
Deliverable D1.1

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SustainCity

Micro-simulation for the prospective of sustainable cities in Europe

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www.sustaincity.eu

Collaborative project

Small- and medium scale focused research project

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Declaration by the scientific representative of the project coordinator

I, as scientific representative of the coordinator of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
- The project (tick as appropriate) ¹:
 - has fully achieved its objectives and technical goals for the period;
 - has achieved most of its objectives and technical goals for the period with relatively minor deviations.
 - has failed to achieve critical objectives and/or is not at all on schedule.
- The public website, if applicable
 - is up to date
 - is not up to date
- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.4) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 3.2.3 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of scientific representative of the Coordinator:

sig. via ECAS

.....

Date: 31/08/2011

For most of the projects, the signature of this declaration could be done directly via the IT reporting tool through an adapted IT mechanism.

¹ If either of these boxes below is ticked, the report should reflect these and any remedial actions taken.

1 Publishable summary

SustainCity – Micro-simulation for sustainable cities in Europe – is part of the 7th Framework Programme for Research of the European Commission (January 2011 to December 2012)².

Increasing concerns about sustainable development and the growth of urban areas have brought forth in recent years a renewed enthusiasm and need for the use of quantitative models in the field of transportation and spatial planning. This project proposes to improve urban simulation models and their interaction with transport models. Unified operational models that favour a microscopic approach, such as UrbanSim and ILUTE (Integrated Land Use, Transportation, and Environment Modelling System) have recently gained a lot of interest both in the land use and transport communities. Nevertheless, in their current forms these models still require further development to support a comprehensive analysis of the main environmental and socio-economic questions of the sustainability of urban growth and the relevant public policies.

The aim of this project is to address the modelling and computational issues of integrating modern mobility simulations with the latest micro-simulation land use models. The project intends to advance the state-of-the-art in the field of the microsimulation of prospective integrated models of Land-Use and Transport (LUTI). On the modelling side, the main challenges are to integrate a demographic evolution module, to add an environmental module, to improve the overall consistency and, last but not least, to deal with the multi-scale aspects of the problem: several time horizons and spatial resolutions are involved.

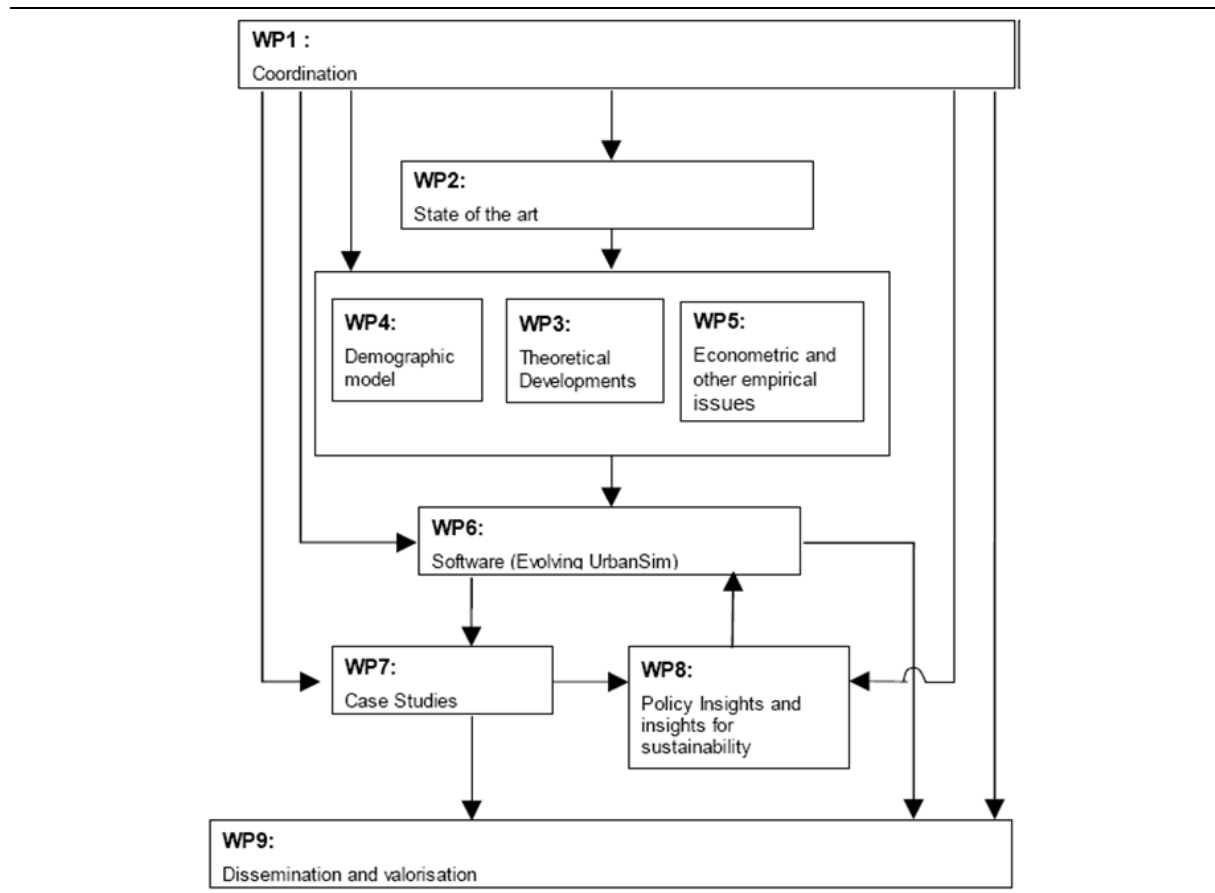
The SustainCity project includes also three case studies to take advantage of the achievements of the other tasks in order to undertake an empirical analysis on three European agglomerations (Ile-de-France, Brussels and Zurich).

Figure 1 provides an overview of the Work Packages (WP) in the SustainCity project. After 18 months of work, the project is in line with expectations. WP2 *State of the art* already has been concluded in summer 2010 by publishing different working Papers focusing on the State of the Art of demographic issues, agent behaviour, firmographics, econometric models, and other subjects regarding land use modelling. Also WP3 to WP6 are in an advanced status: particularly, a software tool modelling demographic events has been developed (WP4) and the coupling of UrbanSim (urban simulation model) with MATSim (travel model) was set up (WP6). Indeed, this is still work in progress. The time consuming phase of data collecting and collating for WP7 *Case Studies* is broadly finished in all of the three case study areas Paris,

² see also project website www.sustaincity.eu.

Brussels, and Zurich. At the moment, the three teams are working on (simplified) first runs. Regarding WP9 *Dissemination and Valorisation*, the organisation of different workshops in Athens, Berlin and Zurich has to be mentioned. Aim of these workshops was to introduce a wide range of researchers in the application of UrbanSim, MATSim and METROPOLIS – particularly also researchers not involved in the SustainCity project. Additionally, the consortium organised also an academic conference on land use and transport to increase attendance. This conference will be part of the 51st ERSA Congress 2011 in Barcelona (30th August - 3rd September 2011).

Figure 1 Overview of the work packages (WP)



One of the main outputs of this project is the development of a modelling platform adapted for the context of European cities. This platform will be based on the existing software UrbanSim, which was originally developed for cities in the United States. Besides identifying new modelling approaches that could be used to improve the existing modelling platform, this review also aims at identifying geographical, social and economic characteristics of European cities that should be taken into account in the platform (from now on called UrbanSim-E)

UrbanSimE will provide the means to evaluate the impacts of policy measures in European cities. With the sustainable development objective in mind, UrbanSimE will provide a quanti-

tative assessment of the trade-off between economic, environmental or social objectives in the development of cities.

The following publications document the work in this first period January 2010 to June 2011 – they all are available on the project website www.sustaincity.eu:

State of the art (Work package 2)

- Morand, E., L. Toulemon, S. Penneec, R. Baggio, and F. Billari (2010) Demographic modelling: the state of the art, *SustainCity Working Paper*, **2.1a**, Ined, Paris.
- Flötteröd, G. and Nagel, K. (2010) Behavioral dimensions in transport microsimulations, *SustainCity Working Paper*, **2.1b**, EPFL & TUB, Lausanne & Berlin.
- Coulombel, N., (2010) Residential choice and household behavior : State of the Art, *SustainCity Working Paper*, **2.2a**, ENS Cachan.
- Proost S.(2010) The Role of Stakeholders, *SustainCity Working Paper*, **2.2b**, CES-KULeuven, Belgium.
- Bodenmann, B.R. and K.W. Axhausen (2010) Synthesis report on the state of the art on firmographics, *SustainCity Working Paper*, **2.3**, Institute for Transport Planning and Systems (IVT), ETH Zurich.
- Picard, N., C. Antoniou and A. de Palma (2010) Econometric Models, *SustainCity Working Paper*, **2.4**, THEMA, Université de Cergy-Pontoise.
- Khademi, N., T.W. Nicolai, S. Zerguini, A. de Palma, K. Nagel, N. Picard, and P. Waddell (2010) Synthesis report on the state of the art on existing land use modelling software, *SustainCity Working Paper*, **2.5**, TUB, Berlin.
- Pholo Bala, A. (2010) Descriptive and Geographical Data for European Cities, *SustainCity Working Paper*, **2.6**, Université Catholique de Louvain, Belgium.
- Hurtubia, R., O. Gallay and M. Bierlaire (2010) Attributes of Households, Locations and Real Estate Markets for Land Use Modeling, *SustainCity Working Paper*, **2.7**, EPFL, Lausanne.

Demographic Model (Work package 4)

- Turci, L., A. Bringé, E. Morand, S. Penneec, L. Toulemon, R. Baggio and F. Billari (2010) Provisional demographic outline, *SustainCity Working Paper*, **4.1**, INED, Paris.

Econometric and other empirical issues (Work package 5)

- Picard, N. and Antoniou, C. (2011) Econometric guidance, *SustainCity Deliverable*, **5.1**, THEMA.

Software (Work package 6)

- Nicolai, T.W., L. Wang, K. Nagel and P. Waddell (2011) Coupling an urban simulation model with a travel model – A first sensitivity test, *SustainCity Working Paper*, **6.5**, TU Berlin.

- Nicolai, T.W. and K. Nagel (2011) Investigating accessibility indicators for feedback from a travel to a land use model, *SustainCity Working Paper*, **6.4**, TU Berlin.
- Nicolai, T.W. and K. Nagel (2010) Coupling MATSim and UrbanSim: Software design issues, *SustainCity Working Paper*, **6.3**, TU Berlin.

Case studies (Work package 7)

- Pholo Bala, A., Peeters, D. and Thomas, I. (2011) Spatial Issues on a Hedonic Estimation of Rents in Brussels, *SustainCity Deliverable*, **7.1**, Université Catholique de Louvain, Belgium.

Additional papers at conferences

- Hurtubia, R., and Bierlaire, M. (2011) Bid rent model for simultaneous determination of location and rent in land use microsimulations. Proceedings of the *Swiss Transport Research Conference* May 11-13, 2011.
- Wang, L. and P. Waddell (2011) A Parcel Level Real Estate Development Model Incorporating Latent Information, paper presented at *51st ERSA Conference*, Barcelona, September 2011.
- Proost, S. and A. de Palma (2011) A small model of equilibrium mechanisms in a city, paper presented at *51st ERSA Conference*, Barcelona, September 2011.
- Nicolai, T. and K. Nagel (2011) Investigating accessibility indicators for feedback from a travel to a land use model, paper presented at *51st ERSA Conference*, Barcelona, September 2011.
- Picard, N., A. de Palma and P.A. Chiappori (2011) Couple residential location and spouses workplaces, paper presented at *51st ERSA Conference*, Barcelona, September 2011.
- Picard, N. and C. Antoniou (2011) Econometric guidance for developing UrbanSim models. First lessons from the SustainCity project, paper presented at *51st ERSA Conference*, Barcelona, September 2011.
- Schirmer, P., C. Zöllig, K. Müller, B.R. Bodenmann and K.W. Axhausen (2011) The Zurich case study of UrbanSim, paper presented at *51st ERSA Conference*, Barcelona, September 2011.
- Bodenmann, B.R. (2011) Modelling firm (re)location choice in UrbanSim, paper presented at *51st ERSA Conference*, Barcelona, September 2011.
- Müller, K. and K.W. Axhausen (2011) Hierarchical IPF: Generating a synthetic population for Switzerland, paper presented at *51st ERSA Conference*, Barcelona, September 2011.

- Zöllig, C. and K.W. Axhausen (2011) A conceptual, agent-based model of land development for UrbanSim, paper presented at *51st ERSA Conference*, Barcelona, September 2011.
- Picard, N. M. de Lapparent and A. de Palma (2011) Household location, dwelling and tenure types in a dynamic context, paper presented at *51st ERSA Conference*, Barcelona, September 2011.

2 Project objectives for the period

Table 1 gives a short overview of the main project objectives for this reporting period. Regarding research tasks, the first step to be accomplished was the synthesis on the state of the art in the different concerned research fields (WP2). The aim of the second step was to issue an econometric guidance (WP5) to ensure a common knowledge for all researchers in the SustainCity project. Simultaneously, the research teams working on the three case studies (WP7) had to collect and condition a base dataset. This base dataset is the pre-condition to all studies to be carried out in WP7. Therefore, it was extremely important to have the data work done by the end of the reporting period. All the more, as the first run of the models expectedly forge for further data to include.

Other immediate bases for the research work are the enhancements of the software UrbanSimE. An important aim of this period was to design a connection between urban simulation model (UrbanSimE) and transport model (MATSim/METROPOLIS) (WP6). Additionally, the focus was led to develop an initial demographic model to be integrated in UrbanSimE (WP5).

Table 1 Overview of the main project objectives for the reporting period

WP	Objective	Lead	No
1	Project Website	ETHZ	M1.1
2	Synthesis reports on state of the art, incl. policy brief	EPFL	D2.1/M2.1
3	Alternative equilibration mechanisms and selection criteria	KUL	M3.1
4	Provisional demographic outline; Initial demographic module	INED	M4.1/ M4.2
5	Econometric guidance	UCP	D5.1/M5.1
6	UrbanSim upgrading modules	TUB	M6.2
7	Database on the three cities (IDF, Brussels, Zurich)	STR	M7.1
8	UrbanSimE indicator module	KUL	M8.1
9	First training courses: UrbanSim, MATSim, METROPOLIS	TUB/ NTUA	M9.2/M9.3

No: **D** = Deliverable, **M** = Milestones, **W** = Working Paper

The most important objectives regarding management (WP1) was the supply of infrastructure (e.g. project website, templates) and organisational issues to support research work by the partners. This includes certainly also the organisation of training courses on UrbanSim, MATSim, and METROPOLIS in the reporting period (WP9).

3 Work progress and achievements during the period

3.1 WP 1: Coordination

Work Package 1 will be discussed in section 4 *Project management during the period*.

3.2 WP 2: State of the art

3.2.1 Summary of progress

A multidisciplinary literature review on the state of the art of urban simulation was conducted. Including the topics of demographic models, residential choice models, the role of stakeholders in urban development, firmographics, transport models and econometric models. An analysis of European cities in terms of their geographic, social and economic structure was also conducted. The review identifies which modelling approaches are feasible and appropriate for the development of a new transport and land use modelling platform, with a focus on particular issues that need to be addressed in the case of European cities. It also identifies relevant research issues that will be considered during the rest of the study.

The work package was subdivided in the following sub-packages:

- WP 2.1 Demographics and microsimulation models
- WP2.2 Behaviour of agents
- WP2.3 Firmographics
- WP 2.4 Econometric models
- WP 2.5 Software (UrbanSim and other tools)
- WP2.6 Descriptive and geographical data
- WP 2.7 Social and economic attributes

The main output of this work package is the following series of working papers, each of them generated as a deliverable for one of the previously mentioned sub-packages.:

- Morand, E., Toulemon, L., Pennec S., Baggio R., and Billari F. (2010) Demographic modelling: the state of the art , SustainCity **Deliverable 2.1a**, Ined, Paris.
- Flötteröd, G., and Nagel, K. (2010) Behavioral dimensions in transport microsimulations, SustainCity **Deliverable 2.1b**, EPFL, Lausanne.

- Coulombel, N., (2010) Residential choice and household behavior : State of the Art, SustainCity **Deliverable 2.2a**, ENS Cachan.
- Proost S. (2010) The Role of Stakeholders, SustainCity **Deliverable 2.2b** ,CES-KU Leuven, Belgium.
- Bodenmann, B.R. and Axhausen, K.W. (2010) Synthesis report on the state of the art on firmographics, SustainCity **Deliverable 2.3**, Institute for Transport Planning and Systems (IVT), ETH Zurich.
- Picard, N., C. Antoniou and A. de Palma (2010) Econometric Models, SustainCity **Deliverable 2.4**, THEMA, Université de Cergy-Pontoise.
- Khademi, N., Nicolai, T., Zerguini, S., De Palma A., Nagel, K., Picard N. and Waddell P. Synthesis report on the state of the art on existing land use modelling software. SustainCity **Deliverable 2.5**, TU, Berlin.
- Pholo Bala, A. (2010) Descriptive and Geographical Data for European Cities, SustainCity **Deliverable, 2.6**, Université Catholique de Louvain, Belgium
- Hurtubia, R., Gally, O. and Bierlaire, M. (2010) Attributes of Households, Locations and Real-Estate Markets for Land Use Modeling, SustainCity **Deliverable 2.7**, EPFL, Lausanne.

3.2.2 Statement on the use of resources

The work was summarized in a Policy Brief (delivered to the EU commission on May 2010). The amount of person-months used in this work package does only marginally deviate from the original description of work and can be summarized in the following table.

Table 2 Use of resources per partner

Partner	ETHZ	ENS	INED	UCL	KUL	STR	NTUA	TUB	EPFL	BU	UCP	UCB
claimed	1.2	5.1	4.0	1.0	0.0	0.0	2.0	2.0	5.0	0.5	4.0	0.0
not claimed	0.5	0.0	0.0	0.0	1.0	0.0	0.4	0.0	2.0	1.5	0.0	0.0
Total	1.7	5.1	4.0	1.0	1.0	0.0	2.4	2.0	7.0	2.0	4.0	0.0

in man-months, rounded to 1 digit after the decimal point

The total amount of person month for this work package was 30 person-months (24.8 have been claimed).

3.3 WP 3: Theoretical developments

3.3.1 Real Estate Investments

For this work package, we have been working on two different articles, which are described in turn.

Household location, dwelling and tenure types in a dynamic context

The fundamental goal of the Real Estate Investment task is the development of a comprehensive individual location and portfolio optimization model for a household or for a single member in a two-period setting. This assignment has to be completed for D3.1, month 24. The provisional theoretical model was finished in line with Annex I at month 10. We are currently working, together with the leading beneficiary of WP5, on its improvement and on the first and preliminary estimations of the chosen econometric specification. This interaction is allowing us to review the practical implications and the proposed solutions for its implementation in UrbanSim. This model has been discussed during different consortium meetings and also during the workshop on equilibrium sorting in urban economics and transport models that was held March, 14-15 2011(month 15) at Zürich.

In this model, we consider a decision-maker (person, worker, household head, etc.) living two periods. At the beginning of each period, she faces continuous and discrete decisions: choices of optimal quantity of floor space and consumption level of an outside composite good, and choices of residential location, tenure and dwelling types. We choose functional forms for utility at each period so that the resulting theoretical model of inter-temporal utility maximization is analytically tractable and can be estimated empirically. The problem is solved in two steps. First, we consider as given a series of discrete decisions and we obtain the corresponding indirect utility function. Second, the optimal series of discrete decisions are derived from the maximization of the indirect utility of the worker.

Our model addresses simultaneously several important questions: economic choices of residential location, bequest motive, dwelling and tenure type and their dynamics, while accounting for interaction with transportation, with demand for local amenities, and with financial investment constraints. We include the most relevant determinants of residential location choices: demands for local amenities, financial constraints (pay-down requirement, borrowings and savings), housing prices, income, transportation costs, and moving costs. Indeed, these choices are subject to budget and other technical constraints. Our approach is based on random utility maximization and formulated as mixtures of Nested Logit Random Utility Maximization.

A preliminary version of this research was/will be presented at Kuhmo-Nectar-ITEA conference (Stockholm, June, 2011), at the International Choice Modelling Conference, June, 2011, and ERSA conference (Barcelona, August, 2011).

Optimal housing consumption and portfolio choice with exogenous random shocks

We analyze the portfolio choice and the housing investment of an investor over his life span. The individual can decide how much to invest on financial assets (bonds and stocks) and what is the level of his demand of housing unit owned as well as his demand for perishable goods. This paper examines the impact of new and major sources of risk. Such major events correspond for example to a long term loss of employment or to divorce. We assume CES utility function for the consumption of housing and perishable goods and describe risk aversion with CRRA specification. The final condition is driven by a bequest left at the end of the life-cycle. We first start with a two-period model and show how the standard solution is qualitatively affected by independent and exogenous random shocks. Then, we set up a continuous time-model where we allow the conditional distribution function of the random occurrence time of shocks to be correlated to financial asset dynamics. For the CRRA utility functions, we compute explicitly the optimal solutions and examine the impact of the random shocks.

3.3.2 Location and Real State Decisions within Couples

The extension of the collective decision models developed by Chiappori (1988, 1992) to the case of household location, including both couple's residential location choice and spouses' job choice, is the main objective of task 3.2. For this matter we have worked in a model that studies the bargaining power of the household members in the context of location decisions. Month of delivery is 24 so as to include it in D 3.1.

Up to month 18 we have successfully developed a theoretical couple residential location model in which household location is predetermined by the workplace location of both spouses. This is relevant if the labor market is more rigid than the dwelling market, in relation to life cycle and job stability, and so spouses cannot commit to long run decision paths. One of the most important empirical implications of our analysis is the computation of the values of time of the man and the woman. We elaborate a new method to provide an unbiased measure of the value of time. More specifically, using census data on the Paris Region, we are able to disentangle bargaining power from the values of time of spouses. This first model has been already presented in several seminars and workshops (UCP, Ecole Polytechnique, International Choice Modeling Conference 2011, Kuhmo Nectar Conference 2011).

From month 19 on, we will develop a complementary model in which the household would anticipate any future shock on either spouse's workplace (and their impact on commuting

cost), and choose location so as to maximize an expected utility, taking into account the probability of any future workplace, and the resulting commuting costs. Under standard assumptions, these anticipated variables would result in a log-sum variable measuring the (individual) accessibility to jobs from the household location. This accessibility measure, specific to household location, would be implicitly included in the list of local amenities.

3.3.3 Equilibrium

In order to study alternative equilibrium mechanisms for the land, housing and transport markets we developed a simple model consisting of two zones. Individuals can live and work in one of the two zones or can commute between zones. This model is used to explore the dynamics of housing and work decisions following a permanent shock in labor demand in one of the two zones. We illustrate the role of the anticipations of developers and government transport agencies for the equilibrium on the housing and the labor market. The model is used to identify the correct Cost-Benefit rules for transport investments and the role of coordination between housing and transport decisions.

Most papers in the literature focus on the equilibrium of the housing market itself. Anas and Arnott (1990) develop a model for one housing market in which they introduce heterogeneity in the housing stock, in consumer tastes and foresee different types of conversions of the housing stock by profit maximizing developers. They propose a perfect foresight equilibrium concept and propose an algorithm to compute it. Martinez & Hurtubia (2006) also propose a land use and housing model in which housing units are unique. Profit maximizing developers supply housing units to the highest bidders. In contrast to Anas and Arnott, they introduce myopic foresight for the developers. Developers are unable to foresee prices correctly and the future prices they anticipate are a weighted average of the present and past prices. Other land use and housing models are less explicit about the supply decisions and the equilibrium mechanism. Still other, more theoretical models only analyze the steady state and its comparative statics properties.

In our small model we add an elementary labour market and a transport market to the housing market. We do this using a 2 "region" model where each of the regions is homogenous and has some employment and residences. This toy model is used to study the reaction of housing, labour and transport market to an exogenous productivity shock in one region and to exogenous policy shocks. We are interested in the role of different types of expectations and behaviour of the decision makers involved.

In order to characterize the equilibriums we need to specify the information and behaviour of all agents that take decisions. For firms we assume that they always hire workers until the point where the marginal product equals the wage cost. Developers build until the discounted profit equals the marginal cost. Individuals have to take two decisions: where to live and

where to work. As they are fully mobile between the two zones and as all individuals are identical, we need to satisfy the spatial equilibrium conditions: the location and work decisions will be an equilibrium when the utility of the individual cannot be improved by moving to another location or other zone to work. As long as transport agency and government are passive, it will be the behaviour of the developers that will determine supply and equilibrium on the housing market and in the economy as a whole. We can construct different types of equilibriums: the perfect foresight, the delayed reaction and the myopic equilibriums. Which equilibrium occurs depends on the information and anticipation rules of the developers. The equilibrium obtained when the shock is correctly anticipated, both in timing and magnitude, and developers anticipate the future rental prices correctly is the perfect foresight equilibrium. If the shock is not anticipated but the developers have correct expectations on the future rental prices we end up in the delayed reaction equilibrium. Finally, when the shock is not anticipated and building decisions are based on past and current rents we have the myopic equilibrium.

To study the decisions on transport capacity we will, in addition, need to account for the behaviour and information of the transport agencies; these can either anticipate the reaction of the developers on a decrease in commuting costs ("smart" government) or not ("non-smart"). The developers can also be "smart" or "non-smart" since they observe investments in the transportation network and can take these into account when making their building decisions or not.

In the perfect foresight deterministic equilibrium we found that developers and individuals will adapt immediately to the shock by constructing more houses in the more productive region. In the case of the delayed reaction equilibrium one observes an unanticipated shock in period 1. Commuting can react immediately but the change in the housing stock can only take effect in period 2. Future rental prices are perfectly anticipated. The new steady state is equal to the perfect foresight equilibrium. The only difference is that the adaptation is delayed by one period.

In the myopic case, developers rely on past rental prices to make their building decisions. In this case the adaptation process will be much longer. Although analytical results are not clear cut, numerical simulations show that for a wide range of parameter values the adaptation process shows a fluctuating pattern but converges to the same steady state as in the perfect foresight equilibrium.

Next we assume that the governments knows that due to a shock there will be a high demand for commuting. To avoid too high commuting costs it decides to improve the transportation network between the two regions. Once the shock occurs the investments are made and the commuting costs decreases. We analyze the effect on the steady state of such a decrease in commuting costs. To focus on the effect of including the housing market we first look to the case where the housing stock is constant and compare this to the case where developers are

active players and react on a change in commuting costs. If the government lacks to take into account the reaction of the developers, i.e. increase the housing stock in the region where the shock occurred, it is very likely that it will overinvest. The reason is that the increase in housing stock will reduce the demand for commuting. The relative cost of investing in new houses versus new infrastructure will to a large extent determine the appropriate level of investment in transport and housing. The ultimate outcome is, however; also depend on whether the agents make the correct anticipations. To correct for myopic behavior of the developers the government has several instruments: it can restrict new housing by imposing strict land-use regulation and it can signal in a credible way what investments are going to be made to avoid an oversupply of housing.

A preliminary version of this research was presented at Kuhmo-Nectar-ITEA conference (Stockholm, June, 2011).

3.3.4 Heterogeneous Real Estate Developers

Real Estate Developers – Zurich

The contemplated developer model tries to model developers as agents inside UrbanSim. This approach tries to consider market characteristics of the supply side that are specific for real estate markets. The issue focused on is heterogeneity or in terms of aggregated terminology segmentation on the supply side (Coiacetto, 2001, 2009, 2007).

The data gathered so far is basically of three types: General descriptives of the Swiss real estate markets, records of development projects and snapshots of the building stock.

Preliminary results of this research will be presented at 51st ERSA Congress in Barcelona (September, 2011).

3.3.5 Firmographics

Firmographics – France

The internal guideline for implementation in UrbanSim was provided at month 10 to WP5 leading beneficiary (WP5 leading beneficiary it is also in charge of the firmography's Paris case study). In the Paris case study, firmography is a four-step model, which decomposes the plants evolution and its job evolution. Given the significant variation of the job market across activities, estimations are therefore sector-specific. The 8 sector classes retained for the French case are: Farming and food industry; Industry; Energy, Construction and Commerce; Transport, Financial and Real Estate Activities; Services; Education, Health and Social Action; and Administration. We propose a three plus one model where the three first steps are

based on estimated models: (1) plant death (Binary Logit Model: observed or not in the first and second), (2) growing/shrinking of plants (Linear Regression Model: final workforce as a function of initial workforce and local variables) and (3) plants location choice (Multinomial Logit with importance sampling regarding the number of jobs in a commune). The last step (4) consists in the equilibration of the number of jobs on the Paris Region and simulations.

Firmographics – Zurich

Zurich case study bases employs firmography results from the adjacent St.Gallen region (Bodenmann and Axhausen, 2008). These models address location behaviour of companies (on the level of plants). Therefore, the intended model structure will model companies' transition, relocation and location choice. The jobs provided are subsidiary modelled based on the behaviour of the companies (for details, see Schirmer *et al.*, 2011).

It is proposed to model firmography in a three-step model, which decomposes the plants and subsidiary jobs evolution:

1. Firmographics events like birth / closures / relocation / growth of plants
2. Location choice of new established plants
3. Location choice of relocating plants

Using data from the three cantons of St.Gallen and both Appenzell, most of these models have been estimated and calibrated. This dataset provides information on more than 50,000 companies during a period from 1991 to 2006. The first model will consist of different sub-models and draw from a macro-econometric transition model.

Due to data restrictions, firmographics in Switzerland generally distinguish between ten sectors (Bürgle, 2006; Bodenmann, 2011). If possible, the sector of service and finance is additionally divided in smaller sections: i) finance, ii) business services, and iii) public and personal services.

A preliminary version of this research will be presented at 51st ERSAs Congress in Barcelona (September, 2011).

3.3.6 Statement on the use of resources

The total amount of person month for this work package was 35.5 person-months (31.5 claimed).

Table 3 Actual use of resources per partner

Partner	ETHZ	ENS	INED	UCL	KUL	STR	NTUA	TUB	EPFL	BU	UCP	UCB
claimed	10.7	15.4	0.0	0.0	0.0	-	0.0	-	-	-	5.5	0.0
not claimed	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	10.7	17.4	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0

in man-months, rounded to 1 digit after the decimal point

3.4 WP 4: Demographic model

3.4.1 Summary of progress

The work in WP4 draws directly on the state of the art report developed within WP2 « WP2.1 Demographic model : the state of the art ». In the framework of this WP, the team provided a synthesis report presenting an overview of demographic micro-simulation models and existing demographic models used in Europe and outside Europe. This report details some of models developed primarily by demographers and statisticians, such as MicMac, SocSim, Lifepaths, and Popsim. These dynamic micro-simulation models are based on transitions between states and/or probabilities that some events occur during each time period of the simulation. These transition probabilities are estimated by sex, age, and other meaningful and available characteristics. These models that want to be representative of the population at both individual and household/dwelling levels explicitly take into account the links between individuals, allowing producing outputs at the individual or household levels.

WP4 progresses were made according to the schedule. The first version of the demographic module has been computed by month 15. It has been sent to the partners for comments and tests on month 19.

3.4.2 Main work performed

As scheduled, the provisional demographic outline was almost entirely completed at month 10 (Annex I). A document « D4.1: provisional demographic outline » has been written and disseminated among the consortium partners. This document describes the model as it is envisaged to build it. The model will be proposed through two levels of use: a simple core level

and a more sophisticated optional level. The optional level includes a series of options not available in the core model, such as additional micro-data and transitions or events parameters if available. To provide facilities in the work of the case studies' teams, the report realised in WP4 gave a description of the micro-data needed to feed the model. The demographic model is an independent/external module written in the Modgen language (a programming language based on C++ and developed by Statistics Canada to support the creation of dynamic microsimulation models).

An initial module, called demo4.exe, has been realised, completed, and diffused during month 18-19 as scheduled (cf. Annex 1). To make sure that the module can be performed by the other teams, it has been tested on different computers with different configurations and different Operating Systems (windows XP and 7). A user guide and the description of the initial population have been provided with the module.

The demographic microsimulation module produces a census-like population for each year. For the inclusion within UrbanSimE, the output of this module is produced at both individual and household levels. It is a type space delimited file including all the variables needed to feed UrbansimE.

The availability of data to estimate the parameters of demographic models has been explored. For the Île-de-France case study, an initial population has been built mainly based on the survey "Histoire Familiale de 1999" (EHF 99), and on some additional data sources when needed. This initial population, as well as a set of transition probabilities, are given as a part of the module, and can thus be used by other teams if needed.

3.4.3 Main issues solved

Due to the integration within UrbansimE, some specific problems have to be solved:

- **Migrations.** it was decided that internal migrations, i.e. migrations within the area of the case study, are performed by the location module (UCL team) and that external migration are performed by the demographic module. The demographic module will thus simulate immigration and emigration to/from the study area but not the spatial mobility within the area. The main problem to solve is a data problem: micro data on migrations are scarce and therefore parameters for migrations will rely heavily on estimations made by migration forecasts experts and not as much on trends in observed data as for other demographic events.
- **Education.** Education in the initial demographic module is as described in the document D 4.1. The approach we have chosen is the imputation of both level of education and age at the end of study. Another approach has been proposed (by the Swiss team) to allow re-entering into education after a time out of the education system. One approach would impute every year the education level of each person according to different covariates, while the other one would be based on transition

rates by age and sex (moving to next level every year, entering and exiting the education system). The first approach would lead to slightly inconsistent results when education trajectories are concerned and the second one would need very detailed data that none or almost none of the case studies has. Therefore, for this initial and core model, we follow the approach described in the “D 4.1 Provisional demographic outline”.

3.4.4 Statement on the use of resources

WP 4 includes two teams of researchers (from INED and from Bocconi University). Both resources and planning are in line with the project plan.

Table 4 Actual use of resources per partner

Partner	ETHZ	ENS	INED	UCL	KUL	STR	NTUA	TUB	EPFL	BU	UCP	UCB
claimed	0.0	-	12.0	0.0	-	-	0.0	-	-	2.0	-	-
not claimed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0
Total	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0

in man-months, rounded to 1 digit after the decimal point

The total amount of person month for this work package was 18.5 person-months (14.0 claimed).

3.5 WP 5: Econometric and other empirical issues

3.5.1 Summary of progress

WP 5 strategic objective is to provide the SustainCity project and its UrbanSim users with coherent guidelines, improvements and recommendations; regarding the estimation and calibration of the econometric models on which UrbanSim is based.

WP 5 measurable and verifiable objectives constitute mainly the supply of a guide for econometric modelling as a milestone needed in WP 7 and the estimation results for at least one case study.

In the lines with the specifications of Annex I of the Grant Agreement; UCP and NTUA, as leading beneficiaries of WP 5, co-ordinated and made available the deliverable D 5.1 “Econometric Guidance” at month 14.

3.5.2 Econometric Guidance

The Econometric Guidance (deliverable 5.1) was certainly relevant towards a better understanding of the underlying econometric models predicting the endogenous variables in our Land-Use Transport-Interaction (LUTI) model, that is, UrbanSimE. In addition, the Econometric Guidance was a great opportunity to assess the data availability, specifics, limitations and possible applications for the three case studies considered in the project and developed in WP 7: Brussels, Paris and Zurich. Furthermore, the Guidance served to review and evaluate project participants own expertise and comparative advantages.

The Guidance clearly established the overall strategies to find the best econometric models and to compare estimation results between econometric softwares and UrbanSimE. It also highlighted the most important practical issues to have in mind when running the models. By giving recommendations for standardize vocabulary, units, result presentations and model outputs, the Guidance guarantees that there is a comprehensible study framework and ensures project coordination and comparisons between different cases studies.

Moreover, this first task permitted to draw some preliminary conclusions on the definition of policy objectives and implications, thereby providing recommendations regarding the type, level of aggregation and quantifications of the policy insights and insights for sustainability to be detailed on WP 8.

3.5.3 Econometric Improvements

Household Location Model: Consistency with variable size of potential location

The household location model should be consistent with variable size of potential locations. We suggest generating alternatives for each household using importance sampling techniques. Importance sampling of a zone is equivalent to uniform sampling of dwellings located in that zone.

The probability that a zone is included in a choice set is proportional to the “size” of the zone, which may be measured either as the population stock (number of dwellings located in the zone, number of households living in the zone, or as a flow (number of movers to this zone, number of vacant dwellings in the zone).

Ideally, importance sampling should not prevent the same zone to appear twice or more in the choice set, but some econometric software does. In case the same zone cannot appear twice in a choice set, this leads to and underrepresentation of the largest alternatives, which becomes more and more severe as the number of alternatives in the choice set increases. This leads to a bias in the coefficients of all variables correlated with zone size. This bias should be corrected carefully. In the SAS software, the procedure `surveysselect` performs importance sampling

with no possibility that the same zone appears twice or more in the choice set, but this is compensated in the probability of selecting each alternative, so that this procedure induces no bias.

Note that the under-representation of large alternatives, and the resulting bias, becomes more and more severe when the number of alternatives in the individual choice sets is increased. As a result, the number of alternatives in individual choice sets should not be increased too much (10 alternatives randomly chosen for each household choice set was a reasonable figure for household location choice in Paris case study) when the software used for estimating models does not allow for repetitions and does not correct the resulting bias.

Household Location Modelling: Buy or Rent? House or Flat?

Household location choice model could be estimated on the whole sample, irrespectively of tenure type and dwelling type. However, when possible, we recommend that tenure type and dwelling type are considered separately, with coefficients specific to each tenure type and dwelling type, and that the decision to move (relocation choice) is estimated together with location choice.

In this case, we recommend the following nested structure: 1) decision to move; 2) tenure choice; 3) dwelling type; 4) Location.

An extension to latent variables was successfully estimated for Paris case study, but it will probably not be included in UrbanSim in the near future. In this latent variable model, two cases are considered for step 2) tenure choice: under credit constraint, the only option available to the household is to rent, whereas unconstrained households are free to choose either renting or buying a dwelling. The probability of credit constraint is estimated simultaneously with the other parts of the model, as an upper level conditional on moving.

Employment Location Choice Model and Firmography

Three options may be used to study employment location: jobs location, either by itself or together with household location, and firmography. Each of these models uses Multinomial Logit (MNL) or Nested Logit (NL).

Note that WP5 suggests considering firms rather than jobs as the decision unit for job locations. This can be done by decomposing the evolution of the number of jobs at a given place in: the variation in the number of jobs in each exiting firm; firms' relocation; births and deaths of firms. This corresponds to firmography (third option).

In the simplest option (first option), each job is located independently from the other jobs in the same firm or plant and from Household location, using a Multinomial Logit (MNL) mod-

el. This simplest option should be considered as a second best, less relevant than the other ones.

The second option, relevant from the point of view of the worker, builds a more elaborate job location choice model. It is a Nested Logit (NL) for workplace and Household location, in either order. In such a model, commuting time is a key variable explaining the location at the lower level of the nest, which happens to be by far more significant than any variable measuring either accessibility or expected time typically used in location choice models.

Firmography, the third option, is relevant from the point of view of the firm; all workers working in the same plant are located simultaneously, at the same place. In addition to the location of new plants, firmography estimates the “death” of the plants using a binary logit model, as well as growing/shrinking of stable plants, using a Linear Regression model. Note that the “birth” of plants, which is implemented in UrbanSim is not estimated. In the simulation process, newly born plants are randomly selected from the distribution of existing plants.

Land Development Model

For the Land Development Model, instead of estimating transitions probabilities from one usage to another, the module should estimate a model of generation of projects of a given type and size, and estimate a location model for these projects given the constraints imposed by their type and size. This is the less advanced model in the 3 case studies (and in UrbanSim).

UrbanSim basically proposes two options, which are substitutes for the moment. It is desirable that UrbanSim could evolve so that these two options are complements, and describe respectively the supply and demand for land, in relation to the politicians or stake holder versus investor points of view.

The “stake holder point of view” option is a Land Use Type transition model that allows choice between the different land use types. Transition between land use types for a given parcel is modeled using a MNL with a relatively limited choice set (there are 83 land use types in Paris region, which can be grouped in 9 homogenous aggregated types).

The “investor point of view” option is a Location Choice Model that allows choice between different locations, using MNL with importance sampling (trade-off between competing locations for a given project). The list of potential alternatives depends on the land use type attached to the project and on the surface of the project: the project can be located only in parcels (communes or IRIS for the Paris case study) for which the surface available for this land use type is larger than the surface of the project.

3.5.4 Statement on the use of resources

The total amount of person month for this work package was 13.8 person-months (12.2 claimed).

Table 5 Actual use of resources per partner

Partner	ETHZ	ENS	INED	UCL	KUL	STR	NTUA	TUB	EPFL	BU	UCP	UCB
claimed	0.0	2.0	0.0	0.0	-	-	2.0	-	-	-	8.2	-
not claimed	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0
Total	0.0	2.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	8.2	0.0

in man-months, rounded to 1 digit after the decimal point

3.6 WP 6: Software (Evolving UrbanSim)

3.6.1 Scientific and Technological Achievements

Overview

The main focus of WP 6 is to better integrate travel model results into UrbanSim. The travel model uses the population and land use information from UrbanSim, generates travel demand from it, and assigns it to the network. The main purpose of this exercise is to come up with realistic network-oriented travel times, including congestion effects. The results from the travel model are fed back into UrbanSim, where they are taken into account in the land use decisions.

Major challenges include that travel models typically use a large amount of computing time, and that the microscopic information that would be conceptually most straightforward to use by UrbanSim is too large to be fed back directly. In WP6, the first challenge is addressed by a so-called warm start capability, which recycles information from a previous run, to be investigated in the next half of the SustainCity project. The second challenge is addressed by investigating in how far accessibility indicators can be pre-computed by the travel model.

An additional challenge is to achieve a robust coupling between UrbanSim and the travel model. This is achieved by using a “certified grammar” for the configuration file, ensuring that modifications of the exchange syntax are always changed consistently on both ends.

The following sections provide some details on the current status. More information can be found in the publications, which are referenced accordingly.

Work Plan

The progress of work is illustrated by the “Milestones_and_deliverables.11” Excel sheet. According to this the following tasks were planned until June 2011:

1. Synthesis report on the state of the art on existing land use modelling software [Month 4] (April 2010)
2. Test cases: MATSim [Month 9] (September 2010)
3. Accessibility indicators from MATSim [Month 12] (December 2010)
4. MATSim UrbanSim-based travel demand generator [Month 12] (December 2010)
5. UrbanSim upgrading modules [Month 18] (June 2011)
6. Warm start: Initial version [Month 18] (June 2011)

Steps Done

1. Completed in May-2010
2. The testing framework was understood and tests were written both on the MATSim and on the UrbanSim side.

On the MATSim side, tests are currently at ci.matsim.org:8080/job/MATSim_playground_M2/lastBuild/testReport/, under playground:tnicolai.

On the UrbanSim side, tests are located at urbansim.serveftp.org:8080/, under opus_matsim.

In both repositories, tests are added as development progresses.

The final repository location for the tests still needs to be decided before the end of the project, but this is not considered as critical.

3. First results are described in Nicolai and Nagel [2011]. Work is not as far along as planned because Item 4 took longer than anticipated (see there). This is offset by the fact that TUB did not start charging to the project before May'2010.
4. The software architecture to achieve a robust coupling between MATSim and UrbanSim is described in Nicolai and Nagel [2010]. The final integration into the Zurich case study cannot be started before there is a first working prototype of the Zurich UrbanSim case study, since MATSim needs to know which population and land use information will be available in the specific UrbanSim setup.

In the meantime, results were obtained with the PSRC-UrbanSim implementation. These are described in Nicolai et al. [2011]. More time than anticipated was nec-

essary in order to replace all elements of the PSRC travel model integration; we anticipate this to be easier with a fresh (e.g. Zurich) scenario.

5. UCB has helped TUB, ETHZ, EPFL and others with various items.
6. An initial version for the warm start capability exists. Tests and documentation of computing time changes will follow. A decision needs to be taken if we progress with the PSRC version as case study, or wait for a working Zurich scenario.

3.6.2 Statement on the use of resources

The total amount of person month for this work package was 18.9 person-months (14.1 claimed).

Table 6 Actual use of resources per partner

Partner	ETHZ	ENS	INED	UCL	KUL	STR	NTUA	TUB	EPFL	BU	UCP	UCB
claimed	0.0	-	0.0	0.0	-	0.0	0.0	8.1	5.0	1.0	-	-
not claimed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	8.0	1.0	0.0	0.0

in man-months, rounded to 1 digit after the decimal point

3.7 WP 7: Case studies

3.7.1 Summary of progress on the 3 case studies

The table below gives a summary of the work progress on the 3 case studies in the tasks 7.1, 7.3 and 7.4. The particular progresses made and difficulties encountered on each case study are described in the next sections, by each team.

The task 7.2 dedicated to spatial issues is treated in parallel as it is not exactly on the critical path to the scenario simulations.

	Planned time-schedule	Paris	Zürich	Brussels
7.1 Data collection and analysis	February 2011 (month 14)	Completed at months 14-15	Data collection finished for a first base year – The collection of some data for model estimation is near to be finished - Creation of a synthetic population – Privacy issues were encountered	Completed at month 17 - Creation of a synthetic population because of privacy issues (no access to the individual data of the 2001 census)
7.3 Model calibration	December 2011 (month 24)	In progress - Simulations on the period 1999-2006 in progress - Calibration of the transport sub-model is almost entirely completed at months 14-15	Estimation of the different sub-models is in progress	Estimation of the different sub-models is in progress; e.g. a preliminary version of the household location choice model has been estimated.
7.4 Scenario simulations	August 2012 (month 32)	Not started yet	Not started yet	Not started yet
7.2 Spatial issues	August 2011 (month 20)	Completed (final report is in progress and will be delivered by end of August)		

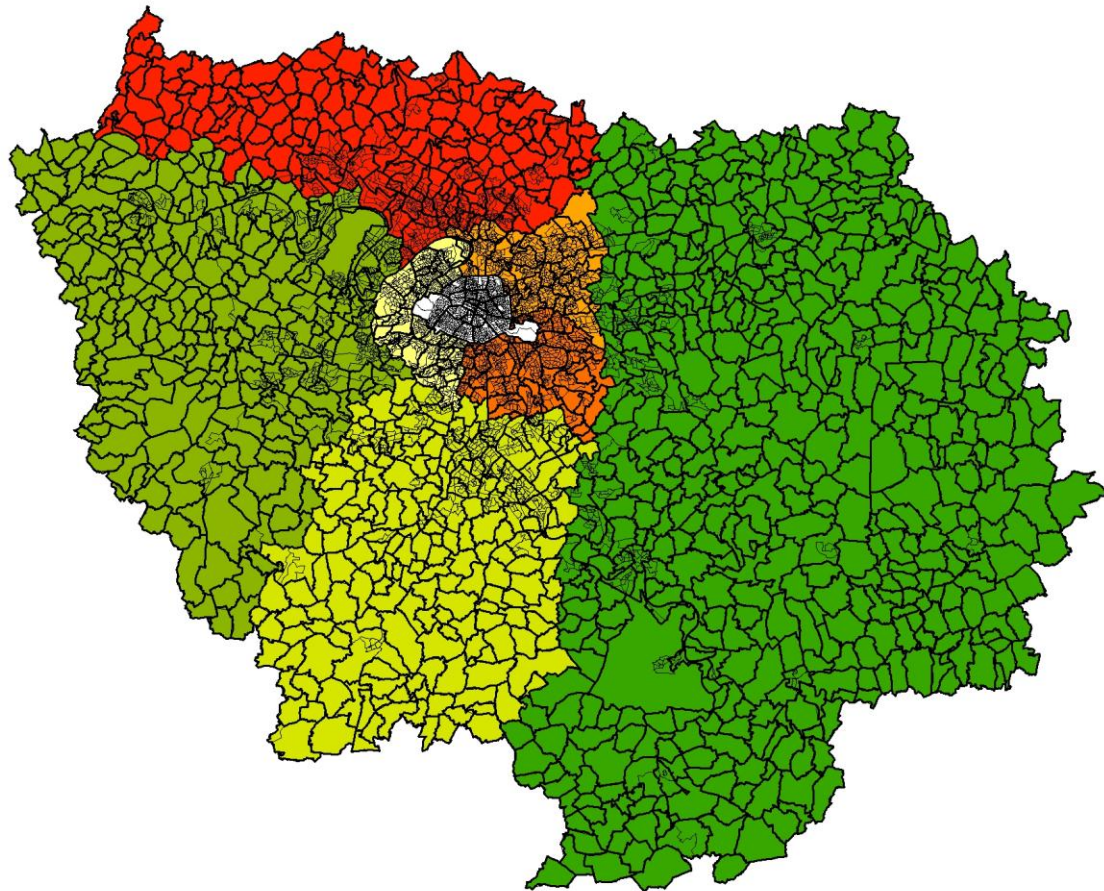
3.7.2 Paris case study

A. Data Collection and Analysis

The data collection and analysis task was almost entirely completed at month 14-15, in line with the Annex I. This work was done by ENS and UCP, except for the demographic data whose collection and analysis were provided by INED.

As already stated and described in other deliverables, the Paris case study employment data comes from the ERE (Enquête Régionale Emploi). The ERE provides two cross-sectional data of the existing firms, plants and jobs over the region, for the years 1997 and 2001. We have exhaustive census data on the 5 million households living in Ile-de-France, at the commune and the IRIS levels (levels explained above). Census data includes information on the year of last move. Regarding Land Use Type, we will use the exhaustive list of “îlots MOS” (see 7.2) in Ile-de-France between 1982 and 2003.

Figure 2 Map of the Paris study area – Departments, communes and IRIS zones



The Paris case study has collected very interesting data for the household collective-location model. In the census data, both household location and workplace are observed at the commune level in a 5% sample. Travel times and accessibility measures are computed using the dynamic transport network model METROPOLIS. Data requirement on real estate prices is available in two price datasets. Cote Callon contains information on average local prices, separately for houses and flats, separately for rental and buying markets. This data is available only for the communes with more than 5,000 inhabitants (there were between 300 and 400 such communes, depending on the year). The “Base de données des Notaires” contains individual price data for all transactions observed over the past years. The number of years available varies from 15 years inside Paris to 6 years in the outer ring.

The Paris case study demographic data are whenever possible based on one dataset that is the survey “Histoire Familiale de 1999” (EHF 99). When needed some additional data sources such as the 1999 census are used.

For mortality, past, current and prospective mortality rates from 1999 to 2048, come from J. Vallin et F. Meslé. (http://www.ined.fr/cdrom_vallin_mesle/contenu.htm). These estimates are determined for the overall population as we assume that mortality between Paris and its suburbs and the overall population of France are not very different.

For fertility, the rates are estimated from the EHF 99 survey. Once again, the estimates are determined using the overall sample of the survey as the Paris subsample is too small and we consider that fertility between Paris and its suburbs and the overall population of France are not very different.

For union formation, union dissolution and leaving parental home, the transition rates (or logistic regression parameters) based on the EHF99 survey are currently under analysis and a first version of the estimates will be available by the end of month 22.

For education, current estimates will be refined by month 22.

B. Model Calibration

The calibration of the UrbanSimE in Paris case study is in progress and our staff is working on its fine-tuning with month 24 as final deadline. We are running simulations using 1999 as the base year and 2006 as the target one. We opted for these two years because most of the disaggregate data are available in the two recent French General Censuses, that is, those of 1999 and 2006. The results of calibration will be compared to a previous application with the grid cell version of UrbanSim.

We are currently estimating and calibrating four models:

- The Household Location Choice Model with a 4-tier nested structure: decision to move, tenure choice (own or rent), dwelling type (flat and house) and location (at the commune level and using random sampling).
- The Employment Location Choice Model for 8 sectors (Farming and food industry; Industry; Energy, Construction and Commerce; Transport, Financial and Real Estate Activities; Services; Education, Health and Social Action; and Administration)
- The Real Estate Price Model using the usual distinction between selling and renting, and between flats and houses: 4 equations. Moreover, a SURE model was also estimated and a panel data version on more than 10 years for Cote d'Azur is being developed.
- The Development Project Location Choice Model for each of the 9 aggregated initial land use type (MOS) where the probability of transaction depends on the local population density and structure (Census data), local employment density and structure (ERE data) and local land use type (MOS) for 5 periods.

Calibration of the Transport Sub-Model was almost entirely completed at month 14-15.

Calibration of the Demographic Sub-Model will be conducted under the same guidelines than the other Paris submodules. Simulations will be run from 1999 to 2006 as observed data are available for comparison with the simulations. The calibration will be done by end month 24.

C. Simulations, tool evaluation and policy evaluation

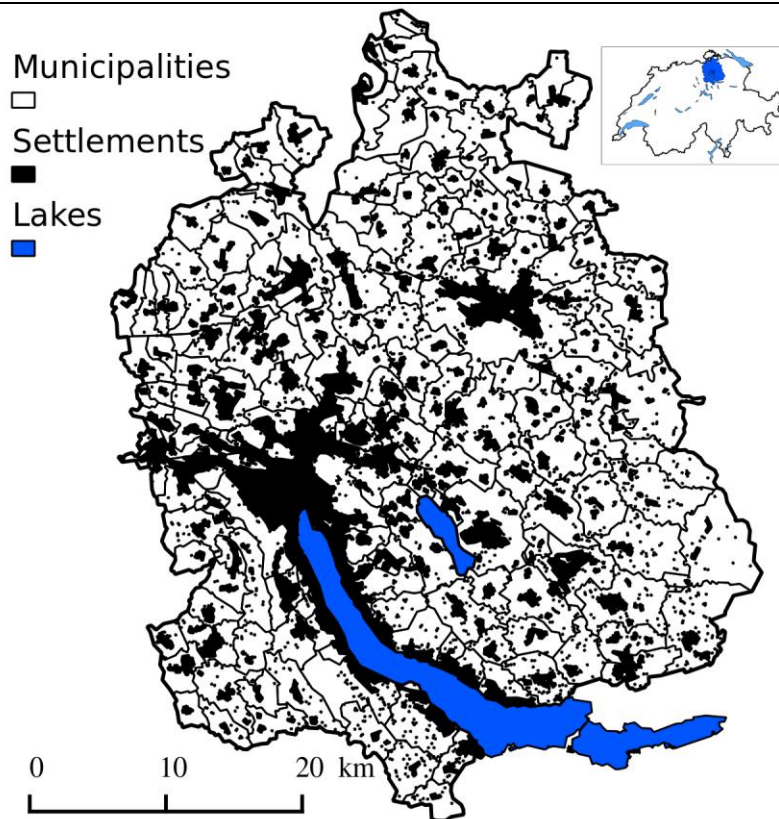
After D 7.2 concerning calibration at month 24 we will proceed with the simulations. We should highlight that the French Government and the Paris Region Administration are planning on huge transport and infrastructural projects in the Paris Region with 2020 and 2025 as delivery date. These projects will be interesting information input to run different simulations and analyze their effects on the distribution of population, firms and jobs over the Paris Region.

3.7.3 Zürich case study

In the following progresses of the case study in Zurich are summarised. In this case study the canton Zurich is simulated. Figure 1 shows the canton with municipalities and settlements. The two major cities are Zurich in the middle west and Winterthur in the east. Starting from a

former gridcell project we are challenged to set up a parcel version. So far mostly data collection and analysis have been the focus of work.

Figure 3 Simulation area of the case study Zurich



Source: © 2009 swisstopo (JD082776)

A preliminary version of this research will be presented at 51st ERSAs Congress in Barcelona (September, 2011; see Schirmer *et al.*, 2011).

A. Data collection and analysis

The **data collection for a first base year is finished**. The base year data for the simulation area is in a PostgreGIS database and **contracts with the data providers** to use the data for the project are signed. Usually, these contracts are issued specifically to the IVT and the project SustainCity. The collected data includes the population census, enterprise census, the building and dwellings register, the legal boundaries of the parcels as smallest spatial reference unit and zoning plans. For aggregation purposes we have levels of different spatial resolution like traffic analysis zones, ZIP code zones and municipalities. The **data for model estimation is ready for the household location choice model and the job location choice model**. For the land development models we do have observations of building projects that should allow to estimate construction costs. **Data on real estate transfers are not yet at hand**. However, we are confident to get this data within the next weeks. It was possible to ac-

quire a time series of parcel geometries. Unfortunately, the digitization process of the cadastre is not finished in 15 out of 171 municipalities of the canton. These holes have to be filled by data imputation.

A suitable **work frame for the data preparation** was created. All data are loaded from the different files into the database on the server. PostGIS provides most functionalities for data integration. Further we use GRASS-GIS for sophisticated geographical analysis, Q-GIS for visualization and R for statistical analysis. The main advantages of this work frame are **data security, documentation and repeatability** due to consequent scripting of all processing.

Conclusions of data preparations are that the **data is very heterogeneous** and has to be made consistent. This concerns the temporal dimension and consistency between different sources describing the same entities, e.g. buildings. In case of the buildings it is to some extent possible to recover a former year because the year of construction is known. In the case of parcels such information is missing. In respect of the population census the main challenges are the **creation of a synthetic population** because of privacy issues and the imputation of income and car ownership from the micro census. **Privacy issues** are a general problem when collecting microscopic data potentially causing delay and may even prevent certain accuracy.

C. Model calibration

The current work is estimating the different sub-models. We started with the household location choice model and the job location choice model. Both of which need further improvements. In parallel but slightly later the work on estimating real estate price models began.

D. Simulations

So far no simulations have been carried out.

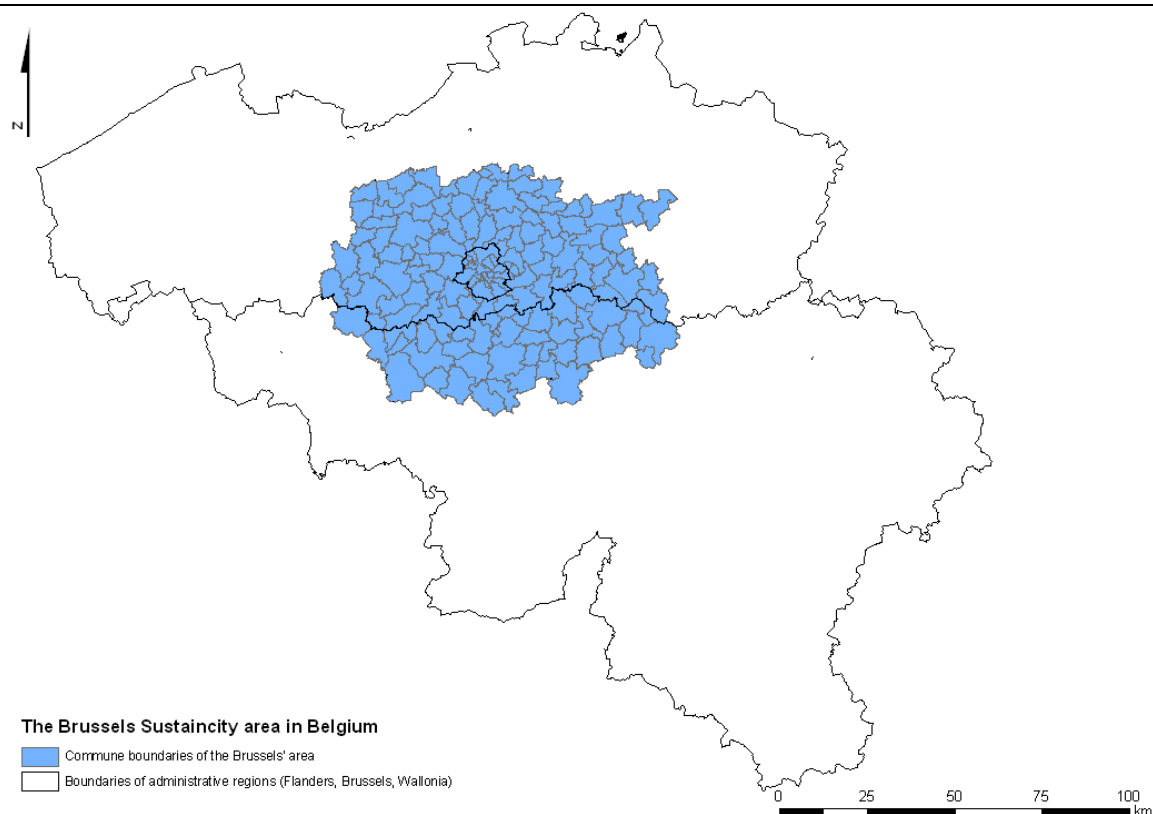
3.7.4 Brussels case study

A. Data collection and analysis

The data collection and analysis task was completed in May 2011 (month 17), with a three-month delay (Annex 1 defines the deadline at the month 14); the delay was mainly due to the fact that the methodology regarding the data population had to be modified compared to what was initially planned (see below). Some analysis is still ongoing but this has more to do with the model calibration (to be completed by December 2011).

Data collection was mainly operated by Stratec (notably the data on population and employment), except for Land Registry data collection (i.e. data on plots and buildings) which was done by UCL. Regarding data analysis, EPFL and Stratec carried out the analysis of the population data (most was done by EPFL as they are building the “synthetic population” - see below), UCL carried out the analysis of Land Registry data and Stratec the analysis of employment data.

Figure 4 The Brussels Sustainability area in Belgium



Data source: IGN; map: Stratec

The base year of the Brussels model is 2001, year in which the last socioeconomic census was made (dated 1st of October 2001). It means that the submodels making up the Brussels model will be calibrated on 2001 data and that the population which is the “skeleton” of the model will be representative of the 2001 population. Besides, we use the year 2007 (December 31th 2007) for purpose of validation of model (i.e. by comparing the situation 2007 simulated by the model to the observed 2007 situation). Hence data had to be collected for year the 2001 and the most important data had also to be collected for the year 2007.

The Brussels study area for this research has been defined as a set of 151 municipalities (“communes”), i.e. Brussels and the suburban area; hence all data had to be collected at least on this area.

Altogether, the following databases were collected:

- on population:
 - data from the 2001 national census (whose official name is the “2001 Socio-Economic survey”) (only aggregate data as individual data were finally not available – see below)
 - data from the National Population Register (on 2007)
 - data from the National Mobility Survey MOBEL (year 1999) : these data are being used to build the synthetic population, together with the aggregate data from the 2001 census
 - data on the occupied active people from the BCSS³ (national Crossroads Bank for Social Security) (on 2007)
 - population movements from 1988 to 2007, from the SPF Economie (administration providing statistics)
 - data from the National Labour Force Surveys (years 1999-2008), providing among other the rate of workers working at home
 - data on the household income (in 2001 and 2007), from the SPF Economie
 - population projections until 2060 from the federal Planning Bureau
- on employment:
 - ONSS⁴ database which includes employee and civil servant jobs (2001 and 2007)
 - INASTI⁵ database which includes self-employed people (2001 and 2007)
 - data on the employment in the international institutions (European institutions, NATO, etc)
 - data on employment from the National Bank of Belgium
 - employment projections until 2016 from the federal Planning Bureau
- on buildings and plots (land):
 - data on the housing real-estate prices, from the SPF Economie (on the period 1985-2008)
 - database with the building permits from 1996 to 2008, from the SPF Economie
 - Land Register database (year 2009)
 - data from the “Observatoire des bureaux” of the Brussels-Capital Region.

The basis of the model is a population, as close as possible to the actual base year (2001) population. To get that population, the first idea was to request data at an individual level from the 2001 Belgian census, called the National Socioeconomic Survey and managed by the Federal Public Service Economy (SPF Economie).

The official request and privacy procedure to get 2001 census data hampered the data collection task.

³ BCSS : Banque Carrefour de la Sécurité Sociale : Crossroads Bank for Social Security

⁴ ONSS: Office National de Sécurité Sociale : National Social Security Office

⁵ INASTI : Institut National d'Assurances Sociales pour Travailleurs Indépendants : National Institute of Social Security for self-employed persons

To request individual census data (although anonymous), the three partners of the Brussels case, the EPFL, the UCL and the Stratec teams built up a justificatory file and committed in a legal procedure of several months. Unfortunately, the authorization has finally been refused by the administration, because of privacy issues and the fact that Stratec is a private sector commercial company. The refusal was also valid for the EPFL and the UCL because of the close partnership.

Consequently, the modelling methodology had to be adapted and the 3 involved teams agreed on a new methodological approach: the new approach is to build a “synthetic population” from distributions according to one variable or two crossed variables (related to households, population, dwellings and home-to-work relationship), mainly at the level of the municipalities (“communes”). When data of the census are nevertheless available at a finer level of disaggregation, such as the statistical sector level, we use them. Note that the generation of synthetic populations is a common practice in land use modelling, especially when individual level data are not available due to strict privacy policies. The process for generating a synthetic population is further detailed in the section below on the model calibration.

For the Brussels case study a synthetic population of individual households is generated from aggregated data at the communal or statistical sector level using an Iterative Proportional Fitting procedure. The first step is the generation of a joint distribution for individual agents (households and persons). For this, we use crossed aggregated data available from the 2001 census (SPF Economie). In the second step, the generation of a distribution for the associations between the agents, we use micro-data. For this second step, we use the MOBEL data (1999 national household survey).

The main data sources on employment are ONSS for employee/civil servant jobs and INASTI for self-employed persons. Those data were compared to other data sources, such as the ones from the Federal Planning Bureau or from the BCSS.

The employment data were processed by Stratec; the main tasks consisted in merging 3 data-sources (ONSS, INASTI and employment in international institutions), checks with other sources (like Planning Bureau and the National Bank of Belgium), estimating rates of work at home from the national Labour Source Surveys.

The Land Register data were processed by UCL, in order to be used in the model.

The SPF Economie also provides data on housing real-estate prices, as well as data on household income (fiscal statistics). Data on building permits (for building or renovation) from the SPF Economie can be used for the development event history table, completed by Land Registry data from the « Administration Générale de la Documentation Patrimoniale » (AGDP). The existence of this last database is purely fiscal and juridical; it provides information for

calculating taxes to be paid by the owner of the plot / building(s). 2009 is the first year for which digitized data are made available.

For the first stages of the calibration, accessibilities by transport district are provided by Stratec, from the SATURN model of Brussels.

For the validation year (2007), demographic and regional population movements data were collected from the National Population Register; data on the population activity are taken from the BCSS. The same data sources on employment are used for 2007, i.e. ONSS for employee/civil servant jobs and INASTI for self-employed persons.

A work meeting gathering Stratec, EPFL and UCL was hold on 4 and 5 October 2010 in Brussels, in the Stratec premises, on the data collection and analysis tasks. The meeting also included presentations on the socio-economic characteristics of the study area.

B. Model calibration

The model calibration process is implemented for 2 separated components: the Land Use model and the Transport model.

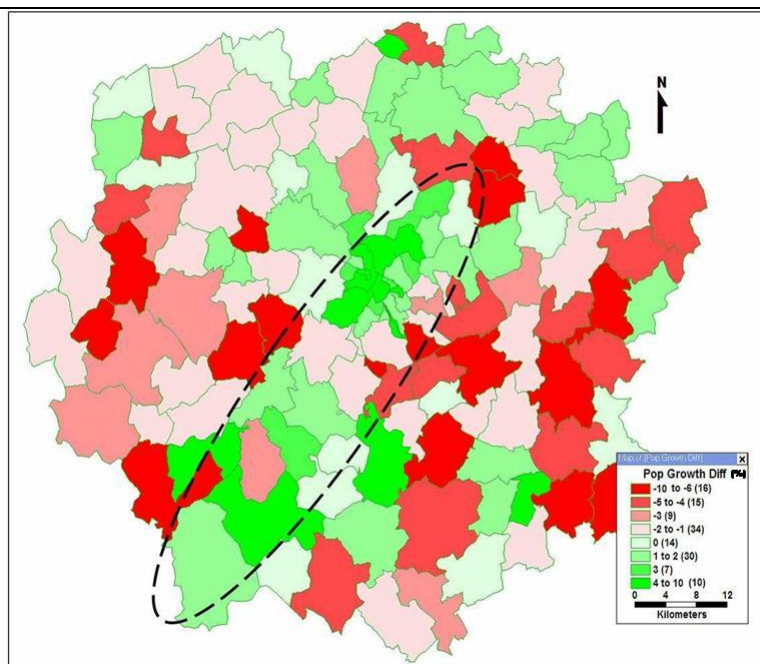
Land Use model (UrbanSim)

Work related to the UrbanSim model has been focused on the implementation and calibration of a preliminary prototype urbanism model for Brussels and in the development of a new methodology for Synthetic population generation. Preliminary estimations for some of the fundamental submodels of UrbanSim with the dissagregated data collected in this study is also an ongoing task.

1.1 Preliminary Prototype model for Brussels

A preliminary model for the Brussels region was implemented in order to familiarize with the UrbanSim modeling platform and to understand the data-management requirements. The model was configured following the zone-based version of UrbanSim, with data coming from aggregated (and already available) sources. The spatial resolution for this model was set at the commune level.

Figure 5 Example of results obtained with the commune-based preliminary UrbanSim model for the Brussels study area



Results of the preliminary model are hard to validate, given the poor quality of the used data. However, this development was a good exercise to understand the model implementation process and to identify potential problems in the final implementation. Thanks to the prototype model it was possible to identify the critical tables and models that require most of the attention in the implementation and calibration process:

Table 7 Fundamental UrbanSim submodels and tables

Tables	Models
Households	Household location choice model
Jobs	Job location choice model
Buildings	Real estate (development) generation model
Development event history	Development project location choice model
Development constraints	Real estate price model

Another conclusion of the prototype model implementation process was relevance of the generation of a synthetic population (at the agent level) of households and individuals for the model’s base year.

1.2 Submodel calibration

The following models are in the process of being calibrated

1.2.1 Household location choice model

In each period, new and re-locating household are assigned to dwellings by UrbanSim. The new households are generated in an exogenous demographic model while re-locating households are endogenously selected from pre-existing (pre-located) households by a re-location choice model. Once the pool of households looking for a new dwelling is generated, each of them is assigned to one of the available dwellings by the location choice model. The model takes the form of a multinomial Logit. A preliminary version of the household location choice model has been already estimated.

Table 8 Household location choice model

Decision maker:	unlocated households
Choice alternatives:	individual dwellings-locations (representative buildings in each zone)
Spatial resolution:	statistical sector level
Explicative variables:	household socioeconomics, dwelling attributes, aggregate zonal attributes.
Involved databases:	2001 Population Census, 2009 Land Register, SPF Economie

1.2.2 Job location choice model

The available data allows estimating a jobs location choice model, where jobs (characterized by their activity type) choose their location according to available supply (building's surface), its attributes (typically land-price, surface and/or type of building) and location attributes describing location externalities (population and firm densities) and accessibility measures.

The model takes the form of a multinomial Logit, where jobs choose between available non-residential buildings.

Table 9 Job location choice model

Decision maker:	unlocated jobs
Choice alternatives:	representative non-residential buildings of each zone
Spatial resolution:	statistical sector level or communes
Explicative variables:	building attributes, aggregate zonal attributes, location of other firms
Involved databases:	2009 Land Register, SPF Economie, ONSS, INSATI, BCSS

1.2.3. Real estate price model

The real estate price model is a hedonic model, explaining rents as a function of dwelling and zonal attributes for each unit in each period

Table 10 Real estate price model

Dependent variable:	levels of rent price per dwelling
Spatial resolution:	statistical sector level, old communes or communes
Explicative variables:	building attributes, aggregate zonal attributes, environment quality
Involved databases:	2009 Land Register, SPF Economie, Census 2001. CORINE, IR-CEL-CELINE

1.2.4. Real estate development and location choice model

The real estate development model is a two stage model. The first component generates a number of dwellings and building by type for each period. The second component locates the new supply in the different zones of the city.

The **Real Estate Generation Model** will assume a single representative developer by type of building. The total supply by type will be estimated as a function of average land prices, expected demand in the future, existing supply, available land and economic indicators like interest rates, unemployment level or annual Gross Domestic Product.

The **Location choice model** is estimated over observed data on new developments (Building permits per period from 1996 to 2008 and 2009 Land Register). The observed buildings are grouped by type and associated with the attributes of the locations where they were built. A multinomial logit model will be estimated to model the choice of zone.

Table 11 Real estate development and location choice model

Decision maker:	real estate developers
Decisions:	what (type) and how much to build, location of the new supply
Spatial resolution:	statistical sector level
Explicative variables:	building attributes, aggregate zonal attributes, pre-existing supply, macroeconomic indicators
Involved databases:	2009 Land Register, SPF Economie, Census

1.3 Synthetic Population generation for the base year

Microsimulation of transportation and land use evolution require base year, individual characteristics and disaggregate locations of the households and persons living in the study area. On the other hand at best, the census and travel survey, which are the primary sources of the data, provide only cross tabulations at various level of spatial aggregations (sector, commune, region, and country) and a small sample of the individual level information (microdata) that usually doesn't have the spatial information attached to it. This necessitates generation of the baseline population using some synthetic means. Currently, some variants of the Iterative

Proportional Fitting (IPF) are predominantly used to generate the base year synthetic population. IPF essentially creates clones of the individual records of households and persons from microdata in a way that the marginal at one or more levels of spatial aggregations are satisfied. In the process of doing so, the IPF ensures that the correlation structure of the sample is preserved in the synthesized populations. The key shortcomings of IPF include: a) losing the heterogeneity that may not have been captured in the microdata, due to cloning rather than true synthesis of the population b) over reliance on the accuracy of the data to determine the cloning weights c) very poor scalability with respect to the increased demand in the number of characteristics of the population that need to be synthesized.

The implementation of UrbanSim and MatSim for Brussels area also required the base year population with rich representation of their socioeconomic, demographic, and location characteristics. On the other hand, even the availability of basic data for a standard IPF based synthesis was not enough. In order to bring in significant contribution to the research in population synthesis for microsimulations and addressing the challenge of scarce and unreliable data, we developed a Markov Chain Monte Carlo Simulation based approach for this project. This approach, instead of cloning the microdata, generates the joint distribution of the characteristics of the households, persons, and the associations between them, by using any available data on these three dimensions. The resulting joint distribution is thus the best possible representation of the real population. The synthetic population is then generated from the realization of the joint distribution. In terms of the progress, we already have developed the basic methodology for the generation process and are giving finishing touches to it. Preprocessing of the input data has been started. The spatial scale of the generated population will be sector level. We plan to synthesize age, sex, nationality, marital status, education details (student, education level), and employment details (labour force status, occupation, industry, location, hours of work) for persons and household size, dwelling type, tenure, and number of vehicle for the households. We will start the implementation of the proposed methodology in form of a publicly available C++ code in August, 2011.

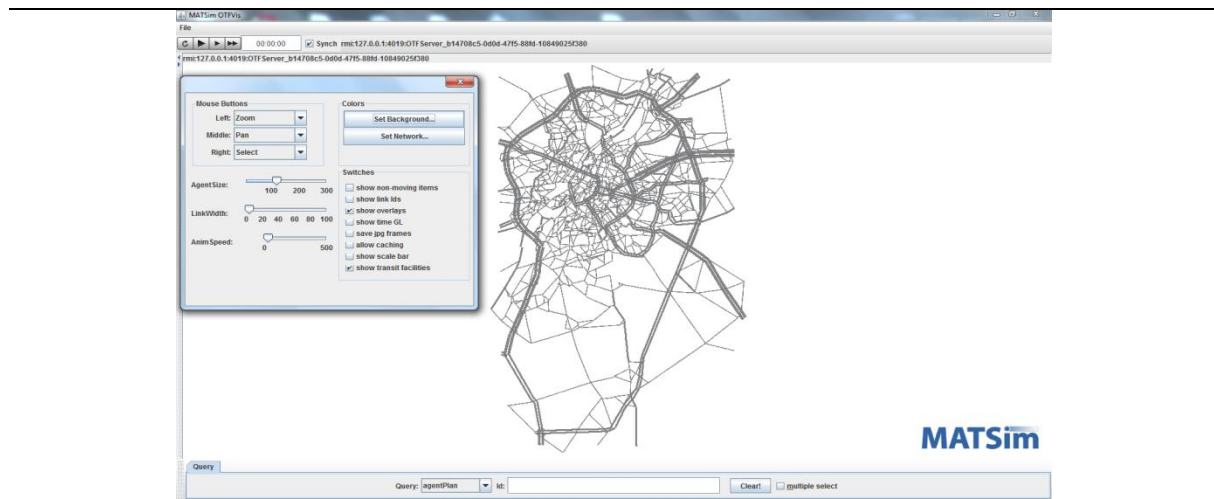
Transport model (MATSim)

Data collected for the transport model came from a previously existing version of a SATURN model for the city of Brussels. SATURN is a well know transport planning model that has an aggregated nature and follows a traditional 4 stage approach modeling framework. The model to implement in Sustaincity will be a MATSim model, which has a more disaggregated nature and an agent based approach. Therefore adaptation of the collected data is required, this translates specifically into:

- Network coding in the MATSim format
- Translation of SATURN OD-matrices into MATSim plan files for individual travelers
- Calibration of the model

The network has been already coded in the MATSim format and was tested with a simplified demand setting

Figure 6 Brussels Network running on MATSim



The OD-matrices have been translated into plans following simplified distribution assumptions, therefore generating a synthetic travel demand. This allows generating individual-specific “OD-matrices” that link agents with basic origins (dwellings) and destinations (workplaces).

The developed method is easily extendable to the dwelling and job location output from UrbanSim for individual agents.

Ongoing work points at running simulations with the synthetic demand in order to implement a preliminary calibration method, based on traffic count. Final calibration will be performed once the land use model and the synthetic population are completed.

C. Simulations

As the model is not yet calibrated, no simulations have been carried out yet.

3.7.5 Spatial issues

UrbanSim requires a massive amount of geographical data, collected from several sources and often available at different spatial scales. Hence, choices have to be made about the relevant underlying basic spatial units (BSU), as well as the definition(s) of the studied area. Those choices are likely to influence or even bias econometric results. Issues like neighborhood ef-

fects, spatial autocorrelation and endogeneity are also likely to have significant impacts on statistical findings.

In order to mitigate these potential biases, it is necessary to carry out sensitivity analyses and to develop/use adequate statistical tools. In the WP 7.2, the UCL team addresses those issues. Up to now, three of the among mentioned problems have been investigated within the SustainCity framework: (1) choice of aggregation scale (MAUP issue); (2) choice of the delineation of the urban agglomeration and (3) spatial autocorrelation

(1) Aggregation scale

The Modifiable Areal Unit Problem (MAUP) states that changes in either the size (equivalently the number) of the basic spatial units or their shape (equivalently the design of their boundaries) may alter the estimates of any statistical analysis based on spatial data. Several contributions have assessed the impact of the MAUP on multivariate statistics. Gehlke and Biehl (1934) were the first to emphasize that simple statistics such as correlation coefficients can vary substantially with changing zoning systems; they outlined the tendency for correlation coefficients to increase as the size of spatial units increase. More recent contributions have tried to disentangle the MAUP and misspecification issues. Amrhein (1995) was the first to suggest to separate aggregation effects from other types of discrepancies, such as model misspecification in multivariate settings. Briant et al. (2010) further investigate on that issue by evaluating the relative importance of size and shape distortions comparatively to misspecification biases in the estimation of spatial concentration, agglomeration economies, and trade determinants. They found that at coarse scales the size effect of MAUP might be important. However, at fine scales they are pretty weak comparatively to misspecification issues.

The contribution of the UCL team is twofold.

First, the impact of the choice of the size of basic spatial units (scale) is further analysed within the context of the hedonic price model. As the information about the dependent variable (dwelling rent) is collected through a categorical variable in the census (distinct modalities that refers to different intervals of dwelling rent), the hedonic price model was estimated through an Interval Regression Model. The sensitivity of the coefficients to scale effect is empirically demonstrated on the example of Brussels. Our results are consistent with Gehlke and Biehl (1934). A possible explanation of such findings is that the larger the size of the BSUs, the lower the variance of the considered variable. As the standard deviations of variables lie in the denominator of the correlation coefficient and the simple regression coefficient, this may explain their increase when the size of a BSU increases. While there are no analytical expressions for variable coefficients in the interval regression model, we may conjecture that a similar effect operates on them.

See forthcoming full report (paper project) due in August 2011

Title : Estimation of an Hedonic Function of Rents in Brussels.

Author : Alain PHOLO BALA,

Promoters/co-authors : Dominique PEETERS, Isabelle THOMAS

Second, variations of the modelling results between different aggregation scales are investigated (ongoing research), by running *UrbanSim* on a synthetic city. Preliminary results show significant differences in estimated parameters of the Employment Location Choice Model between scales. Hence, it is likely that simulations on different aggregation scales (equivalently, different number of BSUs) will lead to somewhat different results.

See forthcoming full report (paper project) (Fall 2011)

Title : Does functional delineations of cities influence land price determinants? Simulation on a theoretical city.

Author : Jonathan JONES,

Promoters/co-authors : Dominique PEETERS, Isabelle THOMAS

(2) Delineation of the study area

Another spatial aspect addressed by the UCL team is the choice of the exact delineation of the metropolitan area and its potential impact on statistical estimations and hence on the results of an *UrbanSim* application. Delineations may be driven by administrative, morphological (Donnay and Lambinon, 1997; Tannier et al., 2010; Van Hecke et al., 2009) or functional criterions (see e.g. Dujardin et al. 2007; Cheshire, 2010; Van Hecke et al., 2009; Vandermotten et al., 1999), etc. As descriptive statistics are sensitive to the choice of a specific study area, one may conjecture that it may also impact statistical results.

Hence, we have studied the delineations of Brussels, Paris and Zurich Urban Agglomerations, to highlight their similarities and differences. We also conduct a sensitivity analysis of the Real Estate Price Model to the boundaries of the urban agglomeration for the Brussels case study (on going research). Results already show significant differences in the estimated parameter of the model, and in significance of independent variables.

See note

Title : Delineation of Brussels, Paris, and Zurich' Urban Agglomerations: Towards Functional Urban Regions

Author : Alain PHOLO BALA,

Promoters: Dominique PEETERS, Isabelle THOMAS

Moreover, the impact of delineation choices was also tested in the Basic Interval Regression model through interaction terms. We found that most of the regressors vary significantly across different definitions of the study area. This gives further statistical backing to the sensitivity of statistical results to the delineation of the study area.

(3) Spatial Autocorrelation

Arbitrary choices in terms of either the aggregation scale or the delineation of the study area have in common that they generate measurement errors that may trigger “nuisance spatial dependence”. The “nuisance spatial dependence” refers to the by-product of measurements errors for observations in contiguous spatial units. In several cases data are collected only at aggregate scale. Because it implies a poor correspondence between the spatial scope of the phenomenon under scrutiny and the delineation of the spatial units of observations, it may entail measurement errors. Those errors will tend to spill over across the frontiers of spatial entities as one may expect that errors for observations in one spatial unit are likely to be correlated with errors of neighboring geographical entities (Anselin, 1988).

The last spatial issue addressed by the UCL is a more fundamental cause of spatial dependence i.e. substantive spatial autocorrelation. This denotes spatial dependence due to varieties of interdependencies across space. We will account for spatial autocorrelation by considering one of the main components of the spatial econometrics toolbox: the Spatial AutoRegressive Model (SAR).

Several contributions investigate the spatial dependence issue through the estimation of SAR and Spatial Error Model (SEM) on Hedonic regression. Kim et al. (2003), Lochl and Axhausen (2009) directly estimate SAR and SEM models.

In most of these contributions, the dependent variable (house price or dwelling rent) is continuous. Since the information about our dependent variable is collected through a categorical variable, we have to resort on techniques designed to estimate spatially dependent discrete choice models. Therefore, we designed and estimated a “Spatial Autoregressive Interval Regression” model. As we obtained a statistically significant spatial dependence parameter from

those estimations, our econometric results evidence substantive spatial dependence. The estimation of this Spatial Model is likely to mitigate the omitted variable bias which generally undermines traditional hedonic estimation.

Most of the results obtained will be detailed in the forthcoming report on spatial issues. The UCL team is currently revising a version of this report and will deliver the final version by the end of August.

(4) Spatial issues analysed in the Paris case study (work done by ENS and UCP)

The Paris team uses two geographical units in the Paris case study. The first is the smallest official administrative division that known as municipality, French *commune* (1,300 in de Paris Region). The second is the IRIS (5 188 in the Paris Region), that is a geographical unit smaller than the commune and used by the French Institute of Statistics INSEE in its surveys and censuses especially for population or job location information. An IRIS includes about 2,000 inhabitants and/or at least 1,000 jobs. We use the commune level for the First Run and the IRIS for the Final Run. We are concluding our data collection and fine-tuning for the IRIS application (Final Run). Both IRIS and commune level data are easy to aggregate in “centre-agglomeration-sub-urban” or “centre-inner-ring-outer-ring” manner and so easy to compare with the other study cases.

The îlots MOS (Land Use Type Sectors/Blocks/Islets) are the French specific GUA that we are using to analyze project locations (530 000 in the Paris Region).

Regarding inclusion and aggregation, we have already verified that the overlapping of îlots MOS and communes is not significant. Out of 531118 îlots MOS only 7 overlap over 2 communes. That is, îlots MOS are included in the communes. Regarding the compatibility between MOS and IRIS, we have noted that 4,66% of îlots MOS are included in more than one IRIS, hence inclusion of îlots MOS on IRIS cannot be yet confirmed.

Another GUA called îlots INSEE was inspected for its use in the project. Îlots INSEE could be compared with the cells in the grid cell. They account, as the cells, for more than 52000, differing however in their size. Îlots INSEE are smaller when located in the centre of the region and larger when located in the sub-urban area, while the size of cells is the same over the entire region. In the past, we used the grid cell and we didn't get worthy results. Moreover, îlots INSEE are no longer used as an official entity. Therefore, îlots INSEE were discarded as a GU in the framework of this project.

At the present time, the Paris case study is studying the implications of the chosen BSU regarding spatial-autocorrelation and endogeneity problems. We are testing the different aggregation levels to correctly answer to these important issues in the D. 7.1 at month 20.

3.7.6 Statement on the use of resources

The total amount of person month for this work package was 84.6 person-months (79.1 claimed).

Table 12 Actual use of resources per partner

Partner	ETHZ	ENS	INED	UCL	KUL	STR	NTUA	TUB	EPFL	BU	UCP	UCB
claimed	17.4	19.3	0.0	12.0	0.0	7.9	0.0	-	13.0	-	9.5	-
not claimed	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0
Total	17.9	19.3	0.0	12.0	0.0	7.9	0.0	0.0	18.0	0.0	9.5	0.0

in man-months, rounded to 1 digit after the decimal point

Regarding the actual use of resources of ETHZ, data collecting and conditioning was an unexpected time-consuming part. It is assumed this additional work alleviates the modelling part.

3.8 WP 8: Policy insights and insights for sustainability

3.8.1 Summary of progress

The ultimate aim of the research is to provide indicators concerning the sustainability of policy options. There is a need to focus on the production of meaningful indicators based on the outputs of our models (see Working paper 2.5 of this project for the outputs of the model and Spiekerman and Wegener (2004) for examples of indicators). The relevant indicators that have been identified in the project are described below.

The variables that determine the utility of the individuals should contain, **a weighted sum of individual utilities** of the current generation will be used, supplemented with some stock variables related to the quality of the environment and built environment that will be left for the next generations. Specifically, the individual (or indirect) utility of current generations is the sum of the wage income, the property income and the value of amenities and social interaction, minus the local taxes, the transport cost, the housing cost and the environmental disutilities. Regarding the next generations there is an interest on stock of greenhouse gasses and quality indicators of built environment.

There will be a distinction between “**primary**” variables and “**secondary**” variables. The sole role of the primary variables is to be instrumental for the computation of the variables which are of ultimate interest as sustainability indicator (which we call the secondary variables).

There will be also a distinction between “**local**” and “**global**”, where local means with high level of spatial disaggregation and global means only the sum for the city or region is of interest.

Another important variable is **equity**. This can include classification of households by size and type. Another question is here whether we focus on individuals or on households.

In general, indicators can be organized in the following four categories.

The first category are the **environmental indicators**, these include the secondary global variables such as greenhouse gas emissions, tropospheric ozone, particles and biodiversity as well as, the secondary local variables such as particles, NO_x, noise, green areas (not for recreation) and green areas for recreation.

The second category of indicators are those related to **transport costs**, such as the local secondary variables travel time and travel cost for the different types of trips (for each origin). If one believes in “accessibility”, one needs for every zone of origin, the travel time and cost to all destination, including rail and motorway access (for out-of-zone destinations), school (for children), job, grocery store etc. Accessibility is required in residential and firm location models.

The third category are the **housing cost and quality indicators**. Concerning the “housing cost” in the case of households that rent their home, the variable of interest should be computed as the sum of rent and housing-related cost (maintenance, energy utilities). For inhabitants that own the property the sum of property costs instead of rent paid is needed as the relevant indicator. For property owners that do not occupy their own property, the model needs the net return of their property. The quality of a housing unit is clearly related to m³ per person. Furthermore, there are a number of other quality variables that can relate to number of bathrooms, existence of garden, garage or fireplace etc. Other amenities, such as the supply of cultural services (e.g. libraries, museums) and other public services (e.g. sport facilities) can be included also as indicators, as they arguably affect the overall utility of the considered areas (see Deliverable 2.2a and 2.4 of the project). The fourth category are the **income indicators**. Income plays a role in the overall utility experienced by an individual and as such it should be modeled. The following variables can provide a reasonable representation: the wage income after federal and state taxes, the property income after federal taxes, the local taxes on income and local taxes on property values.

Social interaction can also play an important role in the overall utility. One possible indicator is the homogeneity by education and income of population in a zone.

Regarding the selection of policies that make sense, one reasonable starting point can be found in existing literature proposals (e.g. Anas and Lindsey (2011), Proost and Van Dender (2011) and Glaeser (2008)). This approach provides a solid foundation and consistency with what is expected in terms of results in this field. For example, in terms of land use policies, in general the recommendation is to move towards higher densities. Similarly, in terms of transport policies, common recommendations include pricing transport according to marginal social cost (thus correcting for external costs), as has been documented, for example in the well-known congestion pricing examples in Stockholm, London and Milan (Anas and Lindsey (2011)), as well as drastic as for speed restrictions in urban areas. Public finance literature (see Wilson (1999)) points to horizontal and vertical tax competition in a world with several regions and rearranging taxation of land (Henry George theorem, indicating that the higher rent integrates the value of the amenities). However, the issue of how to finance public transport policies remains. Integration/segregation considerations are also an important aspect that can affect the sustainability concept at a global level.

3.8.2 Statement on the use of resources

The total amount of person month for this work package was 2 person-months (0 claimed).

Table 13 Actual use of resources per partner

Partner	ETHZ	ENS	INED	UCL	KUL	STR	NTUA	TUB	EPFL	BU	UCP	UCB
claimed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	0.0
not claimed	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

in man-months, rounded to 1 digit after the decimal point

3.9 WP 9: Dissemination and valorisation

3.9.1 Summary of progress

Many actions are being taken to disseminate the project. This includes a website, workshops and conferences and the preparation of the “Handbook on Integrated transport and land use modeling for sustainable cities”. All the tasks performed in the context of this work package have been performed according to the planned budget describe in Annex 1 (to the Grant Agreement).

Website

A website (www.sustaincity.org) was implemented to disseminate the project and also as a platform for internal collaboration (event scheduling, document sharing, internal communications).

Training courses

The following training courses were organized. Grants were offered to finance the travel expenses of some participants.

- First training course on MATSim and Metropolis. Berlin, 4 – 8 April, 2011. 20 participants at the tutorial and 17 participants at the user meeting (11 grants given)
- First training course on UrbanSim. Athens, 4 – 6 July, 2011. 25 participants (16 grants given)

At the beginning of the project, the consortium decided to organise additional training courses for internal researchers. Three workshops have been organised for UrbanSim (17-20 May 2010, 31 participants), MATSim (17-20 May, 2010, 29 participants), and METROPOLIS (22 May 2010, 10 participants). These workshops took place in Zurich and have been coordinated with an Intermediate Meeting of the Consortium. The aim of these introductory courses was to give the researchers of the SustainCity project an appropriate start in using the software to develop. Therefore, no grants have been provided.

Conferences

A special session of the 51st European Regional Science Association Conference ERSA (Barcelona, 30th August - 3rd September 2011) has been organized and specially dedicated to the Sustaincity project. This special session will have an interdisciplinary character and provide an opportunity for researchers to discuss their recent work in the field of land-use and transport.

Handbook

A handbook summarizing all the methodological findings and results of the project will be published. The structure and contents of the handbook has been designed and approved by all the team members, it will be organized in five sections:

- **Introduction:** describes the main microsimulation tools used in the study: UrbanSim, MATSim and Metropolis. Also, a description of the case studies and the modeling challenges they represent is addressed.
- **Methodological contributions:** describes the methodological improvements incorporated into the UrbanSimE platform. Although oriented to the specific models

of the project, they are also a general contribution for integrated land use and transport modeling.

- **Transport and Land Use Integration:** describes the integration of the different models components in a single microsimulation platform. This considers the new approaches described in the previous section and the integration of agent based land use and transport models.
- **Case studies:** describes the main results of the implementation of UrbanSimE for the three case studies. The analysis is focused on the models' performance and policy evaluation.
- **Conclusions:** analyses the usefulness of microsimulation tools for urban planning and policy evaluation, also identifying possible future developments and research in the field

The editors of the book will be Michel Bierlaire, André de Palma and Paul Waddell.

The book has already received two publishing offers (from Springer and EPFL Press). The team is currently assessing the proposals in order to define the publisher by the month of August.

3.9.2 Statement on the use of resources

The total amount of person month for this work package was 2.7 person-months (2.2 claimed).

Table 14 Actual use of resources per partner

Partner	ETHZ	ENS	INED	UCL	KUL	STR	NTUA	TUB	EPFL	BU	UCP	UCB
claimed	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	0.0
not claimed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Total	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0

in man-months, rounded to 1 digit after the decimal point

4 Project management during the period

The main tasks of the consortium management in this period was the organisation and minutes of 5 Consortium Meetings (CM):

- 18-19 February 2010 in Leuven (CM1),
- 20-21 May 2010 in Zurich (Intermediate Meeting),
- 16-17 September 2010 in Paris (CM2),
- 10-11 February 2011 in Brussels (CM3),
- 29-30 August 2011 (CM4 and Mid-Term-Assessment).

All minutes, slides and further documents are available on the project website www.sustaincity.eu – either for public use or in the intranet of the SustainCity website for internal use. The organisation of this Mid-Term-Report also was an important task. Unfortunately, the use of ECAS was quite new and unfamiliar to some of the partner institutions. Therefore, the project management also provided a first level support of ECAS. Evidently, more specific problems had to be solved by the official support.

Beginning May 2010 CEC transferred the first part of the payment to ETHZ. By end of the month, the advices of payment for the other partners have been accomplished according the Annex 1 of the Grant Agreement. Additionally, the consortium management organised the payments of travel grants for project external persons (see section 3.9 *WP 9: Dissemination and valorisation*). Though these payments are financially much less important, they are relatively time consuming.

The consortium has not changed since the signature of the Grant Agreement. Particularly, there are no changes to the legal status of any of the beneficiaries (e.g. non-profit public bodies, secondary and higher education establishments, research organisations and SMEs). Indeed, there are some smaller adaptations:

- A paragraph to be inserted in the Annex I, under the section describing the Partner ENS Cachan and Third Parties to reveal the financial link to the French Ministry for Research and High Education (as a "Third Party").
- Some changes regarding the budget for ETHZ and NTUA (the total EC funding for ETHZ and NTUA remains exactly the same).

The status of the project broadly is in line with the Grant Agreement. At the moment, there are no deviations from the intended deliverables (planned nor foreseeable). Regarding milestones, three of the 12 milestones within the reported period denote a delay:

- *M3.1 Alternative equilibration mechanisms and selection criteria* (planned in month 10): The theoretical paper is almost finished. The research showed that this is a rather new domain of study and that most existing models use a simple myopic mechanism. Studying all properties of other mechanisms proved to be difficult even with a simple model. In addition, the UrbanSim model is a very large model so it is excluded to recommend to reprogram UrbanSim for other equilibrium mechanisms. So we need to downscale our ambition. Rather than to propose new equilibrium mechanisms for UrbanSim, we will propose a set of guidelines (planned for October 2011)
- *M3.2 Qualitative data on behavioural patterns of real estate developers* (planned in month 12), has a delay due to problems to get relevant data on micro level. First results will be presented at the ERSA Congress 2011 in Barcelona (End of August 2011).
- *M8.1 UrbanSimE indicator module* (planned in month 12): A first list of indicators of sustainability has been proposed in Feb 2011 and has been used in WP5.1. A final module will be made available once there is full agreement on the sustainability concept used, and the case studies that are envisaged. This point has been discussed in detail by the SustainCity Consortium during the Mid-Term-Assessments in August 2011. It is planned that the indicator module is set up by February 2012.

5 Deliverables and milestones tables

Table 15 Deliverables

No. Deliverable name	Version	WP-no.	Lead	Nature ⁶	Dissem. level ⁷	deliv. date A.I. ⁸	Actual / Forecast delivery date	Status ⁹	Con-tractual	Comments
2.1 Policy brief: State of the art	1	2	EPFL	R	PU	4	12/05/2010	S	Yes	
5.1 Econometric guidance	1	5	UCP	R	PU	14	19/03/2011	S	Yes	
1.1 Mid-term report and financial statement	1	1	ETHZ	R	CO	18	31/08/2011	S	Yes	
6.1 Policy brief: Using land use models for sustainable policy making		6	STR	R	PU	20	31/08/2011		Yes	in progress
7.1 Spatial issues		7	UCL	R	PU	20	31/08/2011		Yes	in progress
3.1 Comprehensive theoretical models		3	ENS	R	PU	24	31/12/2011		Yes	
7.2 Calibration of the UrbanSimE models in the three case cities		7	STR	R	PU	24	31/12/2011		Yes	
4.1 Comprehensive demographic model		4	INED	P	PU	30	30/06/2012		Yes	
5.2 Policy brief: New behavioural insights; Estimation results for selected case studies		5	UCP	R	PU	30	30/06/2012		Yes	
7.3 Policy brief: Case studies in the three cities		7	ETHZ	R	PU	32	31/08/2012		Yes	

⁶ Nature: R = Report, P = Prototype, D = Demonstrator, O = Other

⁷ Dissemination level: **PU** = Public, **CO** = Confidential, only for members of the consortium (including the Commission Services).

⁸ Delivery date from Annex I (project month)

⁹ Status: **S** = Submitted

suite of Table 15 Deliverables

No. Deliverable name	Version	WP-no.	Lead	Nature ¹⁰	Dissem. level ¹¹	deliv. date A.I ¹²	Actual / Forecast delivery date	Status ¹³	Con-tractual	Comments
8.1 Policy insights and insights for sustainability		8	KUL	R	PU	34	31/10/2011		Yes	
9.1 Handbook and website on land use and transport interaction		9	EPFL	R	PU	36	31/12/2011		Yes	
1.2 Final report		1	ETHZ	R	CO	36	31/12/2011		Yes	

¹⁰ Nature: R = Report, P = Prototype, D = Demonstrator, O = Other

¹¹ Dissemination level: **PU** = Public, **CO** = Confidential, only for members of the consortium (including the Commission Services).

¹² Delivery date from Annex I (project month)

¹³ Status: **S** = Submitted

Table 16 Milestones

No.	Milestone name	WP	Lead	deliv. date A.I	Achieved Yes/No	Actual / Forecast deliv.date	Comments
M1.1	Project website	1	ETHZ	3	Yes	31/03/2010	www.sustaincity.eu
M2.1	State of the art	2	EPFL	4	Yes	30/04/2010	
M3.1	Alternative equilibration mechanisms and selection criteria	3	KUL	10	No	31/10/2010	in progress
M4.1	Provisional demographic outline	4	INED	10	Yes	31/10/2010	
M3.2	Qualitative data on behavioural patterns of real estate developers	3	ETHZ	12	No	31/08/2011	in progress
M8.1	UrbanSimE indicator module	8	KUL	12	No	31/12/2010	in progress
M7.1	Database on the three cities (IDF, Brussels, Zurich)	7	STR	14	Yes	28/02/2011	for details, see section 3.7.1
M5.1	Econometric guidance	5	UCP	14	Yes	28/02/2011	
M9.2	First training course on METROPOLIS and MATSim	9	TUB	15	Yes	31/03/2011	and, additionally, 17/05/2010
M9.3	First training course on UrbanSimE	9	NTUA	18	Yes	30/06/2011	and, additionally, 17/05/2010
M6.2	UrbanSim upgrading modules	6	TUB	18	Yes	30/06/2011	see also Working Papers WP6
M4.2	Initial demographic module for UrbanSimE	4	INED	18	Yes	30/06/2011	
M6.4	Guide on UrbanSim usage of the integrated models	6	STR	20		31/08/2011	
M7.2	Spatial issues	7	UCL	20		31/08/2011	
M9.4	Academic conference on land use and transport	9	ETHZ	22		31/10/2011	
M7.3	Calibration of the UrbanSimE models	7	STR	24		31/12/2011	
M3.5	Comprehensive theoretical models	3	ENS	24		31/12/2011	
M3.6	UrbanSimE module of heterogenous real estate developers	3	ETHZ	24		31/12/2011	
M4.3	Comprehensive demographic model	4	INED	30		30/06/2012	
M5.2	Estimation results for selected case studies	5	UCP	30		30/06/2012	
M6.6	Report on travel behaviour modelling for IDF case study	6	ENS	32		31/08/2012	
M6.7	Report on travel behaviour modelling for Zurich case study	6	ETHZ	32		31/08/2012	
M8.3	Policy insights and insights for sustainability	8	KUL	34		31/10/2012	
M1.2	Data archive	1	ETHZ	36		31/12/2012	
M9.5	Final policy oriented conference	9	ETHZ	36		31/12/2012	
M9.6	Handbook and website on land use and transport interaction	9	EPFL	36		31/12/2012	
M1.3	Final report	1	ETHZ	36		31/12/2012	

6 Working Papers

Table 17 Working Papers

No.	Title	WP	Lead	deliv. date A.I	Achieved Yes/No	Actual / Forecast deliv.date	Comments
W2.1	Synthesis report on state of the art on demographic and micro-sim. models	2	INED	4	Yes	30/04/2010	divided in 2 parts: a/b
W2.2	Synthesis report on state of the art of agent behaviour modelling	2	ENS	4	Yes	30/04/2010	divided in 2 parts: a/b
W2.3	Synthesis report on state of the art on firmographics	2	ETHZ	4	Yes	30/04/2010	
W2.4	Synthesis report on state of the art on econometric models	2	UCP	4	Yes	30/04/2010	
W2.5	Synthesis report on existing land use modelling software	2	TUB	4	Yes	30/04/2010	
W2.6	Synthesis report on descriptive and geographical data for European cities	2	UCL	4	Yes	30/04/2010	
W2.7	Synthesis report on Economic attributes of European cities	2	EPFL	4	Yes	30/04/2010	
W3.1	Individual location and portfolio optimization model for household for a single member in two-period model	3	ENS	24		31/12/2011	
W3.2	Household location, spouses' job location and portfolio optimization model for couples in a two-period mode	3	ENS	24		31/12/2011	
W3.3	Overview of alternative equilibrium mechanisms and selection criteria	3	KUL	24		31/12/2011	
W3.4	Proposal for equilibrating mechanisms	3	KUL	24		31/12/2011	
W3.5	Data of real estate developments and real estate developers	3	ETHZ	24		31/12/2011	
W3.6	Qualitative data on behaviour patterns of real estate developers	3	ETHZ	24		31/12/2011	
W3.7	Models of different behaviour patterns of real estate developers in Europe	3	ETHZ	24		31/12/2011	
W3.8	Discrete choice model for each identified type of real estate developer	3	ETHZ	24		31/12/2011	

suite of Table 17 Working Papers

No.	Title	WP	Lead	deliv.d ate A.I	Achieved Yes/No	Actual / Forecast deliv.date	Comments
W3.9	UrbanSimE-Module considering heterogeneous real estate developers	3	ETHZ	24		31/12/2011	
W3.10	Firmographics: Guideline for implementation in UrbanSim and for estimation	3	UCP	24		31/12/2011	
W3.11	Firmographics: Initial module for UrbanSimE	3	UCP	24		31/12/2011	
W4.1	Provisional demographic outline	4	INED	10	Yes	31/10/2010	
W4.2	Initial demographic module for UrbanSimE	4	INED	18	Yes	30/06/2011	
W6.1	Guide on UrbanSim usage of the integrated models	6	STR	20		31/08/2011	
W6.2	Implications of those issues in the conception of UrbanSimE	6	ENS	18		30/06/2011	part of WP3.2
W6.3	Coupling MATSim and UrbanSim: Software design issues	6	TUB	*	Yes	31/12/2010	
W6.4	Coupling an urban simulation model with a travel model – first sensitivity test	6	TUB	*	Yes	30/05/2011	
W6.x	Report on travel behaviour modelling for IDF case study	6	ENS	32		04/08/2012	
W6.x	Report on travel behaviour modelling for Zurich case study	6	ETHZ	32		04/08/2012	

* additional Working Paper (not explicitly mentioned in Annex I)

7 Explanation of the use of the resources

Table 18 Personnel, subcontracting and other mayor cost items for beneficiary 1 for the period: ETHZ

WP Nr.s	Item description	Amount in €	Explanations
1,2,3,7,9	Personnel direct costs	215,395.56	Dr. B.R. Bodenmann (Senior Researcher, 8.2PM); C. Zöllig (PHD Student, Researcher, 7.8PM); K. Müller (PHD Student, Researcher, 4.2PM); P. Schirmer (PHD Student, Researcher, 11.7PM); A. Zaugg (Researcher, 1.0PM); 5 Students (in total 1.7PM)
	Data acquisition (consumables): new building projects	8339.46	Data acquisition of new building projects (addresses and other information) for 10 years 2000-2010 (supplied by Documedia)
	Data acquisition (consumables): addresses of relocating households	2816.11	Data acquisition of addresses of relocating households (supplied by Schober)
	Translations (consumables)	2543.41	Review of English language for working paper of SustainCity: Bodenmann, B.R. and K.W. Axhausen (2010) Synthesis report on the state of the art on firmographics, <i>SustainCity Working Paper</i> , Institute for Transport Planning and Systems (IVT), ETH Zurich.
	Remaining Consumables	2822.04	others: UrbanSim Tutorial podcast, software licence for CityEngine Academics, remaining data aquisition, prints, office supplies contibuted to the project
	Travel	21,840.62	Participation at Consortium Meetings: Leuven, 18/19 Feb. 2010 (K.W Axhausen, B.R. Bodenmann, C. Zöllig, P. Schirmer, K. Müller); Zurich, 20/21 May 2010 (K.W Axhausen, B.R. Bodenmann, C. Zöllig, P. Schirmer, K. Müller); Paris, 16/17 Sept. 2010 (K.W Axhausen, B.R. Bodenmann, P. Schirmer); Brussels, 10/11 Feb. 2011 (K.W Axhausen, B.R. Bodenmann, C. Zöllig), Travel grants for 11 students participating at MATSim Tutorial 2011 in Berlin, 4-8 April 2011)
	Indirect costs	152,254.32	

Total costs*	406,011.52
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Exchange rate EUR: CHF 1.22670 (ECB 01.07.2011)

Table 19 Personnel, subcontracting and other mayor cost items for beneficiary 2 for the period: ENSC

WP Nr.s	Item description	Amount in €	Explanations
1, 2, 3, 5, 7	Personnel direct costs	232 067.45	Salaries for 3 professors and 7 recruited for a total of 44.62 person-months Prof André de Palma (3.26 person-months for the internal project coordination, 5.47 person-months dedicated to WP 3) Prof Nicolas Drouhin (3.45 PM) Professor Harari Kermadec (4.42 PM) PhD Navid Kadhemi (11 PM) Researcher Seghir Zerguini (7, 5 PM) 2 Master students (Manuel de Palma and Aymeric Boulay; 2 PM) Engineer Amine Naouas (4 PM) Engineer Motamedi Pouneh (2.5 PM) Engineer Beaude Olivier (1 PM)
1, 2, 3, 5, 7	Travels	7088.28	The travel costs declared concerns mainly the project consortium meetings which took place in Brussels and Zurich and the participation of the scientific coordinator to conferences where SustainCity's papers were introduced. The travel costs mainly include: - 11 – 15 July 2010 in Lisbon - World Conference on Transportation Research – WCTR - André De Palma - 17-18th May 2010 Zurich: UrbanSim meeting and Metropolis course. Navid Khademi and André de Palma. - 16-17 september 2010 in Paris (INED) - N Navid Khademi and André de Palma. - 10-11 February 2011 in Brussels – André de Palma
7	PTV Software / equipment (Consumables)	3104.52	(Depreciation cost claimed – the whole value is 9825 €) PTV was paid in order to acquire a software VISUM (at a low academic price) used to run a static traffic models. This model is used in conjunction with METROPOLIS. ENS Cachan is

		responsible for the calibration of METROPOLIS (Working Paper 7.2: VISUM will be also useful for the ongoing task on the integration of METROPOLIS and URBANSIM.
WP 5, 7	Consumable	1429.37 Cote Callon data was bought to get the information on real estate prices needed to estimate price models for Paris Area. Such data are used for the deliverable 3.5 on Regime Switching Models: An application to the Real Estate Market in Ile-de-France, deliverable 3.2 on household location, dwelling and tenure choices in a dynamic context. They are used in UrbanSim: Université of Cergy-Pontoise and ENS Cachan are mainly responsible for this case study. 449, 85 € claimed. The OVH server is used to store data safely (preserving confidentiality) and to share these data within the Parisian teams (ENS Cachan, INED and Université of Cergy-Pontoise, mainly). All these data are needed for several deliverable (most of them) and to run the Paris case studies. 959, 88 € claimed.
1, 2, 3, 5, 7	Indirect costs	146 213.77
Total costs*		389 903.39

* Total costs have to be coherent with the costs claimed in Form C.

Table 20 Personnel, subcontracting and other mayor cost items for beneficiary 3 for the period: INED

WP Nr.s	Item description	Amount in €	Explanations
WP 1 – 2 – 4 -7.1	Personnel direct costs	74206.45	3 months Elisabeth Morand (Engineer); 10 months Lorenzo Turci (Chargé d'étude) ; 1,25 month Laurent Toulemon (Research Director) ; 0.75 month Sophie Pennec (Chargé de recherche); 0.5 month Arnaud Bringé (Engineer)
WP1 – 2 – 4 - 7	Major cost item “Participation to meetings”	2850.21	Participation to steering committee meeting Louvain la Neuve (February 2010, 2 persons); WP2 working meeting at INED (April 2010, lunch cost); Participation to constortium Zurich meeting (May 2010, 2 persons); Organisation of Steering Committee meeting at INED (Septembre 2010); Participation to working meeting with U. Bocconi in the framework of WP2 (september 2010, 1 person); Participation to steering committee meeting Bruxelles (January 2011, 2 persons);
	Remaining direct costs	1866.55	WP2 working meeting at INED (lunch cost); Organisation of Steering Committee meeting at INED (Septembre 2010); IT softwares and material for recruited chargé de recherche
	Indirect costs	47353.93	
	Total costs*	126277.14	

Table 21 Personnel, subcontracting and other mayor cost items for beneficiary 4 for the period: UCL

WP Nr.s	Item description	Amount in €	Explanations
2, 7	Personnel direct costs	52143,34	Salaries of Alain Pholo Bala (Postdoctoral researcher) for 18 months
2, 7	Other Direct Costs	3499,20	Consumable : Equipment : HP6930p + cost of the SAS 9.2 Licence The laptop and the software licence are project specific. For the equipment this is in accordance with the UCL usual accountancy practices. Under 25000 euros for each equipment, the usual accountancy practice at UCL is to depreciate the equipment cost in one year. Travelling : Costs related to the participation in project meetings for Prof. Isabelle Thomas and Alain Pholo Bala (Zurich in May 2010, Paris in March and September 2010, Brussels in May 2010)
	Indirect costs	33385,52	
	Total costs*	89028.06	

* Total costs have to be coherent with the costs claimed in Form C.

Table 22 Personnel, subcontracting and other mayor cost items for beneficiary 5 for the period: KUL

WP Nr.s	Item description	Amount in €	Explanations
	Personnel direct costs	0.00	
2,3,8	Remaining direct costs	4,955.60	4.142€ 18-19/02/2010. Sustaincity - Stef Proost, 2 day project workshop; 720€ 12/05/2010 Registration fee for International conference of Regional Science and Urban Economics in Barcelona
	Indirect costs	2,973.36	
	Total costs*	7,928.96	

* Total costs have to be coherent with the costs claimed in Form C.

Table 23 Personnel, subcontracting and other mayor cost items for beneficiary 6 for the period: STR

WP Nr.s	Item description	Amount in €	Explanations
7 and 1	Personnel direct costs	63 215.51	Salaries of the Stratec employees who worked on the project (8.23 PM): Hugues Duchâteau, manager (0.55 PM) Sylvie Gayda, project manager (3.77 PM) Perrine Fastré, economist (2.88 PM) Eléonore Baranger, engineer in urban planning (0.52 PM) Elise Boucq, economist (0,10 PM) Other employees of Stratec having contributed to the project (Nadège Duvivier, Annabel Monneaux, Louis Duvigneaud, Luc Moreau, Sophie Queeckers, Maud Grisart – total: 0.41 PM)
	Major cost item 'Travel'	1877.20	Travel expenses (consortium meetings): Travel expenses for the consortium meeting in Leuven (Sylvie Gayda – 18-19/02/2010) Travel expenses for the UrbanSim trainee in Zürich (Sylvie Gayda, Perrine Fastré – 18-20/05/2010) and for the consortium meeting in Zürich (Sylvie Gayda – 20-21/05/2010) Travel expenses for the consortium meeting in Paris (Sylvie Gayda – 16-17/09/2010)
	Major cost item 'Consortium Meeting'	1344.85	Catering for the consortium meeting which was held in Brussels in February 2011 and was organised by Stratec
	Remaining direct costs	439.87	Registration to the UrbanSim trainee in Zürich for 2 persons (Sylvie Gayda, Perrine Fastré – 18-20/05/2010) Purchase of a statistics database (from the Service Public Fédéral Economie) Purchase of a book, Other miscellaneous expenses
	Indirect costs	49 941.02	Overheads
	Total costs*	116 818.45	

Table 24 Personnel, subcontracting and other mayor cost items for beneficiary 7 for the period: NTUA

WP Nr.s	Item description	Amount in €	Explanations
2,5,8	Personnel direct costs	16,500.00	Personnel cost of Dr. S. Mavromatis (0.6PM), as well as 4 research assistants (for a total of 3.4PM). Participation in WPs 1, 2, 5 and 8. Contribution to Deliverables D2.4 and D5.1 [During this period there is also unclaimed work of Prof. B. Psarianos and Assistant Prof. C. Antoniou (total of 2.6PM)]
1,2,5,8	Remaining direct costs	8,810.14	Travel: Participation of Assist. Prof. C. Antoniou in the following SustainCity Consortium Meetings: Leuven, Feb. 2010 (Kick-off meeting); Zurich, May 2010; Paris, Sept. 2010; Brussels, Feb 2011, and in the MATSIM (software being used in the project) Tutorial in Berlin (April 2011). Participation of Mr. G. Kalambokis (research assistant working in the project) in the MATSIM Tutorial (Berlin, April, 2011). Equipment: One laptop computer for the development of the software products in the project. According to p. 65 of the Guide to Financial Issues relating to FP7 Indirect Actions (Version 16/01/2012): "To be considered as eligible, a cost must be determined according to the beneficiary's usual accounting practice and each beneficiary must apply its usual depreciation system for durable equipment..." Therefore, according to the NTUA internal regulation for Equipment Depreciation "For durable equipment of net value (excluding VAT) up to 10.000 €, the whole amount is charged within the period that the equipment is bought." Consumables: Printing of color posters of the project results
1,2,5,8	Indirect costs	15,186.09	Overhead
Total costs*		40,496.23	

Table 25 Personnel, subcontracting and other mayor cost items for beneficiary 8 for the period: TUB

WP Nr.s	Item description	Amount in €	Explanations
WP 2, 6	Personnel direct costs (RTD)	50470,48	Salary for Thomas Nicolai (scientist) for 13,55 PM and 500h in total for Ihab Kaddoura and Anne Schubert (student co-workers) Salary for Thomas Nicolai (scientist) for 0,45 PM
WP 6	Major cost item 'Travel'	3.955,10	UrbanSim Tutorial/User Meeting and METROPOLIS Tutorial at Zurich, Switzerland; 16.-22.05.2010 for Thomas Nicolai SustainCity Consortium Meeting at Paris, France; 15.-17.09.2010 for Kai Nagel and Thomas Nicolai SustainCity Consortium Meeting at Brussel, Belgium; 09.-11.02.2011 for Kai Nagel and Thomas Nicolai
	Indirect costs	33.627,30	60% of direct costs
	Total costs*	89.672,79	

Table 26 Personnel, subcontracting and other mayor cost items for beneficiary 9 for the period: EPFL

WP Nr.s	Item description	Amount in €	Explanations
	Personnel direct costs	172,521.40	Ricardo Hurtubia Designation: PhD student (Full-time) Person months: 18 Dr. Gunnar Flötteröd Designation: Post doc (70%) Person months: 18*70% = 13.5
	Remaining direct costs	9,406.98	Travel and conference attendance: NRP 65 meeting, Zurich, 15.02.2010, 1 participant FP7 Sustaincity Project meeting, Louvain, Belgium, 17-19.02.2010, 3 participants MatSim + UrbanSim, Zurich, 17-21.05.2010, 3 participants EURO XXIV, Lisbon, Portugal, 10-13.10.2010, 1 participant ETC 2012 - European Transport Conference, Glasgow, UK, 10-13.10.2010, 2 participants FP7 Sustaincity Project meeting, Paris, France, 15-17.09.2010, 2 participants Meeting with Stratec, Brussels, 04-05.10.2010, 1 participant FP7 Sustaincity Project meeting, Brussels, Belgium, 10-11.02.2011, 3 participants FP7 Sustaincity Project meeting, Zurich, 04-05.03.2011, 2 participants
	Indirect costs	109,157.03	60% of total direct cost
	Total costs*	291,085.41	

* Total costs have to be coherent with the costs claimed in Form C.

Table 27 Personnel, subcontracting and other mayor cost items for beneficiary 10 for the period: BU

WP Nr.s	Item description	Amount in €	Explanations
2, 4	Personnel direct costs	15,718.50	Francesco Billari senior scientist (0,4 PM) and Rodolfo Baggio researcher (3,6 PM)
2, 4	Major cost item travel costs'	1,140.87	Participation of Rodolfo Baggio at Consortium meetings: Leuven, Feb. 2010 (Kick-off meeting); Paris, Sept. 2010; Brussels, Feb 2011.
	Indirect costs	10,115.62	
	Total costs*	26,974.99	

Table 28 Personnel, subcontracting and other mayor cost items for beneficiary 11 for the period: UCP

WP Nr.s	Item description	Amount in € with 2 decimals	Explanations
1,2,3,5,7	Personnel direct costs	138 165.55	Salaries for 4 professors and 1 doctoral student for a total of 28.1 person-months: Professor Barthelemy (5 PM) Professor Donni (2.3 PM) Professor Picard (9.3 PM) Professor Prigent (2.5 PM) PhD student Chauveau (9 PM)
3,5,7	Major cost item 'Travel Cost DC Analysis Training'	2 231.30	Discrete Choice Analysis Training at Lausanne, Switzerland; 20-24 March 2011 for 1 doctoral student (L. Chauveau).
1,2,3,5,7	Major cost item 'Travel Cost Consortium Meeting'	916.90	participation to the consortium meetings and related tutorials and conferences: 17-18 may 2010 Zurich: UrbanSim meeting+Metropolis course (Nathalie Picard, Louis Chauveau, Hakim Ouaras) 16-17 septembre 2010 Paris (Nathalie Picard, Louis Chauveau, Delphine Drouet) 10-11 février 2011 Bruxelles (Nathalie Picard, Louis Chauveau, Kiarash Motamedi) 4-8 avril 2011 à Berlin: Atsim/UrbanSim tutorial & user meeting (Kiarash Motamedi)
5,7	Major cost item 'Others'	2 376.18	Work meeting expenses: Corresponds to the dinner for the Paris consortium meeting which was hosted jointly by INED and UCP.
	Indirect costs	86 213.96	
Total costs*		229 903.89	

* Total costs have to be coherent with the costs claimed in Form C.

Table 29 Personnel, subcontracting and other mayor cost items for beneficiary 12 for the period: UCB

WP Nr.s	Item description	Amount in €	Explanations
	Personnel direct costs	0.00	
	Travel	2,668.45	This includes travel to the SustainCity meeting May 17-20, 2010 in Zurich. This meeting included a training session on UrbanSim.
	Rent	835.45	This is a proportional allocation of the rent for projects coordinated by Paul Waddell, in off-campus space for these projects.
	Indirect costs	2102.34	
	Total costs*	5606.24	

* Total costs have to be coherent with the costs claimed in Form C.

8 Financial statements – Form C and Summary financial report

At the MTA-Meeting, the SustainCity Consortium and the Commission discuss the question on the STR funding. Although STR is eligible for 75% reimbursement rate, it only claimed 50% in the original GPF. As STR will de facto only ask for 50% of reimbursement but the Form C software (FORCE) did not allow to have a lower funding rate than 75%, it was agreed that STR will ask in the final Form C for 75% reimbursement of the total cost, but will only reimburse 50%.

Similar problems regarding reimbursement and flat rates have ETHZ and UCB:

- For ETH the reimbursement rate for “other costs” is 100% in FORCE, but, as agreed, only 75% are claimed.
- For UCB the flat rate for “indirect costs” is 60% in FORCE, but, as agreed, only 26% are claimed.

The following statements are from the FORCE and, therefore, show these inconsistencies.

8.1 Form C beneficiary 1: ETHZ

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)			
Project nr.	244557	Funding scheme	Collaborative project
Project Acronym	SustainCity		
Period from	01/01/2010	Is this an adjustment to a previous statement?	No
To	30/06/2011		
Legal Name	Eidgenössische Technische Hochschule Zürich	Participant Identity Code	999979015
Organisation short Name	ETH Zurich	Beneficiary nr.	1
Funding % for RTD activities (A)	75.00	Flat rate for indirect costs, specify %	60.00

1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)

	Type of Activity				Total (A+B+C+D)
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	
Personnel costs	175,635.30	0.00	34,963.26	4,797.00	215,395.56
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	37,895.41	0.00	466.23	0.00	38,361.64
Indirect costs	128,118.43	0.00	21,257.69	2,878.20	152,254.32
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	341,649.14	0.00	56,687.18	7,675.20	406,011.52
Maximum EU contribution	256,236.86	0.00	56,687.18	7,675.20	320,599.24
Requested EU contribution					320,599.24

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?
If yes, please mention the amount (in €)

No

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art. II.19?
If yes, please mention the amount (in €)

No

4. Certificate on the methodology

Do you declare average personnel costs according to Art. II.14.1?

No

Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €), if charged under this project	
---------------------	--	---	--

5. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €)	
---------------------	--	--------------------------------	--

6. Beneficiary's declaration on their honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement
	Kay W Axhausen / Sabine Anna Meens
	Date & signature
	25/03/2011

8.2 Form C beneficiary 2: ENSC

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)			
Project nr.	244557	Funding scheme	Collaborative project
Project Acronym	SustainCity		
Period from	01/01/2010	Is this an adjustment to a previous statement?	No
To	30/06/2011		
Legal Name	E COLE NORMALE SUPERIEURE DE CACHAN	Participant Identity Code	999849035
Organisation short Name	ENSC	Beneficiary nr.	2
Funding %for RTD activities (A)	75.00	If flat rate for indirect costs, specify %	60.00

1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)

	Type of Activity				Total (A+B+C+D)
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	
Personnel costs	195,511.63	0.00	36,556.82	0.00	232,067.45
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	11,622.17	0.00	0.00	0.00	11,622.17
Indirect costs	124,280.28	0.00	21,933.49	0.00	146,213.77
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	331,414.08	0.00	58,489.31	0.00	389,903.39
Maximum EU contribution	248,560.56	0.00	58,489.31	0.00	307,049.87
Requested EU contribution					290,479.16

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?
If yes, please mention the amount (in €)

No

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art. II.19?
If yes, please mention the amount (in €)

No

4. Certificate on the methodology

Do you declare average personnel costs according to Art. II.14.1?

No

Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €), if charged under this project	
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5. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €)	
---------------------	--	--------------------------------	--

6. Beneficiary's declaration on their honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement	
	Jean-Yves MERINDOL	
	Date & signature	
	29/07/2011	

8.3 Form C beneficiary 3: INED

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)			
Project nr.	244557	Funding scheme	Collaborative project
Project Acronym	SustainCity		
Period from	01/01/2010	Is this an adjustment to a previous statement?	No
To	30/06/2011		
Legal Name	INSTITUT NATIONAL D'ETUDES DEMOGRAPHIQUES	Participant Identity Code	999497119
Organisation short Name	INED	Beneficiary nr.	3
Funding %for RTD activities (A)	75.00	If flat rate for indirect costs, specify %	60.00

1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)

	Type of Activity				Total (A+B+C+D)
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	
Personnel costs	70,972.05	0.00	3,234.40	0.00	74,206.45
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	4,716.76	0.00	0.00	0.00	4,716.76
Indirect costs	46,413.29	0.00	1,940.64	0.00	47,353.93
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	121,102.10	0.00	5,175.04	0.00	126,277.14
Maximum EU contribution	90,826.58	0.00	5,175.04	0.00	96,001.62
Requested EU contribution					65,726.09

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?
If yes, please mention the amount (in €)

No

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art. II.19?
If yes, please mention the amount (in €)

No

4. Certificate on the methodology

Do you declare average personnel costs according to Art. II.14.1?

No

Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €), if charged under this project	
---------------------	--	--	--

5. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €)	
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6. Beneficiary's declaration on their honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement	
	Françoise Depoid	
	Date & signature	
	05/03/2011	

8.4 Form C beneficiary 4: UCL

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)			
Project nr.	244557	Funding scheme	Collaborative project
Project Acronym	SustainCity		
Period from	01/01/2010	Is this an adjustment to a previous statement?	No
To	30/06/2011		
Legal Name	UNIVERSITE CATHOLIQUE DE LOUVAIN	Participant Identity Code	999980664
Organisation short Name	UCL	Beneficiary nr.	4
Funding %for RTD activities (A)	75.00	If flat rate for indirect costs, specify %	60.00

1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)

	Type of Activity				Total (A+B+C+D)
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	
Personnel costs	52,143.34	0.00	0.00	0.00	52,143.34
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	3,499.20	0.00	0.00	0.00	3,499.20
Indirect costs	33,385.52	0.00	0.00	0.00	33,385.52
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	89,028.06	0.00	0.00	0.00	89,028.06
Maximum EU contribution	66,771.05	0.00	0.00	0.00	66,771.05
Requested EU contribution					66,771.05

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?
If yes, please mention the amount (in €)

No

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art. II.19?
If yes, please mention the amount (in €)

No

4. Certificate on the methodology

Do you declare average personnel costs according to Art. II.14.1?

No

Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €), if charged under this project	
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5. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €)	
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6. Beneficiary's declaration on their honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement	
	CECILE SIBILLE	
	Date & signature	
	27/07/2011	

8.5 Form C beneficiary 5: KUL

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)					
Project nr.	244557	Funding scheme	Collaborative project		
Project Acronym	SustainCity				
Period from	01/01/2010	Is this an adjustment to a previous statement?	No		
To	30/06/2011				
Legal Name	KATHOLIEKE UNIVERSITEIT LEUVEN	Participant Identity Code	999991334		
Organisation short Name	KUL	Beneficiary nr.	5		
Funding % for RTD activities (A)	75.00	Flat rate for indirect costs, specify %	60.00		
1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)					
	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	0.00	0.00	0.00	0.00	0.00
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	4,800.58	0.00	0.00	155.02	4,955.60
Indirect costs	2,880.35	0.00	0.00	93.01	2,973.36
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	7,680.93	0.00	0.00	248.03	7,928.96
Maximum EU contribution	5,760.70	0.00	0.00	248.03	6,008.73
Requested EU contribution					6,008.73
2. Declaration of receipts					
Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?				No	
If yes, please mention the amount (in €)					
3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)					
Did the pre-financing you received generate any interest according to Art. II.19?				No	
If yes, please mention the amount (in €)					
4. Certificate on the methodology					
Do you declare average personnel costs according to Art. II.14.1?				No	
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?				No	
Name of the auditor		Cost of the certificate (in €), if charged under this project			
5. Certificate on the financial statements					
Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?				No	
Name of the auditor		Cost of the certificate (in €)			
6. Beneficiary's declaration on their honour					
We declare on our honour that:					
- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;					
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;					
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;					
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.					
Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement				
	Ann Claes-Padlet				
	Date & signature				
	22/08/2011				

8.6 Form C beneficiary 6: STR

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)			
Project nr.	244557	Funding scheme	Collaborative project
Project Acronym	SustainCity		
Period from	01/01/2010	Is this an adjustment to a previous statement?	No
To	30/06/2011		
Legal Name	STRATEC SA	Participant Identity Code	997365350
Organisation short Name	STR	Beneficiary nr.	6
Funding %for RTD activities (A)	75.00	If flat rate for indirect costs, specify %	N/A (Actual Indirect Costs)

1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)

	Type of Activity				Total (A+B+C+D)
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	
Personnel costs	57,739.80	0.00	5,475.71	0.00	63,215.51
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	1,359.95	0.00	2,301.97	0.00	3,661.92
Indirect costs	45,615.14	0.00	4,325.88	0.00	49,941.02
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	104,714.89	0.00	12,103.56	0.00	116,818.45
Maximum EU contribution	78,536.17	0.00	12,103.56	0.00	90,639.73
Requested EU contribution					90,639.73

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?

If yes, please mention the amount (in €)

No

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art. II.19?

If yes, please mention the amount (in €)

No

4. Certificate on the methodology

Do you declare average personnel costs according to Art. II.14.1?

Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?

No

No

Name of the auditor		Cost of the certificate (in €), if charged under this project	
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5. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €)	
---------------------	--	--------------------------------	--

6. Beneficiary's declaration on their honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement
	Hugues Duchâteau
	Date & signature
	10/03/2011

8.7 Form C beneficiary 7: NTUA

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)			
Project nr.	244557	Funding scheme	Collaborative project
Project Acronym	SustainCity		
Period from	01/01/2010	Is this an adjustment to a previous statement?	No
To	30/06/2011		
Legal Name	NATIONAL TECHNICAL UNIVERSITY OF ATHENS	Participant Identity Code	999978142
Organisation short Name	NTUA	Beneficiary nr.	7
Funding %for RTD activities (A)	75.00	If flat rate for indirect costs, specify %	60.00

1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)

	Type of Activity				Total (A+B+C+D)
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	
Personnel costs	16,500.00	0.00	0.00	0.00	16,500.00
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	7,908.16	0.00	901.98	0.00	8,810.14
Indirect costs	14,644.90	0.00	541.19	0.00	15,186.09
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	39,053.06	0.00	1,443.17	0.00	40,496.23
Maximum EU contribution	29,289.80	0.00	1,443.17	0.00	30,732.97
Requested EU contribution					30,732.97

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?
If yes, please mention the amount (in €)

No

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art. II.19?
If yes, please mention the amount (in €)

No

4. Certificate on the methodology

Do you declare average personnel costs according to Art. II.14.1?

No

Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €), if charged under this project	
---------------------	--	---	--

5. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €)	
---------------------	--	--------------------------------	--

6. Beneficiary's declaration on their honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement
	Ioannis Avaritsiotis
	Date & signature
	25/07/2011

8.8 Form C beneficiary 8: TUB

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)					
Project nr.	244557	Funding scheme	Collaborative project		
Project Acronym	SustainCity				
Period from	01/01/2010	Is this an adjustment to a previous statement?	No		
To	30/06/2011				
Legal Name	TECHNISCHE UNIVERSITÄT BERLIN	Participant Identity Code	999986678		
Organisation short Name	TUB	Beneficiary nr.	8		
Funding % for RTD activities (A)	75.00	Flat rate for indirect costs, specify %	60.00		
1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)					
	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	60,470.48	0.00	1,619.91	0.00	52,090.39
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	3,955.10	0.00	0.00	0.00	3,955.10
Indirect costs	32,665.35	0.00	971.95	0.00	33,627.30
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	87,080.93	0.00	2,591.86	0.00	89,672.79
Maximum EU contribution	65,310.70	0.00	2,591.86	0.00	67,902.56
Requested EU contribution					67,902.56
2. Declaration of receipts					
Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?			No		
If yes, please mention the amount (in €)					
3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)					
Did the pre-financing you received generate any interest according to Art. II.19?			No		
If yes, please mention the amount (in €)					
4. Certificate on the methodology					
Do you declare average personnel costs according to Art. II.14.1?			No		
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?			No		
Name of the auditor		Cost of the certificate (in €), if charged under this project			
5. Certificate on the financial statements					
Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?			No		
Name of the auditor		Cost of the certificate (in €)			
6. Beneficiary's declaration on their honour					
We declare on our honour that:					
- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;					
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;					
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;					
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.					
Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement				
	Prof. Nagel/ Ms. Simone Ludwig				
	Date & signature				
	08/08/2011				

8.9 Form C beneficiary 9: EPFL

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)			
Project nr.	244557	Funding scheme	Collaborative project
Project Acronym	SustainCity		
Period from	01/01/2010	Is this an adjustment to a previous statement?	No
To	30/06/2011		
Legal Name	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE	Participant Identity Code	999973971
Organisation short Name	EPFL	Beneficiary nr.	9
Funding %for RTD activities (A)	75.00	Flat rate for indirect costs, specify %	60.00

1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)

	Type of Activity				Total (A+B+C+D)
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	
Personnel costs	172,521.40	0.00	0.00	0.00	172,521.40
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	9,406.98	0.00	0.00	0.00	9,406.98
Indirect costs	109,157.03	0.00	0.00	0.00	109,157.03
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	291,085.41	0.00	0.00	0.00	291,085.41
Maximum EU contribution	218,314.06	0.00	0.00	0.00	218,314.06
Requested EU contribution					218,314.06

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?
If yes, please mention the amount (in €)

No

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art. II.19?
If yes, please mention the amount (in €)

No

4. Certificate on the methodology

Do you declare average personnel costs according to Art. II.14.1?

No

Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €), if charged under this project	
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5. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €)	
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6. Beneficiary's declaration on their honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement	
	Michel Bierlaire	
	Date & signature	
	09/03/2011	

8.10 Form C beneficiary 10: BU

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)			
Project nr.	244557	Funding scheme	Collaborative project
Project Acronym	SustainCity		
Period from	01/01/2010	Is this an adjustment to a previous statement?	No
To	30/06/2011		
Legal Name	UNIVERSITA COMMERCIALE 'LUIGI BOCCONI'	Participant Identity Code	999838850
Organisation short Name	BU	Beneficiary nr.	10
Funding %for RTD activities (A)	75.00	Flat rate for indirect costs, specify %	60.00

1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)

	Type of Activity				Total (A+B+C+D)
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	
Personnel costs	15,718.50	0.00	0.00	0.00	15,718.50
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	1,140.87	0.00	0.00	0.00	1,140.87
Indirect costs	10,115.62	0.00	0.00	0.00	10,115.62
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	26,974.99	0.00	0.00	0.00	26,974.99
Maximum EU contribution	20,231.24	0.00	0.00	0.00	20,231.24
Requested EU contribution					20,231.24

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?
If yes, please mention the amount (in €)

No

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art. II.19?
If yes, please mention the amount (in €)

No

4. Certificate on the methodology

Do you declare average personnel costs according to Art. II.14.1?

No

Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €), if charged under this project	
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5. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?

No

Name of the auditor		Cost of the certificate (in €)	
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6. Beneficiary's declaration on their honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement
	Bruno Pavesi
	Date & signature
	25/07/2011

8.11 Form C beneficiary 11: UCP

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)					
Project nr.	244557	Funding scheme	Collaborative project		
Project Acronym	SustainCity				
Period from	01/01/2010	Is this an adjustment to a previous statement?	No		
To	30/06/2011				
Legal Name	University of Cergy Pontoise	Participant Identity Code	998212742		
Organisation short Name	UCP	Beneficiary nr.	11		
Funding % for RTD activities (A)	75.00	Flat rate for indirect costs, specify %	60.00		
1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)					
	Type of Activity				
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	Total (A+B+C+D)
Personnel costs	138,165.55	0.00	0.00	0.00	138,165.55
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	5,524.38	0.00	0.00	0.00	5,524.38
Indirect costs	86,213.96	0.00	0.00	0.00	86,213.96
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	229,903.89	0.00	0.00	0.00	229,903.89
Maximum EU contribution	172,427.92	0.00	0.00	0.00	172,427.92
Requested EU contribution					172,427.92
2. Declaration of receipts					
Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art. II.17 of the grant agreement?				No	
If yes, please mention the amount (in €)					
3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)					
Did the pre-financing you received generate any interest according to Art. II.19?				No	
If yes, please mention the amount (in €)					
4. Certificate on the methodology					
Do you declare average personnel costs according to Art. II.14.1?				No	
Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art. II.4.4?				No	
Name of the auditor		Cost of the certificate (in €), if charged under this project			
5. Certificate on the financial statements					
Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art. II.4.4?				No	
Name of the auditor		Cost of the certificate (in €)			
6. Beneficiary's declaration on their honour					
We declare on our honour that:					
- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;					
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art. II.17 of the grant agreement;					
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art. II.19 of the grant agreement;					
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.					
Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement				
	Anne Cirot (represent by Simouna Rezaiguia)				
	Date & signature				
	25/07/2011				

8.12 Form C beneficiary 12: UCB

FP7 - Grant Agreement - Annex VI - Collaborative project

Form C - Financial Statement (to be filled in by each beneficiary)			
Project nr.	244557	Funding scheme	Collaborative project
Project Acronym	SustainCity		
Period from	01/01/2010	Is this an adjustment to a previous statement?	No
To	30/06/2011		
Legal Name	THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	Participant Identity Code	999467340
Organisation short Name	UCB	Beneficiary nr.	12
Funding % for RTD activities (A)	75.00	If flat rate for indirect costs, specify %	60.00

1. Declaration of eligible costs/lump sum/flat rate/scale of unit (in €)

	Type of Activity				Total (A+B+C+D)
	RTD (A)	Demonstration (B)	Management (C)	Other (D)	
Personnel costs	0.00	0.00	0.00	0.00	0.00
Subcontracting	0.00	0.00	0.00	0.00	0.00
Other direct costs	3,503.90	0.00	0.00	0.00	3,503.90
Indirect costs	2,102.34	0.00	0.00	0.00	2,102.34
Lump sums/flat rate/scale of unit declared	0.00	0.00	0.00	0.00	0.00
Total	5,606.24	0.00	0.00	0.00	5,606.24
Maximum EU contribution	4,204.68	0.00	0.00	0.00	4,204.68
Requested EU contribution					4,204.68

2. Declaration of receipts

Did you receive any financial transfers or contributions in kind, free of charge from third parties or did the project generate any income which could be considered a receipt according to Art.II.17 of the grant agreement?
If yes, please mention the amount (in €)

No

3. Declaration of interest yielded by the pre-financing (to be completed only by the coordinator)

Did the pre-financing you received generate any interest according to Art.II.19?
If yes, please mention the amount (in €)

No

4. Certificate on the methodology

Do you declare average personnel costs according to Art.II.14.1?

No

Is there a certificate on the methodology provided by an independent auditor and accepted by the Commission according to Art.II.4.4?

No

Name of the auditor		Cost of the certificate (in €), if charged under this project	
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5. Certificate on the financial statements

Is there a certificate on the financial statements provided by an independent auditor attached to this financial statement according to Art.II.4.4?

No

Name of the auditor		Cost of the certificate (in €)	
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6. Beneficiary's declaration on their honour

We declare on our honour that:

- the costs declared above are directly related to the resources used to attain the objectives of the project and fall within the definition of eligible costs specified in Articles II.14 and II.15 of the grant agreement, and, if relevant, Annex III and article 7 (special clauses) of the grant agreement;
- the receipts declared above are the only financial transfers or contributions in kind, free of charge, from third parties and the only income generated by the project which could be considered as receipts according to Art.II.17 of the grant agreement;
- the interest declared above is the only interest yielded by the pre-financing which falls within the definition of Art.II.19 of the grant agreement;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the European Union and in the event of an audit by the European Union and/or by the Court of Auditors and/or their authorised representatives.

Beneficiary's Stamp	Name of the Person(s) Authorised to sign this Financial Statement
	Mark Roderick
	Date & signature 12/08/2011

8.13 Summary financial report

FP7 - Grant Agreement - Annex VI - Collaborative project

Summary Financial Report - Collaborative project															
Project acronym		SustainCity		Project nr.	244557		Reporting period from	01/01/2010		to	30/06/2011		Page	1/1	
Funding scheme		CP		Type of activity								Total (A)+(B)+(C)+(D)			
Beneficiary nr.	If 3rd Party, linked to beneficiary	Adjustment (Yes/No)	Organization Short Name	RTD (A)		Demonstration (B)		Management (C)		Other (D)		Total (A)+(B)+(C)+(D)		Receipts	Interest
				Total	Max EU Contribution	Total	Max EU Contribution	Total	Max EU Contribution	Total	Max EU Contribution	Total	Max EU Contribution		
1		No	ETH Zurich SUBMITTED TO COORDINATOR	341,649.14	256,236.86	0.00	0.00	56,687.18	56,687.18	7,675.20	7,675.20	406,011.52	320,599.24	0.00	0.00
2		No	ENSC SUBMITTED TO COORDINATOR	331,414.08	248,560.56	0.00	0.00	58,489.31	58,489.31	0.00	0.00	389,903.39	307,049.87	0.00	0.00
3		No	INED SUBMITTED TO COORDINATOR	121,102.10	90,826.58	0.00	0.00	5,175.04	5,175.04	0.00	0.00	126,277.14	96,001.62	0.00	0.00
4		No	UCL SUBMITTED TO COORDINATOR	89,028.06	66,771.05	0.00	0.00	0.00	0.00	0.00	0.00	89,028.06	66,771.05	0.00	0.00
5		No	KUL SUBMITTED TO COORDINATOR	7,680.93	5,760.70	0.00	0.00	0.00	0.00	248.03	248.03	7,928.96	6,008.73	0.00	0.00
6		No	STR SUBMITTED TO COORDINATOR	104,714.89	78,536.17	0.00	0.00	12,103.56	12,103.56	0.00	0.00	116,818.45	90,639.73	0.00	0.00
7		No	NTUA SUBMITTED TO COORDINATOR	39,053.06	29,289.80	0.00	0.00	1,443.17	1,443.17	0.00	0.00	40,496.23	30,732.97	0.00	0.00
8		No	TUB SUBMITTED TO COORDINATOR	87,080.93	65,310.70	0.00	0.00	2,591.86	2,591.86	0.00	0.00	89,672.79	67,902.56	0.00	0.00
9		No	EPFL SUBMITTED TO COORDINATOR	291,085.41	218,314.06	0.00	0.00	0.00	0.00	0.00	0.00	291,085.41	218,314.06	0.00	0.00
10		No	BU SUBMITTED TO COORDINATOR	26,974.99	20,231.24	0.00	0.00	0.00	0.00	0.00	0.00	26,974.99	20,231.24	0.00	0.00
11		No	UCP SUBMITTED TO COORDINATOR	229,903.89	172,427.92	0.00	0.00	0.00	0.00	0.00	0.00	229,903.89	172,427.92	0.00	0.00
12		No	UCB SUBMITTED TO COORDINATOR	5,606.24	4,204.68	0.00	0.00	0.00	0.00	0.00	0.00	5,606.24	4,204.68	0.00	0.00
TOTAL				1,675,293.72	1,256,470.32	0.00	0.00	136,490.12	136,490.12	7,923.23	7,923.23	1,819,707.07	1,400,883.67	0.00	0.00
Requested EU contribution for the reporting period (in €)												1,354,037.43			

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