Mark Boyle is the Director of the Heseltine Institute for Public Policy and Practice and has unparalleled access to policy makers and politicians within the Liverpool City Region.
Post-Doctoral Research Associate: We will recruit a postdoctoral research associate to support the project.

Project Partner 2: **Centre National de la Recherche Scientifique (Géographie-Cités), France**

Legal Entity Description: CNRS is a public institution and Géographie-Cités is one of its research units. Géographie-Cités is jointly run by CNRS and three universities (Paris 1, Paris 7, EHESS).

Main Tasks Attributed:
Lead: *Work Package:* Three   *Tasks:* 3.2
Support: *Tasks:* 1.1; 1.2; 1.4; 1.5; 2.2; 3.3; 3.4; 5.3; 6.3

Previous experience of tasks attributed (including brief CV and main publications): The research team at CNRS has un-paralleled expertise in the nexus between transport and land policy and planning; with experience in cross-national research, real estate economics and transportation policy.
- Aveline–Dubach, N. (2017) "Centrality of land and regime of capital accumulation in China" (in French), *Revue de la Régulation*, 21, online.
  Aveline–Dubach (2017), "Land and real estate in Northeast Asia, new approaches in an era of financialization", *Issues & Studies*, Vol. 52, No. 4.
- Debrie J., Lavaud-Letilleul V., Parola F. (2013) "Shaping port governance: the territorial trajectories of reform", *Journal of transport Geography*, vol 27-February 2013, pp. 56-65.
- Debrie J., Raimbault N. (2016) "The port-city relationships in two European inland ports: a geographical perspective on urban governance", *Cities – International Journal of Urban Policy and Planning*, n°50, pp. 180-187.
- Le Goix R., Vesselinov E. (2012). "Gated Communities and House Prices: Suburban Change in Southern California, 1980–2008". *International Journal of Urban and Regional Research*.
- Maulat J. and Krauss A. (2014), "Using contrats d'axe to coordinate regional rail transport, stations and urban development: from concept to practice", *Town Planning Review*, 85, n°2, p. 287-311.
  Debrie J., Lacoste R., Magnan M. (2017) "From national reforms to local compromises: the evolution of France's model for port management", *Research in Transportation Business and Management*, Vol 22, pp. 114-122.

Staff Profile:
Natacha Aveline-Dubach is permanent research director at CNRS. Her research focuses on urban land policy and real estate markets in Northeast Asia, based on language proficiency in Japanese and Mandarin. She was PI of two national ANR-funded projects and an EU-funded project (MEDIUM).
Jean Debrie is professor in urban planning at the Department of Geography of university Paris I, previously at the French Institute of Science and Technologies in Transport, Planning and Networks.
Renaud Legoix is professor at University Paris 7. His research focuses on suburbanism analyzing the contextual patterns of suburban built environment; with expertise in spatial analysis and modeling.
Juliette Maulat is associate professor in urban planning at the Department of Geography of university Paris I Panthéon Sorbonne. Focusing on the transport infrastructure and urban development.
Marion Magnan is associate professor at university Paris IV Sorbonne. She explores the production and management of built space for industrial and logistic uses within port areas in France.
Congcong Li is PhD candidate at university Paris 1 Panthéon Sorbonne. Her PhD thesis addresses the issue of land value capture for transit systems in the Pearl River Delta.
Research assistant: this post will be recruited to support this project.

Project Partner 3: **Université Paris-Est, Créteil (Lab Urba), France**

Legal Entity Description: The *University of Paris-Est* is a community of 22 establishments for research, education and expertise locate in the Descartes Cluster and the "Pôle Ville" ("Cities Hub") and characterized by the diversity of their missions. It supports scientific education and research projects, especially in the *LABEX Urban Futures* in which the Lab'urba collaborates.

Main Tasks Attributed:
Lead: *Tasks:* 3.3
Support: *Tasks:* 1.2; 1.4; 1.5; 2.2; 3.2; 3.4; 5.3; 6.3

Previous experience of tasks attributed (including brief CV and main publications):
The team has an academic experience on the question of land value capture considering their PhD orientated on land taxes and local development (Guelton, 1999), cost-benefit analysis and collective choices (Poinsot, 2011).
Sonia Guelton and Philippe Poinsot are responsible of a course at EUP on Infrastructure and local development (28 hours). They are involved in different works together with Sophie Deraeve and others on land valuation around the Grand Paris Express stations. S. Guelton is nominated in the management committee of th
  - COST program "Public Value Capture of Increasing Property Values" n° OC-2017-1-22315 which stands from 2018 to 2022.
  - Deraëve S., Dubois Maury J., Guelton S. and Poinsot P. (2018). Quelle valorisation économique des quartiers de gare du GPE ? Le cas de Nanterre La Folie et de la ZAC Nanterre les Groues, expert report of EUP for the consortium SGP–CGET–ANRU.
  - Deraëve S., Pour une analyse de la production urbaine au prisme de son financement, WP.
  - Deraëve S. and Poinsot P., Quelles formes de valorisation des nœuds de transport ? Une analyse des liens entre programmation urbaine et valeur économique créée dans le cas des quartiers de gare, under review in *Revue d'Economie Régionale et Urbaine,* mars 2018.

Staff Profile:
Sonia Guelton, professor in Urban Studies, is specialized in local development analysis, land and real estate economics and public-private project financing.
Philippe Poinsot is assistant professor in Economics and Urban Studies at University of Paris Est and researcher at LVMT. He is specialized in the assessment of public policy, the role of infrastructure in territorial economic development and infrastructure funding.
Sophie Deraeve, PhD, holds a post-doctoral position at LVMT. Specialized in urban planning, she analyses value creation and value capture around railway stations, using methods based on stakeholder analysis.
Research assistant: this post will be recruited to support this project.

Project Partner 4: **Radboud University, Nijmegen, Netherlands**

Legal Entity Description: Public University

Main Tasks Attributed:
Lead: *Work Package:* Six   *Tasks:* 2.4; 4.2; 6.2; 6.3
Support: *Tasks:* 1.1; 1.2; 1.4; 1.5; 2.1; 2.2; 4.4; 5.3; 6.1; 6.3

Previous experience of tasks attributed (including brief CV and main publications): The team at Radboud University comprises distinguished LVC and public policy academics who are currently researching the relationship between transport infrastructure and LVC, in particular they have been involved in training course and workshops in spatial planning, land policy and value capture (China, 2015, 2016; South Korea, 2016; Finland, 2016) and have extensive contacts with active European and Chinese think tanks (e.g. Lincoln Institute for Land Policy) and are currently writing a book on LVC mechanisms (expected Routledge published 2019).
Recent international work / projects related to LVC mechanisms:
- Financing transit oriented development by value capture (Lincoln Institute Fellowship grant China program, 2017-2018)
- EU COST Action CA17125 'Public Value Capture of Increasing Property Values (management committee member; from 2018)
- SimsCity Valuecap, JPI Urban Europe / NWO (PI, together with Liverpool University, Norwegian University of Life Sciences and University of Liege) (2014-2018)
- Finance and Governance solutions for Transit Oriented Development (Delta Oost) (co-PI, together with Prof. Smits); NWO Verdus, URD (2013-2016)

Relevant publications on LVC mechanisms
- Nguyen, T., Spencer, Van der Krabben, E., Truong, K.T (2017) Capturing the value of the 'rights' to build high-rise buildings in Ho Chi Minh City, Vietnam. *Cities*, 68, 104-118.
- Valtonen, E., Falkenbach, H. & Van der Krabben, E. (2017) Risk management in public land development projects: comparative case study in Finland and the Netherlands, *Land Use Policy*, 62, 246-257.
- Krabben, E. van der & Jacobs, H.M. (2013). Public land development as a strategic tool for redevelopment: Reflections on the Dutch experience. *Land Use Policy, 30*(1), 774-783.
- Tira, M., Van der Krabben, E. and Zanon, B. (Eds.) (2011) *Land Management for Urban Dynamics: Innovative methods and practices in a changing Europe*. Milano: Maggioli Editori.
- Krabben, E. van der and B. Needham (2008) Land readjustment for value capturing: a new planning tool for urban development. *Town Planning Review*, vol. 79, no. 6 (485-506).

Staff Profile:
Erwin van der Krabben is Professor of Urban Planning and Property Development (Radboud University, NL), a (0.2) position as a Professor of Real Estate (University of Ulster, NI) and Visiting Professor at Hong Kong University. Focussing on the interplay between urban planning, land policy and land and real estate markets internationally, including: Indonesia, Vietnam, China and Europe.
Huub Ploegmakers is a lecturer in the Department of Geography, Planning and Environment and has made extensive contributions to the existing JPI Urban Europe research in inner city renewal and is a leading expert in the relationship between urban economics and planning policy.
Sander Lenferink specializes in public-private partnerships in the role of planning and infrastructure delivery. He has published widely on transport, information and knowledge.
Postdoctoral research associate: this post will be recruited

Project Partner 5: **Tongji University, China**

Legal Entity Description: Public University

Main Tasks Attributed:
Lead: *Work Package:* Four   *Tasks:* 3.1; 3.4; 4.1; 4.3; 4.4; 6.1
Support: *Tasks:* 1.2; 1.4; 1.5; 2.1; 2.2; 2.4; 3.3; 4.2; 5.3; 6.2; 6.3

Previous experience of tasks attributed (including brief CV and main publications): Tongji is recognized as one of the pre-eminent urban planning universities internationally. Their experience is well-recognized as exemplary through the successful completion of high quality research and academic publication, including:
- Li, Y., Li, W., Wei. Y. et al (2017) Using personal carbon dioxide trading to promote cleaner cars, *Proceedings of the Institution of Civil Engineers-Transport*, 170, 86-98
- Yu Yifan, Sui Xin. *Study of the Provision of Elderly Service Facilities in the Perspective of Equity* [J]. Social Policy Research, 2018（1）:97-105
- Yu Yifan, LI Jijun. *The Duple-Marginalization Trap of Social Housing* [J]. Urban Forum, 2013(6):107-111
- Xiao Yang, *Urban Morphology and Housing Market* [M]. Springer Press, 2017.
- Xiao, Y., Webster, C., & Orford, S. (2016). *Identifying house price effects of changes in urban street configuration: An empirical study in Nanjing* [J]. China. Urban Studies, 53(1), 112-131.Book
- He, S, Li, L, Zhang, Y, Wang, J (forthcoming). A small entrepreneurial city in action: Policy mobility and evolving development strategy in Jiyuan, China. *International Journal of Urban and Regional Research*
- Li, L and Chan, R.C.K. (2017). Contesting China's engagement with neoliberal urbanism: An overview of the evolving policy and mismatches in urban China. *Asian Education and Development Studies*, 6(1), 44-56.

Staff Profile:
Ye Li: Professor in the College of Transportation Engineering is a leading expert in low carbon transportation planning. He has hosted over 20 research subjects such as National Natural Science Foundation Project, Soft Science Project of Ministry of Transport and the Joint Specialized Research Fund for the Doctoral Program of Higher Education Project.
Yifan Yu: Professor, PhD in Urban Planning. She is PI of National Natural Science Foundation of China (50608055) Regulations and Assessment of ecological urban settlements; PI of NSFC (51178317) Reuse of Urban Industry Remains and Its Ecological Effects; PI of China Ministry of Education New Century Excellent Talent Support Program (NCET-07-0625）The Ecological Effects of Urban Renewal of the Waterfront area of the Huangpu River in Shanghai.
Yang Xiao: Associate Professor, PhD in Urban Studies (Cardiff University, UK). He is PI of NSFC (41501170) Social Polarization and Segregation in China's Global Cities: evidence from Shanghai; CI of NSFC (51608368) The Application Research of Level of Service Method in Urban Park System Planning; CI of NSFC (5157081118) Study on the influence of urban space elements on respiratory health and planning regulations.
Lingyue LI: Assistant Professor, PhD in Urban Planning (Hong Kong University). She is PI of Shanghai Pujiang Program (17PJC084) A political economy analysis of Shanghai new town development and its spatial impacts; CI of NSFC (41671153) Uneven distribution of healthcare services in Chinese cities and its impact on urban spaces; CI of Francis S K Lau Research Fund The production of urban space in Shanghai: Urban entrepreneurialism and governance.

<u>Project Partner 6:</u> **Xi'an Jiaotong Liverpool University, (Research Institute for Future Cities), China**

<u>Legal Entity Description:</u> Public University. Xi'an Jiaotong-Liverpool University is the largest independent international university in China. The University is to become a research-led international university in China and a Chinese university recognized internationally for its unique features

<u>Main Tasks Attributed:</u>
Lead: *Work Package:* Two   *Tasks:* 1.2; 2.1; 2.2; 2.3; 5.2; 5.3
Support: *Tasks:* 1.1; 1.4; 1.5; 1.6; 5.1; 6.3

<u>Previous experience of tasks attributed</u> (including brief CV and main publications): The team at XJTLU have made an outstanding contribution to understanding urbanization, quality of life and economically and environmentally sustainable planning. Their high quality funded research includes:
- A study of the multi-scalar growth dynamics of producer services and its urbanization effects: from the political economy perspective. NSFC Young scholar, 2014-2016. (Grant No. 41301181)
- Legal Studies for Employment Stabilization of Housing Managers, Funded by the Korea Housing Managers Association, South Korea, October, 2015-Feb. 2016.
- Improving Housing Policy for Changing Mutual Insurance Projects, Funded by the Korea Housing Managers Association, South Korea, June, 2015-Dec. 2015.
- Management Model for Residential Buildings and Standard Management Manuals, Funded by City of Seoul, South Korea, June, 2015-October, 2015.

They have made substantive academic contributions through a wide range of publications, including:
- Kim, J.S.* "Making smart cities work in the face of conflicts: lessons from practitioners of South Korea's U-City projects", Town Planning Review, 86 (5), 2015, pp561-585.
- Kim, J.S.* and Wang, X., "Rethinking the Strategic Dimensions of Smart Cities in China's Industrial Park Developments: the Experience of Suzhou Industrial Park, Suzhou, China" In: Caprotti, F. and Yu, L. eds., Sustainable Cities in Asia. Routledge. 2017.
- Blanco, G. A., Steiner, R. L., Kim, J., & Chung, H.* (2012). The Effects of Impact Fees in Urban Form and Congestion in Florida, Transportation Research Record, 2297, 38-46.
- Sak, H., Yang, G., Li, B., Li, W., (2017), A copula-based model for air pollution portfolio risk and its efficient simulation, Stochastic Environmental Research & Risk Assessment, 31(10), 2607–2616.
- Hartono, D., Lioe, B., Zhang, Y., Li, B., Yu, J., (2017), Impacts of particulate matter (PM2.5) on the behavior of freshwater snail Parafossarulus striatulus. Scientific Reports, 7(1), 644.
- Chen L., Yu B., Chen Z., Li B., Wu J., (2014), Investigating the Temporal and Spatial Variability of Total Ozone Column in the Yangtze River Delta Using Satellite Data: 1978–2013. Remote Sensing. 6(12): 12527-12543.

<u>Staff Profile:</u>
Joon Sik Kim: Associate Professor at the Department of Urban Planning and Design, and Director of Research Institute for Future Cities. He has extensive practical experiences as a professional consultant for smart cities over ten years working on 60 smart city projects and proposals across the world. He is Associate Editor in Asia-Pacific Journal of Regional Science (Springer), and has published journal articles, books, and book chapters in English, Korean, and Chinese.
Hyung-Chul Chung: Lecturer at the Department of Urban Planning and Design works on housing market, urban economics and sustainable development; published over ten journal articles.
Bailiang Li: Lecturer at the Department of Environmental Science works on air pollution and environmental science. He has published over 20 peer-review journal articles.

11.3 Consortium as a whole (max. 1 page)

We have constructed a complementary consortium with the requisite experience and expertise in housing, transport, economic and quality of life indicators and LVC to successfully deliver this project. In addition, both within the research team and the wider stakeholders we are well-placed to translate this fundamental research into applied, sustainable urban policy in China and Europe.

In relation to our first research question - What impact does air quality have on economic activity and citizens' quality of life? – We will use both primary and secondary data to model the impact of air quality on these two variables. There is a great depth of expertise in these areas in the Chinese partners within the consortium. For example Dr. Dong at Liverpool University have worked extensively on the construction of quality of life measures and air pollution impacts on quality of life and human health (Ma et al. 2018; Dong et al. 2018) and are internationally renowned for their work in this area. The fundamental principle of this aspect of the work will be to establish the spatial patterns of citizen and firm behaviour as a function of air quality. These work packages, led by Chinese experts, will allow us to develop quantitative measures that can be applied in Europe and China to model the human and economic geography of variable air quality.

Our second research question - What impact do alternative land value capture mechanisms have on enhancing housing and transportation? – will require us to undertake qualitative research on how instruments for LVC could be designed and implemented to secure sustainable urban development. Guided by the results of the quantitative aspects of the work undertaken in work packages 2, 4 and 5 as detailed above, we will explore the degree to which investment won through the LVC process can be allocated to the sites of greatest 'need', understood as those that face/contribute to the worst air quality. By exploring the behavioural aspects of how LVC is designed and implemented in different locations we will be able to develop insights into what types of LVC mechanism work best in different setting and how the investment decisions are guided. As a team we have a huge amount of expertise in the use of LVC to finance transport and housing investment (see, for example, Aveline-Dubach, 2017; Maulat and Krauss, 2014; Desjardins, Maulat and Sykes, 2014; Debrie, Lacost and Magnan, 2017) which, through this consortium will be allied for the first time to skills in modelling and impact assessment (for example, Ma, Dong, Chen, Zhang, 2018; Lord, 2009).

This brief overview of our two interlocking research questions illustrates how our consortium brings together strengths in quantitative methods and modelling with policy design and evaluation. All our work packages are designed in such a way as to marry these complementary research specialisms.

Finally, a central theme of our proposal is the desire to frame our comparative findings in such a way that they are easily translated into policy solutions. Our consortium has extensive experience of making the leap from pure academic research to policy-relevant findings (Lord et al., 2017; Dunning, Watkins and Crook, 2016). To achieve this objective fully we have a specific work package (WP6).

12. Data management (max. 2 pages)

*A.   What data sets of **long-term value** do you expect that the project will produce? "Long-term" means those data sets that, over time, will or may be of value to others within your research community and/or the wider research and innovation community. Data of long-term value should meet the FAIR principles; i.e. they should be findable, accessible, interoperable and reusable.*

The project will generate a large amount of data (both qualitative and quantitative), which will be of long-term value as observational, simulation and derived data forms. As advised in the UK Data Service data management costing tool and checklist, the project team will ensure that:

- All data are described as they are collected;
- The context and methodology for data collection will be documented as data are collected;
- All data will be formatted and organised in a clear and consistent way, with clear file structures from the outset;

Data collated or derived from other forms will not be retained, except in its contribution to modelling and simulation results. Derived data will be collected from a wide range of, principally, open data. For example for work package two the spatiotemporal model estimates will be calculated using extant quality of life indicators. As an example, for Chinese cities, this derived data will include: 1) Urban land development data from individual geo-referenced land parcels (publiclly available from Bureau of Land and Resources of each city government); 2) Air quality data are from two sources: China's real-time air pollution monitoring station network; and the modelled global concentration of fine particulate matter at resolutions of 1km by 1km grids based on satellite data and sophisticated chemical models (van Donkelaar, Martin, Brauer, and Boys, 2015); 3) Urban economy data from the economic unit census data from National Bureau of Statistics of China; and 4) Urban built environment data are calibrated by using urban point of interest (POI) data.

We will also underake primary data collection. For example for work package two quality of life surveys will build on the existing quality of life and general urban liverability research.

*B.   How do you intend to **manage these data** during the life of the project to ensure their long-term value is protected? For example, where will the data be held during the project, who will have access, and will a specialised data manager be part of the project team?*

With respect to the qualitiative data this will all be coded and stored securely to guarantee participant anonymity. Data such as voice recordings which may be generated as part of this aspect of the work will be stored on the University of Liverpool's secure server which is backed up each night. Access to the data will be limited durign the project to the research team as specified in this application. Additional team members may be included upon permission of the Consortium Manager.

Work Package Coordinators will be responsible for managing data in relation to their individual work package and ensuring that relevant project partners have access to this data. In addition all Work Package Coordinators will be asked to complete monthly updates by sending all new relevant (as determined by the Work Package coordinator) data to both Continent Coordinators. The universities of Tongji and Liverpool will provide central backup storage.

There should be no difficulties in sharing the data (in line with the ERSC's policy on data sharing). All data will be deposited in the UK Data Centre as required by the ESRC, with the UK PI responsible for organising this and completing the data deposit form.

*B.   How will the data be **managed after the end of the project** to ensure their long-term availability? For example, will the data be published with a Digital Object Identifier (DOI) and/or placed in a recognised long-term repository or data centre, and when will this take place?*

Radboud university will be responsible for hosting the project website (deliverable 6.1) and will receive a fee of €20,000 during the project to maintain open access to the website for five years after completion of the project (e.g. March 2027). It is anticipated that prior to the closure of the website the theoretical components of the research will be available through open-access publishing sources (both journal and university library repositories).

*C.   What **supporting documentation and other information** do you plan to make available to support this longer-term re-use of the data by others?*

The project website will host descriptions of both the data and methods employed to undertake the analysis and modelling. This will enable informed use of both the data available and reproduction of the modelling based on up to date data after completion of the project. Where possible supporting documentation will be available in both English and Chinese, technical details will also be provided in French and Dutch where appropriate.

*D.   Do you envisage there being any **restrictions** on how the data can be accessed or reused? JPI Urban Europe's policy is that the data should be as open as possible, though with restricted or closed access/reuse where appropriate and necessary, for example if there are sensitive data involving human subjects, if the rules on protecting personal data are followed or if commercial or industrial exploitation is foreseen (e.g. patent application).*

There will be no restrictions on the deliverables 1.1, 1.2, 1.3, 1.6, 2.1, 2.2, 3.2, 4.2, 5.1, 5.2 and 6.2 which will all be made available through deliverable 6.1 (online project and LVC knowledge exchange platform). Where any sensitive (politically, commercially or for individuals) data has been used in the models it will not be made available, however the model outcomes will be available.

*E.   Will there be **other types of material** (e.g., samples, physical collections, software, curriculum materials) of long-term value produced? If so, what are your plans for ensuring these are also available for the long-term?*

The project will not produce data or other resources of this nature.

*F.How have you accounted for the **costs** required to manage the data and other materials to ensure long-term availability? Please note that some funding agencies request applicants to include these costs in the budget request.*

All the universities in question possess secure data storage facilities and will provide these as an 'in kind' contribution to the project. In relation to making data available and accessible beyond the life of the project we have made an allowance of €20,000 which is reflected in Radboud University's budget to allow for the project website (deliverable 6.1) to be made available for five years after the conclusion of the project.

13. Projected Costs

Organisation	Country	Project type of partner contribution[11]	Costs (EUR; *including overhead costs according to the applicable funding agency's rules*)[12]						Cost share per partner (in %)	Total effort in person months per partner	Partner contribution in EUR	Requested funding in EUR	Funding rate requested (in %)
			Personnel	*R&D infra-structure use*	*Costs of materials*	*Third-party costs*	*Travel costs*	Total					
University of Liverpool	UK	A-F	374,035	0	2,281	0	39,917	416,233	26	38	83,247	332,986	80
Centre National de la Recherche Scientifique	France	A-F	226,000	180,000	3,000	12,800	40,000	461,800	29	26	316,000	145,800	32
Université Paris-Est, Créteil (Lab Urba)	France	A-F	170,600	136,480	5,000	9,400	15,000	336,400	21	26	237,400	99,000	30
Radboud Univeristy	Netherlands	A-F	161,321	0	0	25,000	20,000	206,321	13	48	0	206,231	100
Tongji University	China	A-F	53,000	0	13,000	0	13,000	79,000	5	42	0	79,000	100
Xi'an Jiaotong Liverpool University	China	A-F	26,000	0	19,000	0	34,000	79,000	5	44	0	79,000	100
		TOTAL	**1,010,956**	**316,480**	**42,281**	**47,200**	**161,917**	**1,578,754**	**100**	**224**	**636,647**	**942,107**	**60**

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[11] I: Innovation / implementation; A: Applied research; F: Fundamental research; I-A: Innovation / implementation and applied research; I-A-F: Innovation / implementation, applied and fundamental research; I-F: Innovation / implementation and fundamental research; A-F: Applied and fundamental research
[12] For further information on the different cost categories see: → http://jpi-urbaneurope.eu/calls/sustainable-urbanisation-china-europe

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14. Justification of resources (max. 1 ½ pages)

University of Liverpool Costs comprise:
Professor Lord will be the project PI and will oversee and manage all aspects of the project. He has been costed in for the full duration of the project. Prof. Lord will be supported by Dr. Dunning who is also costed into the project for its full duration. Dr. Dunning will supervise the day to day activities of the project research assistant. Dr. Gavin Dong and Dr. Yiquan Gu will contribute to those work packages that pertain to their academic specialisms and will also bring much needed Chinese language fluency which will be vitally imporant to ensure clear communication between European and Chinese partners. Professor Mark Boyle, Director of the Heseltine Institute at the university of Liverpool, will work on WP6 on policy impact. A project research associate will be appointed upon award.

Radboud University Costs comprise:
Personnel: 36 months post-doc researcher (0,75 fte); 12 months (non-eligible) supervisor hours
Third-party costs: costs of knowledge dissemination (provided by SKG; total € 15,000); costs of project website management after project completions (5 years; from 2022 to 2027; total € 20,000)
Travel costs: post-doc researcher bench fee € 5,000; € 20,000 projected costs for participating in project meetings, based on: total of 6 project meetings (two per year; 3 in China, 3 in Europe); costs for 3 European meetings, three participants, total € 8,000; costs for China meetings, two to three participants, total € 12,000; three participants per project meeting (postdoc and two supervisors)
Supervisor salary costs (non-eligible) not included in projected costs; projected supervisor effort (2 supervisors): 4 hours per week = (approximately) 12 person months.

Centre National de la Recherche Scientifique (Géographie-Citiés) and Université Paris-Est, Créteil (Lab Urba) Costs comprise:
NPS non permanent staff : 1 research assistant 36 months(2500€*36) CNRS/1 research assistant (post-doc) 15 months ParisEast (4700€*15 months) = 70,500
PS permanent staff: CNRS : (9,089€x12months)+(8,000€x14months)= 221,070€
                        ParisEast : 50% (7700€x 26months)= 100,100 €
R&D infrastructure use ("taux d'environnement") 80% of all personal cost
Cost of material: 2 computers, documents and books
Third-party cost: administrative cost: 8% of all costs except personal cost of permanent staff and R&D cost; proofreading of documents in English
Travel costs: fieldwork research (in Europe and China for CNRS /in France for Paris East); participation to consortium meetings; organization of events in France (cost shared by the two teams)

Tongji University Costs comprise:
Personnel = 53,000 Euros (comprising 8 postgrad students + one RA without PhD and one post doctoral researcher for one year each)
Cost of materials = 13,000 (comprising publication and data costs)
Travel Costs = 13,000 Euros (to facilitate coordination between Chinese partners and to participate fully in project meetings and research dissemination)
Total = 79,000 EUR (approximately 600,000 RMB, Chinese Yuan)

XJTLU Costs comprise:
Personnel = 26,000 Euros (comprising 4 postgrad students + one RA without PhD and one post doctoral researcher for one year each)
Cost of materials = 19,000 (comprising publication and data costs)
Travel Costs = 34,000 Euros
Total = 79,000 EUR (approximately 600,000 RMB, Chinese Yuan)

15. References (max. 2 pages)

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Whitehead, C. (2016) The Economics of Development Value and Planning Gain, in Crook, T., Henneberry, J. & Whitehead, C. (eds) *Planning Gain: Providing Infrastructure and Affordable Housing*, Wiley Blackwell, Malaysia.