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## Teaching Social Sustainability Through Antenarrative Imaginaries of Energy Cultures

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# Teaching social sustainability through antenarrative imaginaries of energy cultures

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## Abstract

This chapter introduces antenarratives – intra-plays of grand narratives with living stories – to teach energy cultures to clarify how activities connected to specific energy systems contribute to understanding social sustainability. We view energy cultures as the norms, practices, and material artefacts in a society linked to energy use and operating at all levels, from individuals and groups to organizations and even nations. We draw on a recent United Nations Policy brief that calls for energy use related to Social Development Goal (SDG) 7 to be linked with the rest of the SDGs. The policy signals an important development in that it directly acknowledges the role of energy use in spurring large-scale progress in all SDGs. Given the complexity inherent in those interlinkages, we propose the antenarrative method for navigating complexity when teaching this topic. Antenarratives enable the development of imaginaries, understood as powerful cultural resources that shape social responses. The antenarratives method is relevant to teaching social aspects of sustainability as it unveils the disconnect between the ideas that support the organization of activities in the present modes of production and consumption organized through links with current energy systems and those emerging as

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a consequence of sustainable energy systems. Ideas and interests acquire legitimacy and are normalized through social and cultural practices, and this chapter proposes that educators can use antenarratives to direct attention to energy cultures, which is critical to bridging the gap in understanding social sustainability. Antenarratives enable students to understand how social sustainability evolves onto a different semantic level.

### **Keywords**

Energy Cultures; Social Sustainability; Imaginaries; Transitions; Antenarratives.

## **1 Introduction**

Burning fossil fuels for energy is the largest contributor to climate change, which means sustainability implies moving from fossil fuels toward more renewable-based energy systems. The process is often characterized as an energy transition (Jorgenson et al. 2019; Princen et al. 2015; Friedman 2008). Energy embodies the mode of human-nature interactions and energy systems, and inherently shapes the ecological conditions of social life (Cederlöf 2021). Those interactions are governed by cultural norms concerning shelter, mobility, food, and clothing, increasing the relevance of teaching and learning about energy cultures. Energy cultures reveal energy-related consequences of habitual behaviour and behaviour change and help scholars make sense of how cultural formations influence sustainability outcomes (Stephenson 2018). Such sensemaking aims to highlight and reform the thinking and practice of socio-political governance to encourage the necessary shifts toward sustainability (Meadowcroft 2009). Making sense of the complex social, economic, and ecological

interactions requires actors in all recursive strata to generate variety in balance with the complexities faced (Schwaninger 2015).

In the context of education for social sustainability, capturing that complexity would translate into accessing diverse knowledge systems to generate the requisite variety of practices. One method of doing so would be through antenarratives, defined as an intra-play of grand narratives, that is, a broad, overarching retrospective story that attempts to explain the nature of human existence, history, and culture with living stories, in other words, stories that lead to the retelling of narratives (Boje 2011b; Luhman and Boje 2001). In this chapter, we deploy the idea of antenarrative as a method to highlight interactions that constitute energy cultures – social collective behaviours connected to energy sources with their ability to influence all spheres of sustainability. Such behaviours emerge from ‘*collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology*’ (Jasanoff 2015, p. 6), often referred to as socio-technical imaginaries. Here, antenarratives as alternative imaginaries or speculations are fragmented, nonlinear, incoherent, collective, non-deterministic, and pre-narrative, allowing for collective co-construction by multiple participants (Boje 2001). Each participant holds a fragment, and none has an overarching conception of the story unfolding through entanglements, acquiring contextual elements in some quarters and dropping some for performances in other areas (Boje 2001).

If unaddressed, this fragmentation of social cognition will adversely affect sustainability. These fragmented voices remaining unheard contributes to social inequality; they are an important and often overlooked element when teaching and learning about social sustainability. The selection within contexts makes antenarrative trajectories transformative and lends them an endemic role in making sense of complexity (Boje 2014; Luhman and Boje 2001),

showcasing social sustainability's importance in achieving environmental and economic sustainability. This way of teaching and learning about social sustainability also addresses a recent United Nations Policy brief that calls for linking energy use related to Social Development Goal (SDG) 7 with the rest of the SDGs. That is an important development highlighting the role of energy use in propelling large-scale progress in all SDGs. The complexity inherent in those interlinkages increases the relevance of the antenarrative method when teaching this topic as they enable the development of imaginaries, understood as powerful cultural resources that shape social responses.

## **2 Importance of learning about energy cultures**

The energy transition is a transformative societal shift toward sustainability where issues such as reducing the public health risks concomitant with fossil fuel use, creating local and regional jobs, and reducing the political and economic power concentrated in large fossil fuel companies also come into play (Jorgenson et al. 2019). The complex and related social, technological, and ecological changes provide a lens, educators, and researchers can apply to advance educational goals related to those aspects (Jorgenson et al. 2019) and incorporate contradictory evidence to renew theoretical foundations rather than defend theoretical constructions (Clegg et al. 2020). The process is also related to how human and non-human actors increasingly participate in business and social networks and demand a distributed or a context-specific understanding of these new forms of socio-economic communities, their cultures, and nested relationships (Harman 2018; 2009; Morton 2010; Russell and Smorodinskaya 2018).

Moreover, sustainability remains a contested concept, making transitions complex (Hallin et al. 2021). Therefore, information on sustainability and sustainability transitions

lacks conceptual clarity and empirical evidence (Van Poeck et al. 2020). We argue that approaching learning from the perspective of energy cultures is relevant because it involves a culture-based approach to behaviour while drawing on lifestyle and systems thinking. Energy cultures address the problem of multiple interpretations of behaviour by suggesting that it is influenced by the interactions between cognitive norms, energy practices, and material culture (Stephenson 2018). The approach is linked to the objective of this study to steer learning toward an understanding of social concerns related to sustainability by actively sensing connections and relationships that link those concerns to environmental and economic elements. Thinking in a relational manner permits space for diverse perspectives. That is because learning about sustainability is a social process, and education on social sustainability must reflect that process by grounding it in diverse experiences. Those experiences should safeguard against translating complex, contested, and wicked sustainability problems into simple learning solutions by incorporating the complex challenges of sustainability transitions (Van Poeck et al. 2020) to enhance learning effectiveness.

Learning is also critical to achieving sustainable development, particularly the UN sustainable development goals (SDGs) (Leal Filho 2021; Rieckmann 2017). The theme of learning has been incorporated into the UN's Sustainable Development Goal 4 (SDG4), which focuses on providing equitable education and promoting lifelong learning (Leal Filho 2021; Webb et al. 2019) and is also associated with helping reduce poverty (SDG1) and malnutrition (SDG2) and yielding positive health benefits (SD3) (Leal Filho 2021). In addition to raising awareness of issues, learning also provides opportunities to collectively build future-proof societies (Vargas et al. 2022).

However, for learning to be effective, energy must be woven into the process, as energy is at the heart of such future-proof societies, and learning acquires importance by con-

necting the SDGs through their energy interlinkages (McCollum et al. 2018). That importance was also echoed in a recent UN policy brief that specifically presents education as central to initiating urgent action on energy (SDG7) to deliver the entire, 2030 Agenda for Sustainable Development and the Paris Agreement on climate change (Report – 2022 SDG7 TAG Policy Briefs: Addressing Energy’s Interlinkages with Other SDGs | Department of Economic and Social Affairs, n.d.). However, the crux of the policy brief is the importance it attaches to understanding energy’s linkages to other SDGs as a cornerstone of any action on the progress of SDGs. The approach establishes the primacy of energy as a crucial factor in making meaningful progress on all SDGs.

The problems of acting on SDGs are well documented. For instance, the SDGs offer three logics: (1) a governance logic that sets goals, adopts policies and tracks progress to steer impacts; (2) a systems (nexus) logic that manages SDG interactions; and (3) a strategic logic that enables (micro-level) companies to develop strategies that impact (macro-level) policy goals to aid the transformation toward sustainable societies to overcome the hurdles encountered (Van Zanten and Van Tulder 2020). However, discussion of the hurdles reveals a slew of problems. They range from a flawed understanding of complexities and interlinkages, design shortcomings and imbalances, implementation and governance hurdles, unsuitable indicators and assessment methodologies, truncated adoption and off-target progress, unclear responsibilities, and the absence of coordination with the untapped role of technological innovation and knowledge management (Castro et al. 2021). It has been suggested that those hurdles must be addressed before the usefulness of the SDG framework can be leveraged.

Making progress on SDG7 by understanding the linkages offers the opportunity to do so. We use the UN policy brief (Report – 2022 SDG7 TAG Policy Briefs) as a guide and suggest that learning by drawing on energy cultures can make implicit social interactions in energy explicit. Energy cultures are the norms, practices, and material artefacts in a society that could

operate at any scale, from individuals and groups to organizations and even nations (Sovacool and Griffiths 2020). The objective is to help students understand the intra-linkages that SDG7 presents to other SDGs and, subsequently, the interactions required to address a critical hurdle of making sense of those intra-linkages. Making sense would involve considering the socio-technical dimensions in the diverse interactions through the living stories associated with actions on energy. In this form of sensemaking, the imaginaries of the future are aligned with the needs of particular actor communities, and activating interactions could be understood as a process of developing socio-technical imaginaries (STIs) of the future (Jasanoff and Simmet 2021).

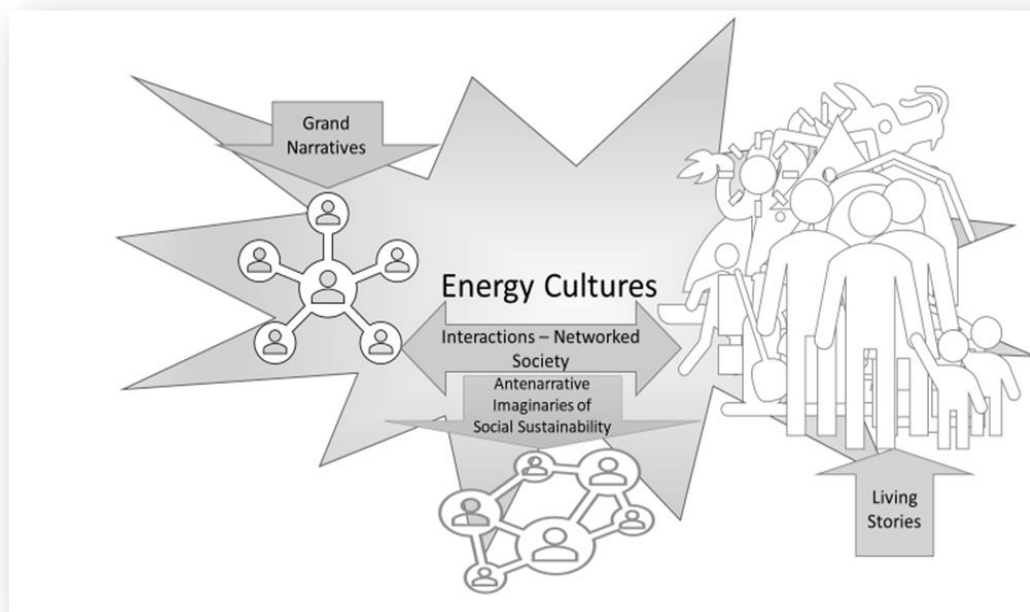
### ***2.1 Antenarratives for learning about energy culture***

Using antenarratives to show the interactions between grand narratives and living stories that illustrate using energy to teach about energy culture offers a novel way of making sense of the links between energy and diverse aspects of society and, by extension, other SDGs. Antenarratives help explore innovative social processes underlying energy cultures and serve as canvases to convey the role of creative and innovative network building to progress action on SDG7. They offer opportunities to explore diverse practices in food, arts, crafts, fashion, and technologies. The same learning can be leveraged to understand the connections and relationships between the SDGs present and which forms of recombination could facilitate creating new networks of commons for societal well-being. For instance, interdisciplinary research on collaborative networks indicates that interdependencies of different sustainability issues – which actors get involved, with whom they collaborate, and how actors are tied to the biophysical environment – have profound implications regarding understanding actors' abilities to address different types of societal and environmental problems (Bodin 2017).

Further, that understanding is critical to developing imaginaries of the future that are compatible with detecting obscure aspects of socio-technical transitions (Jasanoff and Simmet 2021). Antenarratives bring out the meaning-making dimensions of STIs through diverse and fragmented stories and illuminate the energy transition's material and technological dimensions along with its cultural and socio-political ones (Jasanoff and Simmet 2021). That ability again influences making sense of socio-technical reordering with the emerging information and communication technologies often referred to as the networked information society (Castells 2010; Rifkin et al. 2008). In particular, through its new modes of information distribution and provision, the internet – understood as the multiplicity and fluidity of situated assemblages of technical, social, and informational elements (Hanseth and Lyytinen 2016) – appears to spearhead deep transformations. The opportunity stems from the internet's ability to capture and disseminate information, making it a fertile space for detecting and engaging with the interactions between grand narratives and living stories emerging from the business world, contemporary societal governance, existing value orders, social relations, and individual and collective identities. Given the resultant complexity, developing imaginaries of the future, more specifically, a future grounded in a diversity of values, requires creativity. Antenarratives, in such contexts, through the interactions between grand narratives and living stories, offer opportunities to contribute to an alternative lexicon of societal well-being. In this chapter, we propose that learning about sustainability is a social process, and education on social sustainability must reflect that process by grounding it in experiences embodying energy cultures. Antenarratives offer an effective method to do so.

Figure 1 below illustrates the methodology used to highlight the social dimensions of sustainability by capturing the interactions between grand narratives and living stories related to energy culture in networked societies. These interactions enable the development of antenarrative imaginaries of social sustainability. Antenarratives in the form of fragmented,

still-forming stories enable a form of learning that does not just normalize complexity but offers a legitimate space to be complex. Energy choices could depend on specific and subjective needs, and networked environments offer opportunities to negotiate and reconcile those needs at the community level; for instance, using a car when a journey is urgent but public transport for everyday mundane tasks. The networked environments allow such complex ideas to scale.



**Figure 1: Antenarrative imaginaries of social sustainability: A method for learning about social sustainability.**

## ***2.2 The Circular Economy – a rich source of antenarratives for imagining future energy cultures***

Making energy cultures tangible for teaching can be challenging, and a practical way of making energy cultures tangible is through the circular economy (CE) perspective, as energy is an implicit element of it. CE is ‘a regenerative system in which resource input and

*waste, emission, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops thanks to long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling'* (Geissdoerfer et al. 2017, p.759). Further, as CE is an emerging area of study, it offers teachers the opportunity to incorporate timely phenomena and grand challenges (Elo et al. 2022), and through the continuous interactions of grand narratives and living stories, the source of antenarratives for imagining future socio-economically and environmentally sustainable energy cultures.

The connection to energy in the CE is evident in its earliest manifestations in industrial symbiosis (Ehrenfeld and Chertow 2002; Jacobsen 2006). In adopting a collective approach to competitive advantage where separate industries create a cooperative network for exchanging materials, energy, water, and/or by-products, industrial symbiosis addresses resource depletion, waste management, and pollution issues. It plays an important role in the transition toward sustainable development (Baldassarre et al. 2019). Baldassarre et al. (2019) tried to combine the two conceptual perspectives of industrial symbiosis, industrial ecology, and the CE to offer an integrated process to design new industrial symbiosis clusters. The former encompasses the development of industrial symbiosis over time and its impacts on the environment, the economy, and society. The latter explains how a cluster functions from a business standpoint in the operating phase. As new clusters require innovative network configurations and business models, the CE also offers a route into sustainable entrepreneurship (Del Vecchio et al. 2021; Heshmati 2017).

However, as the practicalities affecting these models take shape, the emergent experiences that could be described as stories diverge from the overarching conception. This divergence is revealed in Greer et al.'s (2021) waste-resource paradox, uncovering the relations that emerge as CE models are deployed. Boje (2014, 2011a, b) writes of antenarratives that emerge before narratives and become coherent. At the same time, they embody imaginaries of future possibilities as a viable means for making sense when navigating the complexity of organizational change processes. Antenarratives connect grand narratives and living stories

with past and future imaginaries, thus acting as a novel transition mechanism. Therefore, drawing upon antenarratives is a viable method for making sense of the underlying connections that link SDGs for making progress on them (Report – 2022 SDG7 TAG Policy Briefs) and ushering in the changes required for sustainable futures. An antenarrative is often constituted deterministically, like a story with a beginning, middle, and end while positioning itself beyond or above, as something akin to a meta-story. That definition omits unconstructed or fragmented stories from organizational discourses and fails to capture how actors exist as multiple discourses, or networks of identities, in space and time (Luhman and Boje 2001). Antenarratives capture these fragmented and polyphonic living stories in the multiple discourses that are part of an ongoing dialogue with social and historical forces, constantly interpreting and reinterpreting sensemaking categories or schemas about the organizational reality (Boje 2014, 2011 a, b). Culture offers a conducive environment for identifying antenarratives.

Culture operates on various levels – individuals, groups, organizations, and nations – which reflect local social practices, beliefs, and behavioural routines and their socio-material or socio-technical manifestations (Sovacool and Griffiths 2020). Research indicates that culture is a salient yet unacknowledged barrier or enabler to low-carbon transitions and broader transitions to sustainability (Sovacool and Griffiths 2020). As an amalgamation of complex interactions between policies, infrastructure, technologies, and human behaviour, energy systems are dynamic (Cherp et al. 2018, 2011). Energy systems are central to all activities and consequently, key to sustainability transitions because human factors such as attitudes, perceptions, and decision-making processes shape energy consumption and use (Klaniecki et al. 2020; Sovacool 2014). Scholars have called for studies on energy transitions to take a more human-focused approach through the integration of a systemic mode of operation to understand energy use, aspirations, and perceptions by integrating multiple disciplinary perspectives (Cherp and Jewell 2011; Karatasou et al. 2014; Klaniecki et al. 2020). That is important

given that our present systems are organized in ways that reveal their connections, directly or indirectly, to the dominant energy system (Jorgenson et al. 2019); these connections must be explicated, as they influence the norms that determine how we think and act. The emergent discussions around CE make these connections and their relationship to dominant energy systems explicit. It is necessary to focus on and acknowledge whether the transition the CE implies can meet the current demands for work, heat transfer, lighting, and data manipulation of current globalized and growth-oriented economies (Alexander and Floyd 2018; Floyd et al. 2020).

Relations shape us, and experiences make sense only if we understand relations in practice between conflicting schemes of experiences (Deleuze 2000). New concepts must be created to make sense of singular experiences and affirm their meanings in practice (Deleuze 2000). This creation of new concepts and meanings employing notions of difference and becoming is a specific pedagogy. Differences arise precisely because experiences always overflow the cognitive confines of individual minds, which triggers learning from those experiences (Deleuze 2000, 1993; Deleuze and Guattari 1987). More specifically, studies exploring social sustainability should consider the role of energy systems in shaping the ecological conditions of social life (Cederlöf 2021) and how social milieus shape the understanding of systems (Greer et al. 2021). The consideration leads to an understanding of the ecologically unequal exchange and forces a rethink of the ontology of technology to reflect an inherent social relation defined by distribution asymmetries (Cederlöf 2021). In addition, it also reinforces existing systems in unintended ways by generating paradoxes (Greer et al. 2021). These paradoxes have been framed within rebound effects (Levänen et al. 2021; Zerbinò and Aloini 2022). Profound changes in the dominant modes of production and consumption are important aspects (Floyd et al., 2020) often ignored in this context.

Therefore, developing human capital or creativity competencies to depict and implement the CE requires integrated learning programs. Such learning must combine different perspectives on the CE to overcome the fragmentation of initiatives focused on specific aspects, such as design thinking or engineering issues (Kirchherr and Piscicelli 2019; Del Vecchio et al. 2021). Initiatives related to CE will have to consider how related activities such as the adoption of economic policies through deregulation in banking, the globalization of capital markets, improvements in IT, and off-shoring of production encourage consumption, especially in the electronics, clothing, and consumer goods sectors (Murray et al. 2017). The links between material devices, embodied skills, mental representations, and the configurations they combine (Shove and Pantzar 2005) are an important part of the learning process for designing CE models.

The pressures on planetary boundaries call for a new understanding of resources, where the social process of turning something into a resource offers new dimensions for managing that resource (Hultman et al. 2021). Consequently, teaching on the CE must be radically transformed, too (Kirchherr and Piscicelli 2019; Salas et al. 2021). As a result, the CE becomes a rich source of antenarratives to aid in making sense of the past and creating imaginaries of future energy cultures (Bauwens et al. 2020). That advance spawns an opportunity to act on SDG7 and make progress on other SDGs. Accordingly, the CE was the main catalyst for designing two courses specifically to teach social sustainability.

### ***2.3 Adopting antenarratives on CE to teach social sustainability***

Antenarratives always introduce fragmented stories and tensions as they are premature narratives, and they become stories through interactions (Boje, 2011 a, b; Boje, 2001) and can be adopted in multiple ways in course design or lectures. That is especially true for subject areas steeped in complexity – such as sustainability or innovation – that are not fully

comprehensible even to educators. That indicates a need for both multidisciplinary and multi-dimensional approaches. The antenarrative approach offers a more conversational means of learning about complex issues. We further present the examples of two courses in which antenarratives were used to introduce the idea of social sustainability, and the antenarratives helped in engaging students to learn through critical reflection. Below, we present how antenarratives can illustrate interactions between retrospective storytelling and imaginaries of the future and help learn about social sustainability in two different educational contexts.

### *2.3.1 Antenarratives to teach socially sustainable entrepreneurship*

The first context relates to a massive open online course (MooC) on Futurelearn (Futurelearn, n.d.) that interprets social sustainability within the framework of SDGs. The course discussed here contributes to the larger theme of sustainable entrepreneurship for well-being/welfare in the era of digitalization. It does so by looking specifically at entrepreneurial activity in the knowledge economy, with an implicit focus on social sustainability. A MooC is generally characterized by having many participants from various backgrounds and cultures. Other characteristics include openness and voluntariness; a MooC can usually also be integrated into other courses. It is hard to control for the number of participants and their knowledge level; however, the variety and diversity of participants encourage imagining pathways to social sustainability. Learners can explore antenarratives as their own living stories interact with the grand narratives and offer an opportunity to become aware of the social processes that drive awareness of social sustainability. The learning approach chosen to deliver the learning outcomes is the flipped form (Eryilmaz and Cigdemoglu 2019). The flipped learning design permits integrating various perspectives on the topic.

The course we developed is *Sustainable Entrepreneurship in Information Societies*.

The content of the course relates to sustainable entrepreneurship with special emphasis on social sustainability within the context of the transition from an industrial to an information society (Castells 2010; Rifkin et al. 2008). The learning outcomes of the course are as follows:

1. To develop an awareness of sustainability in the context of the transition from the industrial to the information society. That involves learning about and reflecting on sustainability in the information age and the role of entrepreneurship in that evolution of thinking.
2. To identify features of the information age and contrast them with those of the industrial age, and why and how they influence sustainable entrepreneurial choices.
3. To understand the roles of systems thinking, networks of commons, and innovative forms of decentralized and distributed organizing in developing an entrepreneurial mindset suited to digital environments.

The course is spread over a week and consists of five learning modules. The first introduces the idea of sustainable entrepreneurship in information societies and begins with the key concept of what comprises an information society. A simple quiz also encourages learners to identify the mindsets that contribute to activities related to industrial and information societies. For example, the quiz includes questions related to approaches to work, views on failure, problem-solving, collaboration, and views on knowledge management. Learners' answers are assigned points that, when summed, identify their mindsets. The aim is to provide learners with a basic understanding of an industrial-society-dominated mindset (reinforced by efficiency, individual achievements, etc.) and an information-society-dominated one (reinforced by collaboration, experimentation, etc.) and the related approaches.

In the next module we explain why sustainable entrepreneurship is key to transformations from industrial to information societies. The module features three articles; the first introduces the idea of sustainable entrepreneurship in information societies, followed by sto-

ries that exemplify sustainable entrepreneurship. We chose stories on sustainable entrepreneurship that showcased those who leveraged new technologies and business models, promoted social and environmental awareness, and encouraged collaboration and partnerships. The stories guide making sense of sustainable entrepreneurship in information societies. For example, we used the story of Vigga Svensson, the co-founder of *Vigga*, a baby clothes subscription service based in Denmark, who also runs *Continued Fashion* (continued.fashion n.d.). That platform focuses on recirculating clothes to reduce their associated carbon footprint. This story highlights how brands and consumers connect with the goal of offering fashion as a service, a new business model based on the CE concept. In doing so, it reduces waste and promotes resource efficiency, urges a rethink of how we shop for new products and encourages a transition in the culture of ownership towards access. The example provides a living story illustrating a transformation in the dominant cultures of production and consumption, which remained underdeveloped in the stories of sustainable entrepreneurship as those continued to adhere to the dominant cultures. In the discussions near the close of the module, we urge learners to explore imaginaries of sustainable entrepreneurial activities for information societies. That involves students reflecting on questions such as: What kind of entrepreneurial activities would you categorize as sustainable? and How could sustainable entrepreneurs adapt their business to the information society? The objective is to help learners explore the interactions of their own living stories with grand narratives to become cognizant of the social processes that drive awareness of social sustainability.

The third module presents several articles written with the support of generative artificial intelligence. In this case, it is employed to transform complex academic research content into a more accessible blog-type text. The first article introduces learners to the idea of change through the concept of market shaping, which is the ability of entrepreneurs to shape markets in contrast to tailoring their entrepreneurial activities to the market. The living story

of Vigga Svensson acts as a catalyst for this article. The next article presents the skills and capabilities required to cultivate sustainable entrepreneurship in information societies and is followed by an audio clip that links technology to knowledge. The objective is to familiarize learners with interactions between knowledge and technology, which is key to imagining entrepreneurial activities. For example, knowledge acquired on the unsustainable outcomes of the global clothing industry led Vigga Svensson to leverage the power of technology to design a better model, and it was technology that brought the knowledge about this unsustainable system into the public realm. At the end of the module, we ask learners to reflect on the audio clip.

Further in the course, the grand narratives of sustainable entrepreneurship and the living story of Vigga Svensson also pave the way for learners to delve deeper into the role of entrepreneurship in shaping energy cultures. Accordingly, in the fourth module we employ two articles to prompt discussion of energy cultures – such as car culture, food culture, housing culture and work culture – and to present existing entrepreneurial activities in the emerging sustainable energy landscape. We ask learners to reflect on the two articles.

Throughout our course, students encounter stories, take self-reflective quizzes, and address exploratory questions designed to help learners identify the grand narratives and to think about their own living stories. Storytelling through cultural artefacts such as descriptions of entrepreneurs and businesses and activities are deployed to encourage learners to examine relationships, which will expand their understanding of sustainable entrepreneurship. The self-reflective quizzes and questions nurture the sensemaking process and reveal how sustainable entrepreneurship as a social process of change is connected with social sustainability. Introducing the complex concepts underpinning social sustainability in an accessible manner can be challenging, and tools such as ChatGPT (generative pre-trained transformer) can be useful for teachers. We leveraged our background in business networks, innovation

systems, strategy, and sustainability to access the stories from existing case studies, conference presentations, and news articles. These stories are then shaped into an easily comprehensible format via ChatGPT.

When adopting the teaching approach introduced in this example, the educators should pick their stories to suit their background and teaching context and also to reflect the core objective. The aim of capturing fragmented, living stories is to compile a narrative with a specific purpose – highlighting that as systems of organizations evolve, they create both good and bad outcomes. New forms of organization emerge to capture the benefits and address the consequences. The stories are intended for learners to develop a holistic understanding of digital technologies and the interactions they facilitate. The method helps to introduce how these technologies change societal dynamics and how societal dynamics, in turn, shape them. For teachers, these stories help introduce concepts like systems thinking, networks of commons, the sociology of markets, and the relevance of innovative forms of decentralized and distributed organizing without necessarily mentioning them explicitly. Decentralized and distributed organizing become relevant as energy choices fragment, as renewable energy sources are characterized by their diversity. The stories show how these concepts are central to developing and nurturing an entrepreneurial mindset.

### *2.3.2 Antenarratives for teaching design thinking*

The second education context relates to an optional or elective master's level degree course introducing new trends in business. Given the introductory nature of the topic, the course had to be simple and accessible. The topic was design thinking, where the business model canvas for the CE became the catalyst for understanding and implementing it. Design thinking is 'a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert

into customer value and market opportunity' (Brown 2009, p. 86). The number of students was limited, and the course was part of a strategic business development program. The background knowledge of some students was known from the outset.

The course focused on a design approach to problem-solving, where students learned how to look beyond the boundaries of a particular business problem by focusing on customer needs (explicit and tacit) and the end user's environment, social and environmental factors, market adjacencies, and emerging trends. The intended learning outcomes of the course were to 1 understand design as a strategic business issue; 2 identify the role of design in managing new product development and organizational processes, and 3 apply customer-focused design principles and tools and use design thinking approaches to advance sustainability. The course focused on a design approach to problem-solving, where students learn to look beyond the boundaries of a particular business problem by focusing on customer needs (explicit and tacit) and the end user's environment, social and environmental factors, market adjacencies, and emerging trends.

Again, the course content was structured through stories of CE models and how they deploy design thinking. That structure incorporated retrospective storytelling with elements such as interdisciplinary coordination, incorporating diversity and multidisciplinary tools to analyse, synthesize, and generate insights and new ideas highlighting the interdisciplinary nature of design thinking. For instance, we used the context of built environments or manmade structures, features, and facilities viewed collectively as an environment in which people live and work to construct a grand narrative. Built environments, by their very nature and scale, offer an entry point to grand narratives that often consider better waste management, recycling, efficiency, and waste-to-energy. We do this intentionally because these narratives obfuscate real issues that, in turn, restrict design processes from addressing well-being at a more fundamental level. Better waste management helps with lowering costs, but the problem of

waste remains; this is true of recycling, efficiency metrics, and waste-to-energy design models. Then we introduced the living story of *Villa Welpeloo* (Superuse-studios.com n.d.), a house and art studio using Google Earth to identify waste stock in industrial zones and then incorporate locally salvaged material into its designs. The living story gave a radically different perspective on designing built environments and showcased how design and technology can combine to offer solutions.

The stories encouraged students to articulate innovative strategies balancing technical, business, environmental, and human dimensions. As an experiment, each student was tasked with monitoring and repurposing household waste and reporting the experience. The stories on design thinking showcased emotional, integral, and experiential intelligence. They also addressed how doing so offers organizations valuable insights into a range of business activities and decision-making. Here, the individual stories by students on monitoring and repurposing household waste revealed failures, achievements, barriers, and opportunities and offered insights on new design trajectories. We used the business model canvas to direct students' attention to global interconnectedness through excerpts from popular media. Stories of creative processes transforming things into products can shift attention from essentialist queries on the nature of products toward what kinds of relationships enable their creation. Energy features because it facilitates the interactions that lead to such relationships. The learning approach was cooperative learning (Johnson et al. 2000), as the objective was to elicit experiences. Experiencing the stories opened up imaginaries that helped forge new stories of creation.

### **3 Teaching social sustainability through imaginaries for energy cultures**

Learning as a critical component for achieving SDGs (Leal Filho 2021; Rieckmann 2017) to collectively build future-proof societies (Vargas et al. 2022) requires an awareness of energy cultures, as energy linkages are imperative for connecting the SDGs (McCollum et al. 2018). These linkages became evident during the recent pandemic, as is reflected in the recent UN policy brief on initiating urgent action on energy (SDG7) to deliver the entire 2030 Agenda for Sustainable Development and the Paris Agreement on climate change (Report – 2022 SDG7 TAG Policy Briefs). The policy brief acknowledges the complexity of the Agenda and proposes that energy offers the requisite linkages to other SDGs for strategic and intentional action to advance sustainability. Energy cultures offer opportunities for identifying interactions and subsequently negotiating sustainable actions.

The two courses approached the complexity inherent in sustainability through an interaction between retrospective storytelling and living stories. These interactions clarified the connections and possible actions and thus made the issues relatable and tangible. People approach the complexity of relationships by organizing activities linked to a particular energy system and related values and cultures, which prompt imagining new and emerging ones anchored to diverse energy systems with myriad values and cultures challenging the dominant one. Social processes are relevant to mediating this difficult transition, and the MooC attempts to highlight the processes, challenges, and opportunities through the interactions between narratives and living stories that reveal how they are linked and could be recombined.

The second course focused more on a particular social milieu, business, and strategic business activities. The stories about the CE helped highlight the social interactions that are key to uncovering the dominant mental models and the cultural norms that legitimize them. A

collaborative and creative thinking activity, design thinking, was used to elicit imaginative pathways for developing CE business models using a business model canvas. Letting students develop their own living stories about their encounters with waste drew attention to the social processes underlying the idea of waste and encouraged them to imagine solutions suiting their individual contexts. The social processes that contribute to the extraction, processing, marketing, distribution, and consumption of products and services and the energy expended on such processes.

New concepts for triggering insights into socially complex issues do not evolve neatly from established theories. However, they can emerge by acknowledging the paradoxical tensions in a manner that can accept integrating discursive material and cognitive theorizing. That approach can help integrate contradictory evidence to support the renewal of theoretical foundations rather than a defence of theoretical constructions (Clegg et al. 2020). The process requires ideas to be organized creatively, and teaching social sustainability offers an opportunity to do so. Energy cultures provide a context to showcase that organization of ideas.

The energy cultures framework unveils the factors influencing energy consumption behaviour and helps identify opportunities for behavioural change (Stephenson 2018). For example, information technologies promising energy conservation are often deployed to accelerate processes that ultimately consume more energy. Approaches that consider energy cultures can help address that paradox through stories of material flow embodying socio-material continuities characterizing lived experiences. Creating any bounded unit of analysis clouds the multi-scalar patterns of resource use and distribution (Cederlöf and Hornborg 2021; Floyd et al. 2020), and energy cultures reveal such patterns.

Meanwhile, the interactions and interdependence of technologies and social change understood through the antenarratives reflect the growing complexities characterized by social, organizational, and cultural shifts that facilitate the formation of the knowledge-based

economy (Russell and Smorodinskaya 2018). The energy culture frame helps capture the stories acknowledging and clarifying these relationships, which, when problematized, directs attention to the ideas and pathways that emerge to manage the negative outcomes.

## **4 Conclusion**

We conclude that energy is at the core of the SDGs and teaching related to social sustainability. Sustaining that position can be boosted by capturing energy cultures that shape antenarrative imaginaries related to social sustainability. Integrating technologies like generative artificial intelligence (e.g., ChatGPT) is becoming central to learning experiences and could be leveraged to create simple, accessible modules, especially for complex and somewhat abstract topics. The antenarrative method encourages creativity, diversity, innovativeness, and cooperation in unforeseen ways. The method could benefit any subject, lending itself to a more interactive and speculative mode of inquiry and discovery. In the context of sustainability, antenarratives offer a unique way to understand the various networks and linkages underlying the current system while permitting the imagining of new combinations. Antenarrative imaginaries introduce new dimensions of reality and help us understand that reality is complex. We often use singular dimensions or stories because they are easier to visualize them. However, if we want to take on the wicked and complex challenges of our current environments, we should refrain from allowing the expediency of plots offered by singular stories, and our need to visualize easily diminish the richness of reality. Energy cultures embedded in diverse stories are an entry into those rich dimensions.

Suggested further reading on the topic

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- Malm, A. (2016). *Fossil capital: The rise of steam power and the roots of global warming*. Verso Books.

Podcasts from Santa Fe Institute (<https://www.santafe.edu/culture/podcasts>) are a good way to explore the idea of complexity, an idea at the heart of any transformation process.

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