sEEnergies

QUANTIFICATION OF SYNERGIES BETWEEN ENERGY EFFICIENCY FIRST PRINCIPLE AND RENEWABLE ENERGY SYSTEMS

D2.2 Data set from the different scenarios developed in TransportPLAN

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 846463.

Project

Acronym	**sEEnergies**
Title	Quantification of Synergies between Energy Efficiency First Principle and Renewable Energy Systems
Coordinator	Brian Vad Mathiesen, Aalborg Universitet
Reference	846463
Type	Research and Innovation Action (RIA)
Programme	HORIZON 2020
Topic	LC-SC3-EE-14-2018-2019-2020 - Socio-economic research conceptualising and modelling energy efficiency and energy demand
Start	01 September 2019
Duration	34 months
Website	https://seenergies.eu/
Consortium	**Aalborg Universitet (AAU)**, Denmark **Hogskolan i Halmstad (HU),** Sweden **TEP Energy GmbH (TEP),** Switzerland **Universiteit Utrecht (UU),** Netherlands **Europa-Universität Flensburg (EUF),** Germany **Katholieke Universiteit Leuven (KULeuven),** Belgium **Norges Miljø- og Biovitenskapelige Universitet (NMBU),** Norway **SYNYO GmbH (SYNYO)**, Austria **Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Fraunhofer),** Germany

Deliverable

Number	D2.2
Title	Data set from the different scenarios developed in TransportPLAN
Lead beneficiary	Aalborg University (AAU)
Work package	WP2
Dissemination level	Public
Submission date	21.01.2021
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1 Introduction

As part of work package 2 of the sEEnergies project, transport data has been collected for 28 European countries. This includes transport activity demand data, transport specific energy consumptions, load factors and capacity for different modes of transport.

The major source of data are the European National Travel Surveys. The data is categorized based on distance bands for each mode, both for passenger and freight. This is done for all EU-28 countries in a bottom up manner. The data is then combined together via weighted average to calculate the overall EU-28 transport activity and transport energy demand for the reference year (2017). A baseline is created following the same transport growth rates as used in the European PRIMES model.

On top of the baseline, along with the results from Deliverable 2.1, calculations are performed to estimate the demand reductions and modal shifts based on energy efficient urban spatial and infrastructure development for the future.These energy efficiency practices are then combined with four energy efficiency transport technology scenarios for the future.

The following provide an overview of the data for EU-28 transport sector:

Transport Activity:

Contains EU-28 transport demand activity for different modes categorized into distance bands.

Passenger transport 2017	Transport demand	Load factor	Energy consumption	No of vehicles
	Mpkm	%	TJ	
Cars and vans	5,004,273			
Leisure	60%			
<5km	*6%*			
5-25km	*31%*	43%		
25-50km	*16%*			
>50km	*47%*		8,984,177	270,002,858
Work	40%			
<5km	*6%*			
5-25km	*35%*	33%		
25-50km	*22%*			
>50km	*37%*			
International	0%	62%		
Rail	436,028			
National rail	414,641			
National rail (diesel)	*52%*	48%	239,436	
National rail (electricity)	*48%*			
International rail (electricity)	21,387	69%		
Bus	510,783			
National bus	506,160			
< 5km	*7%*			
5-25 km	*33%*	49%	426,420	773,563
25-50km	*18%*			
>50 km	*42%*			
International bus	4,623	60%		
Bicycle/walking	247,812			
< 5km	*62%*			
5-25 km	*30%*	*100%*		
25-50km	*5%*			
>50 km	*3%*			
Air	1,538,820			
National air	134,340	61%		
International air	1,404,479	82%	2,828,418	
International air (1-1000km)	*42%*	82%		
International air (>1000km)	*58%*	82%		
Sea	28,736			
National sea	14,609	19%	246,196	
International sea	14,128	45%		

Freight transport 2017	Transport demand	Load factor	Energy consumption	No of vehicles
	Mtkm	%	TJ	
National truck	1,174,122			
<50km	*10%*	67%	1,169,187	
50-200km	*31%*	61%		
>200km	*59%*	69%		6,547,341
International truck	640,226			
<250km	*2%*	54%	905,841	
250-1000km	*11%*	51%		
>1000km	*87%*	58%		
Vans	489,942			
<50km	*49%*	50%	1,349,990	32,662,813
>50km	*51%*	50%		
National rail	374,756			
National rail (diesel)	*59%*	64%	247,206	
National rail (electricity)	*41%*	64%		
International rail (electricity)	203,140	64%	143,551	
National air	803	49%	10,614	
International air	48,877	49%	646,374	
National sea	176,811	45%	65,479	
International sea	6,488,656	55%	393,212	

Transport Energy:

Contains EU-28 transport energy demand by fuel for 2017, 2030 and 2050 for traditional urban spatial and infrastructure development and energy efficient urban spatial development. For 2050, this is further categorized into different energy efficiency transport technology scenarios.

	Year	Scenario	Petrol (PJ)	Diesel (PJ)	Jet-fuel fossil (PJ)	Biogas (PJ)	Bioethanol (PJ)	Biodiesel (PJ)	Bio e-fuel (PJ)	Bio e-jetfuel (PJ)	CO_2 e-fuel (PJ)	CO_2 e-jetfuel (PJ)	Ammonia (PJ)	Hydrogen (PJ)	Natural gas (PJ)	Electricity Train / bus / trucks / ships / aircrafts (PJ)	Electricity BEV + Plug-	Total (PJ)
Traditional urban developement	2017	Baseline	4,911	8,265	3,485	-	232	481	-	-	-	-	-	-	-	282	-	**17,656**
	2030	Baseline	3,713	6,822	4,057	311	285	499	-	-	18	-	-	-	86	457	300	**16,547**
	2050	Baseline	1,864	4,674	4,425	274	262	389	-	110	74	-	-	129	338	700	1,148	**14,388**
		Biofuels	-	-	-	2,282	1,609	4,300	-	4,535	216	-	-	-	-	600	704	**14,245**
		H2	-	-	-	-	-	-	-	2,267	216	-	619	5,537	-	1,027	704	**10,370**
		Electrification and e-fuels	-	-	-	80	-	-	-	1,472	2,751	2,364	39	-	-	1,939	1,977	**10,621**
		Electrification+	-	-	-	80	-	-	-	1,435	769	2,102	39	-	-	3,241	1,990	**9,656**
		1.5TECH	69	1,494	1,805	321	-	260	-	1,029	133	1,497	82	551	480	907	1,687	**10,316**

	Year	Scenario	Petrol (PJ)	Diesel (PJ)	Jet-fuel fossil (PJ)	Biogas (PJ)	Bioethanol (PJ)	Biodiesel (PJ)	Bio e-fuel (PJ)	Bio e-jetfuel (PJ)	CO_2 e-fuel (PJ)	CO_2 e-jetfuel (PJ)	Ammonia (PJ)	Hydrogen (PJ)	Natural gas (PJ)	Electricity Train / bus / trucks / ships / aircrafts (PJ)	Electricity BEV + Plug-	Total (PJ)
Energy efficient urban development	2017	Baseline	4,911	8,265	3,485	-	232	481	-	-	-	-	-	-	-	282	-	**17,656**
	2030	Baseline	3,508	6,674	2,788	293	269	484	-	-	18	-	-	-	87	553	285	**14,959**
	2050	Baseline	1,507	4,390	1,991	226	211	343	-	46	74	-	-	107	344	954	946	**11,139**
		Biofuels	-	-	-	2,282	1,291	3,831	-	2,387	272	-	-	-	-	821	579	**11,462**
		H2	-	-	-	-	-	-	-	1,019	272	-	619	4,126	-	1,073	579	**7,687**
		Electrification and e-fuels	-	-	-	80	-	-	-	613	2,690	1,133	39	-	-	1,793	1,637	**7,984**
		Electrification+	-	-	-	80	-	-	-	598	708	991	39	-	-	2,953	1,650	**7,019**
		1.5TECH	57	1,477	835	305	-	275	-	479	133	693	80	474	480	1,105	1,409	**7,802**