Abstract
An increasing attention has been dedicated to the innovation in methods and approaches in tackling energy consumption issues. Among these, the Practice-oriented design approach, combined with Living Lab concept, seem to have a considerable innovation potential for the consumption reduction. In this paper I will analyse these approaches with a specific focus on the role of the body and implement the methodologies for energy consumption practices change, drawing on aspects from the theatrical disciplines.

Keywords
Practice-Oriented Design, Living Labs, Participatory Design, Energy Consumption, Interventions, Drama, Theatre, Performing Arts

1. Introduction
In response to the global climate agenda, the European Commission adopted numerous climate and energy targets for the next decades, as an attempt of cutting the green gas emissions and decarbonising the economical development (EEA Signals, 2017). Among different challenges to be achieved in the near future for sustainable energy transition, the optimisation of energy efficiency plays an important role. It is a complex challenge since it involves targeting dynamics between technological innovations, technological improvements, the optimisation of the existing constructions (i.e. buildings and infrastructures), and energy consumption patterns and cultures.

Meeting the energy targets is highly dependant on the behaviour and practices of the final energy users and resulting consumption patterns (EEA Signals, 2017). As citizens are responsible for a quarter of the final energy consumption (Eurostat, 2017), understanding and targeting the energy consumption patterns are important. An adequate approach should require a coordinated effort towards the sustainable development based on a democratic process (Dvarioniene et al, 2014) and this presupposes the involvement of all stakeholders and in particular citizens, in the
transition towards a more sustainable energy consumption. The purposes of households energy use all around Europe are various: heating of space and water, space cooling, cooking, lighting, electrical appliances use; All these uses contribute to the household life-quality of individuals and communities, and they are all subjected to different social norms, behaviours and habits. Moreover, there is a big difference between the socio-economic, cultural and infrastructural conditions in the EU countries and this brings another level of complexity in finding efficient methodologies of addressing the consumption reduction.

This article will focus on Living Labs (LLs) as a valuable approach in experimenting energy-saving innovations and in finding new, and diverse solutions for sustainable consumption. Living Labs are a user-centered, open innovation ecosystems (Dutilleul, 2010) that operate in a real-life context and integrate research and innovation processes within a public-private-people partnership (Dvarioniene et al, 2014). The experimental, participatory and user-centered features of LLs make them a particularly versatile tool for involving consumers in co-creating and testing innovation and engaging them actively in the investigation of behavioural scenarios in everyday lives.

A large part of European initiatives that address energy consumption and energy efficiency issues by using LLs concept, have been channeled towards the implementation of new technologies and of the role of ICT (Batey et al, 2013; Bristol Living Lab, UK; City Lab Coventry, UK); The development of new business models for more sustainable products and services (Energy Living Lab, CH); The exploration of the Smart City concept with a focus in smart energy systems (Helsinki Living Lab, FI), and therefore they are focusing mainly on the user-centered design approach. Minor endeavors have been made in the attempt of energy-reduction by leveraging behavioral change, mostly in public buildings (Energie Cités, PL; Green Schools Living Lab, IT; TOGETHER project, Central Europe).

Referring back to households consumption, little has been done for what concerns the use of LLs in household energy reduction. In a case-study of a Living Lab regarding bathing and therefore the household water consumption (EU Living Lab in Scott et al. 2011) the ‘Practice-oriented approach’ is used as the theoretical framework underlying design strategies.

In this article I will argue that social practice theory is a valuable framework for the design of Living Lab initiatives that aim changes in energy consumption, mostly because it considers the everyday practices as performances in which the body plays an important role with its embodied knowledge, habits, memory and perception (Wallenborn, Wilhite, 2014).

A concrete issue in designing with this approach is the lack of methodologies that can facilitate or prompt changes in the behaviour. Consequently the problem formulation of the research can be stated as follows: How to implement methodologies and interventions in designing household sustainable consumption Living Labs, in which the participant’s body and its performativity are considered as an important source of change?

The design intent is to draw from methodologies deriving from theatre training practices and performing arts, as theoretical inspiration for developing new Li-
ving Lab approach that focuses specifically on the role of the body. Theatre anthropology and performance studies are already used as methodological devices with different purposes in many social disciplines, and it is possible to extrapolate some of these methods for the improvements in the above mentioned objectives.

The conceptual and theoretical framework of the research, has been supported by two different fieldworks, one aimed to reach a deeper understanding and capture the variety of Living Labs, by attending the annual summit of European Network of Living Labs; The second aimed to gather a broader understanding in the process of designing the Living Labs for energy consumption reduction, through the participation at a workshop-meeting of the consortium of researchers involved in the european ENERGISE Project.

The ENERGISE Living Labs (ELLs) design methods and processes have been precious for the designing phase of the research as a reference and case-study on which to outline the new proposals.

The teatrical inspiration is drawn on my theatrical education and long experience as professional in the field.

The expected outcome of the project is a guideline of possible suggestions of theatrically inspired types of interventions for some of the crucial phases of ELLs i.e participant selection, co-creation with households, mapping practices, testing, peer-to-peer knowledge sharing, diffusion of practices within the community etc.

The article is structured as follows: the first section ‘Methodological and Conceptual approach’ is outlining the theoretical framework of the research and analyzing the fieldwork findings that will prepare the needed assumptions for the ‘Design’ section in which the theatrical interventions are traced and detailed in relation to the ELLs design processes. The design proposal is critically examined in the ‘Discussion’ section, and then analysed for its possible further developments in ‘Conclusions’ section of the paper.

2. METHODOLOGICAL AND CONCEPTUAL APPROACH:
THEORETICAL PREMISES AND ANALYTICAL OUTCOMES

This is a conceptual article addressing theoretical and methodological potentials for drawing on aspects from the theatrical disciplines when designing new Living Lab approaches.

Through Desk Research the project has been informed by a broad literature review carried out in the following four theoretical fields:

- Open innovation and Living Labs;
- Practice Theory and Practice-oriented Design;
- Theatre Anthropology and Performing Arts;
- Design and Performance, the existing research and correlations.

The intent of the desk research was to define better the research problem and understand, through a comparative work on different research theories, approaches and cases, how to theoretically position Living Lab approaches that account for the
role of the body and performativity in sustainable energy initiatives.

The Desk Research has been supported by a **Fieldwork** that has included participation at two events: the European summit on Living Labs and a workshop on the ENERGISE Living Labs (ELLs) methods, both important for getting relevant insights that could inform and question the project research.

The two events have in common the focus on Living Labs at the european level. The **European focus** was chosen with the intent of collecting a broader variety of scenarios concerning LLs across EU countries, and a more articulated understanding of the complexity when considering sustainable consumption issues and open innovation opportunities.

The **empirical knowledge** concerning Performing Arts derives from my education and professional experience in the field, held in over 12 years of theatre acting, participation to theatrical workshops and laboratories, and through teaching theatre to kids, teenagers and adults in a number of pedagogical settings and projects.

In this section of the article I will summarize and analyse the findings gathered through the fieldwork and literature review with the intent of defining the research problem and drawing the conceptual premises for the design solution.

### 2.1 European Network of Living Labs (ENoLL)

ENoLL is an international non-profit association based in Bruxelles, representing a federation of benchmarked Living Labs, founded in 2006 in Europe. The main purpose of the network is to create an international platform of knowledge and best practice exchange about contemporary Living Labs development and explore their innovative potential. But also to act concretely, indeed the over 400 LLs carried out in the last 9 years, contributed to improve Europe’s economic competitiveness and to tackle numerous societal challenges (Dutilleul, 2010).

The ENoLL's extended definition of LLs can underline the main characteristics of LLs and their versatility as a tool for innovation:

> "**Living Labs** are defined as user-centred, open innovation ecosystems based on systematic user co-creation approach, integrating research and innovation processes in real life communities and settings. LLs are both practice-driven organisations that facilitate and foster open, collaborative innovation, as well as real-life environments or arenas where both open innovation and user innovation processes can be studied and subject to experiments and where new solutions are developed. LLs operate as intermediaries among citizens, research organisations, companies, cities and regions for joint value co-creation, rapid prototyping or validation to scale up innovation and businesses. LLs have common elements but multiple different implementations." (ENoLL website)

As mentioned in the introduction, relevant for this article was the attendance at the ENoLL’s Summer School - **Open Living Labs Days 2017** (OLLDS), held in Krakow, Poland, from the 29th August to the 1st of September 2017. The OLLD are the annual summit of the worldwide Living Lab community where around 300 experienced professionals from 31 different countries, involved in research,
design and realisation of Living Labs, meet and participate to conferences, interactive sessions, discussion panels, workshops and social events. It is a good occasion for being updated in the latest researches concerning LLs, and to have an exchange with researchers and professionals from the field, as well as a more structured and guided exchange on methods and designing perspectives through the workshop group-works.

The main outcome of this fieldwork was a better understanding of what the Living Labs are and can be, and a detailed insight on the multitude of methods and approaches from which design and facilitation of LLs can benefit.

For what concerns the energy consumption, the participation to a day of workshops entitled “Leveraging behavioral change for Energy Efficiency in Public Buildings”, offered insights and methodologies on a number of LLs dedicated to the energy efficiency in public building through the DSM (Demand Side Management) approach. It was an occasion to work and discuss with professionals that have designed and facilitated Energy LLs about their experiences and about different considerations of energy consumption and the related patterns and practices.

For more detailed informations on OLLD findings, see the fieldwork sheets in the Appendix1.

2.2 ENERGISE Project
Project overview

The European NEtwork for Research, Good practices and Innovation for Sustainable Energy (ENERGISE) is “an innovative pan-European research initiative to achieve a greater scientific understanding of the social and cultural influences on energy consumption. ENERGISE develops, tests and addresses options transforming the quality and quantity of energy use among households and communities among Europe.” (ENERGISE website)

The project is created by 10 research partners across Europe, and it aims to develop an innovative framework in the evaluation of energy cultures and initiatives from 30 EU countries with a particular focus on energy reduction initiatives and, based on that vast data collection the project is intending to develop 16 ENERGISE Living Labs (ELLs) that will be implemented 8 countries of Europe, during the fall 2018, involving 320 households.

The whole project is divided in 8 big Work Packages (WP), but particularly significant for my research is the WP3, dedicated to the Design of ELL with and their ad hoc designed methodology. In order to follow the designing process, I had the opportunity to participate to the ELL Design workshop that took place in Helsinki from the 29th November till the 1st of December 2017, and where the whole consortium of researchers involved and other experts of the field met and discussed the design of the ELLs. The meeting was based on a design proposal made by the team of researchers responsible for the WP3 and it was very interesting to see how, starting from those initial proposals, through the discussions and the group-work sessions, in the end of the process the initial design took a very different form.
Relevant to know were the elements of the design such as domains, practices, measures, comparability, evaluation and monitoring tools, individual and collective participants, participant selection criteria, engagement tools, implementation teams, etc. While the rise of the guiding questions to address in designing ELLs, and the consideration of all the outcomes and of the unexpected that can emerge from the realisation of a Living Lab, helped me to reflect on concrete situations in which it should be possible/impossible, relevant/irrelevant, useful/unuseful to use the theatrically-inspired methods.

Apart from the Design process and content of Living Labs, some of the concepts on which ENERGISE bases its theoretical framework were useful for this project research. I will list them below and briefly explain often using the definition extrapolated from ENERGISE deliverables.

**The concept of intervention**

The design of ELLs is based on the concept of interventions. In the WP3 deliverable 3.1 there is a definition of intervention defined as follows: “an organized, planned and usually ongoing effort designed to ameliorate a social problem or improve social conditions” (Rossi et al. 1999: 2). The term is commonly used when speaking of various ways to influence household energy use, such as feedback, goal-setting, commitment or modelling (Abrahamse et al. 2005)(WP3 Deliverable 3.1). In Scott (2011) citing Julier and Shove interventions “foster innovation in practices”(Scott, 2011, 284)

**Household individual and community**

An interesting distinction of consumers in the ENERGISE project is between the individual households and the community. Because of the very different outcomes in engaging the two different types of consumers as participants of Living Labs, there is a specific design for each type, resulting in two different Living Labs: ELL1 dedicated to “targeting individual households”, and ELL2 to “promoting community-driven efforts” (Laakso et al. 2017).

**Basic design of ELLs**

In the following ‘Design’ section I will draw on insights from the ENERGISE design process, taking into consideration the opportunities for incorporating a more explicit focus on the role of the body and performativity in Living Lab design processes, based on the insights and experiences that emerged from participating in the workshop mentioned above.

The figure below is reporting the basic schema of the ELL Design (WP3.2)
2.3 Practice Theory Framework

This research project bases its theoretical premises on the sociological studies that are applying practice theory to **understand and explain the social nature of consumption and the related issues**. A big part of that research is focused on the role of materiality and meanings in practices related to consumption (e.g. Shove et al 2012), but in this paper I will refer to the less extensively theoretical contribution that conceptualises the **role of the body in consumption**, and outlines the main agents related to the body’s performativity in everyday lives such as habits, embedded knowledge, perception and memory. In doing so I will first summarize the broader definition of a practice and describe some aspects of practices particularly interesting for the **Practice-oriented design approach** (Scott, 2011), and later on discuss a few relevant theories about the body in practices.

**Practices in practice theory**

In particular strands of theories of social practice, a **practice** is generally defined as “a routinized type of behaviour which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, ‘things’ and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge.” (Reckwitz, 2002, 249-50).

There are three **elements** that establish a practice according to Shove: tangible material artefacts (‘stuff’), conventions (‘image’) and competences (‘skill’) (Shove et al. 2008) and the practices are the result of a link between these elements. The body in this framework is somewhat distributed all over the three elements. It is ‘stuff’ as part of the material world, with no distinction between humans and things (Kuijer, 2014). It is ‘skill’ as the bearer of the know-how of the practice’s accomplishment, but also in this case it is not specifically distinguished from things, as skills are distributed between objects and bodies. It is ‘image’ as ideas and meanings associated to the conventional aspects of the practice, that result and are the resultant of a mix of identity, ideologies, values, emotions, beliefs, aspirations, norms, aesthetics (Kuijer, 2014; Scott, 2011). This three elements are relevant in simplifying the understanding of body’s contribution to the practice, but not sufficient to explain how the knowledge about the practice is learned, embedded and reiterated, which will be the subject of the next paragraphs.

Practices are **embodied and performed** by individuals that are the carriers of practices, but practices are inherently social in nature because “**people learn them from each other and therefore standards, or norms, of practice emerge**” (Scott, 2011, 281). At the same time practices has a **dynamic nature**, over time they originate and expire, they can be de-stabilized and re-stabilized (Scott, 2011) but there is a need of novelty or innovation in order to keep the dynamic nature of practices alive and therefore allow them to change. Furthermore, practices are not isolated but rather **linked between them**, the change of one practice can influence or change many others (Shove et al 2008).

An another relevant distinction, utilized by the practice theory researchers, is between **practices-as-entity** and **practices-as-performance** (Shove et al., 2007 and Warde, 2005 cited by Kuijer 2014). Practices-as-entities describe the elements of the practice that makes a certain practice recognizable, and their links, more specifically “**how actions (including speech acts) ought to be carried out, understood, prompted, and responded to; what specifically and unequivocally should be done or said (when, where, ...); and which ends should be
pursued, which projects, tasks, and actions carried out for that end, and which emotions possessed – when, that is, one is engaged in the practice.” (Schatzki 2001: 101). Practices-as-performance refers to the action in the moment of doing, that can differ and produce variety each time, but at the same time despite its dynamic nature, the performative feature is the one that guarantees the surviving of the practice-as-entity over time (Kuijer 2014). About the interlinked nature between practices and performance, Schatzki claims “A performance presupposes a practice, and practice presupposes performances.” (Schatzki 2001). The practices therefore have a static and dynamic nature (that was mentioned also above) that is worth to consider as an element that can facilitate or hinder the change in practices.

The body in practice theory and in consumption

The body is certainly contemplated in the theories of social practice, both as carrier and performer of practices (Kuijer 2014) but people in practices are mainly considered as ‘body/mind’ (Reckwitz), and therefore the body is not disjoined from the mind.

In opposition to this mainstream conception of the body/mind related to practices, Wallenborn and Wilhite outline a new perspective, putting the body as a unit of analysis of practices related to consumption. Their intent is to consider bodies as constitutive of human practices, and therefore if we want to understand practices, it is necessary to look at bodies, and in the ways they interact with other bodies and with things (Wallenborn, Wilhite, 2014). The body is considered as a spatiotemporal entity that interacts with other objects in a practice and as active and passive sites of actions, activities and events. W&W outline and explain all the elements that makes the body capable of changes: the behaviour, the habit, the memory and the perception.

The important contribution of this research to my project is the consideration of the fact that the body perspective suggests a new way of considering consumption, in particular the energy consumption, as “experienced by bodies in cultural settings and shaped by material environments. Energy using habits are acquired through the repetition of similar practices. Practices are always performed in the present, though they are disposed to endure into the future.” (Wallenborn, Wilhite, 2014, 63)

The role of habits

An interesting dimension of research in the clarification of constituents of practices inherent to the body, is proposed by Harold Wilhite in the study about habits (Wilhite, 2012). Wilhite analyses the ways in which practices become habits and the potential strength of habits, drawing the theory of strong and weak habits. Two important elements to understand in approaching the notion of habits were theorized by Bourdieu: ‘practical knowledge’ (predisposition for action) and ‘habitus’ (field of predispositions for action generated and preserved through repeated performances), both embodied (Merleau-Ponty 1962 and Mauss 1934, mentioned in Wilhite, 2012) and embedded in rules that undertake the actions (Stevens and McKechnie 2005, mentioned in Wilhite, 2012). The resultant of these concepts is the embodied knowledge that, according to Wilhite resides both in the body and in the objects with which the body interacts. Relevant for this research project is the opening for the consideration of the body derived from the embodied knowledge concept: the body is considered as knowledgeable and able to influence the action. The body is therefore able to learn through the exposure to other performing bodies, or through purposive training. The strength of habits depends directly
from the strength of the embodiment, and the strength of embodiment can be reinforced through repetition. According to this theory, what can unhinge the habit or challenge the embodied knowledge are the uncertainty and more generally any change of the known setting for the action (Wilhite, 2012).

This theoretical perspective will be taken in consideration in the designing session because the theatrical art concerning physicality and the training on the body is pragmatically based on the same assumptions (i.e. rehearsals, the extra-ordinary body and the segmentation of the gesture etc.).

2.4 Theatre and performing arts inspiration

The terms

‘Performance/Performing arts’ and ‘Theatre’ are both umbrella-terms as a resultant of language sedimentation, of intense debates and theoretical perspectives, researches and praxis, therefore there is a need to briefly explore the meanings of the two concepts, and inscribe them in a specific framework of meaning.

It is useful to make a distinction between ‘Performance Art’ that in contemporary art is reserved to an avant garde and conceptual art derived from visual arts, in which the work is related to the physical action of an individual or a group, in a particular connotation of space and time (Guerra et al, 2011); And ‘Performing Arts’ that refers to those forms of creative activity that can be performed in front of an audience such as theatre, music, dance etc. The term ‘Theatre’ is often replaced in common use by the term ‘drama’, even if drama it is just one of the numerous theatrical expressions.

Theatrical Research and the concept of Laboratory

Since the so called Experimental Theatre and the Theatrical Avant-garde movements at the end of the Nineteenth century there has been a radical change in the purposes, languages and techniques of theatre itself. The focus was moved from the product (play) to the process (rehearsals) and from the psychological drama dominated by the ‘word’ and expressed only with the voice, to the movement of the whole body and its poetic expression.

Rehearsals became ‘laboratories’, in which director and actor are free to experiment and explore together the scenic life.

In the beginning of the Nineteenth century Stanislavski and Meyerhold proposed the first pioneering laboratory of this experimental kind, but it was in 1959 that Jerzy Grotowski founded Theatre Laboratory where the laboratorial dimension of theatrical research became systematic and a type of “working model in which the current research into the actor’s art can be put into practice” (Grotowski, 1968, p.9). The ‘laboratory’ was proposed as a methodical and investigative frame for exploring mental-physical-emotional processes, actions, behaviours, relations, and other acting/life elements, independently from performance and the presence of the audience. Therefore this new, scientific approach moved the aim of theatrical art towards the “ripening” of the actor, citing Grotowski: “(..) we consider the personal and scenic technique of the actor as the core of theatre art.” (Grotowski, 1968, p.16).

Theatre as methodological device

Grotowski is the boldest example of this kind of experimentation that set up a big movement of theatre companies following the research in the same direction and it opened up theatre techniques and languages to the specialists of other disciplines such as psychology, phonology, pedagogy, cultural
anthropology, art-therapy etc. Indeed, the experimentation with the new conception of theatrical art led to transform it in a versatile device that can be worthwhile also outward the theatrical context. Used without aiming the artistic production, theatre became a methodological toolbox, used mostly to improve the communication between people, their expression of the emotions, their expression of body language, promote the self care and the wellbeing.

The features that are mainly exported from the theatrical world and used elsewhere are: Collaborativeness, Relationality, Gaming and play, Storytelling, Role playing, Improvisation, Physicality, Emotionality, Exploration, Movement dynamics, Proprioception, Liberation of creativity, Tacit knowledge, Expressiveness.

Some of these characteristics will be further explained and discussed in the ‘Design’ section of the paper with the intent of deepening their possible utility for different Living Lab design phases.

2.5 Performance and design

For what concern the studies about the use of performing arts/theatrical techniques and methods in the design processes, there are several studies and methodologies implied. Often the concept of ‘staging’ is borrowed from the theatre world as a metaphor for tackling more easily the complexity of managing and facilitating participatory processes. In the following table I will try to summarize the main approaches found through a broad literature review, describing the main features of each approach: field of utilization in the design process, theatrical methodologies implied, outcomes for the design process and implications for my research.

<table>
<thead>
<tr>
<th>RESEARCH PROJECT</th>
<th>FIELD OF UTILIZATION /INTENT</th>
<th>THEATRICAL METHODS IMPLIED</th>
<th>OUTCOMES FOR THE DESIGN PROJECT</th>
<th>IMPLICATIONS FOR MY RESEARCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liao, Person, 2015 “Drama, play-making and ambiguity in the early stages of design”</td>
<td>Framing the process during design education</td>
<td>Role-playing, performances, forum and improvisation theatre</td>
<td>“Ability to produce alternative trajectories of inquiry that have implications beyond the staged performance alone.” (Liao, 2015, 135)</td>
<td>Oblique angle that theatre techniques can generate and the consequent possibility to look the phenomena anew through discussion, information acquisition and ideas exchange.</td>
</tr>
<tr>
<td>Brandt, Grunnet, 2000 “Evoking the future: drama and props in user centred design”</td>
<td>Exploration of design ideas in Scandinavian Participatory design tradition</td>
<td>Setting the stage, Providing props</td>
<td>The bodily approach can help in making tacit knowledge explicit</td>
<td>Extending the design process to more senses than just the textual or verbal. The use of drama demands courage from both Designers and Participants, and the absence of fear of exposure from both sides.</td>
</tr>
<tr>
<td><strong>Research Project</strong></td>
<td><strong>Field of Utilization / Intent</strong></td>
<td><strong>Theatrical Methods Implied</strong></td>
<td><strong>Outcomes for the Design Project</strong></td>
<td><strong>Implications for My Research</strong></td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Tassinari et al, 2017, “Storytelling in design for social innovation and politics: a reading through the lenses of Hannah Arendt.”</td>
<td>Design for social innovation</td>
<td>Storytelling</td>
<td>“Storytelling can be used to reopen the idea of public space and to facilitate dialogue/action amongst citizens aimed at attaining a more participative society. Storytelling is, in essence, the act of recognizing what is hiding outside the mainstream and to be able to read it, to translate it and to tell its story.”</td>
<td>The idea of storytelling as a tool that enable empowering a democratic process of active citizenship</td>
</tr>
<tr>
<td>Iacucci, Kuuti, 2002, “Everyday Life as a Stage in Creating and Performing Scenarios for Wireless Devices”</td>
<td>HCI (Human-Computer Interaction)</td>
<td>Performance of scenarios (called SPES = Situated and Participative Enactment of Scenarios) Participative enactments</td>
<td>Scenarios are often used in practice-based HCI design to discuss future changes in practices, but they can also be used in describing completely novel practices made possible by new technology.</td>
<td>There are negative implications such as: disturbance caused by the “presence of the designer, which perturbs and disturbs the everyday life of the participants changing organization of the practices and social conditions.” In social situations in particular, “the participants may feel uncomfortable or embarrassed while acting”.</td>
</tr>
<tr>
<td>Iacucci et al. 2002, “Imagining and experiencing in design, the role of performances”</td>
<td>Product development</td>
<td>Performance intended as a the creation of a fictional space, the role of imagination, and interactional creativity.</td>
<td>Difference between the daily activities and the extra-daily activities. “Performance is valuable for the design if its underlying idea is sustainable in time.”</td>
<td>Risk of failure of the Performance. Reconsideration of the everyday life thanks to the performance enlightments. Difficulty to transform the performing experiments in design methodology.</td>
</tr>
</tbody>
</table>

2.6 Conclusions
Many concepts outlined in this chapter, addressed to the theoretical and methodological framing of the research, will be considered as the basic elements for the ‘Design’ section. In particular the pivot elements will be the concept of intervention, the ENERGISE ELLs overall design process and the consideration of the bodily habits and the embodied knowledge. In proposing the specific theatrical interventions for the design of consumption Living Labs, some of the theatrical features outlined in this chapter will be utilized and other added, relying on my personal experience.
3. DESIGN

The design phase of this project, as specified in the previous chapters, will draw on the Practice-oriented design approach, which is based on the principle that co-development of innovative and sustainable ways of consuming and living, can be informed by the understanding of “mechanisms of persistence and change in practices”. (Scott, 2011)

It is necessary to point out from the beginning that the suggested tools are not sufficient in the attempt of fully address change in practices, but they can support intervention methods, mainly for what concerns the emergence of the underlying bodily habits and routines that are hard to explore, and induce participants to the practical consciousness of their consumption practices.

The Design

Drawing on lessons from the fieldwork, the literature review presented above, and from my professional experience in performing arts, the theatre-inspired methodology design suggestion is based on three ‘Sets of Tools’ that can be used in different steps of the Living Lab design and which can be combined with other methodologies: Narrative, Relational and Physical. In the table below the three approaches are explained:

<table>
<thead>
<tr>
<th>Main feature</th>
<th>Narrative</th>
<th>Physical</th>
<th>Relational</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main feature</strong></td>
<td>Relating to verbal production or interaction.</td>
<td>Concerning bodily dynamics, leads to self-perception, better awareness of one’s bodily actions and more reactivity.</td>
<td>Based on the interaction with other people, it stimulates the understanding of the self through the observation of the others and it enables the co-creation between participants.</td>
</tr>
<tr>
<td><strong>Utility</strong></td>
<td>Exploring scenarios, mapping norms and practices, inventing new practices.</td>
<td>Understanding and challenging habits, deconstructing habits, Learning through doing.</td>
<td>Peer to peer learning, Brainstorming, Scenario creating</td>
</tr>
</tbody>
</table>

These Sets of Tools can be used for different design purposes and each of them can be based on one or more theatre Action Principles. The Action Principles presented below, are draw on some basic theatre techniques, and have very specific outcomes when utilized in a particular way.
In the table below the three approaches are explained:

<table>
<thead>
<tr>
<th>Action Principle</th>
<th>Description</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mime</strong></td>
<td>Reproduce everyday actions using only body gestures</td>
<td>Actions are isolated from their context and the use of objects and therefore revealed. The memory is challenged. The gestures decomposed.</td>
</tr>
<tr>
<td><strong>Recount</strong></td>
<td>Tell a story with the intent of reconsidering the real in a different way (from a point of view of an object, or in a context that is different from usual)</td>
<td>Creation of a different perspective on routinized activities. Understanding and exchanging norms, habits, behaviours. Emerging of the tacit knowledge. Investigation of situations.</td>
</tr>
<tr>
<td><strong>Observe</strong></td>
<td>Watch someone/something performing an action.</td>
<td>Observation of somebody else performing is a way of re-thinking both about ourselves and the action itself.</td>
</tr>
<tr>
<td><strong>Invent</strong></td>
<td>Create new scenarios with the imagination</td>
<td>Exploration of new possibilities in practices. Emerging of the tacit knowledge. Investigation of situations.</td>
</tr>
<tr>
<td><strong>Deform</strong></td>
<td>Amplify, hyperbolize reduce, minimise gestures, recounts, situations</td>
<td>Reconsideration of what the normality is through caricaturization. Exploring new/different possibilities in practices. Emerging of the tacit knowledge.</td>
</tr>
<tr>
<td><strong>Improvise</strong></td>
<td>In a pre-given situation creating or performing spontaneously</td>
<td>Emerging of the tacit knowledge. Investigation of situations.</td>
</tr>
</tbody>
</table>

In order to **exemplify the design idea**, what follows is a possible use of theatrical-tools in some of the steps of designing and implementation of ENERGI-SE Living Labs. The two domains of practices related to energy consumption taken in consideration are borrowed from ELLs as well, and they are **Home Heating** and **Laundering**.

For example, if the objective is MAPPING PRACTICES in the ‘Laundry domain of practices’ it can be done *Physically* through the Mime activity asking the person to reproduce all the activities usually related without dealing with objects and in a de-contextualised space. The outcome will be more related to person’s bodily habits. *Narratively*, asking the participant to write a real story about their practices with laundry, but for example from the washing-machine’s point of view. The outcome in this case will be more analytical of their practices. *Relationally*, through an improvisation setting between one or few households, asking them to create a scene i.e. in the common laundry space where something unusual happened and they need to demonstrate that is not their fault. The outcome here can be more explorative of different practice cultures.

Furthermore, the suggested tools might be combined with or incorporated into the other user-engagement tools such as Challenges, Learning-by-doing
The table below will give more examples in relation to the different phases of ELL Design and implementation. Significant to be mentioned is that not in all phases a theatrical intervention can be relevant.

<table>
<thead>
<tr>
<th>Phase of ELL design</th>
<th>Moments in which theatre-tools can be useful</th>
<th>Which theatrical tools?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREPARATION OF ELLs</td>
<td>The definition of the Target Groups of the EELs (with expert panel members or representatives from households)</td>
<td>Narrative: <strong>Improvisation</strong> with role playing in order to analyse different possible types of households</td>
</tr>
<tr>
<td></td>
<td>Recruitment of households (Know about the background informations of participants)</td>
<td>Narrative: <strong>Storytelling</strong> about themselves and their practices</td>
</tr>
<tr>
<td></td>
<td>Gaining a baseline with households (How to map habits and routines, How to take out the norms and conventions, How to co-create knowledge with households on their practices, How to co-design change in practices, how to address the interconnectedness of practices)</td>
<td>Physical: <strong>Mime</strong> game that segments the gesture to find new ways of practicing, <strong>Deformation</strong> of the gesture to find new ways of practicing, <strong>Relational</strong>: <strong>Mime Observation</strong>, Group <strong>improvisation</strong> about the practices i.e. in the common laundry</td>
</tr>
<tr>
<td>IMPLEMENTATION AND MONITORING OF ELLs</td>
<td>Activities in the active phase (Find ways of changing practices, Tracking the change in practices)</td>
<td>Narrative: tracking of the practice changes in a <strong>storytelling</strong> way i.e. from the point of view of the washing machine the differences in practice changes</td>
</tr>
<tr>
<td></td>
<td>Final meeting (Final group discussion)</td>
<td><strong>Relational</strong>: <strong>improvisation</strong> of the outcomes of the experience, Forum of the experience exchange</td>
</tr>
<tr>
<td>COMPLETION OF ELLs</td>
<td></td>
<td>Not relevant</td>
</tr>
<tr>
<td>EVALUATION</td>
<td></td>
<td>Not relevant</td>
</tr>
</tbody>
</table>
The Guideline

The design idea will be exemplified further in a set of sheets containing a number of suggested activities which result from a combination of the three sets of tools and the Action Principles. Each activity will be described with the following features: **Action** (*What?*), **Direction** (*Why?*), **Situation** (*When?).

Importantly, focus will be put on the outcome of the theatrical-suggested activity on the practices with the following three considerations: if the activity is helpful for **INFORMING** the researchers about practices, or for **RECRAFTING**, **SUBSTITUTING** practices or **CHANGING** how practices interlock.

How to use these suggestions:
- Evaluate which method to utilize based on the needs and objectives
- Evaluate the possible level of engagement of participants
- Integrate with other more common methods in order to reach better results

**DISCUSSION and CONCLUSIONS**

In this section I will briefly discuss some of the advantages and limitations in using the above illustrated methods.

The ability of gathering more qualitative data through a deeper involvement of participants is among the opportunities that the method potentially offers. This is due to the emerging of the tacit knowledge that theatre can arouse, of the ‘oblique angle’ (Liao 2015) on the consumption culture that can easily emerge from theatre actions. An another positive aspect can be a different level of engagement based on play and creative contribution, that can influence the issue of the drop-out. This is just an assumption, experiments are needed in order to verify the effectiveness.

Among the limits of the method there is the different role of the facilitator, that has to be physically present in the situations in order to gather the datas emerging from the activities and to be able to decodify performative outcomes. So the investment in timing and resources would be different from the mainstream approach.

There is an another potential limit, analyzed by Iacucci and Kuuti, 2002, the fact that not all the people is willing to be part of the performative and creative process.

The approach theorized in this paper is purely conceptual, due to the fact that I didn't have the occasion to research the theoretical framework, design and test the design in the timing of a semester, but I hope to have the opportunity in the following years to test the methods, and implement these initial assumptions into a more concrete and reliable toolkit.
REFERENCES

- Batey M., Bull R., Decorme R., 2013, Living labs: Successful User Engagement on Energy-efficiency through Participatory InnovationThe International Society for Professional Innovation Management (ISPIM), Manchester

- Brandt E., Grunnet C., 2000, Evoking the future: Drama and props in user centered design, Proceedings in Participatory Design Conference, NY, USA


- EEA SIGNALS 2017, Shaping the future of energy in europe: Clean, smart and renewable, EEA 2017


- Jacucci G., Iacucci C., Kuutti K., 2002, Imagining and experiencing in design, the role of performances, NordiCHI 10/02 Århus, Denmark


- Tassinari V., Piredda F. & Bertolotti B, 2017 Storytelling in design for social innovation and politics: a reading through the lenses of Hannah Arendt The Design Journal Vol. 20 , Iss. supl,2017

WEBSITES:

- BRISTOL LIVING LAB
  http://www.openlivinglabs.eu/livinglab/bristol-living-lab

- CITY LAB COVENTRY
  http://www.openlivinglabs.eu/livinglab/city-lab-coventry

- ENERGY LIVING LAB
  http://enoll.org/livinglab/energy-living-lab

- HELSINKI LIVING LAB
  http://www.openlivinglabs.eu/livinglab/helsinki-living-lab-forum-virium-helsinki

- ENERGIE CITE’
  http://www.pnec.org.pl/en/component/content/article/3-aktualnoci-kat/590-mia-
  sta-i-gminy-w-drodze-do-transformacji-energetycznej-seminarium-w-serocku

- GREEN SCHOOLS LIVING LAB
  http://www.greenschools.eu/1782.aspx

- TOGETHER INTERREG PROJECT

- ENOLL
  http://www.openlivinglabs.eu

- ENERGISE
  www.energise-project.eu

- USER ENGAGEMENT TOOLKIT
  http://www.u4iot.eu/end-user-engagement-toolkit

- LIVING LAB METHODOLOGY HANDBOOK

- USER INNOVATION TOOLKIT
APPENDIX
OPEN LIVING LAB DAYS 2017
“Multiple Helix Innovation without Boundaries”

RESEARCH

WORKSHOPS

PROJECTS

29.08 - 01.09 KRAKOW
Enabling Citizen Science in the EU

Speakers:
- Wojciech Przybylski (President of the KTP Board)
- Jarosław Królewski (CEO Synerise S.A.)
- Juan Bertolin (Director Espaitec Science Park and LL)
- Joelle Mastelic (Manager of Energy Living Lab)
- Omer Onur (Director of Başakşehir Living Lab)

Insights:
- Technology parks as open and user-centred innovation facilitator
- “Citizen Science main challenge: Improving Self-Assessment Tools and encourage people to build new type of civil society”
- Exemple: https://www.zooniverse.org (world’s largest and most popular platform for people-powered research)
- Considering the Quadruple Helix Innovation: “Government, Academia, Industry and Citizens collaborating together to drive structural changes far beyond the scope of any one organisations could achieve on its own”
- Let’s call it Open Innovation 2.0
- The importance of the CO- prefix approach... co-think, co-creation, co-design, co-build, co-test, co-finance, co-innovate...that can be called a Democratic Innovation Streamflow
- CS can be useful for: Attitude Behaviour gap, Tacite knowledge, Engagement of the citizen

Open Science, Open Innovation, Living Labs

Speakers:
- Artur Serra (Vice President ENoLL, I2CAT deputy director)
- Noboru Konno (President, Japan Future Alliances Innovation Network)
- Dr Belinda Chen (deputy director of IDEAS Institute, Taiwan Living Lab)
- Prof. Rudolf Giffinger (TU Wien)

Insights:
- objective: Empowering everyone to innovate
- examples: https://digitalsocial.eu (Platform that collects projects with Open hardware, Open networks, Open data and Open knowledge.)
- https://www.fablabs.io/labs
- Triple collaborative impact: Local, Global, Policy level.
- VUCATIONAL society: VolatileUncertainComplexAmbigious
- Science based linear innovation is NOT mainstream anymore! User-centric innovation, Open innovation, Systemic innovation, Experimental mash-up
- Sustainable innovation is full of disruptions, Sustainable innovation is about (value) choices, Sustainable innovation is beyond (political) buzzwords, Sustainable innovation is holistic

Open Innovation
- Indepencency
- Cross-licensing
- Cluster
- Linear, leaking
- Triple Helix
- Validation, pilots
- Management
- Win-win game
- Out of the Box
- Single Discipline
- Value network

Open Innovation 2.0
- Interdependency
- Cross-fertilisation
- Ecosystem
- Mash-up
- Quadruple Helix
- Experimentation
- Orchestration
- Win more-Win more
- No Boxes!
- Interdisciplinary
- Value constellation
New profession and education trends in societal and open innovation

Speakers:
Bror Salmelin (European Commission, DG Connect)
Tuija Hirvikoski (ENoLL President, Director Laurea University)
István Szakáts (Altart Foundation)

Insights:
- Considering the Open Innovation 2.0 and new business structures, as a dynamic value constellations
- Essential drivers for modern innovation policy: connectivity, openness, interaction, “organic” (OrganiCsations...), crowd resourcing, catalytic IPR
- In this scenario the new professions can be Curators, Bridgers, Orchestrators and Systems Designers
- New types of ecosystems: Self-directed, Real world prototyping and experimentation, Common interest, Open platforms, Recognition beyond ordinary means
- "Open Science has become a reality and is offering a whole range of new, unlimited opportunities for research and discovery worldwide. Scientists, citizens, publishers, research institutions, public and private research funders, students and education professionals as well as companies from around the globe are sharing an open, virtual environment, called The Lab." Carlos Moedas, Open Innovation, Open Science and Open to the World. 2016


Problem statement of drop-out in living lab field tests:
- Limited knowledge on drop-out definition and types of drop-out in Living Lab field tests
- Reasons why drop-out occurs within Living Lab field tests

Participant-related drop-out
Participants only participate in the startup of the field test but they have not started to test that innovation (Participants’ attitude, Personal context, Participants’ resources)

Innovation-related drop-out
Participants stop using the innovation because of motivational or technical reasons related to the innovation (Tech problems, perceived usefulness, perceived ease of use)

Research-related drop-out
Participants stop participating in the research component of the field test, you don’t get feedback anymore from them (Design task, interaction, timing)
Managing Innovation Uncertainties: A User Oriented Knowledge Typology for Targeted Learning Activities Throughout Living Lab Projects


Objectives:
Providing a new framework, theoretically driven by uncertainties or knowledge deficits
"With this workshop, we support our vision to transcend the gut-feeling and experience-driven selection of learning activities, and instead select more appropriate, targeted, learning activities defined by the existing knowledge deficits or uncertainties. We built our workshop on the theoretical foundations as discussed in Herregodts, Baccarne, Conradie, & Schuurman (2017). We depart from the end-user, as key within the living lab conception, as embedded in a two-states framework. In this framework, the current state (as-is) is opposed by the future state (as-could-be). These states are then complemented with relevant knowledge types.”

Insights:
Facilitators proposed a new attempt of considering the methodology of the design process, and some tools (innovatrix) that can be useful during the process. They are in the process of defining the User innovation toolbox that contains methods and tools card-shaped, that can help the designer deciding what to choose for each project.
Introducing design methodologies for ideation: multi-disciplinary analysis as a tool for designing circular economy innovations

**WS organiser:** imec Living Lab (https://www.imec-int.com/en/livinglabs)

**Objectives:**

“User-centered design, participatory design and cooperative design are closely linked to the early Living Lab-movement (Ballon & Schuurman, 2015). Design thinking and principles of UCD are also still building blocks within a lot of contemporary Living Labs (Ståhlbröst, 2008; Bergvall-Käresborn et al., 2015). However, one of the challenges when letting end-users take a more active role in the innovation process is to translate their inputs into design. Moreover, end-users lack the background and insights of professional designers which limits their potential to design their own solutions based on their explicit and latent needs. Therefore, within this workshop, we will introduce a strategic design framework (Manzini & Vezzoli, 2003), consisting three determinants: usage, technology and market. This design framework helps to structure co-design efforts, improves the quality of the eventual solutions and facilitates the process of product innovation in general. We will illustrate and introduce this framework based on smart city best and worst practices.

We will start the workshop by splitting the participants into smaller groups and doing a free-form ideation and co-design exercise for all participants for specific smart city challenges. After this initial phase, the design thinking framework will be introduced and illustrated with hands-on examples. Subsequently, the ideation and co-design exercise will be repeated with the participants using the ‘usage, technology & market’-framework to improve their ideas and design. As a final step, the participants present their outcomes and reflect upon the process. This will give them a better insight in co-design processes and how to introduce design thinking principles and techniques to users.”

**Insights:**

Facilitators proposed a very clear methodology in the process of problem definition and solution elaboration.
**Sensitizing techniques for ideation and co-creation in LLs projects:**
Focus groups about using contextual triggers and boundary objects in smart cities research

**WS organiser:** imec Living Lab (https://www.imec-int.com/en/livinglabs)

**Objectives:**
"Living Labs are linked to User Centered Design and User Innovation methods and techniques, but the ideal way for co-creating with end-users in focus group discussions is rarely discussed (Schuurman, 2015). In literature, some so-called 'sensitizing' techniques are described to overcome the cognitive barriers of end-users to facilitate the ideation and creation process. The usage of 'boundary objects' has been described within the design thinking literature (Carlile, 2002). Within Living Labs literature itself, the multi-contextual environment has been put forward as the crucial element to understand the tacit user needs (Ballon, Pierson, & Delaere, 2005; Bergvall-Kåreborn et al., 2015).

The central research question for this workshop is "How to implement sensitizing techniques and boundary objects in smart city research?" and the focus is on learning from each other’s projects and finding new methods when co-creating with end-users."

**Insights:**
Exchange through discussion between participants about the methods used in different design contexts. Acknowledgment of new methods and contextual triggers. (journey mapping, diary studies, creative track, moodboard, tangible toolkits, shadowing...)
Leveraging behavioral change for Energy Efficiency in Public Buildings

WS organiser: Together IT and PL, iScape and Tips & Tricks

Objectives:
Exchange experiences on behavioural-based energy saving.
Demonstrating that a number of Living Lab projects exist in Europe that have successfully managed to increase energy efficiency in public buildings - without or beside “hard” renovation or expensive retrofitting investments - by just giving room to the coordinated initiatives of building occupants.

Insights:
“The common trait of these projects is known in literature as DSM - Demand Side Management - and particularly consists of a set of organisational, behavioral and financial measures that incentivise sustainable change of energy consumption habits. In addition to DSM, Living Lab tools and methods have been used - both to achieve user co-design and to facilitate the participation of all relevant building stakeholders (from a truly Quadruple Helix) in the realisation of the project goals. Usually, the goal of DSM is to encourage the consumer to use less energy during peak hours, or move energy use to off-peak times such as nightly or during the weekends. More recently, a number of Living Lab inspired projects has successfully managed to introduce elements of Behavioral as well as Analytical DSM in the real life experience of energy efficiency in public buildings, namely wherever available budgets are insufficient to guarantee an effective retrofitting or there are different constraints (such as cultural heritage preservation rules) impeding to undertake an infrastructure renovation only approach to energy efficiency.
By Behavioral DSM we refer to management of individual energy behavior of building users, while Analytical DSM focuses on the actions that people can take to alter energy use as a result of data analysis and equipment monitoring. Concrete DSM impacts on energy bills will be documented and the perspective of reutilization of some of the tools and methods developed therein also in the concrete experience of the City of Krakow will be presented.”
RELEVANT PROJECTS

**LL Green Schools (IT)**

**Description:**
Treviso’s schools become leaders of a COMMON ENERGY PROGRAM with the objective to create more efficient and sustainable school environments, thanks to the combination of new technologies and active participation of all citizens/users.

**Website:**
http://www.greenschools.eu/greenschools.aspx

**EduFootprint Project (MED)**

**Description:**

**Website:**
http://www.svimed.eu/website/portfolio/edufootprint/

**LL Energy Living Lab (CH)**

**Description:**
“The Energy Living Lab is an open innovation ecosystem dedicated to energy efficiency and the development of renewable energy in Western Switzerland. The goal of the Living Lab is to empower the users of energy and integrate them into the innovation process, motivating them to participate, putting the right tools in place to enable a bottom-up dialogue, and translating ideas into sustainable commercial products or services. A toolbox has been developed to propose the right method at the right time of the innovation process, adapted to the needs of different companies and public authorities.”

**Website:**
http://enoll.org/livingglab/energy-living-lab
www.i-brain.ch
RELEVANT PROJECTS

**Malopolska Laboratory of Energy Efficient Building (PL)**

**Description:**
"1:1 research laboratory in an energy-efficient building, independent climate zones are set up and the processes are fully automated and monitored by almost 3,000 specialized sensors. The infrastructure of the MLBE building itself is a research object and its specialized measuring equipment allow to conduct interdisciplinary research in the field of widely understood energy-saving construction."

**Website:**

**Together (IT, HR, CZ, HU, PL, SK, SLO)**

**Description:**
"Encouraging Central Europe public administration to improve energy efficiency in their buildings, also by involving users in energy management. We aim at changing the existing atomistic vision into a holistic vision of the buildings as a whole of functions and relationships between physical space, technological devices and users’ needs-behaviour."

**Website:**
www.interreg-central.eu/together
Conceptual schema of the project

1. User Involvement in Innovation
   - Participatory
   - Living Labs

2. Uses
   - Methodologies
     - Stages
     - Typologies
   - Performing arts

3. Sustainable Consumption
   - Energy
     - Practice Theory
   - Energy Living Labs

4. Energy Living Labs