KPI REPORT

VERSION: 02

Report No. D5.1 **//** Date: 24/06/2021

AUTHORS

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ENCHANT Report

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ABSTRACT

This report provides guidance on all data and information collection activities in ENCHANT and aims at providing quantitative and qualitative results regarding the impact of ENCHANT in WP2.

VERSION	DATE	VERSION DESCRIPTION
1	16.06.2021	First version for quality check
2	24.06.2021	First submission

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1 Introduction

Leveraging the potential of increased energy efficiency for a sustainable, low-carbon and climate-friendly European Energy Union is paramount. In the past several years, intervention strategies, informed by psychological and behavioural science have been tested in a myriad of small-scale field trials. These research efforts have provided a deeper understanding of promising factors, have shown up barriers and obstacles and have also highlighted contextual (inter- and intra-country, as well as cultural) differences as well as psychological factors that need to be considered to improve the decision-making of households.

The ENCHANT project builds on the findings of previous research and takes them further by testing established behavioural science-based intervention techniques under controlled conditions in an unprecedented large-scale effort, targeting millions of European citizens. ENCHANT will systematically evaluate data gathered in these field trials, will make full use of already existing data and will apply the project's findings to the design of an empirically informed decision tool for impactful energy-efficiency campaign design, relevant for a number of actors, like policymakers, municipalities, NGOs, and energy providers. Thereby, ENCHANT does not only aim for significant impact during the project duration, but provides a sustainable decision tool for impactful efficiency campaign design that can be used by stakeholders on all governmental and societal levels.

This deliverable outlines the parameters by which the performance of the whole project will be measured. Ten specific impact categories were developed which are presented below. The aim of this report is to describe the Key Performance Indicators (KPI) with which the progress of ENCHANT will be measured in each category.

This report will be updated throughout the project. Version No. 1 aims at defining the number of impact categories set out for the whole project. Since the intervention packages are currently designed, several of the KPIs described below will be updated in the next version and formulas for calculating them will be provided where applicable. At a later stage of the project, the KPIs presented will be calculated and discussed in an updated version of this KPI report.

2 Data Collection strategy

To collect data, several tools will be used. First, the **ENCHANT Impact Tracker** was developed and implemented as an online google document. The Impact Tracker serves a twofold goal: i) to collect the input parameters for the calculation of KPIs and ii) to support the dissemination and communication team of ENCHANT to keep track of all related DEC activities. In order to fully comply with GDPR requirements, this online document is only used for non-GDPR sensitive data collection activities, e.g. the peer-reviewed journal articles published by the ENCHANT team to create impact in the research community. All ENCHANT partners are asked to document their activities within the ENCHANT project once a month through the *Impact Tracker* to ensure a continuous project monitoring.

Second, the various communication channels of user partners will be utilised to reach the households and conduct the interventions. And finally, data needed for the assessment of the

impact created by the interventions will be collected via a data collection template, which will be described in the next update of the present document.

As outlined in ENCHANT deliverable D4.1, which describes guidelines, application principles, and an operational implementation plan for the pilots, data collection activities related to the implementation of intervention packages take place at four steps in the project's planning framework (see Figure 1): in Stage II/Step 4: Recruitment, Stage II/Step 6: Pre-intervention data collection, Stage II/Step 8: Monitoring & executing and Stage II/Step 9: Post-intervention data collection. D4.1 outlines all relevant aspects of the data collection procedure, from setting up the necessary administrative structures to ethical requirements, which therefore need not be repeated in the present document. Yet, for the four key data collection steps a few key aspects are briefly outlined below.

Stage II/Step 4: Recruitment

In the recruitment process, adult participants will be invited to participate in the pilots. Their involvement is entirely voluntary and participation in the pilots will require their informed consent. In the recruitment stage, the minimum personal information that needs to be collected is the participant's name and contact details. Further data collections needs will be specified at a later stage of the project. In order to be able to report on the number of recruited participants, the ENCHANT partner responsible for recruitment will ensure the anonymization of all personal data collected at this stage before reporting.

Stage II/Step 6: Pre-intervention data collection

After recruitment, baseline data needs to be collected before the implementation of the intervention packages. The data to be collected for calculating the impact of the ENCHANT interventions is measured either directly (e.g., by digital data tracking or by collecting consumption data obtained from utility companies) or indirectly (e.g., from the consumers self-reporting through mobile or web-based apps, from surveys). In a later stage of the ENCHANT project, a data collection template for all intervention packages will be designed in order to establish the baseline for the KPI calculation.

Stage II/Step 8: Monitoring & executing

During the execution of the intervention, data will be continuously collected by the ENCHANT partner responsible for the implementation of the intervention. The data collection template will be used.

Stage II/Step 9: Post-intervention data collection

After the runtime of the intervention, data anonymization will take place as swiftly as possible and the collected data will be transferred to all research partners responsible for data analysis.
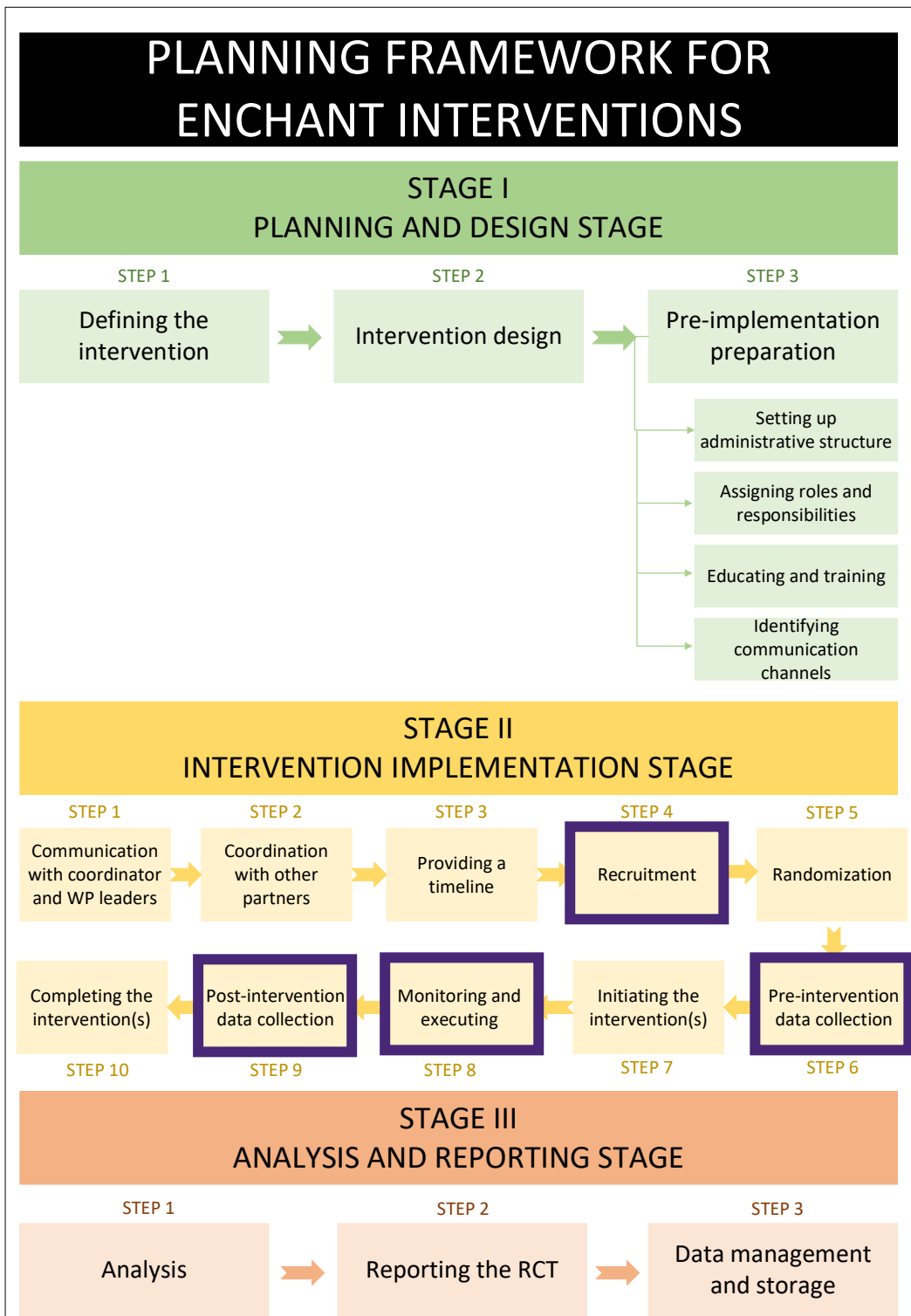
PLANNING FRAMEWORK FOR ENCHANT INTERVENTIONS

STAGE I
PLANNING AND DESIGN STAGE

STEP 1
Defining the intervention

STEP 2
Intervention design

STEP 3
Pre-implementation preparation

- Setting up administrative structure
- Assigning roles and responsibilities
- Educating and training
- Identifying communication channels

STAGE II
INTERVENTION IMPLEMENTATION STAGE

STEP 1
Communication with coordinator and WP leaders

STEP 2
Coordination with other partners

STEP 3
Providing a timeline

STEP 4
Recruitment

STEP 5
Randomization

STEP 10
Completing the intervention(s)

STEP 9
Post-intervention data collection

STEP 8
Monitoring and executing

STEP 7
Initiating the intervention(s)

STEP 6
Pre-intervention data collection

STAGE III
ANALYSIS AND REPORTING STAGE

STEP 1
Analysis

STEP 2
Reporting the RCT

STEP 3
Data management and storage

Figure 1: Planning Framework for ENCHANT interventions; Source: Biresselioglu et al. (2021)[1]

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3 Impact Categories

Improving energy efficiency by advancing behavioural science-based intervention techniques in a large-scale roll-out of behavioural science informed interventions:

The consortium of ENCHANT has the possibility to test energy efficiency behavioural change interventions among a large number of European citizens in six countries using different communication and feedback channels. This will allow large-scale randomized control trials, whose magnitude is unprecedented in behavioural science research. The diversity of user-partners and heterogeneity of participating regions and countries will allow the derivation of efficient intervention strategies to foster energy efficiency among households deployable throughout Europe. The list of user partners and their outreach potential is depicted in Table 1.

Table 1: User partners and their outreach potential; Source: ENCHANT project proposal (2020)

Partner	Total number households targeted	Country	Number of households adopting a more sustainable energy consumption behaviour		
			adopting a more sustainable lifestyle	adopting energy efficient transport technology in the next 5 years	adopting energy efficiency upgrades of buildings
Izmir	1,420,000	Turkey	45,400	10,300	5,700
Gediz	3,000,000 1,42 mio in Izmir (see above) 1,58 mio in other cities	Turkey	50,560	11,530	6,320
EK	18,182	Austria	600	100	100
Naturvernforbund	15,500	Norway	500	100	100
Viken	600,000	Norway	19,200	2,400	2,400
FONDA	86,957	Italy	2,800	600	300
Energia Positiva	522	Italy	20	5	2
Electrica	3,800,000	Romania	121,600	27,800	15,200
ACSD	70,000	Romania	2,200	500	300
Cluj-Napoca	140,000	Romania	4,500	1,000	600
badenova	700,000	Germany	22,400	5,100	2,800
Total	**8,431,161**		**269,780**	**59,435**	**33,822**

The final result, ENCHANT's decision tool, will combine all the empirical results gathered in the field trials into an algorithm-based web-tool, developed to support policymakers,

municipalities, NGOs and other collective social units to select the most effective energy efficiency campaign design for their specific context and resource situation.

Enabling informed decision-making by households through targeted, inclusive and specific intervention provision

Increasing engagement across all societal levels is a key factor in the energy transition and needs context-specific strategies that are inclusive, informative and target-group specific. By enabling the widescale application of behavioural science-based interventions in different contexts, cultures, countries and among different target groups, ENCHANT aims at providing households with the information and know how they need while fully considering the wide scale of influencing factors – from economic drivers to psychological biases. The inclusive approach taken by ENCHANT will also allow focusing specifically on energy poor households, thereby enhancing the representability and usability of intervention strategies.

Enhancing research capabilities and resources for research

ENCHANT makes use of existing data and research-based knowledge to streamline the application of interventions and tackling cross-cutting issues through a contextual and multi-disciplinary approach. Bringing together the different strands of research undertaken in the past decades will provide the research communities from different disciplines to build their future work on a consolidated knowledge base and will thereby also avoid research silos and repetition.

In the following, the 10 distinct impact categories defined for ENCHANT are presented.

3.1 Impact Category 1: Policy Support

Support policies, at all governance levels, aiming to foster investments in Energy Efficiency improvements and best practice development

ENCHANT strives to translate the results of the large field trials implemented in ENCHANT into direct and tailored policy advise. The consortium of ENCHANT is specifically built to include stakeholders from different positions, large municipalities, influential NGOs, large and small energy companies and start-ups whose diverse perspectives on the energy market and their different customer groups will allow the development of a holistic, efficient and adaptive decision-making tool. ENCHANT strives to engage with this diverse group of stakeholders, especially in regional, national and European politics.

The members of consortium will continuously report their own interactions with policy makers using the Google Document *Impact tracker*. Possible citations of the ENCHANT project in policy-relevant documents will be captured in the same sheet of the respective document (Activities with policy makers/ENCHANT Impact tracker). Every 6 months the task leader EI-JKU will consolidate the information input and create an updated version of the KPI report, including the added results of this impact category. The support for policy making will be measured by the number of interactions with politicians and the number of citations of the ENCHANT project in policy-relevant documents. Thereby, ENCHANT's impact on policy developments will be monitored. The ENCHANT consortium aims at achieving at least 72 direct interactions with policy makers (4 per consortium member).

The seven scientific partners from five countries are a regular reference for their national/regional decision-making bodies in the related contexts and we expect that the results of ENCHANT will be highly appreciated input to 1 to 3 such documents per country. Hence, on average, we expect two references per country, i.e., 10 in total. All of these assessments and analyses will not be limited to the countries directly represented in ENCHANT.

KPI for IC#1a	Interactions with politicians
Measurement level	# of meetings, telephone conferences etc
Data collection procedure	Input in Google Document
Data safety and protection issues	Non-disclosure agreements, written permissions (if necessary)
Reporting parties	All consortium members
Target value	72
Actual value	**To be reported in the updated KPI report**

KPI for IC#1b	Citations in policy-relevant documents
Measurement level	To be assessed via online searches
Data collection procedure	Input in Google Document
Data safety and protection issues	Not relevant
Reporting parties	All consortium members
Target value	10
Actual value	**To be reported in the updated KPI report**

3.2 Impact Category 2: Awareness

Increased awareness among households, businesses and financing institutions

ENCHANT will focus on intervention strategies focused on private, household consumers. Nevertheless, many such strategies can also be beneficial and usable for small and medium sized enterprises and their employees in their everyday work life. The different biases and levers that are in the focus of ENCHANT (see Impact Category #5) will be approached with **different communication channels** to reach as many citizens as possible in as many life situations, cultural settings and psychological pre-dispositions as possible. Specific focus will be put on raising awareness about energy efficiency benefits among energy poor households. At the present stage of the project, the following five communication channels are planned to be used for interactions. Any additional channel used in the project will be added to the list during the updates of this report.

Channels:

- A. Social Media
- B. Email
- C. Meetings, Workshops, other Events
- D. Mobile Applications
- E. Websites
- F. Printed media, such as posters
- G. Energy bills

All partners will document the outcome of their communication means through the Google Document Impact tracker. In case of live events, the results will be documented directly after the event. If digital communication networks are used, the results of the outreach are entered into the Google Document Impact tracker at the end of the intervention implementation when data is available. After the implementation of the interventions, WP5 leader EI-JKU will consolidate the inputs and create an updated version of the KPI report, including the added results of this impact category. The impact on the awareness will be measured by the number of citizens reached through the communication networks of the user-partners.

KPI for IC#2a	Citizens/consumers reached via Channel A: Social Media
Measurement level	To be assessed via analytics function of the Social Media channel used by each partner
Data collection procedure	Input in Google Document
Data safety and protection issues	Information about compliance with GDPR over the respective communication channel
Reporting parties	All

Target value Channel A	800,000
Actual value Channel A	**To be reported in the updated KPI report**

KPI for IC#2b	**Citizens/consumers reached via Channel B: Emails**
Measurement level	# of emails sent
Data collection procedure	Input in Google Document
Data safety and protection issues	Information about compliance with GDPR over the respective communication channel
Reporting parties	All
Target value Channel B	80,000
Actual value Channel B	**To be reported in the updated KPI report**

KPI for IC#2c	**Citizens/consumers reached via Channel C: Meetings, Workshops, other Events**
Measurement level	To be assessed via participant lists
Data collection procedure	Input in Google Document
Data safety and protection issues	Information about compliance with GDPR over the respective communication channel
Reporting parties	All
Target value Channel C	2,500
Actual value Channel C	**To be reported in the updated KPI report**

KPI for IC#2d	**Citizens/consumers reached via Channel D: Mobile Applications**
Measurement level	To be assessed via # of usages of the respective features
Data collection procedure	Input in Google Document
Data safety and protection issues	Information about compliance with GDPR over the respective communication channel
Reporting parties	All
Target value Channel D	10,000
Actual value Channel D	**To be reported in the updated KPI report**

KPI for IC#2e	**Citizens/consumers reached via Channel E: Websites**
Measurement level	To be assessed via analytics function of the website used by each partner
Data collection procedure	Input in Google Document
Data safety and protection issues	Information about compliance with GDPR over the respective communication channel
Reporting parties	All
Target value Channel E	25,000

Actual value Channel E	To be reported in the updated KPI report

3.3 Impact Category 3: Outreach to the general public

Number of public officers, private actors and other stakeholders involved and reached out to

ENCHANT aims at creating impact among public and private stakeholders by actively disseminating the decision tool. The scientific community will benefit from the decision tool as well, as it will provide them with a sound, state-of-the-art information and planning resource. The dissemination, exploitation and communication plans of ENCHANT will also establish efficient ways of distributing relevant data to NGOs and consumer organisations, on the one hand, and to commercial actors such as utilities, energy cooperatives or energy service companies on the other hand.

All project partners will make use of their networks to reach out to further stakeholders throughout the project's runtime. The ENCHANT results and the decision support tool will be consulted and promoted with the Europe-wide network of ENCHANT, allowing to involve an approximate number of 200 relevant representatives at the lower bound. Each project or user-partner who has successfully reached a new actor reports it directly through the Google Document *Impact tracker*. Every 6 months the task leader EI-JKU will consolidate the information input and create an updated version of the KPI report, including the added results of this impact category.

KPI for IC#3	Actors involved in ENCHANT
Measurement level	# meetings, interviews
Data collection procedure	Input in Google Document
Data safety and protection issues	Non-disclosure agreements, written permissions (if necessary)
Reporting parties	All
Total target value (all actor types)	200
Total actual value (all actor types)	To be reported in the updated KPI report

KPI for IC#3a	Public officers involved in ENCHANT
Measurement level	# meetings, interviews
Data collection procedure	Input in Google Document
Data safety and protection issues	Non-disclosure agreements, written permissions (if necessary)
Reporting parties	All
Target value	50
Actual value	To be reported in the updated KPI report

KPI for IC#3b	Scientific actors involved in ENCHANT
Measurement level	# meetings, interviews
Data collection procedure	Input in Google Document
Data safety and protection issues	Non-disclosure agreements, written permissions (if necessary)
Reporting parties	All
Target value	100
Actual value	**To be reported in the updated KPI report**

KPI for IC#3c	NGOs & consumer organisations involved in ENCHANT
Measurement level	# meetings, interviews
Data collection procedure	Input in Google Document
Data safety and protection issues	Non-disclosure agreements, written permissions (if necessary)
Reporting parties	All
Target value	25
Actual value	**To be reported in the updated KPI report**

KPI for IC#3d	Commercial actors involved in ENCHANT
Measurement level	# meetings, interviews
Data collection procedure	Input in Google Document
Data safety and protection issues	Non-disclosure agreements, written permissions (if necessary)
Reporting parties	All
Target value	25
Actual value	**To be reported in the updated KPI report**

3.4 Impact Category 4: Publications

Number of peer-reviewed articles produced, or references to impact assessments, strategy papers

The seven scientific partners in ENCHANT aim at publishing a minimum of 2 peer-reviewed articles each during the project runtime, resulting in a minimum of 14 published articles. In addition, the whole consortium strives at making additional impact by being used as a reference by public and private organisations (see also IC#3 and IC#1) and will track these references throughout the project runtime. Also, considering the fast pace of policy-making in the energy sector as well as the ever-improving technology options, staying up-to-date with impact assessments done, e.g., by the European Commission, strategy papers published by

stakeholder (e.g., interest groups) and other policy documents, on national as well as regional level, will be a cornerstone of the scientific work done in all WPs.

Whenever a project partner publishes an article or a user-partner/project partner gets informed of a reference made to ENCHANT, the respective organisation reports it in the Google Document *Impact tracker*. Every 6 months the task leader EI-JKU will consolidate the information input and create an updated version of the KPI report, including the added results of this impact category. The impact category *Publications* will be measured by the number of the peer-reviewed articles published by the project partners and the number of the references made to ENCHANT project (excluding references in policy-relevant documents, which are collected in IC#1).

KPI for IC#4a	Peer-reviewed articles
Measurement level	Assessed via publication platforms (e.g. google scholar)
Data collection procedure	Input in Google Document
Data safety and protection issues	Not relevant
Reporting parties	All
Target value	14
Actual value	**To be reported in the updated KPI report**

KPI for IC#4b	References made to ENCHANT in other articles (excluding policy-relevant documents)
Measurement level	Assessed via online searches
Data collection procedure	Input in Google Document
Data safety and protection issues	Not relevant
Reporting parties	All
Target value	50
Actual value by decision-making bodies	**To be reported in the updated KPI report**

3.5 Impact Category 5: Interventions

Number of interventions designed using behavioural levers and relevant behavioural biases and elements identified

ENCHANT focuses on behaviourally-tested initiatives and behaviourally-informed initiatives that systematically assess and observe the effects of scientifically proven interventions in different contextual conditions in countries across Europe under realistic conditions, acknowledging boundaries set by economy, regulations, and market conditions.

ENCHANT targets ten types of biases and tests seven types of interventions at three behavioural categories of households, namely the investment, maintenance and consumption behaviour in regards to energy (see Table 2). Following the classification of behavioural initiatives proposed by Sousa Lourenço et al. (2016a)[2], ENCHANT focuses on behaviourally-tested initiatives and behaviourally-informed initiatives that systematically assess and observe the effects of scientifically proven interventions in different contextual conditions in countries across Europe under realistic conditions, acknowledging boundaries set by economy, regulations, and market conditions.

Table 2: Number of interventions designed using behavioural levers and relevant behavioural biases and elements identified

Biases:	Interventions (Levers):
A) Framing Effect B) Loss Aversion C) Endowment Effect D) Status-quo Bias E) Cognitive Dissonances (attitude-behaviour effect) F) Myopia in intertemporal decisions G) Altruism H) Fairness I) Social Norms J) Information Overload	1) Feedback on own consumption 2) Social norms 3) Information (including Simplification) 4) Monetary incentives 5) Commitment 6) Competition 7) Collective vs. individual framing

Thereby, the evidence-based assessment of the different intervention techniques will be conducted following a **systematic RCT approach**, targeting behaviours from three categories, which have been identified as most important to **realizing large energy efficiency improvements in households** quickly with existing technology. Interventions per behavioural category are tested individually and in systematic combinations.

	Investment behaviours	Potential Biases	Potentially effective Interventions (Levers)

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[2] Sousa Lourenço, J., Ciriolo, E., Rafael Almeida, S. & Troussard, X. (2016). Behavioural insights applied to policy: European Report 2016. EUR 27726 EN; doi:10.2760/903938.

	Energy efficient technology purchase of appliances	A, D, F, I; J	3, 4, 7
	Energy efficiency upgrades of buildings	C, E, F, J	1, 2, 3, 4, 7
	Energy efficient transport technology	A, B, D, E, F, I	1, 2, 3, 4, 6, 7
Category 2	**Maintenance behaviours with relation to energy efficiency**	**Potential Biases**	**Potentially effective Interventions (Levers)**
	of heating, cooling and water-preparation devices	A, D, F	1, 3, 4, 5, 6, 7
	of cars (tires, etc)	A, B, D, I	3, 5, 6, 7
Category 3	**Energy savings from behavioural change**	**Potential Biases**	**Potentially effective Interventions (Levers)**
	energy behaviour at home	A, B, C, D, E, F, G, I, J	1, 2, 3, 4, 5, 6, 7
	Reorganizing mobility behaviour (trip chaining, co-driving, increased use of public transport, e-biking, biking etc)	A, B, C, D, E, F, G, H, I	1, 2, 3, 4, 5, 6, 7

ENCHANT will systematically vary the provision of the interventions alone and in combination, as well as the communicating actors (energy providers, municipalities, NGOs), communication channels, and local contexts. Conditions of the responding individual and household will be measured before and after the intervention period to determine the effects of the intervention (packages) on different segments of the population. While previous research has highlighted the effectiveness of individual interventions in small-scale field trials, the unprecedented scale of the ENCHANT field trials as well as the specific research agenda will allow answering several open questions: which interventions are the most efficient? How does bundling up several intervention influences their effectiveness? How can rebound effects be omitted by proper intervention design? What other adverse effects among the population are observed (if any)? How prevalent are different biases in the population and what effects the effectiveness of a specific intervention (package)? In order to provide scientifically sound and robust results to these (and many more questions), the ENCHANT consortium has an ambitious research goal and aims at testing at least 3 intervention packages made up of at least 2 types of interventions overcoming at least 2 biases each for every user partner, resulting in at least 60 interventions.

The impact category *Interventions* will be measured by the number of interventions implemented and types of biases addressed and intervention packages introduced by ENCHANT's user partners:

▶ IBB (Municipality)
▶ GEPS (Energy company)
▶ EK (Consultancy)
▶ Naturvern-forbundet (NGO)
▶ Viken (County)
▶ FONDA (NGO)
▶ Energia Positiva (Energy company)
▶ Electrica (Energy company)
▶ Cluj-Napoca (Municipality)

- ▶ ACSD (NGO)
- ▶ badenova (Energy Company), including City of Freiburg (Municipality) and Climate partners upper Rhine valley (NGO) that are both handled through badenova

The planned interventions (scheduled to be implemented from Autumn 2021 onwards) are described in D2.2: *Design of intervention matrix, definition of RCT research protocol and short report on the co-construction process*. Furthermore, D4.1: *Guidelines and Operational Intervention Plan*, provides the guidelines, application principles, and an operational implementation plan for the pilots.

This impact category will be assessed after the intervention implementation (or after the data evaluation if a qualitative KPI regarding the data quality will be included). EI-JKU will obtain the necessary information from the Intervention Matrix (see D2.2) that will be filled out by every user partner in close collaboration with WP 4 leader IUE (especially regarding D4.2: *Intervention Monitoring Plan* and D4.3: *Evaluation Report on Pilot Implementations*).

For every user partner the number of biases and types of biases (Table 3) will be collected, same for interventions (Table 4). In addition, the biases will be measured via classic psychometric survey items to assess the prevalence of the different biases in the population.

Table 3: Number of biases and types of biases addressed by the intervention packages (UP = user partner)

Bias	UP1	UP2	UP ...	UP...	Sum
A) Framing Effect					
B) Loss Aversion					
C) Endowment Effect					
D) Status-quo Bias					
E) Cognitive Dissonances (attitude-behaviour effect)					
F) Myopia in intertemporal decisions					
G) Altruism					
H) Fairness					
I) Social Norms					
J) Information Overload					
Sum					

Intervention Type	UP1	UP2	UP ...	UP ...	Sum
A) Feedback on own consumption					
B) Social norms					
C) Information (including Simplification)					
D) Monetary incentives					
E) Commitment					
F) Competition					
G) Collective vs. individual framing					
Sum					

The data collected with the two tables shown above will be used to calculate the following KPIs.

KPI for	Target value	Actual Value
IC#5a: number of interventions tested	60	
IC#5b: number of intervention types used	7	
IC#5c: number of intervention packages designed	33	
IC#5d: number of biases targeted	22	
IC#5e: number of types of biases addressed	10	
IC#5f: number of behavioural categories tested	3	**To be reported in the updated KPI report**
IC#5g: number of individuals tested per investment behavioural category	TBD	
IC#5h: number of individuals tested per maintenance behavioural category	TBD	
IC#5i: number of individuals tested per energy consumption behavioural category	TBD	

3.6 Impact Category 6: Households

Number of households adopting a more sustainable energy consumption behaviour

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ENCHANT aims at targeting more than 8 million consumers. Based on prior experiences and literature reviews, we expect at least 10% of this population to respond to the initial contact of the respective partner and engage with the tested intervention(s). More specifically, we expect

in total around 270,000 households among the target groups to adopt a more sustainable energy consumption lifestyle and experience a change in the way energy is consumed in their households. A further category of relevant changes in sustainable energy consumption behaviours includes adoption of energy efficient transport. We expect ~60,000 households among the targeted households to adopt a more energy efficient transport in the next 5 years. While the timeline of this investment lies beyond the scope of the project (if an investment is needed as in case with electric cars or purchasing a bicycle), we consider this estimation an important impact triggered by the project.

Similarly, to the adoption of a more sustainable energy lifestyle, we also estimate the impact of ENCHANT on the number of households who – due to ENCHANT's targeted interventions – will increase the energy efficiency of the buildings they reside in. We expect that approximately 34,000 households will adopt some energy efficiency updates to their buildings, including retrofit, window changes, water saving shower heads etc.

KPI for IC#6	IC#6a: number of households adopting a more sustainable lifestyle	IC#6b: number of households adopting energy efficient transport technology in the next 5 years	IC#6c: number of households adopting energy efficiency upgrades of buildings
Measurement level	Via data collection template		
Data collection procedure	Data analysis	Interventions/surveys	Interventions/surveys
Data safety/ protection issues	Included in the data collection and processing procedures		
Reporting parties	All	All	All
Target value	270,000	60,000	34,000
Actual Value	**To be reported in the updated KPI report**		

3.7 Impact Category 7: Primary Energy Savings

Primary energy savings triggered by the project

The implemented interventions within the ENCHANT project aim at transforming the energy behaviour of households to align with the environmental, social and economic sustainability. This change in energy behaviour leads to primary energy savings which are a measurable indicator of the direct impact of the project on environmental sustainability.

A sustainable energy consumption behaviour can take various forms, like reduced electricity consumption and consumption of renewable energy instead of fossil fuel energy. These aspects will be measured by comparing the baseline data collected in the pre-implementation phase of the interventions with data collected during and after the intervention. Whenever needed or necessary, secondary data sources will be used to formulate assumptions. Some intervention designs cater for long enough after-intervention periods to observe the energy behaviour after the intervention implementation to account for rebound effects.

For every user partner the following KPIs will be calculated.

KPI for IC#7	IC#7a: observed primary energy savings per household (hh)	IC#7b: stated behavioural primary energy savings per household (hh)
Measurement level	Pre-/post intervention data collection of user partners	
Data collection procedure	Via the data collection template	Surveys
Data safety and protection issues	Included in the data collection and processing procedures	
Reporting parties	User partners	
Target value	179 GWh = 412 kWh/household	
Actual Value	**To be reported in the updated KPI report**	

KPI for IC#7	IC#7c: stated changes in behaviour towards more sustainable energy consumption	IC#7d: increased uptake of RES
Measurement level	Pre-/post intervention data collection of user partners	
Data collection procedure	Surveys	Surveys/data collection template
Data safety and protection issues	Included in the data collection and processing procedures	
Reporting parties	User partners	
Target value	20% of participants stating they made a change	76 GWh = 174 kWh/hh
Actual Value	**To be reported in the updated KPI report**	

Table 3-5: Primary energy savings, GHG reductions and investments triggered by ENCHANT

| | EI#7 Primary energy savings triggered by the project [in GWh and kWh/hh per year] | | | | | | | | EI#8 Reduction of greenhouse gases emissions [in tCO₂-eq/year] | | | | EI#9 Investments in sustainable energy triggered by the project (in Euro) | |
| | Energy savings, total | | Energy savings per household | | Increased uptake of RES, total | | Increased uptake of RES per household | | Energy savings | | Increased uptake of RES | | energy efficient appliances, | energy efficient appliances, |
	GWh total p.a	€ total p.a.	kWh per hh p.a.	€ per hh p.a.	GWh total p.a	€ total p.a.	kWh per hh p.a.	€ per hh p.a.	kg CO₂ total p.a.	kg CO₂ per hh p.a.	kg CO₂ total p.a.	CO₂ per hh p.a.	total in €	average per hh p.a. in €
Izmir	21	2,142,947	188	19	10	1,030,660	90	9	9,438,791	83	3,404,720	30	1,925,599	17
Gediz	30	2,980,508	188	19	11	1,146,790	90	9	13,127,896	83	3,788,350	30	2,142,568	17
EK	1	126,986	356	70	0	46,544	163	32	55,023	30	15,126	10	101,880	70
Natur-vern-for-bund	2	275,996	1,371	223	1	109,286	543	88	153,001	123	45,438	37	39,820	32
Viken	66	10,683,732	1,371	223	26	4,230,418	543	88	5,922,611	123	1,758,874	37	1,541,404	32
FONDA	1	296,765	203	43	1	137,482	94	20	361,022	52	125,438	18	260,868	37
Energia Positiva	0.01	1,781	203	43	0.004	825	94	20	2,166	52	753	18	1,565	37
Electrica	41	5,091,587	135	17	21	2,552,768	68	8	12,529,358	41	4,711,382	15	5,736,746	19
ACSD	1	93,792	135	17	0	47,025	68	8	230,804	41	86,789	15	105,677	19
Cluj-Na-poca	2	187,585	135	17	1	94,049	68	8	461,608	41	173,577	15	211,354	19
badenova	14	4,298,783	252	77	5	1,631,512	96	29	6,216,875	111	1,769,613	32	3,010,083	54
Total	**179**	**26,180,462**	**412**	**70**	**76**	**11,027,359**	**174**	**29**	**48,499,155**	**71**	**15,880,060**	**23**	**15,077,564**	**32**

KPI: #observed primary energy savings per category and household #increased uptake of RES #increase investments in energy efficient appliances #reduction of GHG

3.8 Impact Category 8: Reduction of Greenhouse Gas Emissions

Reduction of greenhouse gas emissions [in t CO2-eq/year]

This impact category translates the primary energy savings and transition to renewable energy into mitigated greenhouse gas emissions. The average greenhouse gas emissions per generated energy unit by the energy mix prevailing in the country where the interventions took place will be used to calculate a close approximate value of the effectively mitigated emissions. This average value will be multiplied by the respective observed or reported energy savings due to the interventions thus resulting in a close approximate value for the greenhouse gas emissions that have been mitigated thanks to the interventions.

KPI for IC#8	IC#8: Reduction of greenhouse gas emissions
Measurement level	Calculated based on results of IC#7
Data collection procedure	Data analysis
Data safety and protection issues	Included in the data collection and processing procedures
Target value	64,379,215 kgCO$_2$eq
Actual Value	**To be reported in the updated KPI report**

3.9 Impact Category 9: Investments

Investments in sustainable energy triggered by the project (in Euro)

The aim of ENCHANT project is to increase energy efficiency in the long term, including investments in energy efficient appliances, renewable energy technologies (RET) and energy efficiency upgrades of buildings. Data on these investments triggered by ENCHANT will be either observed or reported within the intervention implementation and surveys. The results of this impact category will be assessed by the task leader EI-JKU.

Investments in RET and energy efficiency upgrades of buildings usually takes more time than available for assessing these effects during the ENCHANT project. While the timeline of these investments lies beyond the scope of the project, we consider these investments an important impact triggered by the project.

KPI for IC#9	IC#9a: Investments in energy efficient appliances	IC#9b: Investments in RET	IC#9c: Investments in energy efficiency upgrades of buildings
Measurement level	Pre-/post intervention data collection of user partners		
Data collection procedure	Surveys/interventions		
Data safety and protection issues	Included in the data collection and processing procedures		
Reporting parties	All	All	All
Target value	15 million	Beyond the timeline of the project	Beyond the timeline of the project
Actual Value	To be reported in the updated KPI report		

3.10 Impact category 10: Additional Impacts

In addition to the main expected impacts of ENCHANT described above, the consortium also anticipates to create additional impacts in a number of different areas.

3.10.1 Support for digital municipalities

ENCHANT has a strong involvement of municipalities. They will get in touch with their citizens through different communication channels in the project. This will involve the development and application of practicable ways to ensure data protection and security, including data collection and storage, as well as efficient ways to communicate with citizens that can support municipalities in the ongoing development towards e-government and digital public services.

The project partners in contact with municipalities or municipalities themselves as user partners will document the support for the digitalisation of the municipality operations resulting from the ENCHANT project. The respective organisation will document the outcome in the Google Document *Impact tracker*.

Support for digital municipalities will be measured by the number of the supported e-government and digital public services (dps) during the project.

KPI for IC#10a	Support for digital municipalities: e-gov
Measurement level	Post-intervention data collection
Data collection procedure	Input in Google Document
Data safety and protection issues	Not relevant
Reporting parties	Municipalities
Target value e-government	3
Actual value e-government	To be reported in the updated KPI report

KPI for IC#10b	Support for digital municipalities: dps
Measurement level	Post-intervention data collection

Data collection procedure	Input in Google Document
Data safety and protection issues	Not relevant
Reporting parties	Municipalities
Target value dps	3
Actual value dps	**To be reported in the updated KPI report**

3.10.2 Breaking up the silos

The heterogeneity of the ENCHANT consortium - linking municipalities, SME, NGOs and research organisations - will support increased cooperation between these stakeholders, enable learning with and from each other, thereby creating a better understanding of different perspectives, opinions, needs and strategies of and between these stakeholders. Cooperation between stakeholders along the whole chain of innovation will support a more rapid uptake of ideas and solutions.

Whenever a project partner or a user partner engages in a cooperative activity with another stakeholder, the respective organisation will document this activity in the Google Document *Impact tracker*.

The impact of ENCHANT on breaking up the silos will be measured by the number of the cooperative activities between seemingly independent sectors during the project.

KPI for IC#10c	**Cooperative activities between stakeholders**
Measurement level	# of meetings, interactions
Data collection procedure	Input in Google Document
Data safety and protection issues	Not relevant
Reporting parties	All
Target value	12
Actual value	**To be reported in the updated KPI report**

3.10.3 Business models through a collective perspective

In terms of cooperation, the Clean Energy for all Europeans Package will provide the framework for collective energy action (e.g., local energy communities) which have a high potential for municipalities and citizen communities. ENCHANT's findings will be highly relevant for supporting the establishment of such solutions, by providing the scientific foundations of intervention (and thereby also: support) strategies.

Whenever a project partner or a user partner is informed about the influence of the ENCHANT project on an establishment of a business model for collective energy action, the respective organisation will document it in the Google Document *Impact tracker*.

KPI for IC#10d	Inspired/supported business models for collective energy action
Measurement level	# of inspired or supported business models for collective energy action
Data collection procedure	Input in Google Document
Data safety and protection issues	Not relevant
Reporting parties	All
Target value	10
Actual value	**To be reported in the updated KPI report**

3.10.4 Opening options for the energy poor

All intervention strategies developed in ENCHANT aim at improving the wellbeing and comfort level of citizens, particularly those considered energy poor or struggling with their energy bills. ENCHANT will provide citizens with targeted information which gives them more control and less unwanted surprises like unexpectedly high bills or other negative outcomes.

KPI for IC#10e	Provision of information to the energy poor households
Measurement level	# of energy poor households reached
Data collection procedure	Input in Google Document
Data safety and protection issues	Not relevant
Reporting parties	User partners
Target value	30,000
Actual value	**To be reported in the updated KPI report**

3.10.5 Strengthen trust in the public

Every citizen can play an important role in the energy transition and providing them with the information, tools and know-how to make changes, is a core goal of ENCHANT. A recent large-scale survey done by members of the ENCHANT consortium in the ECHOES project (H2020

#GA727470) shows remarkable differences in peoples' opinion about their actual possibilities of supporting the energy transition.
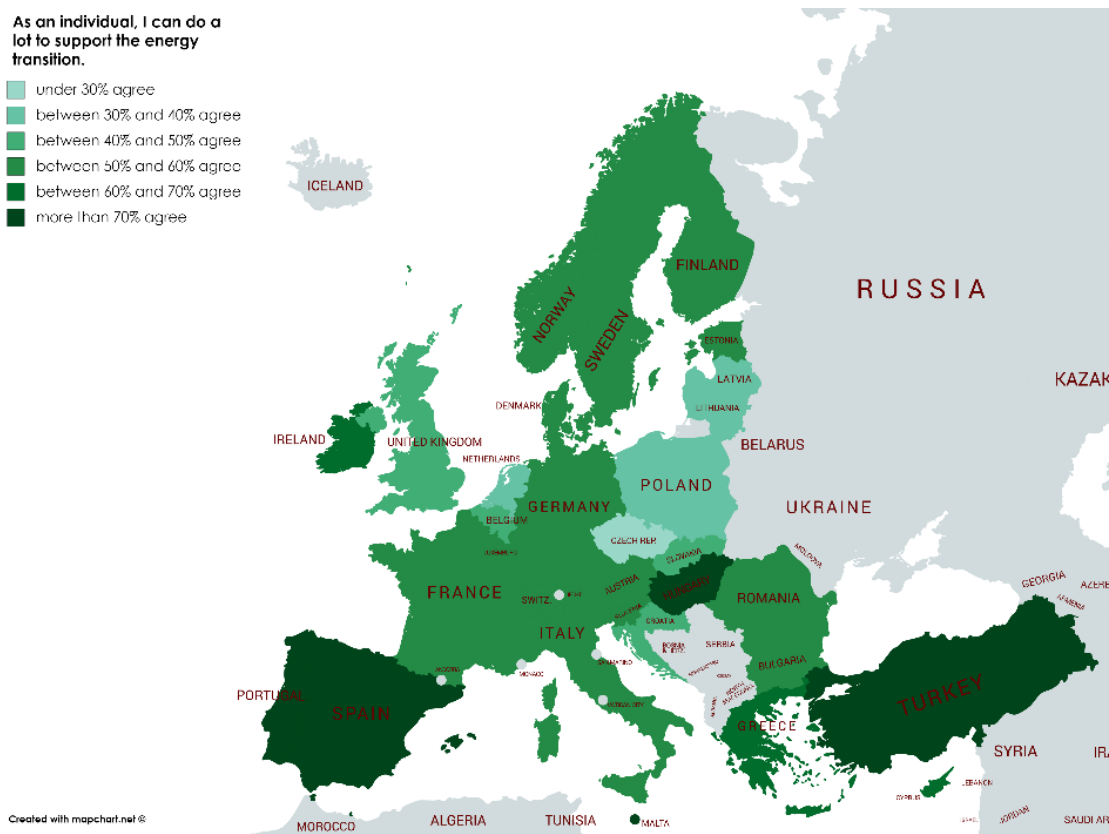

Figure 2: Results of the ECHOES project: do individuals believe that they can support the energy transition (n=18,037), Source: ECHOES consortium

ENCHANT will use state-of-the-art communication techniques and fully account for cultural and other differences between individuals and societies in Europe to help counterbalance the obvious differences between countries (see Figure 2). Providing interventions and messages that initiate positive responses will support a more balanced public discussion of the energy transition.

This impact category will be measured in the same manner as Impact Category 2: Awareness. Citizens will be asked to answer the question whether they feel empowered in the energy transition process before and after receiving the information through the communication networks of the user-partners. The impact on the trust in the public will be measured by the difference between the number of citizens feeling empowered before and after receiving the information through the communication networks of the user-partners.

KPI for IC#10f	Citizens feeling empowered
Measurement level	# citizens feeling empowered
Data collection procedure	Surveys
Data safety and protection issues	Not relevant
Reporting parties	User partners
Target value	300,000
Actual value	**To be reported in the updated KPI report**