Catch me if you can: energy savings beyond the low hanging fruit

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Abstract

> In the competition for hearts and minds, improving the efficiency with which we use energy faces an uphill challenge; images of heat exchangers, solid state lighting, infrared scanning technologies, more and better roof insulation, double and triple glazing, air sealing systems, or even smart meters do not get the pulse racing. [Convery, 2011, 189]

Why do energy savings measures "not get the pulse racing"? In Convery's view, they cannot compete with "the glow" of energy supply projects or the local economic benefits of new power plants. Yet, we also know that energy supply projects regularly take years or decades to conclude at significant financial, political, and environmental cost. Conversely, energy savings measures often pass under the radar and are frequently, though not always implemented relatively quickly and easily as the proverbial low hanging fruit. In this paper, we suggest that the binary view of high attention = high impact versus low attention = low impact is neither accurate nor helpful. To speed things up and nuance the discussion, we highlight the relevance of capitalizing on low attention but high impact approaches. First, we develop a conceptual framework that brings into relation energy savings impact and attention (aspects such as participation by different actors, a measure's material footprint; and political consequences) and how the two evolve over time. Second, we offer examples from Geneva and Switzerland, aiming to populate the framework-derived matrix, analyze movements across cells in the matrix during a project's life, and identify complementarities between different quadrants of the matrix, for example between programs of the Service Industriels de Genève and the Swiss Confederation. Finally, we address "scope conditions" under which higher hanging fruit can be reached (because they attract less attention) and conclude with recommendations for planning and implementing energy efficiency and sufficiency measures.

Introduction

A dozen years ago, resource economist Frank J. Convery wondered why energy savings measures "do not get the pulse racing?" In his view, it is partly because they fail to equal "the glow" of energy supply projects such as "gleaming windmills, solar towers, and arrays of solar cells" or the local economic benefits of new power plants (Convery, 2011, 189). High-impact supply projects do regularly get built, but we also know that they often take years or decades to conclude, absorbing significant and widely underestimated financial, political, and environmental resources in the process (for cost overruns of dams, see Plummer Braeckman et al 2020; for political opposition against nuclear reactors, see Martínez-Alier 2023; for the over and underestimation of the environmental impact of hydropower projects, see Gemechu & Kumar 2022).

Energy savings measures often pass under the radar, sometimes involve intricate and little-understood institutional devices, and for a variety of reasons are occasionally considered difficult to measure or evaluate. The phasing out of incandescent light bulbs or the mass adoption of low-flow faucets have been realised through the evolution of regulation, voluntary agree-

ments, or one-shot efficiency action plans. To go further than these low hanging fruits – quickly and relatively easily implemented measures – energy utility companies have developed demand side management (DSM) strategies aiming to activate the "negawatts" available in industry, households or municipalities. Despite the real success of such strategies, however, they do not quite measure up to the spectacular promise of energy supply infrastructure.

In this paper, we suggest that the binary view of high attention and high impact versus low attention and low impact, which his implied by Convery (2011) and developed in this paper, is neither accurate nor helpful. It is inaccurate when considering that the International Energy Agency (IEA), in its flagship report *Energy Efficiency 2023*, proposed that focusing on energy efficiency action is the "unambiguous first and best response [to the current energy crisis] to simultaneously meet affordability, supply security and climate goals." It is unhelpful when considering the decade-long global slowdown of energy intensity improvements and the momentous acceleration now needed to meet global, national, and local energy transition goals and achieve associated pledges (IEA 2023).

To speed things up, we highlight the relevance of conceptualizing, identifying, and capitalizing on low 'attention' and high impact approaches. First, we provide an overview of current energy efficiency and sufficiency trends, challenges, and opportunities at the international level as well as in the specific context of Switzerland and the Canton of Geneva. Second, we develop a conceptual framework that brings into relation energy savings impact and attention – which we conceive to include such aspects as the scope and modalities of participation by key actors; a measure's material dimension and hence visibility; and political consequences (Jones & Baumgartner 2005; see also Lage et al 2023) – while being attentive to the variable evolution of impact and visibility throughout the various stages of a project cycle.

Third, we offer illustrations of this framework with energy efficiency and sufficiency examples from Geneva and Switzerland (and possibly beyond), aiming to populate the framework-derived matrix, single out movements across cells in the matrix that correspond with projects' temporal evolution (for example, from high visibility and high impact during agenda setting and legislative debate to low visibility and high impact during implementation), and identify synergies and complementarities between measures in different parts of the matrix, for example between the éco21 program of *Service Industriels de Genève* (SIG) and the ProKilowatt program of the Swiss Confederation. Finally, we circumscribe several "scope conditions" under which higher hanging fruit can be pursued (because they are less visible) before concluding with recommendations that we hope may facilitate the planning and implementation of energy efficiency and sufficiency measures.

This paper is an empirically informed exploration whose primary aim is to address a counterintuitive question and thereby inspire discussion. We set out with a puzzle – what if less, rather than more attention were conducive to accelerating energy savings? – and hope to offer sufficient traction for sustained discussion and further investigation. Methodologically, we develop our argument based on our respective professional experiences as well as an interdisciplinary reading of diverse literatures.

Current trends and challenges in energy efficiency and sufficiency

According to the second law of thermodynamics, equilibrium between supply and demand in an energy system can be achieved by increasing production capacities and/or imports (industrial revolution approach), or by reducing needs (sufficiency) and/or more efficient technologies. Sufficiency and efficiency represent two complementary approaches to reducing energy consumption.

ENERGY EFFICIENCY

Databases on energy efficiency such as ODYSEE and MURE[1] show that energy efficiency has continually improved over the last decades: without it, industrialized countries like Switzerland today would have to produce or import between 30–40 percent more energy to meet their needs.

According to the US Department of Energy, energy efficiency is the use of less energy to perform the same task or produce the same result. Energy-efficient homes and buildings use less energy to heat, cool, and run appliances and electronics, and energy-efficient manufacturing facilities use less energy to produce goods. Energy efficiency is one of the easiest and most cost-effective ways to combat climate change, reduce energy costs for consumers, and improve the competitiveness of US businesses. Energy efficiency is also a vital component in achieving net-zero emissions of carbon dioxide through decarbonization (US Department of Energy 2024).

According to International Energy Agency (IEA), doubling efficiency progress could cut energy bills by one-third and make up 50 % of CO_2 reductions by 2030 (IEA 2023).

ENERGY SUFFICIENCY

Sufficiency, understood as a voluntary reduction in unnecessary consumption, has gradually appeared, since the 1960s and the publications of the Club of Rome, as a response to ecological and energy challenges (Jeanneret et al. 2020).

The négaWatt association has carried out significant conceptualization work which highlights the collective dimension of sufficiency strategies. According to the French Agency for Ecological Transition, sufficiency consists of questioning ourselves about our needs and satisfying them by limiting their impacts on the environment; it must lead us to change our modes of production and consumption and more generally our lifestyles, on an individual and collective scale (Cézard & Mourad 2019).

Calls for a fundamental transformation of economic systems relying on fossil fuels have moved up national and international political agendas following the Russian invasion of Ukraine. The more or less voluntary reduction in energy service levels, particularly heating, has become a strategic issue in efforts to avoid supply disruptions. Remarkable reductions in consumption have taken place in Europe; however, in many countries, electricity consumption did not decline as much as intended (e.g., Switzerland) or increased between 2021 and 2022 (e.g., Malta, Portugal, Ireland, Cyprus) (Eurostat 2023). This suggests that significant potential for sufficiency remains untapped.

In the *Energy Efficiency 2023* report cited above, the International Energy Agency notes that "energy efficiency stand-

1. See https://www.indicators.odyssee-mure.eu/energy-efficiency-database.html.

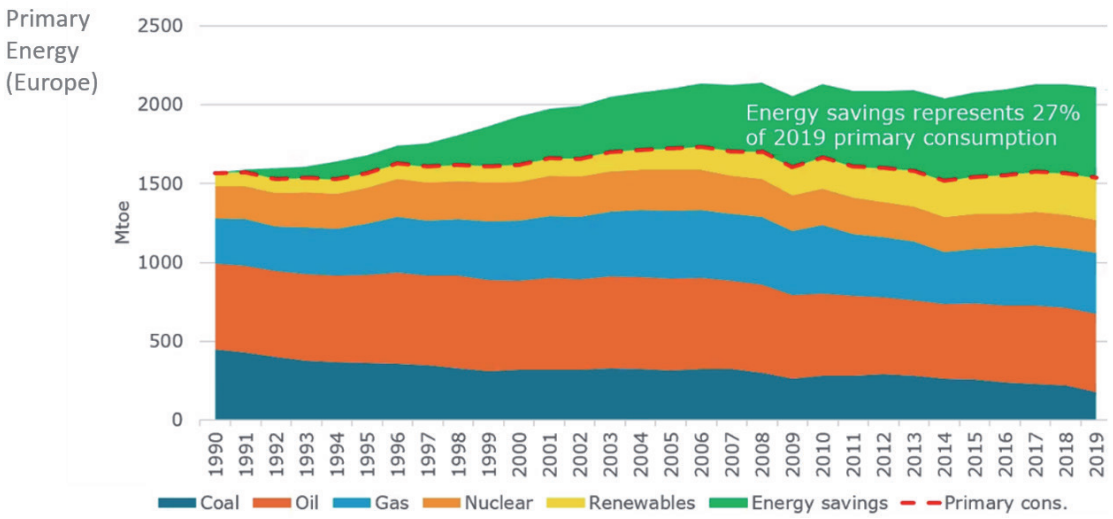

Figure 1. Primary energy consumption in Europe, 1990–2019 (Source: ENERDATA 2020).

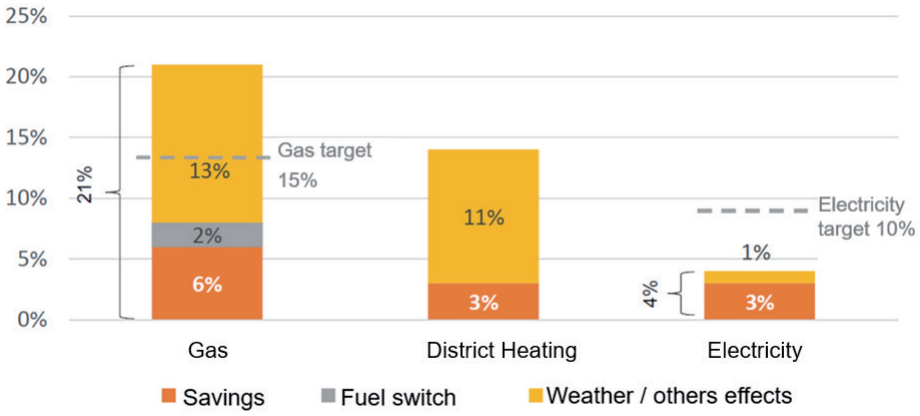

Figure 2. Energy savings in Geneva, Switzerland, Winter 2022–2023 (Source: Cabrera Santelices et al 2023).

ards and regulations are ramping up, but it takes time to drive observable demand change" (2023, 91). Replacing 90 % of the existing stock of small appliances is estimated to take just over 10 years, but between 25–30 years for cars and trucks and 65–100 years for buildings (IEA 2023, 92). In what follows, we propose to consider this and other challenges from a new angle.

Energy savings programs as interstitial activities beyond attention

Successfully arguing that under the right circumstances, action under the radar may be more effective in accelerating the energy transition implies a few assumptions. To begin with, a legitimate case would have to be made that certain high-attention actions may become subject to opposition that slows down implementation. This is easily imagined on the supply side, as in the case of wind power and dams in Switzerland (Vonplon 2024), but less so clear on the demand side, notwithstanding examples such as political mobilization against the 2023 German Building Energy Act requiring the installation of heat pumps (Meakem 2023). Next, a justifiable case would have to be made for keeping or removing from attention actions that may or may not have a significant impact. This is tricky because of the high value attached to transparency and participation, as well as legal requirements of public consultation in place in most democracies (see, e.g., Ansell & Gash 2008, De Fine Licht 2013). Finally, scenarios would have to be conceptualized and parametrized for when and why low-attention energy savings activities could have a higher impact than high-attention activities.

THE POLITICS OF ATTENTION

To practitioners, researchers, and observers of energy sector developments, it will come as no surprise that energy supply issues garner (much) more attention than energy demand issues. This is the very essence of Convery's claim cited at the start of this paper. A few years before he made it, a major study of the drivers of policy change in the United States Jones and Baumgartner (2005, 231) argued that "[n]o political system can balance the intensity of policy attention with the severity

of problems so long as the agenda space is constrained. And, of course, collective action cannot occur before collective attention is directed at a problem." From the perspective of the authors' information-processing framework, policy actors and institutions maintain a status quo because individual cognitive constraints and institutional processes combine to prevent quick and proportional responses to changes in the environment. In other words, when policy change is needed, such as to promote and accelerate energy savings practices, the stickiness of political attention to other issues (e.g. energy supply, not to mention the welter of non-energy issues) acts as a break on transformation.

Another way to interpret and apply the argument by Jones and Baumgartner to the issue at hand can be illustrated by the well-known energy efficiency gap or energy efficiency paradox. This phenomenon builds on numerous studies suggesting that energy efficiency progresses at a slower than socially optimal rate because consumers undervalue, i.e. pay insufficient attention to future energy savings (see Gillingham & Palmer 2013 for a review of the literature).

Numerous reasons for this behaviour have been suggested, including market failure (including environmental externalities, inefficient energy pricing, lack of information, credit constraints, and principal-agent problems, such as where a property owner's energy efficiency investments cannot be passed on to renters), behavioural patterns (e.g. loss aversion, [sic] inattention), and [sic] hidden costs (e.g., consumer may prefer gasoline over electric cars for non-energy-related reasons, such as vehicle performance or access to charging infrastructure) as well as transaction costs associated with an energy efficiency renovation. Accordingly, policy interventions to address the energy efficiency gap may include information labelling, certification systems, subsidies, performance requirements, and nudges.

This synthesis of the energy efficiency gap demonstrates that several core challenges and responses relate to attention, above all that of individual consumers; some work on firms suggests that they face many of the same issues as individuals. If only more attention were paid to the benefits as calculated by engineers, the argument often goes, energy efficiency would advance more optimally (Cooremans 2011, Gillingham & Palmer 2013). Others suggest that the gap may be overestimated because of [sic] hidden costs, consumer heterogeneity, uncertainty, over-estimated savings, and the rebound effect (Gillingham & Palmer 2013, Smith & Moore 2010). Here, too, the argument includes elements of attention and inattention, visibility and invisibility.

If attention can be an impediment to socially optimal policy direction, it is not systematically so. Interventions that escape attention can evoke a range of reactions once they become known, though typically located on the negative side of the spectrum and including ignorance at best, apprehension at worst (Hood & Heald 2006, Grimmelikshuijsen & Meijer 2012). There are good reasons for this. Whenever decision-making is removed from view or access, fundamental principles of democratic functioning and good governance are at stake. As a consequence, there is usually enormous pressure to ensure transparency and participation.

To recall, we do not suggest otherwise but submit that an overly binary view may not be appropriate and that less of some kinds of attention can be an advantage under some circumstances. Two bodies of work in which working under the radar has been considered an advantage are those looking at high reliability organizations (HROs) on the one hand, and interstitial spaces and activities on the other.

Research on HROs emerged in the 1990s to investigate organizations facing the "challenge of managing and operating technologies that were capable of failing with catastrophic effects (Schulman 2017). Initially focused on aircraft carriers and nuclear power plants, this research is of interest for two reasons. On the one hand, these HROs had "a great deal of control over their internal operations […] and many buffers from turbulence in their environment [including] elaborate physical buffers – guns, gates, and guards to protect against environmental intrusions" (Schulman 2017, 247), allowing them to develop their standard operating procedures at some remove from attention despite scrupulous oversight.

On the other hand, subsequent HRO work examining the energy sector, more specifically the California Independent System Operator (CAISO) responsible for managing the state's high voltage electricity grid, found that CAISO's need to balance loads in a complex network of providers and consumers meant significant unpredictability and variability (de Bruijne 2006). This in turn required operators (so-called "reliability professionals") to balance formal and experiential knowledge as well as skills in improvisational action. In network contexts, such skills necessarily evolve at the interface between organizations, norms, and situational demands: so-called interstitial spaces to which we now turn.

INTERSTITIAL SPACES AND ACTIVITIES

Interstitial activities are protected from potentially counterproductive attention in at least three ways. First, by definition, they unfold not only at the margins of established domains of activity but literally in between them, rather than at the core (this may have a physical dimension, when meeting spaces are similarly out of sight).

Second, because they do not fully fit in the dominant organizational logic, they are less visible. For instance, an energy provider, whose dominant approach to efficiency programmes evolves around technical measures, will pay relatively little attention to initiatives that promote behavioral change. Robinson (2000) and Robinson and Gore (2005; 2011) have investigated Canadian municipal climate mitigation action that is not "seen." They found that the formal mitigation milestone process to track climate change responses had failed to account for "interstitial activities" that made up more than half of all mitigation actions and over one third of adaptation actions (Robinson & Gore 2011).

Third, from a practice-theoretical perspective of organisations and organisational change, interstitial activities are sometimes associated with the "mundane practices" of professionals "involved in the everyday doing of energy management, rather than [… the] 'strategic' or top-down organisational management as the locus of change" (Royston et al 2020, 62). Studying energy management professionals (EMPs) in England's health and higher education sectors, Sarah Royston and colleagues (2020, 62) confirm the portrayal of EMPs by Aune et al (2009) and Goulden and Spence (2015) as "involving multiple relationships, continuous negotiations, and competing demands."

In the words of one of the EMPs they interviewed, "A good Energy Manager does things so that people don't even realize that it's been done" (ibid, 66).

Furnari (2014) has identified interstitial spaces as sites of interaction where collaboration between actors from different organizational domains can sometimes generate innovation. Villani and Phillips (2020, 6) describe interstitial spaces as "informal settings where individuals positioned in diverse fields can interact without the conflict that usually accompanies such activity." Among the defining characteristics of interstitial spaces are institutional diversity and complexity (Kraatz & Block 2008), temporally bounded interaction (Furnari 2014), and part-time activity, though it must be remembered that these characterizations originate primarily from investigations of informal interaction settings.

While cross-field collaboration can be difficult because participants' interests, goals, and practices diverge (O'Mahoney & Bechky 2008), we suggest that they may become problematic when they attract too much attention, which is not uncommon when interstitial activities lose their informal quality.

Researchers interested in factors that facilitate and consolidate interactions in interstitial spaces have pointed to catalysts as important "actors who sustain others' interaction over time and assist the construction of shared meaning" (Furnari 2014, 452). Villani and Phillips (2002, 6) then asked what role catalysts can play when interstitial spaces are not informal settings but are "created purposefully in an attempt to initiate cross-field collaboration among organizations."

In this article we suggest that when organizations are characterized by significant internal heterogeneity and crucial extra-organizational bridges (as the notion of organizations as open systems has suggested for at least three decades), the purposeful creation of *intra*-organizational interstitial spaces is of equal interest.

Interstitiality and attention in practice

To this point, our claim that reaching beyond low hanging fruit to promote and accelerate energy savings practices has remained theoretical, if not speculative. Drawing on literature from the energy sector and beyond, we believe the claim has sufficient legitimacy to be examined further. Importantly, we find that when professionals act under the radar, there need not be bad intentions. On the one hand, the sheltering from scrutiny may not be of their own choice (regulators may want it so); on the other hand, operating under the radar often creates the necessary space for experimentation and learning.

In this section we consolidate our argument in the form of an impact-attention matrix and offer illustrations for different combinations of the two variables (Table 1). While attention and energy savings are separated into low, medium, and high, the distinction is analytical rather than normative, i.e. we understand the two as continua along which examples may fall. We do not quantify the two variables. Attention is an indicator that brings together various aspects including the breadth and intensity of multistakeholder participation, the material footprint or visibility of a particular intervention, or the real, anticipated, or intended political consequences. Energy savings may be more straightforward to quantify but we feel that causal complexity warrants caution. By placing "direct" in parentheses we imply that there may be other causal factors or that that energy savings may take time to manifest, making it impossible to assume direct causality universally.

The matrix and illustrations below address two main objectives. First, drawing on our experience and knowledge of the energy savings sector, we want to offer examples in each cell of the matrix, with a particular interest in finding examples with high savings and low attention. Second, we seek to identify factors that would permit practices in one cell to move to another, vertically (without prejudging the desired direction) or horizontally (ideally towards higher energy savings).

INTERNATIONAL CONFERENCES

International conferences like the Conference of Parties (COPs) are important for advancing the concepts underlying energy savings, but it is difficult to attribute direct impacts to them.

CLASS ACTION SUITS

The most famous class action in the energy and climate sector was won by Dutch environmental group, the Urgenda Foundation, and 900 Dutch citizens (Sabin Center for Climate Change Law 2024). They sued the Dutch government to require it to do more to prevent global climate change. The court in the Hague ordered the Dutch state to limit GHG emissions to 25 % below 1990 levels by 2020, finding the government's existing pledge to reduce emissions by 17 % insufficient to meet the state's fair contribution toward the UN goal of keep-

Table 1. Impact–Attention Matrix.

		(Direct) Energy savings		
		low	medium	high
Attention	high	International conferences, e.g. Conference of Parties (COPs)	Class action suits	Forced sufficiency: crisis/ emergency management
	medium	Protest action	Subsidies/tax mechanisms High-visibility public campaigns	Demand Side Management programs Collective sufficiency action
	low	Property owner / renter awareness raising	Performance contracting Education and training	Regulation, labels & certification Green/impact investing

ing global temperature increases within 2 °C of pre-industrial conditions.

CRISIS/EMERGENCY MANAGEMENT

Familiar to the populations of territories lacking infrastructures (parts of Africa, South America, or islands), quotas and load shedding as elements of contingency planning have returned to Europe following Russian aggression in Ukraine. They constitute the ultimate, most radical, and least fair means of rebalancing consumption levels with production capacities (the negative impact of load shedding on energy justice has been a major issue in Southern Africa, see, e.g.,Wiese & van der Westhuizen 2024).

PROTEST ACTION

The spontaneous youth protest movement or more structured movements like Extinction Rebellion have had a significant influence on CO_2 emission reduction schemes, at local, national, and international level. Very progressive legislative frameworks have been implemented following citizen mobilizations (Denmark, Vorarlberg, etc.; see Héran 2015; Kooij et al 2018). However, it is difficult to measure their impact in terms of direct energy savings.

COLLECTIVE SUFFICIENCY ACTION

Following the idea of Transition Towns inspired by Rob Hopkins and others in the UK, more and more citizen initiatives aim to increase self-sufficiency to reduce the effects of climate change, and economic instability through renewed localization strategies, especially around food production and energy usage. An increasing number of citizen groups in Europe, North America and Australia are registered with the Transition Network and/or similar movements. In addition to the potential for improving local resilience (see, e.g., Hoppe & Warbroek 2021, Rosewarn 2022), these dynamics allow peer-to-peer questioning in the sufficiency domains. Citizens movements are often at the root of paradigm shifts for e.g., the development of cycle paths in the Netherlands following protest movements in favor of bicycle mobility (Feddes et al 2020).

SUBSIDIES/TAXES MECHANISMS

Subsidy and tax mechanisms have been introduced to discourage polluting energies such as oil, gas or nuclear power, which externalize the cost of global warming, coverage of accident risks, and other factors. Notwithstanding important differences between subsidies and taxes as well as debate about their real impact, both continue to be used extensively. On the one hand, energy subsidies are often shown to be effective (e.g., Nicolini & Tavoni 2017); on the other hand, administrative cost, free rider effects and imperfect carbon pricing tend to undermine their impact (e.g., Kalkuhl et al 2013).

DSM PROGRAMS

In order to deal with congestion in distribution networks and avoid blackouts, energy Demand Side Management programs (DSM) emerged in North America in the last quarter of the 20th century, driven by regulators and large utilities in California in particular. These models allowing the economic interests of energy operators to be aligned with energy efficiency have been developed over the past forty years in some fifty states and communities around the world. They make it possible to reduce the quantities of energy delivered without reducing margins, by decoupling part of the revenue from the volumes sold.

HIGH-VISIBILITY PUBLIC CAMPAIGNS

During the 2022-2023 winter, Europe returned to awareness campaigns that echoed those seen in the 1970s. Even if the messages conveyed were very basic (turn off the lights, turn down the heat, put lids on pots, etc.) it has been verified (Cabrera 2023) that, combined with an explosion in energy prices, they had a real impact on energy consumption.

PROPERTY OWNER/RENTER AWARENESS RAISING

On the webpages of all the world's energy departments, those of sustainability-oriented energy operators or equipment manufacturers or those of non-governmental organisations (NGOs), tips and tricks for saving energy are sometimes useful but so much less visible than advertising consumerism campaigns, that their impact stay generally under the radar (Andor et al 2022).

PERFORMANCE CONTRACTING

A rare commercial tool that integrates energy savings, Energy Performance Contracting (EPC) is a form of 'creative financing' for capital improvement that facilitates the funding of energy upgrades from cost reductions. Under an EPC arrangement, an external organization (energy service company, ESCO) implements a project to deliver energy efficiency and uses the stream of income from the cost savings, to repay the costs of the project, including the costs of the investment. Essentially the ESCO will not receive its payment unless the project delivers energy savings as expected.

REGULATION, LABELS & CERTIFICATION

Since the oil crises of the 1970s, to face the threat of shortages and reduce environmental impacts, standards and schemes aimed at banning the most energy-intensive processes / devices have been implemented throughout the world with visible impacts on energy demand in all sectors: buildings, transportation, industries, etc.

EDUCATION AND TRAINING

Technical and non-technical skills are used to increase energy savings enabled by professionals and/or non-professionals. The lack of training (initial or continuing) in the fields of green jobs is one of the most important challenges of the energy transition (ILO 2018; OECD 2023).

GREEN/IMPACT INVESTING

The carbon footprint of investments of a country like Switzerland is close to 20 times the carbon footprint of activities carried out within the country (all sectors combined) (Wenger et al 2022). Green investing which supports business practices that have a favourable impact on nature have a key role to play. Often grouped with socially responsible investing (SRI) or environmental, social, and governance (ESG) criteria, green investments focus on companies or projects committed to the conservation of natural resources, pollution reduction, or other environmentally conscious business practices. Some investors

buy green bonds, green exchange-traded funds (ETFs), green index funds, green mutual funds, or hold stock in environmentally friendly companies to support green initiatives. While profit is not the only motive for those investors, there is some evidence that green investing may mimic or beat the returns of more traditional assets (Chen 2022).

These examples are necessarily brief, but our objective is not to provide in-depth knowledge about any one of them. Rather, our intent is to assess whether the conceptual framework we propose can generate a diverse set of illustrations that can serve to reflect on the framework and generate questions and hypotheses for discussion and further investigation.

Reaching past the low hanging fruit

The matrix and list of energy savings examples suggest that all manner of combinations can be found. To be sure, the examples do not constitute a random or stratified selection from a comprehensive universe of possible examples. Indeed, we tried to find examples for each cell, making this an exercise of purposive sampling. Moreover, while we considered the classic categories of energy savings activity – buildings, appliances, transport, and industry – we also sought to include more general socio-political practices that can be found in connection with energy savings but also common in other issue domains such as international conferences or regulation.

In this section we wish to identify a few implications from applying the conceptual framework to energy savings practice. In so doing, we are particularly interested in two aspects. The first concerns examples that we were not sure where to place or, rather, could imagine finding in different cells of the matrix. Reflection of such cases invariably forced us to identify scope conditions such as scale and temporality. The second concerns movements (intentional or not) from one cell or set of cells to another and hence insights into (and ultimately recommendations for) crafting approaches to reach past the low hanging fruit (i.e. low attention – low impact).

SCALE

Two aspects that play a vital role in teasing out scope conditions are scale and temporality, with each being subject to further differentiation. Scale is of relevance to attention and impact and in some ways bridges the two. One dimension relates to geographic scale. For example, "international conferences" can be organized at a global scale or in a regional or even bilateral context; larger conferences often get more attention than smaller ones, but when policy instruments are to be created, the larger number of negotiators creates more significant collective action problems (the same applies domestically, especially in federal systems).

Another dimension relates to jurisdictional scale, which has consequences for energy savings impact (municipal versus national regulation) and attention, though jurisdictional scale does not necessarily correlate with attention, as highly conflictual local measures can sometimes garner more attention than consensual national measures. Scaling up or down certain energy savings measures can thus influence attention or impact.

Moreover, energy savings practices often unfold in multilevel contexts, where the functioning of interstitial spaces depends on a larger enabling environment. Villani and Phillips (2020, 25), for instance, found that catalysts of cross-field collaboration operating at the individual level often benefitted from technology transfer organizations committed to "guaranteeing specialized support for interaction and sponsoring existing interactions and multiplying occasions that might generate future interactions." In Switzerland, performance contracting set up at the level of residential buildings has benefited from a federal program that funded the setup of an industry-wide organization promoting this particular tool (swissesco 2016). Multilevel contexts also lend themselves for experimenting with substantive complementarity such as between energy efficiency (often, but not always initiated at higher levels) and sufficiency (often, but not always driven at the level of individuals or micro-environments).

TEMPORALITY

Temporality is another scope condition that can introduce differentiation to some of the examples in the matrix and thereby provide hints for reaching past low hanging fruit. One important dimension of temporality is simply duration, an aspect that has already been noted in the discussion of interstitial spaces. Duration can make a difference for DSM programs and subsidy programs (how long will they last and therefore lower entry barriers to energy efficiency upgrades?) but also to socio-political processes such as protest action (one-off events or sustained mobilization?).

In all these cases, temporal variability can affect the level of attention and the size of impact. Frequency and rhythm are two further dimensions of temporality that can vary. When awareness raising campaigns appear to be ongoing, the level of attention paid to them may flag. On the other hand, where interactions in interstitial spaces are too infrequent, effective action may not result. In Switzerland, the first annual Energy Savers conference was held in April 2023 but without more frequent meetings such as through the Club éco21 initiated by the *Services industriels de Genève* (SIG), concertation at the sectoral level would be more difficult (Swisspower 2023).

CATALYSTS

Both scale and temporality influence catalysts, who have been found to play a special role in promoting energy efficiency in interstitial spaces. Researchers focusing on boundary organizations and boundary spanning actors and organizations have found them to have specific characteristics such as the ability to "work to establish a shared context" (Carlile 2002, 451) and "sustain others' interactions over time and assist the construction of shared meanings by coordinating and energizing common activities" (Furnari 2014, 452). Catalysts have social skills (Fligstein 2001) and are adept at "multivocal coordination" (Padgett & Ansell 1993).

In their study of cross-field collaboration between academia and industry, Villani and Phillips (2020, 21–25) further associated catalysts' performance with the ability to find and match the right parties and establish a positive connection; the capacity to adequately time and sequence interactions; skill in designing interaction rules and sustaining interaction financially; and, during development and implementation, "re-orienting parties' interactions and sanctioning inappropriate behavior."

Learning to stretch

We now turn to outlining the implications of our analytical framework in light of the examples we presented. On the one hand, we are interested in comparing the features of examples at a given level of attention, which provides insights concerning the feasibility of increasing energy savings at that level of attention (horizontal movement in the matrix). On the other hand, we wish to explore the consequences of changing levels of attention for a given level of energy savings (vertical movement in the matrix). While the ultimate objective is to identify pathways for increasing energy savings, our more immediate goal is to prompt discussion and further questioning, using the proposed framework as a heuristic.

Moving across cells in the impact-attention matrix by adjusting the scope conditions (scale, temporality, role of catalysts) can be the result of exogenous or endogenous forces. For example, when entire systems become subject to shocks such as a worldwide pandemic or a global energy crisis, forced sufficiency (selective rationing) and concomitant high energy savings may quickly come to replace softer approaches, either as a result of a shift from international declaratory instruments (horizontal movement to the right in the matrix), or as a consequence of making voluntary approaches mandatory (vertical movement upwards in the matrix). By contrast, endogenous forces can be mobilized to achieve (sometimes transformative) changes that help actors stretch for the higher hanging fruit. Holding energy savings impact constant, we suggest that low-attention scenarios are often quicker and more effective (see empirical studies suggesting that greater transparency does not always increase trustworthiness of policy processes, e.g. Bauhr & Grimes 2014, De Fine Licht 2014). Holding the level of attention constant, we argue that moving towards higher energy savings (reaching beyond low hanging fruit) is often easier for low-attention scenarios than for high-attention scenarios. How can this happen?

Naturally, horizontal movement in the matrix from low to high energy savings impact is desirable. Yet a look at the examples in the matrix quickly reveals that this comes at a cost: the higher the impact at a constant high level of attention, the more coercive the measure, a tendency that is the subject of much debate in works on various forms of the green state (for a discussion of benign forms, see, e.g., Eckersley 2020; for a review of authoritarian variants, see Eninga 2023).

With medium attention, achieving higher impact appears to involve formalization, though this may be an artefact of our choice of protest action as a low-impact measure (recall that we are addressing protests for energy savings, not protests in general); one could also deduce that higher impact comes with higher cost, but the collective sufficiency measures would contradict this suggestion.

At low levels of attention, seeking greater impact also appears to correlate with greater formalization; however, in contrast to high attention examples, low attention examples do not systematically entail coercion, since certification and labels are often voluntary. One implication we can draw from this discussion is that when attention is high, achieving greater impact may be facilitated by lowering attention, precisely because, looking at the pathways in the matrix, avoiding coercion is only possible by moving to a lower level of attention. If we recall the constituent concepts and scope conditions, this would point to trajectories involving decentralization and deconcentration, possibly accompanied by the development of networked forms of intra- and interorganizational governance and practice, which in turn is typically associated with the emergence of interstitiality as we have shown above (see the literature on energy decentralization, e.g., Heldeweg & Saintier 2020, as well as legislative developments such as the European Union's Renewable Energy Directive RED III (European Union 2023) or the introduction of electricity cooperatives in Switzerland's proposed revision of the Electricity Supply Act (Swiss Confederation 2023)). Here it is important to note that lowering attention is *not* concomitant to curtailing participation. The multiplication of spaces for experimentation and learning may even increase participation.

When it comes to vertical movements in the matrix, it is more difficult to discern clear patterns, but this may be a reflection of our selection of examples. Just as likely, however, this relates back to our initial argument, which is that promoting energy savings is not a question of ensuring high or low attention, but of differentiating between situations where one or the other may be the more promising scenario. Or is it? To take one example, when high-attention international conferences fail to achieve desired results, would medium attention political protest be more effective? It is hard to say but certainly an observable phenomenon (Han & Ahn 2020).

Similarly, when political protest misses its target, would lowering attention still more by focusing on awareness raising of key stakeholders in the energy savings domain help? Probably, especially when the duration of the latter surpasses that of the former (for household awareness raising, see Hoppe & Coenen 2022). At the other end of the spectrum, when public acceptance of crisis or emergency management begins to flag, will DSM programs or collective sufficiency programs be a more promising approach? This very much depends on the type of crisis at hand, but insofar as it is not unusual for crises to be followed by policies aiming to rebuild (e.g. Green New Deal), the scenario is realistic. In turn, it is not unusual that practices established in the context of programs become institutionalized through regulation or codified through certification and labelling schemes.

Ultimately, large scale education and training, socialization, and professional ethics play a crucial role, and this takes time. Do we have it?

Conclusion

We have recently seen that our societies are able to react quickly and quite effectively to situations where there is a risk of energy shortages. Despite the need to reduce energy consumption to limit global warming, we can see that as soon as the risk of shortages recedes, the emphasis on efficiency and sobriety measures decreases. In this paper, we have listed a dozen portfolios of measures, from the most visible to the least visible, to simultaneously reduce the risks associated with global warming and those related to supply disruptions. They are available to political decision-makers, who, based on local specificities, skills and know-how, can assemble them in dedicated strategies to reduce energy consumption in line with current energy challenges.

The often mundane tasks of energy management professionals may not win the competition for minds and hearts, but this does not mean that lack of attention to their efforts renders them futile. On the contrary. In this article we have sought to situate a theoretical legitimation for action that escapes the attention of at least some, while serving to advance socially optimal energy transition goals. A growing body of literature suggests that during turbulent times, when flexibility and adaptation is called for, interstitial spaces emerging from decentralized and networked practices can provide the necessary space for experimentation and learning (Ansell et al 2017), that such spaces have an important multilevel dimension (for instance in balancing energy community development and intercommunal network planning and coordination), and that energy savings and sufficiency measures can be usefully combined.

In doing so, we suggest that it is possible to reach beyond the proverbial low hanging fruit, precisely because reaching higher is sometimes facilitated when attention is avoided, particularly in increasingly polarized political environments. The trick is to assemble the right tools to stretch for those higher hanging fruit.

Ours is a highly exploratory claim with evident limitations. First, the variables making up the conceptual matrix require more scrutiny (are attention and impact as unrelated as the matrix as an analytical tool suggests?) and more systematic operationalization (what is the internal validity of attention when it brings together so many factors?). Second, the choice of examples and especially their location in the matrix would benefit both from wider review and greater precision. Finally, this greater precision must be used to further underline the need for non-binary analysis: we do not ask if attention is good or not, but what level of attention is optimal under what circumstances.

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