Linking research through design and adult learning programs for urban agendas: a perspective essay

Paolo Picchi
Academy of Architecture, Amsterdam University of the Arts, Waterlooplein 211-213, Amsterdam, The Netherlands
paolo.picchi@ahk.nl

Dirk Oudes
Academy of Architecture, Amsterdam University of the Arts, Waterlooplein 211-213, Amsterdam
Landscape Architecture Group, Wageningen University, Droevendaalsesteeg 3, 6708 PB Wageningen, The Netherlands

Sven Stremke
Academy of Architecture, Amsterdam University of the Arts
Waterlooplein 211-213, Amsterdam
Landscape Architecture Group, Wageningen University, Droevendaalsesteeg 3, 6708 PB Wageningen, The Netherlands

Abstract

Local governments are addressing energy transition, one of the prominent sustainability goals in the urban agendas, yet they need to enhance capacity building, therefore engagement with sustainability science and adult learning programs for civil servants are frequently activated. Landscape architects are more frequently called to be boundary spanners in complex sustainability goals. This perspective essay investigates the synergetic links between adult learning approaches and landscape architecture research through design in the prominent field of the transition to renewable energy. The reflections will be narrated by means of a first application conducted for the Municipality of Amsterdam. The tentative implications suggest that a social learning environment finds synergetic links to a constructivist research through design approach.

1. Introduction

While central governments work on strategies to pursue sustainable development goals (UN DESA, 2019), local governments aim to increase capacity building to put in practice new directives and objectives through concrete planning and design solutions. Capacity building is frequently slowed-down by the fragmentation of local governments into different departments, leading to a separation of competences and decrease of communication. The pursuit of sustainability goals, however, requires interdisciplinarity and knowledge exchange. Direct engagement with sustainability science and the organization of workshops for civil servants have been identified as promising for capacity building (Holmes *et al.*, 2018).

Landscape architecture is a sustainability science discipline that deals with landscape design and can "effectively link science and society in knowledge innovation for sustainable landscape change" (Nassauer and Opdam, 2008, p. 635). Among the sustainable development goals, the energy transition, goal 7, is a prominent socio-cultural issue and causes a landscape change that must be carefully designed (Stremke and Sijmons, 2017). Landscape architects are now active in the energy transition both in research through design and practice, e.g. they are involved in the negotiations of the na-

tional climate agreement in The Netherlands, to represent landscape and landscape users in the process, or are designing renewable energy landscapes in Italy.

A recent paper from van den Brink *et al.* revealed that landscape architects can be considered boundary spanners in complex sustainability goals, supporting interdisciplinarity and knowledge exchange between different competences in different roles, yet those should be object of new research and development (2019). There is a challenge to employ this new landscape architecture role in training civil servants by different departments and competences in order to increase local administrations capacity building. Therefore the aim of this essay is to reflect on potential synergetic links between landscape architecture research through design and training civil servants. These reflections are based on a training program conducted by the authors for the Municipality of Amsterdam. The training program aims to increase civil servants self-confidence with respect to the spatial dimension of energy transition spatial dimension while applying a context-specific design thinking in the high-density metropolitan landscape of Amsterdam. Considering the fact that the knowledge institution the authors is in the domain of arts, the program employs an artistic perspective.

The following section will ground this essay in the existing literature on adult learning and landscape architecture research from an artistic perspective; section three will present the training program application and section four will introduce tentative implications and critical reflections.

2. Landscape architecture research and adult learning in artistic perspective

With regards to the authors' research group, in 2017 Dirk Sijmons stated «up to this moment, there is little knowledge on how to actually design with energy. Designers are involved in the energy transition, are able to add the spatial dimension to the debate. The research group is in a position to address this need for artistic design and 'designerly' ways of knowing». The need for an artistic perspective is relatively new with regards to renewable energy but not in landscape architecture. For example, in a letter dated from 29th January 1967 Pietro Porcinai and Carl Theodor Sørensen were exchanging thoughts on this need with regards to the new landscape architecture challenges (Archive Porcinai, 2019).

More recently authors as Dixon Hunt (2000) advocate an artistic perspective because they consider the exclusive functionalism not capable of addressing the present complex socio-cultural issues. For example Milburn and Brown (2003) affirm that societies ask to landscape architecture research and practice 'environmental and social appropriateness' and 'creative and unique solutions' so determining a radical switch from a modernism to a post-modernism approach (p. 18).

Lenzholzer *et al.* considered designing the core activity of landscape architecture practice domain and addressed the relationship between research and 'design' to individuate main groups of conducting research in landscape architecture (2013). They considered research through design (RTD) as the core landscape architecture research activity.

The authors individuated four main approaches in RTD and the *Constructivist* approach capture our attention. The relevance of this approach is in being site specific and affording socio-cultural issues: the knowledge is qualitative and is represented under the form of new insights as new mental constructs, landscape interpretations, design thinking. The authors highlight the fact that the aspect of generating the new and the unknown is one of the reasons why a constructivist research approach was frequently used in the arts domain, evidencing the link between landscape architecture's creative component and performative art (2013, p. 8). The generated knowledge is not replicable, because embedded in the physical and social context, but still transferable in operational principles.

At this point our reflections focus on urban landscapes and site specific and socio-cultural approaches, and we found relevant correspondence with the 'species of spaces' approach in Lambertini (2011, 2013). Inspired by the French writer Georges Perec and his book *Species of spaces and other pieces* (1974) Lambertini conceived a creative approach in reading and interpreting the present and potential socio-cultural and ecological diversity of urban spaces. It deserves a quote, translated by the authors "this species of spaces interpretative lens allows to overcome the risks and limitations caused by the adoption of exclusively quantitative parameters [...] to apply a multilateral design thinking and to adopt operative ways not exclusively finalized to urbanism functions and regulations, but also to a huge variety of opportunities and roles (ecological, social, figurative and symbolic)" (2011, p.234) .

Crossing the border of our discipline we move now to adult learning. This field was born as a branch of pedagogy at the beginning of the XX century, and became a distinct discipline focused on life-long learning processes in the 70's. In particular the

ORIENTATIONS IN ADULT LEARNING	DESCRIPTION	TENTATIVE KEY-WORDS
Cognitivist	It is based on the humans capability of recognizing the experience from the environment and attribute meanings	self-development
Behaviorist	It is based on the control on the environment, the learning happens when the learners behavior changes and is capable to take control	self-development
Humanist	It is based on the principle of self-directing, the learner who is seeking for self-actualization and self-confidence turns into someone else, e.g. an expert or ambassador on new emerging issues.	self-development
Social learning or social cognitive	It focuses on the social context in which people learn, reciprocal teaching among learners is a relevant learning principle and the learning goal consists e.g., in new employee becoming effective in their organization on issues and topics (Marquardt and Waddill, 2004).	edification of the social environment; temporary goals; reciprocal teaching; interaction;
Constructivist	It emphasizes the fact that the learner changes first itself, then the environment; the knowledge here is related to the context and the learner makes personal meanings of the context experiences.	site specific

Tab. 1 – the five main orientations in adult learning and key-words (adapted from Merrima and Caffarella, 1999)

work of Knowles pushed the new discipline development, which stated that the difference between pedagogy and adult learning is basically in the fact that the former is focused on the *learning*, while the latter on *learners* (1980). In the book *Learning in Adulthood* Merriam and Caffarella (1999) created an overview on the discipline which is recognized as the the most complete prospectus (Marquardt and Waddill, 2004). They differentiated between five main orientations or schools in adult learning (table 1). At this point our reflections focus on the *social learning* orientation because the theories date back to the work of the Russian pedagogue Lev Vygotsky (1896–1934) who supported the use of creativity in the learning process and defined the 'poetry of every moment' which is "the cre-

ative reworking of reality, a processing of things and the movement of things which will illuminate and elevate everyday experience to the level of the creative" (1997, p.261). This definition intuitively opens a new perspective on possible synergetic links with RTD and more specifically with the constructivist approach where new insight can be generated through mechanisms similar to Vygotsky reworking of reality. According to some authors Vygotsky theories can be challenging for different present times research fields. For example Skorc states "Vygotsky's immortal work is able, in this moment, to initiate inclusive, active, and creative networks of practitioners, scientists, and interdisciplinary researchers" (2019, p. 195). More in detail Shah and Rashid (2016) reflected on

TECHINICAL AND ANALYTICAL SKILLS
Gaining knowledge on renewable energy technologies and the concept of energy landscapes
Conducting high density landscapes analysis for the planning and design of energy landscapes
Develop skills in creative design thinking for sustainable energy landscapes - renewable energy technologies as integral part of dynamic social-ecological urban systems
INTERDISCIPLINARY AND SOCIAL SKILLS
Sharing and communicating landscape values with colleagues from different backgrounds | reciprocal teaching
Sharing and communicating design thinking for sustainable energy landscapes with colleagues from different departments | self-development and becoming ambassadors

Tab. 2 – learning goals of the training program

Vygotsky present times challenging applications in adult learning programs, remarking the relevance of the edification of a social environment, the setting of cultural activities with temporary goals affording interaction, the exchange of experiences and related meanings and the creation of new shared insights on a focus issue.

Table 1 summarizes the different orientations and extrapolates some key words.

3. Illustrative case: training program on high density energy landscapes for Amsterdam civil servants

The Netherlands are the sixth most densely populated country in Europe. The City of Amsterdam has ambitious objectives with regard to energy transition: 75% less CO2 emissions in 2040 (Agenda Duurzaamheid, 2015). The metropolitan region of Amsterdam has a high population density (900 inhabitants/km2) that requires a breakthrough in design thinking to pursue sustainability goals. The municipality Space and Sustainability Department aims at strengthening daily practices to advance the energy transition. For this purpose a multi-year partnership has been established with the institution of the authors. The partnership main objectives are:

a. To advance RTD for the energy transition in the

Amsterdam metropolitan area;

b. To organize a training program on energy transition for the civil servants.

One of the expected outcomes is to create a group of 'ambassadors' inspired and trained in the field of energy transition through "mutual responsibility, joint inquiry and shared purpose" (Holmes et al. 2018, p. 83). Those ambassadors are expected to encourage interdisciplinary and knowledge exchange practices and to create spillover effects between the different municipality departments and competences with the final result of increasing "capacity building" (Costa Junior et al., 2018, p.68). As mentioned in the introduction, energy transition requires space and must therefore be supported by envisioning future landscapes (Stremke and Schöbel, 2019). The majority of renewable energy technologies has a spatial footprint in the landscape, such as the land needed to build photovoltaic parks (De Waal & Stremke, 2014), furthermore it may compromise the quality and the quantity of other ecosystem services (Picchi *et al.*, 2019). The need for envisioning future landscapes is even more relevant at the urban scale: is there available space to produce the required amount of renewable energy?

In urban landscapes characterized by high population density, high energy demand and consump-

ACTIVITY	DEDICATED HOURS
Exercises on concrete cases	12
Lectures	8
Meeting experts from other cities	4
Field trips	8
Reading/self-study and related presentations	20
Final presentation	1.5

Tab. 3 – the activities and the dedicated hours according to participants' preferences

tion (see e.g. urban landscape definition in Mcin-tyre et al., 2008), the spaces for renewable energy generation may seem to be scarce. Nowadays it appears more difficult than ever to combine re-newable energy and spatial quality: we need to better comprehend the spatial dimension of ener-gy transition as socio-ecological phenomenon. Yet several landscapes as green fingers, urban-agri-cultural fringes, linear infrastructures, vacant and abandoned spaces can be activated to implement the renewable energy generation in metropolitan regions, besides the built-up areas. The aim of this first year partnership was to reflect on potential synergetic links between RTD and the training program goals. The former aimed at answering the following research question: which theories, nar-ratives and design guidelines can help achieving energy transition targets while, simultaneously, improving spatial quality of degraded landscapes or unlocking vacant spaces in the densely populat-ed metropolitan landscape of Amsterdam? Learn-ing goals are summarized in table 2.

4. Application in the high density metropolitan landscape of Amsterdam and reflections

The training program was set in three steps: 1) in-depth interviews; 2) a Focus group meeting; 3) a Masterclass. A call for the training program

was launched, inviting colleagues with previous experiences in the field from their daily work and willing to share them. Ten participants were se-lected based on their motivations letters. In step 1, individual 30-minutes in-depth interviews were held with the learners. The interviews aimed at understanding the background, previous experi-ences and a general opinion on the main issues of energy transition. The in-depth interviews in-cluded open-ended questions and were conceived as a space where participants could speak freely, avoiding the fear of offending other colleagues with different ideas or expectations (Holmes *et al.*, 2018).

In step 2, a half day focus group meeting was orga-nized to gather civil servants perspectives from dif-ferent backgrounds on common cases, arguments and objectives. Participants introduced themselves by means of a 'my landscape' themed presenta-tion: presenting and commenting on five landscape pictures which they were familiar with (Freire and Ramos, 2012, p. 68) (fig. 1). Later a short lecture pro-vided some basic concepts and definitions on the energy transition topic, such as the energy land-scape definition (Pasqualetti and Stremke, 2019) in order to share some first conceptual and imagery categories and related vocabulary.

Participants were then asked to map potential

203

Fig. 1 –the Amsterdam western corridor (Westerscheg) provides several ecosystem services such as biodiversity, habitat creation and recreation. Some r

enewable energy is already provided by scattered wind turbines, yet due to a quantitative planning approach, the energy potential is not fully explored.

Fig. 2 – one of the participants teaching on the historical construction of the *Westerscheg* landscape, while opening new insight on the spatial dimension of the energy transition. This is a typical moment of edification of the social environment and self-teaching practice.

spaces for the energy transition and related critical points and challenges to be potentially addressed in the Masterclass. This was functional to gather participants' prior experience on data and concrete problems as a starting point for socialization and cross-fertilization. At the end we asked participants to vote some activities they would like to incorporate in the (then) perspective Masterclass. The Masterclass was set in four intensive days according to the following agenda, result of the preferences expressed during the Focus group (tab. 3). On the first day activities started with the presentations of the participants' self-study. Some participants presented innovative technologies, others some reflections on the history of wind power in Amsterdam or the history of the dykes systems, others presented data and plans for renewable energy development in the metropolitan area.

Collected information was later used during the exercise phase.

During the first two days lectures provided some conceptual and methodological tools on renewable energy landscapes concepts and approaches, and experts from other cities (Rotterdam in the specific case) presented 'best practice' projects. The topics were energy landscapes qualifications and scales, mapping vacant spaces for the energy transition in urban landscapes, trade-offs between renewable energy and ecosystem services, the energy-food nexus and a special focus on solar parks. In line with participants' request the Masterclass included exercises on a site specific case addressing the main question in the assignment.

In the afternoon of the first day we conducted a

Fig. 3 – The *tramway botanic corridors* is one of the species of space individuated by participants. Those are linear grasslands along the tramway tracks, rich in flower species.

field trip in the Amsterdam Westerscheg.
The study site was selected by combining information collected during the interviews and the Focus group. Westerscheg is the western green finger south of the harbour area along the IJ, originally created by the straight line of the railway to Haarlem (1839). The adopted approach in RTD was the *species of spaces* as in Lambertini (2011), functional to open new insights through an artistic perspective. During the field trip we experimented on reading and interpreting the different species of spaces in the area and we did some reflections on the urban ecosystem services provided, included the visual values, the historical landscape layers, while discussing context specific new insights on the potential of integrating different renewable energy technologies (fig. 2).

In a panel session participants invented *new names* for the species of spaces in an energy transition perspective and attributed them a certain supply of ecosystem services: *the city gardens, the tramway botanic corridors, the railway landscape, the city gates, the sport parks, energy towers, the memory lines* (fig. 3). Later groups focused each one on one species of space and elaborated some design concepts (fig. 4). Finally participants summarized the design concepts in a matrix combining different species of spaces with renewable energy technologies and a qualitative estimation of renewable energy and ecosystem services supply.

5. Tentative implications and reflections on the application

The links we found between research through de-

Fig. 4 – The memory lines design concept by Ries Breek and Maartje Pittery. The historical dykes alignments are recovered to collective memory thanks
The turbines are a sort of sentinel recalling the past and addressing the future. In the specific context this memory line was called *Bloemendal Road* fol

u bevindt zich op de
14e eeuwse dijk

s to a system of oscillating vertical axis wind turbines that while producing renewable energy indicate the dyke sign and the related age.
llowing the IJ XIV century dyke (authors design concept elaboration).

sign approaches and adult learning orientations – illustrated in figure 5 - are the main but tentative implication (fig. 5). The majority of synergetic links were experienced between a research through design constructivist approach and both social learning and constructivist adult learning orientations in coincidence of the Masterclass exercise activity. The common factors enabling synergy in between research through design and adult learning were the reciprocal teaching in an effective social environment and design thinking employing learners creativity - the 'poetry of every moment' – in a specific site. A relevant 'poetic' moment occurred in the *speciation* action: participants interpreted some species of spaces with a potential for the energy transition by giving them new names. The poetic of this moment consisted in forgetting, using Georges Perec's words, what the official land uses maps and present planning say and opening new insight on unofficial available spaces, giving them new attributes and alternative use. For example with regards to solar energy the official plans in Amsterdam limit the calculation of solar energy potential to the buildings roofs. Quite differently, participants investigated interstitial vacant spaces and opened new perspectives for harvesting solar energy, e.g. in the railway marginal landscapes or the tramways corridors, which cover a huge area if one considers the entire municipality of Amsterdam.

To list a concrete example for the synergetic links, we can refer to one of the conceived species of space: the 'memory lines'. This was enabled at first by sharing knowledge on the historical dykes and the potential use of vertical axis wind turbines (reciprocal teaching). The capacity to communicate and share the historical alignments as landscape value was a second factor enabling the design thinking (a constituted social environment). A third factor was the complicity between the two participants who conceived the design concepts (the generated elective affinities).

Concluding, the edification of a social environment seems to be beneficial for both research through design and adult learning. The in-depth interviews supported mutual trust between the trainers (whose role is to provide some conceptual and operational tools) and the learners, while the focus group meeting established a common ground between them. An important tool for the social environment edification was the so-called 'my landscape' activity. Participants used photographs to initiate their discussion and communication on landscape values by describing landscapes they were familiar with. Furthermore, through 'my landscape', they started the process of reciprocal teaching too, or in other words the ability to explain to unknown people specific issues which they had experience and competence with. Through the 'my landscape' activity passionate discussions on specific landscapes and issues immediately arose, contributing to the stimulation of elective affinities and consequent effective groups setting.

The combination of constructivist research through design and social learning, tentatively speaking, appears to be promising for the future and deserving further attention and research. The edification of the social environment, the reciprocal teaching, the generation of elective affinities, can be a promising setting for site specific design thinking capable to generate new insights in an artistic perspective. The artistic perspective appears to be directly generated through the sharing of new values and meanings and complicity in the group, factors stimulating the capacity to conceive design concepts stepping out of the current plans and protocols. The presented tentative implications and the related reflections can be beneficial to start a pioneering body of knowledge on the organization of adult learning programs to increase capacity building. In the future, the involvement of landscape architects in such training may be more required, due to their intrinsic value as boundary spanners.
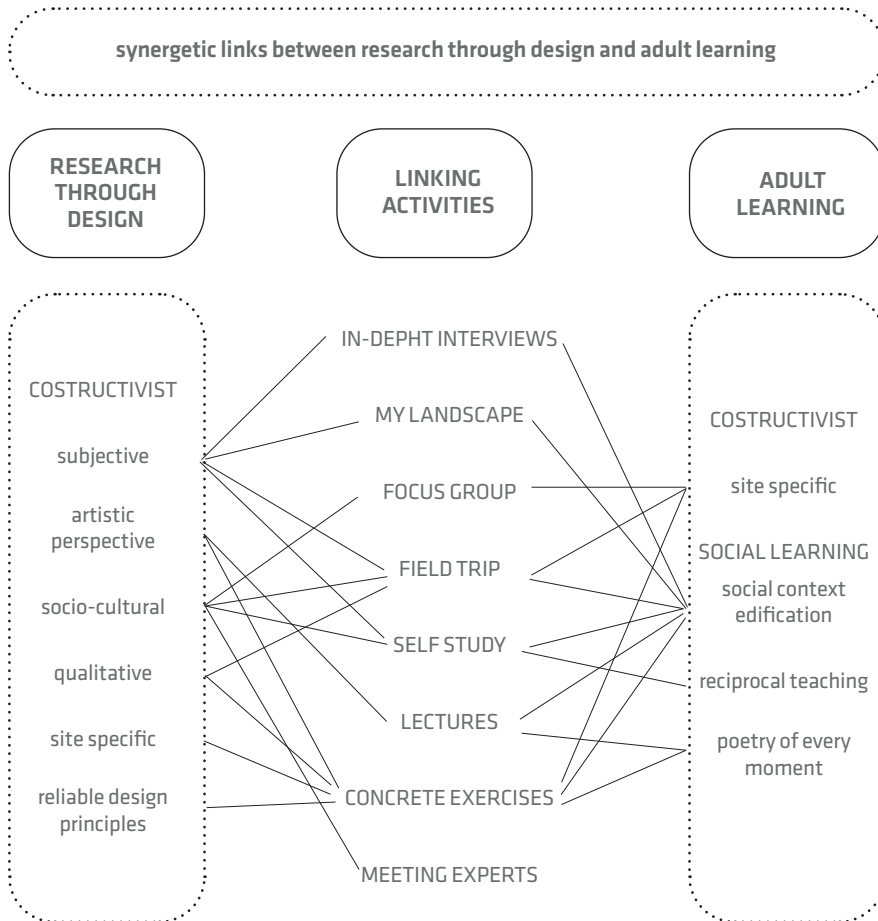
Fig. 5 – The image shows the experienced links between research through design and adult learning and the linking activities.

References

Costa Junior J. D., Diehl J. C. & Secomandi F. 2018, *Educating for a systems design approach to complex societal problems*, «Journal of Engineering Design», n. 29(3), pp. 65–86, <https://doi.org/10.1080/09544828.2018.1436 162>

de Waal R. M. & Stremke S. 2014, *Energy transition: Missed opportunities and emerging challenges for landscape planning and designing*, «Sustainability» (Switzerland), n. 6, pp. 4386–4415, <https://doi.org/10.3390/su6074386>

Freire, M. A. R. I. A., Ramos I., Rego C., & Lucas M. 2012, May, *Towards a different approach in teaching landscape design. A cross educational, cultural and disciplinary strategy*, in *Proceedings of 5th WSEAS International Conference on Landscape Architecture (LA'12)*, Universidade do Algarve, Faro, Maio, pp. 2-4, <http://www.wseas.us/e-library/conferences/2012/Algarve/ENS/ENS-10.pdf>

Holmes H., Gregson N., Watson M., Buckley A., Chiles P., Krzywoszynska A. & Maywin J. 2018, *Interdisciplinarity in Transdisciplinary Projects: Circulating Knowledges, Practices and Effects*, DISP, n. 54(2), pp. 77–93, <https://doi.org/10.1080/02513625.2018.1487646>

Hunt J. D. 2000, *Greater perfections: The practice of garden theory*, University of Pennsylvania Press.

Knowles M.S. 1980, *The modern practice of adult education*, Cambridge Adult Education, <https://pdfs.semanticscholar.org/8948/296248bbf58415cbd-21b36a3e4b37b9c08b1.pdf>

Lambertini A. 2011, *Specie di Spazi*, in Corrado M., Lambertini A. (a cura di) *Atlante delle Nature Urbane*, Editrice Compositori, Bologna, pp. 233-235

Lambertini A. 2013, *!Urban Beauty! Luoghi prossimi e pratiche di resistenza estetica*, Editrice Compositori, Bologna

Lenzholzer S., Duchhart I. & Koh J. 2013, *Research through designing* in «landscape architecture. *Landscape and Urban Planning*», <https://doi.org/10.1016/j.landurbplan.2013.02.003>

Marquardt M. & Waddill D. 2004, *The power of learning in action learning: a conceptual analysis of how the five schools of adult learning theories are incorporated within the practice of action learning,* in «Action Learning: Research and Practice», <https://doi.org/10.1080/14767330 42000264146>

McIntyre N. E., Knowles-Yánez K. & Hope D. 2008, *Urban ecology as an interdisciplinary field: Differences in the use of "urban" between the social and natural sciences,* in «Urban Ecology: An International Perspective on the Interaction Between Humans and Nature», <https://doi.org/10.1007/978-0-387-73412-5_4>

Meijering J. V., Tobi H., van den Brink A., Morris F. & Bruns D. 2015, *Exploring research priorities in landscape architecture: An international Delphi study*, in «Landscape and Urban Planning», <https://doi.org/10.1016/j.landurbplan.2015.01.002>

Merriam S. B. & Caffarella R. S. 1999, *Learning in Adulthood (Second Ed.),* Jossey-Bass, San Francisco, California.

Milburn L. A. S. & Brown R. D. 2003, *The relationship between research and design in landscape architecture,* in «Landscape and Urban Planning», <https://doi.org/10.1016/S0169-2046(02)00200-1>

Nassauer J. I. & Opdam P. 2008, *Design in science: extending the landscape ecology paradigm*, in «Landscape Ecology», n. 23(6), pp. 633–644, <https://doi.org/10.1007/s10980-008-9226-7>

Pasqualetti M. & Stremke S. 2018, *Energy landscapes in a crowded world: A first typology of origins and expressions*, in «Energy research & social science», n. 36, pp.94-105, <https://doi.org/10.1016/j.erss.2017.09.030>

Picchi P., van Lierop M., Geneletti D. & Stremke S. 2019, *Advancing the relationship between renewable energy and ecosystem services for landscape planning and design: A literature review*, in «Ecosystem Services», n. 35, <https://doi.org/10.1016/j.ecoser.2018.12.010>

Schmuck P., Eigner-Thiel S., Karpenstein-Machan M., Sauer B., Ruppert H., Girschner W. & Roland F. 2013, *Bioenergy villages in Germany: Applying the Göttingen Approach of Sustainability Science to promote sustainable bioenergy projects*, in «Sustainable Bioenergy Production-An Integrated Approach», pp. 37-71, Springer, Dordrecht, <https://doi.org/10.1007/978-94-007-6642-6_2>

Skorc B. 2019, *Creative implications of Vygotsky's Theory: development and capacity for change*, in «Mind, Culture, and Activity», <https://doi.org/10.1080/10749039.2019.1624775>

Shah T. A. & Rashid S. 2016, *Applying Vygotsky to adult learning*, in «Journal of social Sciences», n. 8(1), pp. 1-14, <https://gcuf.edu.pk/pages_data/journals/social-sciences/JSS-Vol-8-Issue-1.pdf#page=8>

Stremke, S. and Schöbel, S. 2019, *Research through design for energy transition: two case studies in Germany and The Netherlands*, Smart and Sustainable Built Environment, Vol. 8 No. 1, pp. 16-33. https://doi.org/10.1108/SASBE-02-2018-0010

Stremke S., Sijmons D. 2017, *From creation to co-creation to agenda setting? Recent design experiences from the Netherlands*, ECLAS 2017 Conference proceedings.

UN DESA, 2019, *The Sustainable Development Goals Report 2019*. Available at <https://unstats.un.org/sdgs/report/2019/The-Sustainable-Development-Goals-Report-2019.pdf>