Supplementary Material

S1) Literature Review

#	Authors, date	City-scale	Infra-city scale	Other scales	Sectoral (partially)	Drivers(non-exhaustive)	Energies (non-exhaustive)	Method of investigation or approach	Main findings (citation or summary of conclusion)
[8]	Creutzig, Baiocchi, Bierkandt, Pichler & Seto, 2015	x			x	Transport costs, geographic factors, urban form	Urban direct energy use & urban transport energy use	Regression and regression (multivariate)	Higher gasoline prices combined with compact urban form can result in savings in both residential and transport energy use.
[9]	Štreimikienė, 2014			x	x	Economic and technological factors	Residential energy consumption	Regression analysis	Residential energy use per capita in Lithuania is significantly lower than in old EU member states because of the lower income per capita and lower living standards.
[10]	Zachariadis & Taibi, 2015			x	x	Exogenous macroeconomic and price variables, using income and price elasticities	Residential/ households and the tertiary sector end use energy	Econometric forecasting models	Forecasts for the Republic of Cyprus up to the year 2040 are presented, 4 scenarios considered : Rigorous implementation of energy efficiency measures is realistic & strong energy savings required in line with EU decarbonisation targets
[11]	Warren-Rhodes & Koenig, 2001	x			x	Population	Fuels (solid, liquids), electricity, natural gas	Quantitative comparative analysis of consumption between 1971 and 1997	Evidences of change in energy vectors (from liquid, and solid to electricity and natural gas), as well as doubling of TJ/cap yr between 1999 and 1971.
[12]	Newcombe, 1975	x			x	Population	Fuels (solid, liquids), electricity, natural gas	Quantitative comparative analysis of consumption between 1971 and 1997	Shares of energy consumption are presented : 31% of its total energy consumption are for industrial purposes, 22% is commercial energy use, 29% is transport.
[13]	Kennedy, Stewart, Facchini, Cersosimo, Mele, Chen, Uda, Kansal, Chiu, Kim, Dubeux, Lebre La Rovere, Cunha, Pincetl, Keirstead, Barles, Pusaka, Gunawan, Adegbile, Nazariha, Hoque, Marcotullio, Gonzalez Otharan, Genena, Ibrahim, Farooqui, Cervantes & Sahin, 2015	x	x		x	Population, GDP, Domestic land area, Commercial/ind. Floor space, Building foot print area, land area, HDD, urbanized area per person, 10-y pop growth rate, Total gross floor	Electricity consumption, Heating and industrial fuel use, Ground transportation fuels, Electricity consumption, Commercial/ industrial electricity use, total electricity use, residential electricity use	Uni- and multivariate regression, comparative analysis between 2001 and 2011	For the 27 megacities: the resource flows are largely consistent with scaling laws established in the emerging science of cities; Correlations are established for electricity consumption, heating and industrial fuel use, ground transportation energy use, [...]in terms of heating-degree-days, urban form, economic activity, and population growth. ; The correlation between per capita electricity use and urbanized area per capita is shown to be a consequence of gross building floor area per capita, which is found to increase for lower-density cities.

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[14]	Facchini, Kennedy, Stewart, & Mele, 2017	x				Urbanized population density	Total energy use	Power-law regression	Power law decay of per capita total energy versus urbanized population density for the 27 analysed megacities is found.
[15]	Athanassiadis & Bouillard, 2013		x		x	Density, income, density of office space, number of buildings	Electricity, natural gas end use	Correlation	Infra-city data shows more complex relations from what is usually offered by urban metabolism studies which consider generally cities as homogeneous wholes.
[16]	Athanassiadis, Bouillard, Vercalsteren, Crawford & Khan, 2016	x			x		Natural gas, Electricity, Pretroleum products, and others	Comparative analysis of a territorial-based and a consumption-based approach to estimate both direct and embodied resource use and pollution flows (directe accounting, and WIOD EE-MRIO tables)	The results show that the indirect primary energy use, GHG emissions and material use estimated by the consumption-based approach is more than three times higher than local measures indicate.
[17]	Lenzen, Dey, & Foran, 2004		x		x	Income, household size, age, and degree of urbanity	Total energy, domestic energy	Input–output analysis and detailed household expenditure data. Multivariate regression and structural path analysis (SPA)	Consumption based calculation offers an understanding of global environnemental impact of local actions, not accessible otherwise. To correcly act local, globals effects of local actions needs to be understood.
[18]	Wiedenhofer, Lenzen, & Steinberger, 2013		x	x	x	Urban form, climatic and socio-economic factors	Total direct and indirect energy use of households	Input–output analysis coupled with spatially resolved household expenditure data. Correlation and regression analysis	Urban households require less direct energy, but their total consumption is higher. Significant rebound effects can be expected when direct energy use is decreased.
[19]	Duvigneaud & Denayer-De Smet, 1977	x					Electricity, Coal, Petrolum, Gas, Natural Gaz	Data gathering	One of the first paper attempting a complete overview of the in and out flows of a city (Brussels).

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[20]	Wang & Li, 2016			x		Population, GDP, individual income	Energy use intensity	Annual time-series data analysis, IPAT, LMDI	During the period 1970-2012, factor of evolution in energy consumption can be divided in 4 period. During the period 1970-79, rise of individual income is the main contributor in China, whereas, in India, the population is main contributor. During 1980-89, in China the technological effect is a factor of energy use offset, the affluent, population and technological effect contribute to the rise in energy use. During 1990-99, in China the affluent factor is main contributor of increase in energy use, while in India it is the technological effect. Finally, during 2000-09, the affluent effect if prominent in the increase of energy use in China, while in India it is the technological effect.
[21]	Howard, Parshall, Thompson, Hammer, Dickinson & Modi, 2012	x	x		x	Building stock, building floo area, number of building, building types (commercial, residential, office, retail, garage, storage, factory, and education, health, warehouse), number of dwelling for residential	Electricity, Natural Gas, Steam, Fuel oil energy end-use intensity (kwh/m 2 floor area) by sector (residential, educational, office)	Muliple linear regression	Urban feature related to building stock allow to make statistically significant prediction of the different energy vectors.

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[22]	Shammin, Herendeen, Hanson & Wilson, 2010			x	x	Total expenditure, number of vehicules, family size, building types, population size	Total energy requirements of households	Uni- and multivariate regression analysis	Direct energy intensity diminishes with increasing expenditure while the relationship between indirect energy and expenditure is almost perfectly linear. Sprawl is only 17–19% more energy intensive than compact living. Some of the advantages of reduced direct energy use by people living in high density urban centres are offset by their consumption of other non-energy products.
[23]	Baynes, Lenzen, Steinberger & Bai, 2011		x	x	x	Household expenditure	Residential (heating fuels, electricity), transportation	Regional production accounting and household accounting (IO tables)	Differences in method, scope and detail actually makes these two approaches extremely complementary and useful for overlapping policy applications: IO results have more relevance to managing consumption behaviour and consumer responsibility and the regional energy assessment relates to economic structure, the management of the metropolitan economy and potential transitions in urban production.

S2) Data source for energy

City	Abbrev.	Year	Sources
Brussels	BRU	2014	Data provided confidentially by Brussels grid operator
Glasgow	GLA	2012	https://data.glasgow.gov.uk/dataset
London	LDN	2014	https://www.gov.uk/government/statistical-data-sets/total-final-energy-consumption-at-regional-and-local-authority-level
Milan	MIL	2010	www.istat.it http://sirena.finlombarda.it/sirena/
Chicago	CHI	2010	https://data.cityofchicago.org/resource/9wsh-b774.json
New York City	NYC	2010	https://data.cityofnewyork.us/
Los Angeles	LA	2010	https://data.lacity.org/
San Francisco	SF	2010	https://datasf.org/opendata/
Buenos Aires	BA	2010	Kennedy et al. 2015
Cape Town	CT	2011	Dataset provided by the City of Cape Town

S3) Other data found for cities but not included in study

	Residential	Tertiary	Industrial	Transport	Agriculture	Non-domestic	TOTAL
Electricity	BRU, BA, CT, GLA, LDN, LA, MIL	BRU, BA, MIL	BRU, BA, CHI, MIL	MIL	MIL	GLA, LDN	BRU, BA, CHI, GLA, LDN, MIL, SF
Natural gas	BRU, GLA, LDN, NYC	BRU	BRU, CHI, NYC			GLA, LDN	BRU, CHI, GLA, LDN, MIL, NYC, SF
Petroleum products	LDN			LDN		LDN	LDN
Coal	LDN					LDN	LDN
Bioenergy							LDN
Steam							
TOTAL	LDN			LDN		LDN	LDN