ESPON

EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

espon.eu

EUROPEAN TOOL FOR GHG QUANTIFICATION IN SPATIAL PLANNING

Kimmo Lylykangas
Professor, head of Academy
Academy of Architecture and Urban Studies
Tallinn University of Technology

ACADEMY OF ARCHITECTURE AND URBAN STUDIES IN 2020

Kimmo Lylykangas
Professor, Head of Academy

Jenni Partanen
PhD, Professor of Future City

Jaan Kuusemets
Chartered Architect Level 8
Professor of Contemporary Architecture

Luca Mora
PhD, Adjunct Professor, Urban Innovation

RESEARCHERS
Francesco De Luca, PhD
Veronika Valk-Siska, PhD

SENIOR LECTURERS
Epi Tohvri, PhD
Ignar Fjuk
Anu Juurak
Raoul Kurvits

PROGRAMME DIRECTORS
Üllar Ambos
Kristi Grišakov

LECTURERS
Irina Raud
Emil Urbel
Ioannis Lykouras
Tiina Tuulik

ENGINEERING GRAPHICS TEAM
Sergei Letunovitš, PhD
Aurika Nõmm
Harri Annuka, PhD
Külli Meister

EXPERT
Anni Oviir

SUPPORT PERSONNEL
Triinu-Liis Looveer
Kärt Olli

EG=Engineering graphics team
*The staff members with a **PhD** are qualified to supervise PhD students*
*The names highlighed with a **blue** tone are qualified to supervise Master's theses (degree in architecture)*

CONTENTS

I THE QGasSP PROJECT: A NEW ESPON TOOL AND METHOD FOR GHG QUANTIFICATION IN SPATIAL PLANNING / SEA

ESPON EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

espon.eu

QGasSP PROJECT OBJECTIVES

A methodology and **a tool** for

- quantification of GHG emissions in spatial planning
- collection of comparable GHG baseline emissions data at national, regional and local levels
- cross-country, inter-regional and inter-municipality comparisons
- SEA process (Strategic Environmental Assessment)

Four stakeholders

- Eastern and Midlands Regional Authority (IE)
- Scottish Government – Planning & Architecture Division (UK)
- of Infrastructure, Northern Ireland (UK)
- Regional Council of Kymenlaakso (FI)

ESPON EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

espon.eu

SEA

STRATEGIC ENVIRONMENTAL ASSESSMENT

"In Europe, land use, residential and commercial development and the development of the transportation infrastructure are as a rule controlled by means of spatial planning instruments, for which Strategic Environmental Assessments (SEA) must generally be carried out under the terms of a European Union Directive European Parliament and Council of the European Union, 2001" (Wende *et al.*, 2012).

- SEA is a systematic process for evaluating the likely environmental implications of a proposed policy, plan or programme
- SEA provides means for looking at cumulative effects and appropriately addressing them, at the earliest stage of decision making, along with economic and social considerations
- SEA is recognised as the vehicle for the implementation of climate protection within spatial planning

ESPON EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

espon.eu

QGasSP CONSORTIUM

Academy of Architecture of Urban Studies
Tallinn University of Technology
Estonia

Kimmo Lylykangas, professor, head of Academy
Jenni Partanen, PhD, professor of Future City
Anni Oviir, expert
Kristi Grišakov, programme director, researcher, Smart City Center of Excellence

Codema
Dublin's Energy Agency
Ireland

Donna Gartland, Chief Executive Officer
John O'Shea, Energy Systems Analyst
Rebecca Cacchia, Energy Engineer
Rowan Moloney, Energy Systems Modeller

Stockholm Environment Institute
Tallinn Centre
Estonia

Kaja Peterson, PhD, Programme Director, Senior Expert (Sustainable Development Programme)
Kaie Kriiska, PhD, Expert
Peter Walke, PhD, Expert

OIVAN (IWA)
Finland

Aki Teliö, Senior Software Architect
Joonas Kumpulainen, Senior Web Developer

codema Dublin's Energy Agency SEI TAL TECH IWA

ESPON

EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

espon.eu

ESPON

The **ESPON EGTC** is a European Grouping on Territorial Cooperation. ESPON started in 2002 and have continued since then building a pan-European knowledge base related to territorial dynamics.

https://www.espon.eu/

Tool development within ESPON is targeted to the use of policy makers and practitioners at all administrative levels (including cross-border and transnational groupings) and will enable the use of information and data by these particular groups of stakeholders. The ESPON tools contribute to the consolidation of a European research field on territorial development and cohesion.

https://www.espon.eu/tools-maps

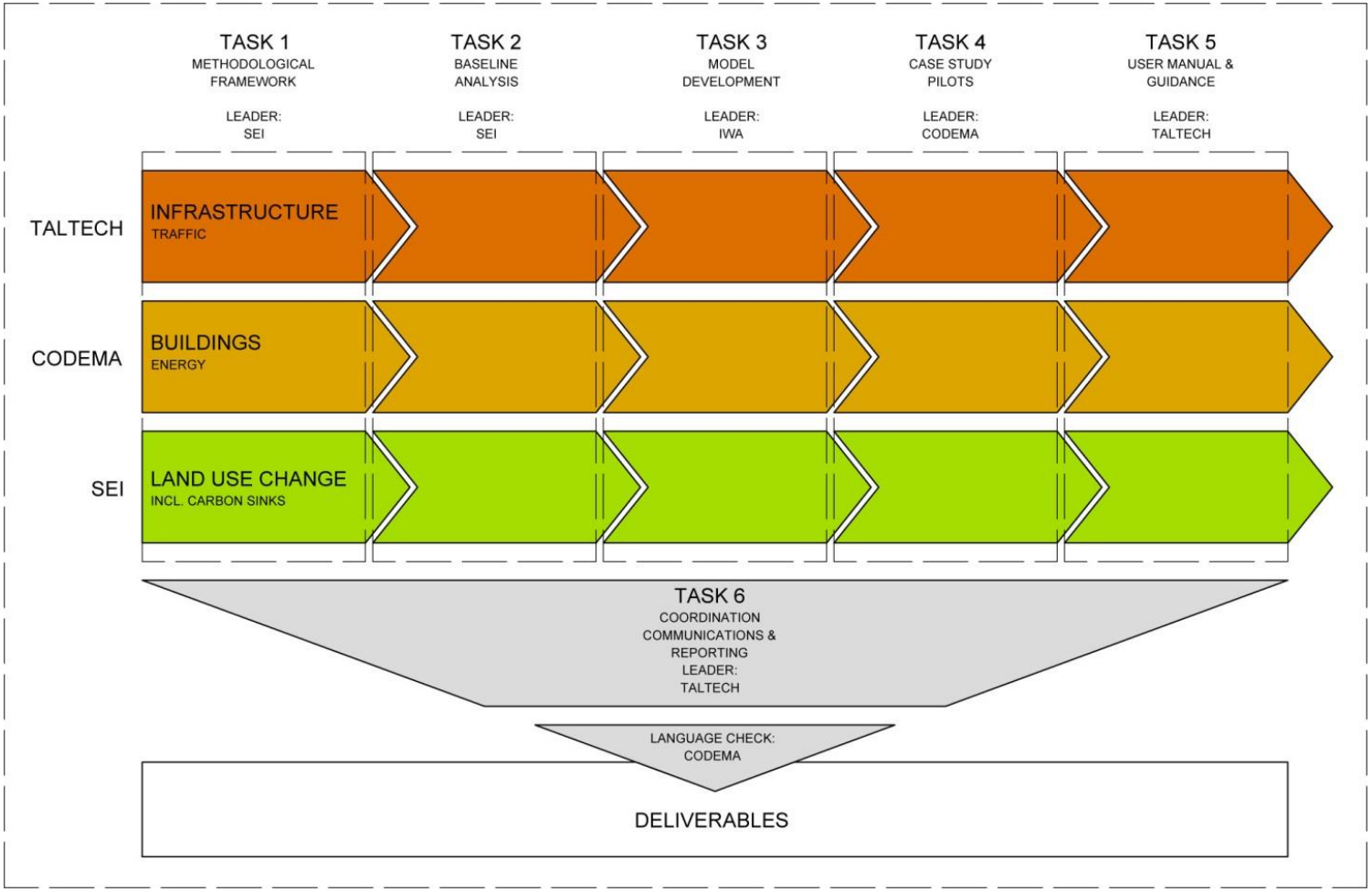
ESPON EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

espon.eu

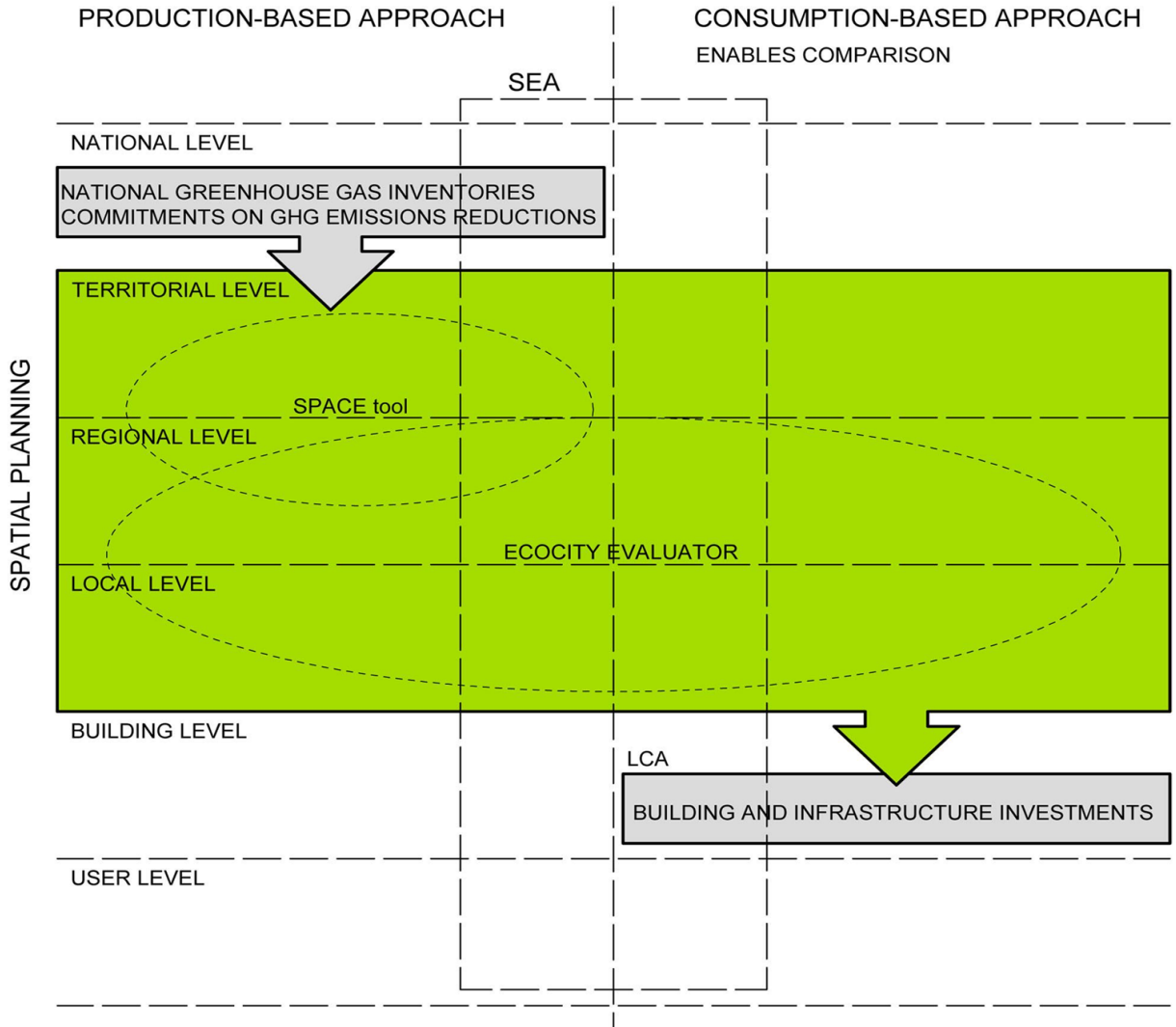
TASKS AND WORKFLOW



ESPON
EUROPEAN UNION
Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

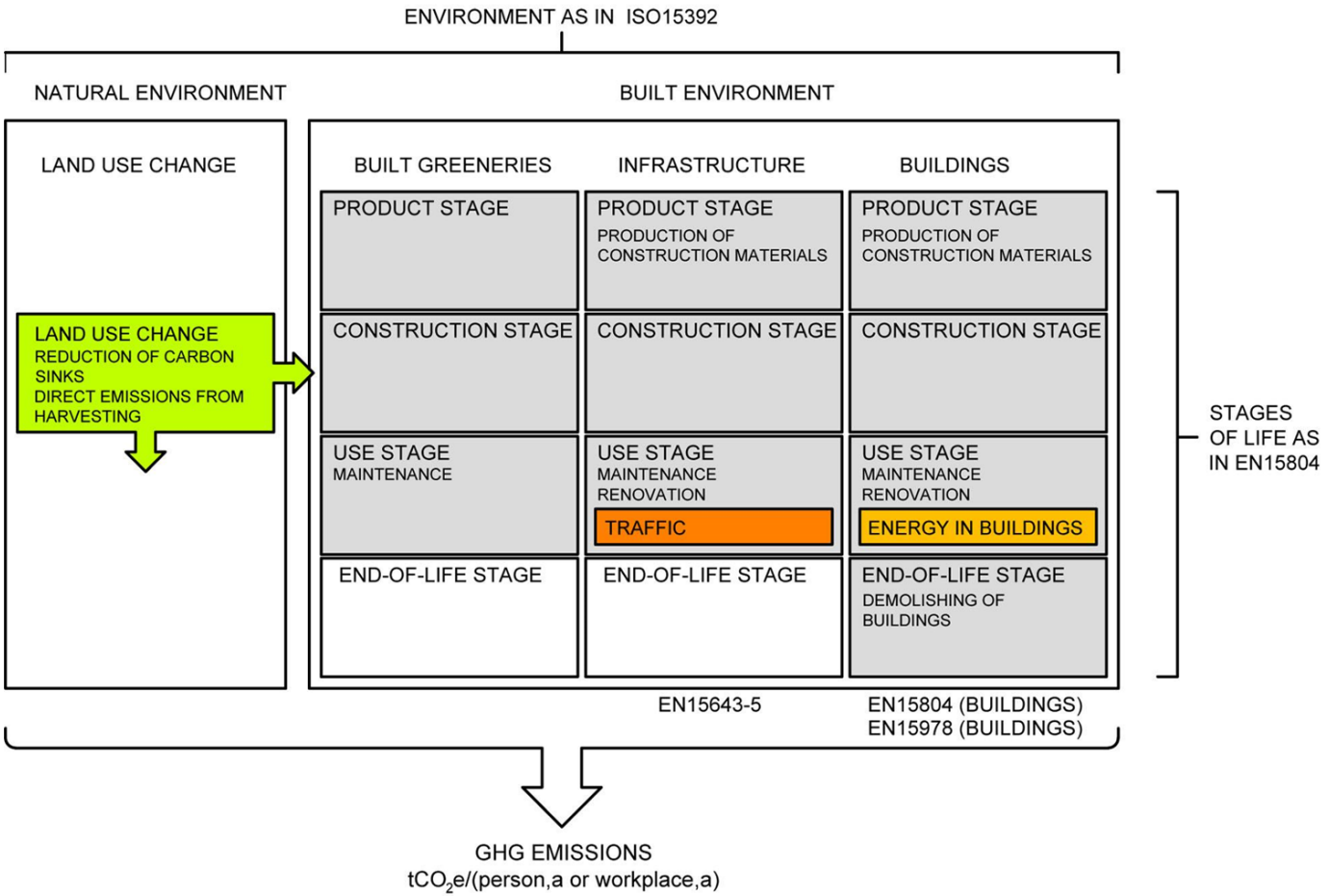
espon.eu

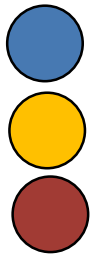


ESPON
EUROPEAN UNION
Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

espon.eu

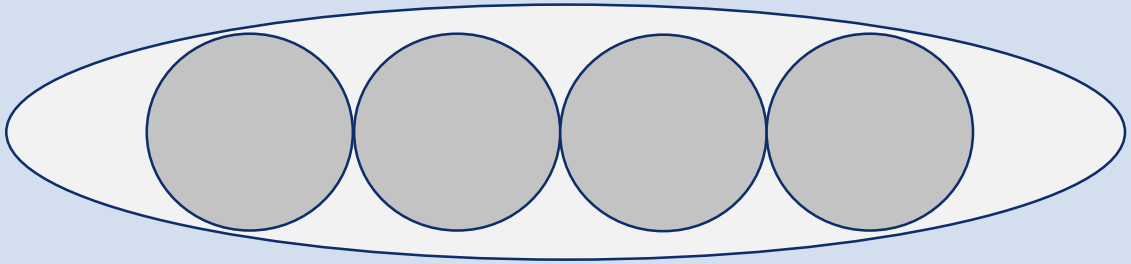




ACCURACY INDICATION
(RESULTS)

INTERFACE

OPEN-SOURCE CALCULATION MODEL



METHOD DEVELOPER
USER

PLANNER
=NON-EXPERT USER

DATASETS

LOCAL SET-UP

LOCAL SET-UP

LOCAL SET-UP

LOCAL SET-UP

OTHER

IRELAND

SCOTLAND

NORTH IRELAND

FI NLAND

OTHER

GENERIC DEFAULT DATASET

EXPERT USER
(FOR EXAMPLE
SEA CONSULT)

ESPON

EUROPEAN UNION

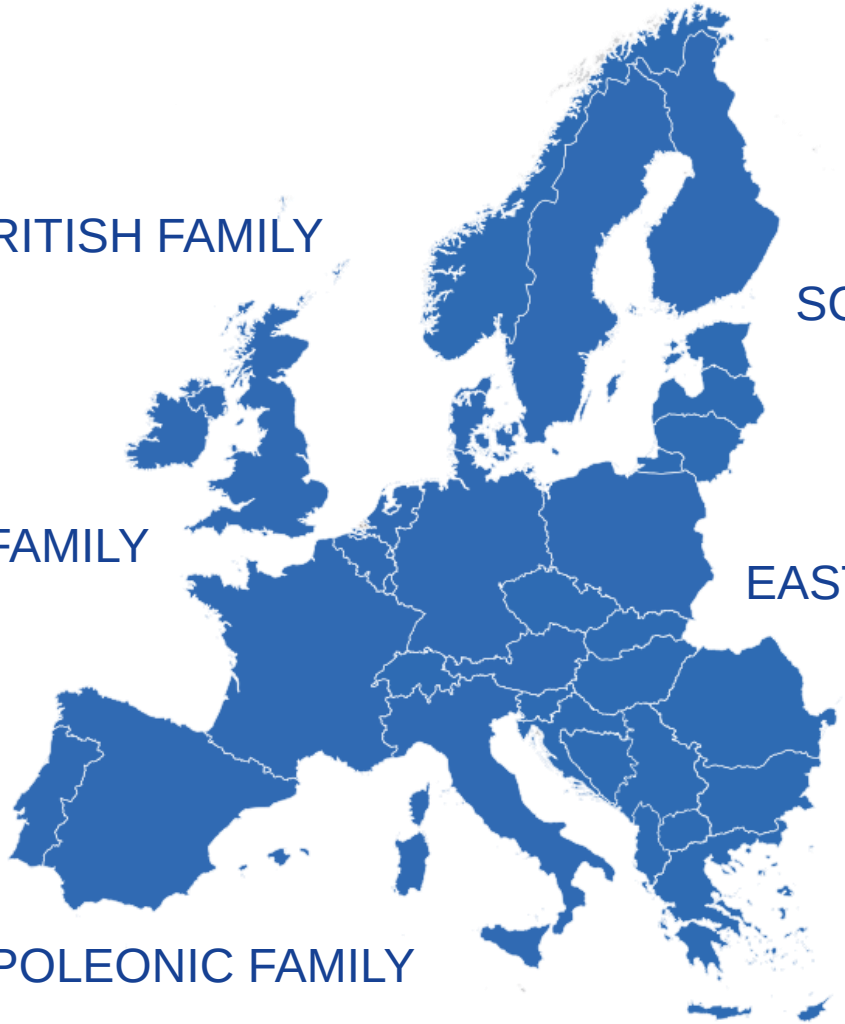
Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

espon.eu

EUROPEAN SYSTEMS FOR SPATIAL PLANNING

as in Newman, P & Thornley A (1996), *Urban Planning in Europe. International competition, national systems and planning projects*, Routledge, London/New York.



BRITISH FAMILY

SCANDINAVIAN FAMILY

GERMANIC FAMILY

EASTERN EUROPE

NAPOLEONIC FAMILY

ESPON

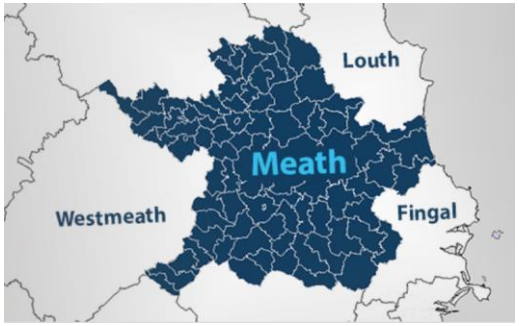
EUROPEAN UNION

Co-financed by the European Regional Development Fund

Inspire Policy Making with Territorial Evidence

espon.eu

CASE STUDY PILOTS

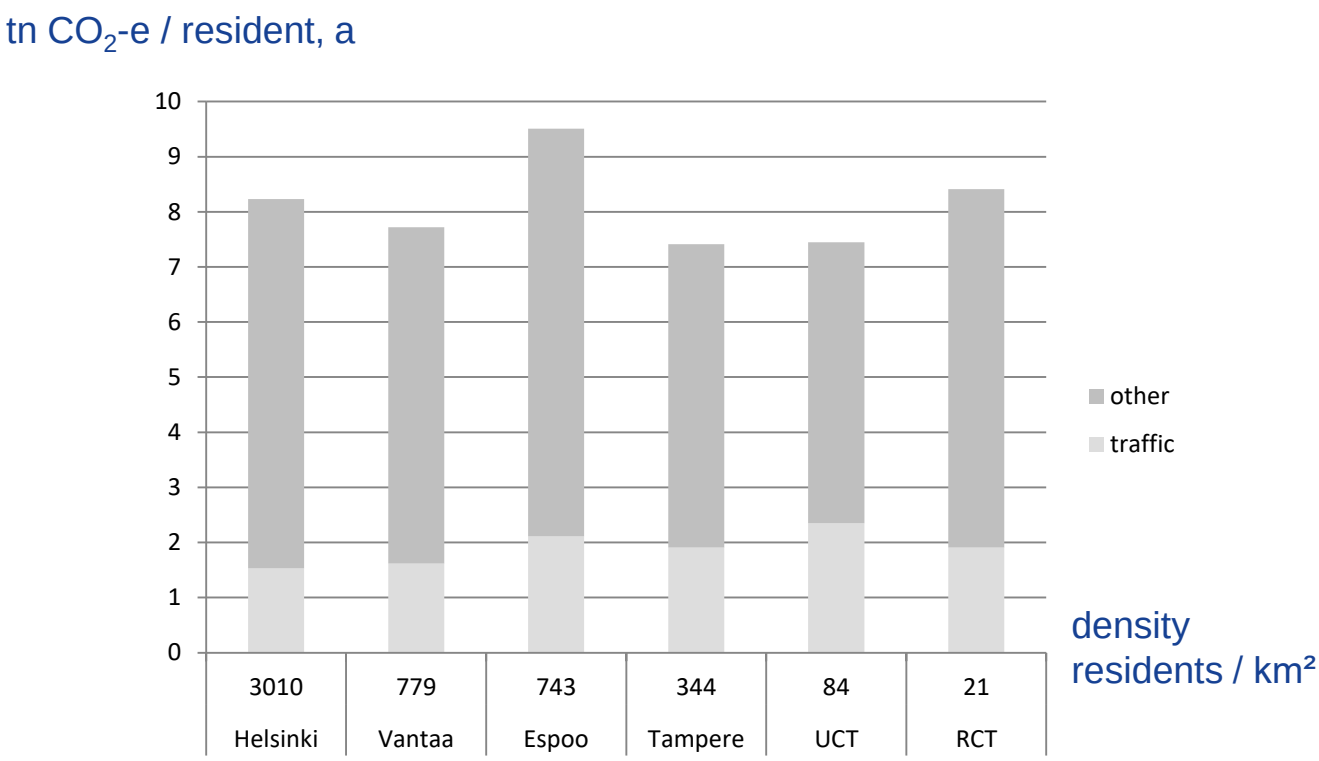


II OPPORTUNITIES FOR GHG EMISSIONS MITIGATION IN SPATIAL PLANNING

CLIMATE NEUTRALITY?

DENSIFICATION?

TIERED HYBRID LCA -METHOD BY PROFESSOR JUNNILA'S TEAM

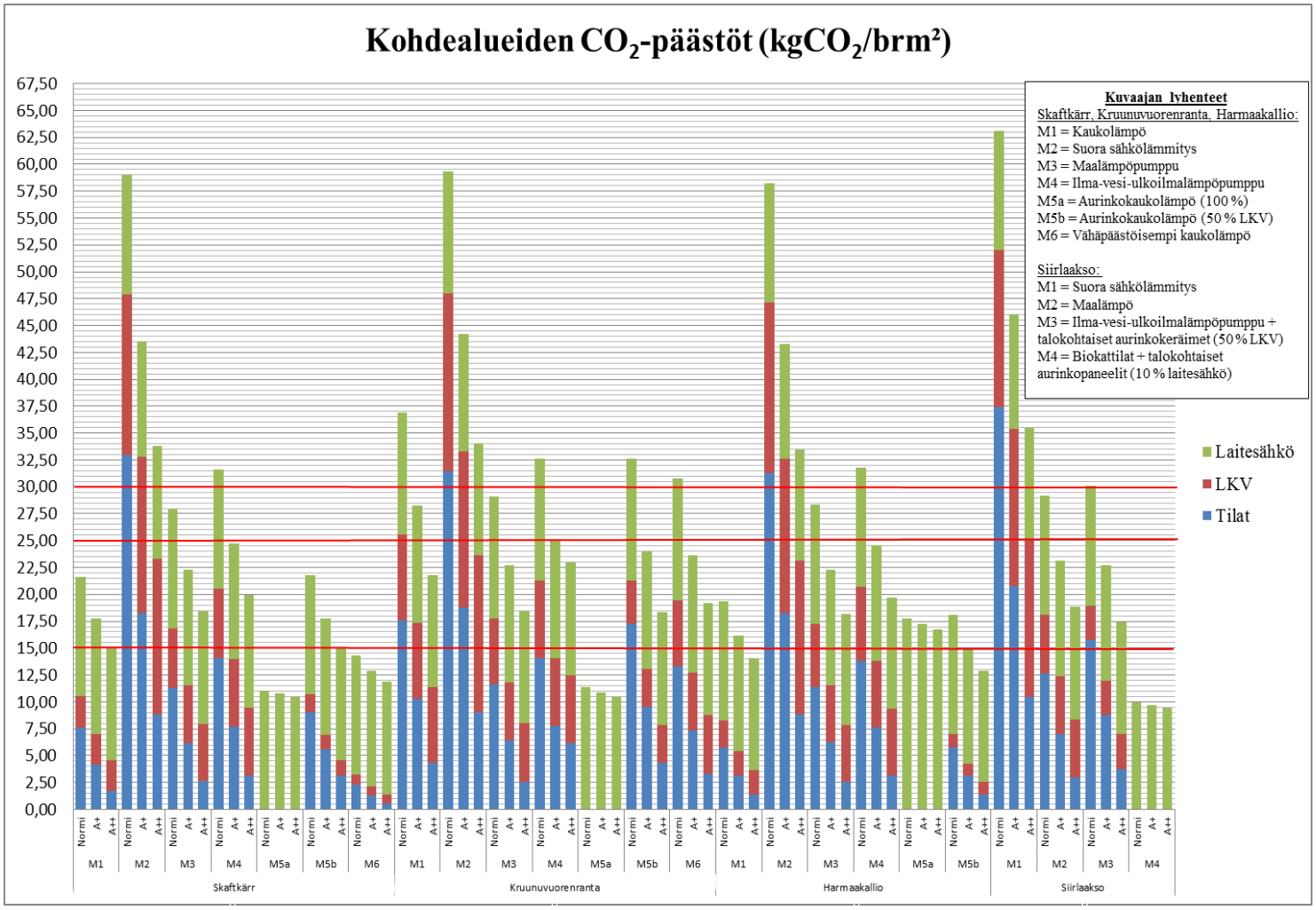


GRAPH: Heinonen, Jukka & Junnila, Seppo: Implications of urban structure on carbon consumption in metropolitan areas. Environmental Research Letters Volume 6 number 1 (2011).

THE POTENTIAL OF SMART?

„THE FIRST GREEN GHOST TOWN“

ACTIVITY x CO_2 EMISSION FACTOR



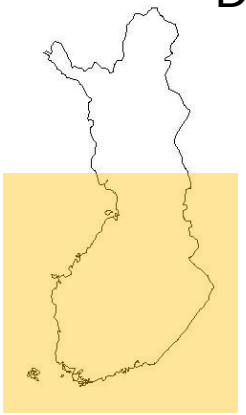
SKAFTKÄRR PORVOO | KRUUNUVUORENRANTA HELSINKI | HARMAAKALLIO LOVIISA | SIIRLAAKSO MÄNTYHARJU

Vainio, Tuukka: Master's thesis 2011, Aalto University.

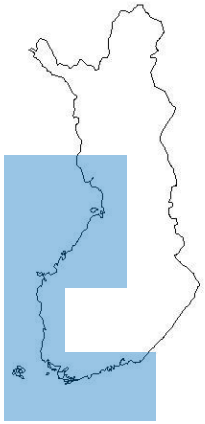
DISTRICT HEATING 20 $kgCO_2$/MWh

DISTRICT HEATING 350 $kgCO_2$/MWh

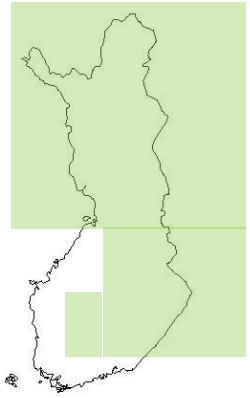
SOLAR



WIND



WOOD



Ryhmä A 20 $kgCO_2$/MWh	Ryhmä B 40 $kgCO_2$/MWh	Ryhmä C 60 $kgCO_2$/MWh	Ryhmä D 80 $kgCO_2$/MWh
Haapajärvi Hanko Kauhava – keskusta Kauhava – Kortesjärvi Kuortane Loimaa Nurmes Outokumpu Raasepori Rantasalmi Rääkkylä Uusikaarleby Viitasaari	Mäntyharju Nurmijärvi Puumala Virrat	Akaa Juuka Kannus Kiuruvesi Kokemäki Mynämäki Paimio	Inari Kolari–Yllas Pielavesi
Ryhmä E **100 $kgCO_2$/MWh**	**Ryhmä F** **150 $kgCO_2$/MWh**	**Ryhmä G** **200 $kgCO_2$/MWh**	**Ryhmä H** **250 $kgCO_2$/MWh**
Hämeenlinna–Lammi Iitti Karvia Loviisa Orimattila Rautalampi Somero	Kärsämäki Loppi	Alavieska Hamina Jalasjärvi Joroinen Kangasala Kauhajoki Kauhava – Alahärmä Kolari Kuopio–Karttula Mäntsälä Ruovesi Siuntio Suonenjoki Veteli	Alajärvi Hausjärvi Kauhava – Ylihärmä Keminmaa Kittilä Teuva Tohmajärvi Vimpeli
Ryhmä I **300 $kgCO_2$/MWh**	**Ryhmä J** **350 $kgCO_2$/MWh**	**Ryhmä K** **400 $kgCO_2$/MWh**	**Ryhmä L** **140 $kgCO_2$/MWh**
Inkoo Karkkila Kirkkonummi–Veikkola Saarijärvi Ylöjärvi	Juva Laihia		Erillistuotantoalueet, joita ei ole ryhmissä A–K

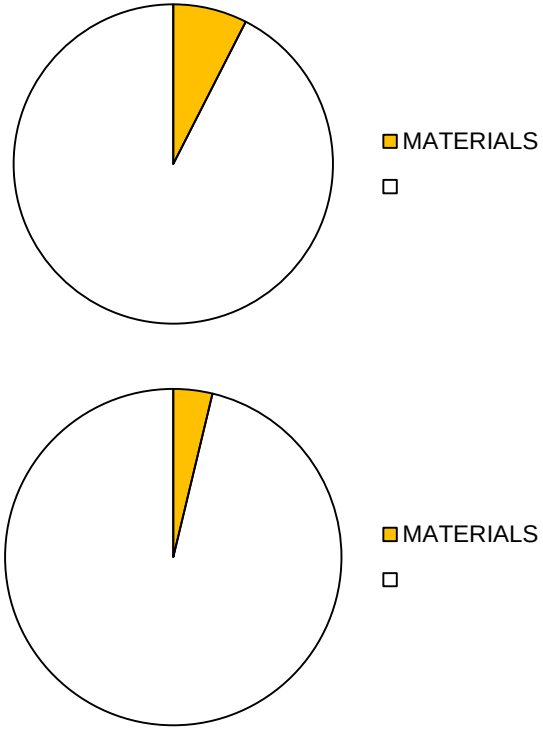
Lähde: Energiateollisuus ry 2014

Lähde: Rannik, Priit: One tonne life: A sustainable Community in Torppala. Master's Thesis, TalTech 2019.

CARBON BUDGET

HOW MUCH IS LEFT FOR ONE TONNE LIFE?

1 t CO_2eqv/person,a



FIVE TREES HOUSE
4 persons
50 years life

►0.075 t CO_2eqv / person,a

FIVE TREES HOUSE
4 persons
100 years life

►0.038 t CO_2eqv / person,a

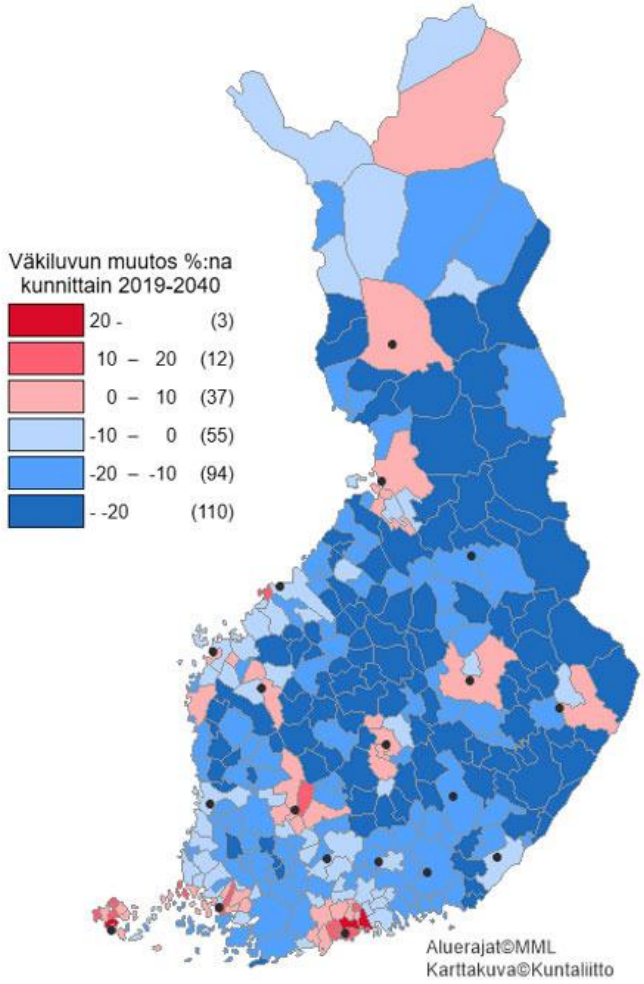
Image: The Five Tree House. Kilpailuehdotus, Aalto-yliopiston opiskelijatiimi 2012

BACK CASTING METHOD

Näkymäkuva keskustasta.

IMAGES: Nurmi-Sorila, Tampere; Arkkitehdit Anttila & Rusanen Oy. www.aa-r.fi

THE FINNISH BUILDING STOCK IS MOVING TOWARDS SOUTH AND WEST

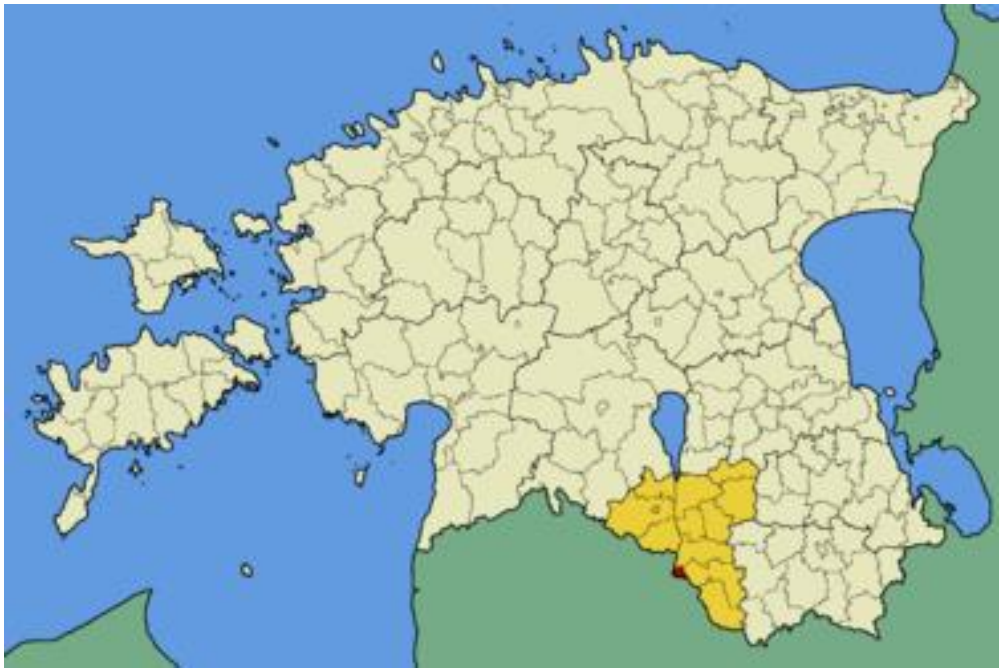


TAL TECH

DIGNIFIED SHRINKING

(Väärikas kahanemine)

Jiri Tintera, PhD, town architect of Valga



https://www.tuglas.fi/jiri-tintera-kutistuvien-kaupunkien-peloton-pelastaja


DIGITAL TWIN

LÄHDE: www.onetonnelife.com

THANK YOU FOR YOUR ATTENTION

TAL TECH