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Disenabling fossil energy production in Civitavecchia

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Abstract

A powerful and widespread bloc of vested interest that resists the exit from fossil fuels and defends the current fossil centric world-system concurs substantially to obstruct sustainability transitions. This article assumes that to ‘phase in’ these transitions it is first necessary to ‘phase out’ such bloc., i.e. to disable the ‘fossil machine’, the novel analytical and descriptive category proposed and framed to investigate the ‘phase out’ side of sustainability transitions. The article analyses the disablement of the fossil machine of fossil energy plants in Civitavecchia – the long-standing ‘fossil energy’ city close to Rome, Italy – whose planned coal to gas conversion was recently abandoned. To this end, besides the concept of fossil machine, the article specifies the notions and potential of ‘destabilisation’ and ‘disruption’ and use them to examine how multiple agents disabled the fossil machine under scrutiny. It then goes on to frame the practices of destabilisation and disruption occurred in Civitavecchia within a broad societal framework articulated in ‘axes of disablement’ and concludes by putting forward lessons and ways forward to disable the fossil machines.

Keywords – Agents of transformation; Axes of disablement; Destabilisation; Disruption; Fossil machine.

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1 Introduction

Since the post-war boom in consumption and population, the Earth's temperature has rocketed (Bova, Rosenthal, Liu, Godad, & Yan, 2021; Kaufman et al., 2020), causing an upsurge in the frequency and intensity of extreme weather events, with a global climate catastrophe possible (Lenton et al., 2019; Bradshaw et al., 2021; IPCC, 2022) if carbon emissions are not dramatically cut. The current roadmap to decarbonise global socio-economic systems is proving inadequate to tackle the impending climate crisis (IPCC, 2021; IISD, 2022; UNEP, 2022). While global carbon emissions from fossil fuels hit record high in 2022,¹ fossil fuel companies continue to invest hundreds of billions of dollars in 425 'carbon bombs' that, if exploited until their end, would emit 646 bl tons of CO₂, i.e. twice as much as the global carbon budget that must not be exceeded to keep global warming at +1.5°C (Kühne, Bartsch, Tate, Higson, & Habet, 2022). In brief, our socio-economic systems seem to continue to be trapped in fossil fuels: to understand this gridlock it is necessary to investigate this fossil centric world through a broad socio-political perspective to evince its structure, scale, entanglements, powers and conflicts.

Approaches aimed at moving our socio-economic systems toward a low carbon world by and large adopt either a 'phase in' or a 'phase out' focus (Paterson, 2021), however framed, specified, and termed. The first, much more developed and embraced for instance by most of the transition and transformation literature (e.g. Geels, 2014; Geels, Sovacool, Schwanen, & Sorrell, 2017; Roberts et al., 2018; Köhler et al., 2019; Kivimaa, Laakso, Lonkila, & Kaljonen, 2021), concentrates on the facilitation of the emergence and diffusion of innovative technologies, practices, policies, and governance systems to favour sustainability. It envisages the transition to a low carbon world as a creative, experimental, positive action based on socio-technical innovation and human ingenuity. The phase out focus is instead a stark effort to dismantle the entrenched fossil-centric world to make room to a sustainable future. It revolves around the ways to challenge and eventually overcome the fossil incumbent's power and resistance to a low carbon future (Morgunova, 2021). This is a perspective embraced by the literatures of climate politics, political economy, political ecology, anthropology of infrastructure, science and technology studies, philosophy of technology, energy humanities – see, for instance, Berners-Lee and Clark (2013), Healy and Barry (2017), Mangat and Dalby (2018), Newell and Simms (2020), Ford and Newell (2021), Paterson (2021), Grasso (2022) – and more recently adopted in the transition literature, for example by David (2017), Davidson (2019), Rinscheid, Rosenbloom, Markard, and Turnheim, (2021), Van Oers, Feola, Moors, and Runhaar, (2021), Frank and Schanz (2022), Grasso and Delatin Rodrigues (2022).

¹ See The Global Carbon Project – Carbon Budget 2022 at: <https://www.globalcarbonproject.org/carbonbudget/index.htm>.

This article embraces the ‘phase out’ perspective and its goal is the investigation of the concerted practices of destabilisation and disruption that multiple agents carried out to disenable a functioning fossil machine (FM).

More specifically, destabilisation and disruption – i.e. practices to stigmatise, delegitimise, obstruct, slow down, dismantle and/or stop an FM – will be investigated in relation to the FM of a group of coal plants in Civitavecchia – the long-standing ‘fossil energy’ city close to Rome – whose planned fossil-to-fossil conversion – coal to gas – was recently abandoned.²

The article first explains the descriptive and analytical new categories introduced – the FM, destabilisation, and disruption – then examines how multiple agents destabilised and disrupted – i.e. disenabled – the Civitavecchia’s FM. The article goes on to frame these practices within a broad societal framework articulated in ‘axes of disenablement’ and concludes by putting forward lessons and ways forward to disenable FMs.

2 The fossil machine: destabilisation and disruption along disenablement axes

Consistent with the perspective of ‘extractivism’ (e.g. Chagnon et al., 2022), the FM can be understood as a heterogeneous reticular structure (Appel, Mason, Watts, & Hubber, 2015; Anand, Gupta, & Appen, 2018; Appel, 2019) to enable fossil-centred economic growth built around a specific major fossil infrastructure: extractive and production sites, refineries, regasification plants, fossil powered power plants, pipelines, terminals, carbon offsetting sites – e.g. for underground storage and for nature-based solutions.

An FM is usually set up, coordinated, and led by large fossil-fuel companies and includes governments and policymakers at various level, formal institutions, industry representatives, unions, other industries dependent on fossil fuels, the financial system, managerial elites, the military, epistemic communities, PR companies, think tanks, conservative pundits, advocacy groups, private foundations, and the media and communication systems. Its boundaries are unstable given the reproducibility and substitutability of its components and its constant expansive metamorphosis (Anders, 2007) and look blurred and elusive given its camouflage capacity that can make the FM almost invisible (Macdonald, 2017). To maintain the legitimacy and acceptability of fossil fuels, the FM habitually uses practices of Gramscian ‘*trasformismo*’ able to accommodate counter-hegemonic pressures to change within its hegemonic framework. It also routinely engages in a ‘war of position’ to form alliances and expand its

² The definitive abandonment of the conversion to gas of the coal plant was officially announced by Enel – an Italian multinational producer and distributor of electricity and gas which over the time has managed to own and run all the fossil plants in Civitavecchia – on 7th October 2022.

sphere of influence across multiple dimensions of power (Ford & Newell, 2021). For instance, the FM manipulates the narrative on fossil fuels and climate change through discursive forms of power; institutional power allows it to anchor its interests to ongoing political negotiations and policy changes by routinely establishing networks with policymakers, with the latter internalising its ideas and interests; on a material level, the FM uses instrumental means – money, authority, access to funding, lobbying skills, and political networks – to achieve its goals.

Drawing from the social sciences concepts of web (Marriott & Minio-Paluello, 2013), assemblage (Stewart, 2012; Watts, 2012), infrastructural ecologies (Banoub & Martin, 2020), network (Barry, 2006; Mitchell, 2011), regime complex (Keohane & Victor, 2011), and complex system (Watts, 2005), the FM establishes an otherwise unobservable explicit relational space – which extends far beyond the places where fossil fuels are materially treated – where its components strive to perpetuate fossil continuity and where opponent agents conduct its disablement. The notion of FM offers a unified viewpoint on the large-scale functional articulation of fossil fuel-related processes and of the socio-political environment (Simondon, 2016) created to ensure support for its continuity. This notion at the same time exposes the vulnerable nodes of the fossil-centric model (Mitchell, 2011) and makes it visible the more suitable entry points to confront it. Additionally, given the progressive depoliticization of climate change (Swyngedouw, 2013, 2022) and the hegemony in climate discourse of the mono-technological fossil culture (Hui, 2020a), the FM can reinvigorate phase-out perspectives on sustainability transitions since it makes possible to re-politicise them and to abandon this narrow mono-technological ambit by focusing on the conflictual dynamic between fossil interests and a common future for all on a liveable planet (Latour, 2018).

In a theoretical perspective the FM is a novel descriptive and analytical category in the phase out literature inspired in its focus on the coalescence of vested interests and material practices to what the Italian Marxist philosopher Antonio Gramsci (1929) defined a ‘transnational historical bloc’. The machine concept clarifies the intersection between the biophysical, climatic, and ecological dimensions and the socio-technical, economic, cultural, and political ones (Bakke, 2016; Simondon, 2016; Guattari, 2018; Fisch, 2019; Hui, 2020b) of the broader fossil world and elucidates the variety of agents and activities involved in the extraction, refinement, distribution, and combustion of fossil fuels. The FM is a continuous process of material and immaterial assemblage of the various components of this system to ensure its functional continuity over time.³

³ The FM is then a, so to speak, dynamic and composite view of what the UN Secretary General Guterres in a recent speech insightfully referred to as ‘enablers’ of ‘fossil fuel producers’, a conglomerate of interest that he rightly considers the main obstruction to the needed ‘renewables revolution’ (Elliot, 2023).

It should be eventually underlined that this article carries out a, so to speak, piecemeal analysis of a specific FM and cannot clarify whether its disenablement in Civitavecchia actually meant a reduction in the capacity of its components to give birth to other FMs in other location or not.

As said the concept of FM delimitates a relational space to identify and dynamically explain how different agents guarantee and oppose its continuity, i.e. how they disenable it. The agents involved are termed here ‘agents of transformation’ (ATs): they have no univocal identity, but they can rather be categorised in terms of activity in relation to a FM. Additionally, ATs could have been components of the FM and could even return to that status. For instance, most unions were parts of the Civitavecchia’s FM to protect labour, but when they could overcome the job/health dichotomy, as explained in what follows, they became ATs; if such realization had proved for whatever reason wrong, it is likely that they could have re-joined the FM.

For analytical purposes, disenablement is articulated in ‘destabilisation’ and ‘disruption’. The current transition literature tends to use these terms interchangeably and without thorough specification (Turnheim & Geels, 2012, 2013; Van Oers, Feola, Moors, & Runhaar, 2021; Frank & Schanz, 2022) as actions necessary to move towards a low carbon future. In this article AT’s destabilisation and disruption practices are instead circumscribed through their effects on the components of the FM. A particular AT can simultaneously be involved in destabilisation in one context and/or point in time, while engaged in disruption in another context and/or point in time. For instance, a climate NGO may try to destabilise the oil industry through awareness-raising initiatives, but as shareholder of an oil company, the same NGO can attempt to disrupt it through resolutions and other initiatives aimed at stand in the way in the corporate works. Based on this distinction, ATs in general use destabilising practices to stigmatize and delegitimize a FM. Destabilisation breaks the consensus about the naturalised use of fossil fuels and foments dissent against the fossil model. It engages part of the social environment – including communities not directly involved in the FM – and aims to generate, foster, and maintain social/moral norms and principles and good practices that denaturalize the use of fossil fuels (Jamieson, 2017; Wilson, Szeman, & Carlson, 2017) and shape behaviour in favour of a less harmful low-carbon world, also by contrasting climate denial and strategies of delay and obstruction. Practices of destabilisation are carried out, for example, by favouring the acknowledgment of the harmfulness of fossil fuels, emphasizing the harmful behaviour of fossil companies, discouraging high-carbon lifestyles, supporting the rectification of the harm done. In short, such practices shape and steer individual and collective behaviour – inside and outside the FM – in different contexts and at different levels towards interiorising and embracing progressively less carbon intensive attitudes and approaches.

ATs carry out disruption – not necessarily proximate to the places where fossil fuels are physically located – through existing institutional, political, and economic arrangements that directly target the components of the FM to obstruct, slow down, dismantle and/or stop the reproduction of the fossil model and its overall functioning, fruition, and continuity. Disruption practices consist of, for instance, lawsuits, legal and administrative provisions, divestment initiatives, shareholders resolutions, alternative non-fossil options, projects, and plans. By constricting the FM, disruption opens new opportunities for experimenting and implementing low/non-fossil pathways.

Destabilisation and disruption can be usefully investigated through and along ‘disenablement axes’, internally homogeneous social areas recurrent in the, so to speak, energy and social sciences literature (e.g. Köhler et al., 2019; Kivimaa, Laakso, Lonkila, & Kaljonen, 2021; Grasso & Delatin Rodrigues, 2022). They can be grouped according to the set of issues predominantly addressed: i) socioeconomic-technological, ii) institutional-political, and iii) educational-informational. Disenablement axes are context-dependent and Table 1 (see below) lists those most relevant to the Civitavecchia’s FM, as well as some of the practices (for the sake of simplicity, as yet not divided up into destabilisation and disruption) that ATs carried out in relation to the FM under scrutiny.

Table 1 – Disenablement axes and examples of practices of destabilisation and disruption of the Civitavecchia’s FM

Set of issues	Axis	Practice
Socioeconomic-technological	Social cohesion	Communitarian meetings, assemblies, and demonstrations
	Economy	Strikes
	Science and technology	Alternative low carbon projects
Institutional-political	Governance	Community/policy-makers joint initiatives
	Law	Legal appeals against the fossil industry
	Policy	Regulations and laws against fossil fuels
Educational-informational	Culture	Protest and dissent artworks
	Education and awareness	Civic science program in epidemiology
	Media and communication	Formation of counternarratives

Source: our elaboration

The disenablement of an FM first requires expressive, symbolic, and material practices able to develop new social norms, key values and concepts, and institutionalise new moral principles (Gunningham, 2017) to denaturalise fossil fuels. As said, we recognise these as being destabilisation practises, and they are carried out by ATs which we shall hereby refer to as ‘primary’. Investigating primary ATs’ role is essential to explore the other ATs, termed ‘operational’, which are mainly involved

in disruption. The latter practices are more feasible when the socio-cultural context is ‘ripe’: that is, when the urgency to eliminate the dangerous relationship with fossil fuels is perceived by a wider public. However, to achieve this level of maturity, disruption must be rooted in destabilisation: in other words, the success of primary ATs has a knock-on effect on operational ones.

3 The case of Civitavecchia

3.1 The Civitavecchia’s FM

The FM scrutinised in this article refers to the Civitavecchia fossil plants. They were installed in the immediate post-war period: work began in the summer of 1951 in the Fiumaretta area whose first – coal and then naphtha – plant remained in operation from 1953 to 1990. A further plant was installed in the Torrevaldaliga Nord area and began its operation the 1960s: it was originally a fuel oil-fired thermal power plant consisting of four groups with a total capacity of 2,640 MW. This plant was reconverted to coal in 2003 through the installation of three steam generators (boilers), built by the multinational company Ansaldo-Hitachi. Another power plant in the Torrevaldaliga Sud area was commissioned between 1964 and 1973. This latter plant, which originally consisted of three groups (1-2-3) of 320 MW of electricity each and one group of 180 MW of electricity, underwent extensive modifications over time and the 1-2-3 groups were transformed into combined cycle groups; two new sections called TV5 (800 MW) and TV6 (400 MW) entered into operation in 2005. In 2019 ENEL presented its plan for the conversion to gas of these existing coal plants and the installation of new gas plants in the Civitavecchia area, as a response to the requirement to quit coal for energy production of the imminent National Integrated Energy and Climate Plan (*Piano Nazionale Integrato per l’Energia e il Clima* – PNIEC) which was eventually adopted in January 2020.

Besides the plants, the perimeter of the Civitavecchia’s FM is difficult to pinpoint given the camouflage capacity of this kind of ‘assemblages’ and their continuous necessary transformation to maintain their functional continuity based on the relentless inclusion and dismissal of components throughout their life. The arc time of this research (2019-2022) focused on the disenablement of the Civitavecchia’s FM – the last segment of its lifecycle – and reveals particularly those parts most exposed to destabilisation and disruption. The plants themselves were the main object of protests and awareness-raising campaigns; other prominent components were political groups which aligned and realigned their positions in favour or against the FM, and unions whose ondivagous role depended mostly on the everchanging sensitivity to the – already mentioned – health/job conundrum. It should be

noted that unions were an overly problematic component of the Civitavecchia's FM: in Torrevaldaliga Nord alone there are now 320 direct plants employees members of the Federazione Italiana Lavoratori Chimica Tessile Energia Manifatture (Filtem), 460 metalworkers protected by the Federazione Impiegati Operai Metallurgici (Fiom), and 200 dockers engaged in coal unloading referring to the Federazione Italiana Lavoratori Trasporti (Filt).⁴ An integral part of the FM, trade unions have moved, as we will see, from support to protest – due to the prospect of job cuts caused by the switch to gas – thus favouring its disenablement; it is however impossible to specify how each union positioned itself during the life of the FM.

Other components of the FM remain unexplored though: for instance, the financial galaxy that supported it,⁵ insurance companies, subjects along the fossil supply chain, maintenance and consulting companies, the international coal supply market⁶.

Altogether, the Civitavecchia's FM disseminated a narrative of progress, after the city was reduced to rubble in World War II. By generating jobs and professional qualifications, Enel could present itself as a promoter of local development. But progressive environmental degradation and health impacts – with an increase in cardio-respiratory diseases, allergies, and cancer – triggered intense confrontation and continuous protests within the community. Dissident, citizen-driven expertise uncovered the consequences of continuous exposure to fossil fuel-generated pollution. Studies carried out by citizen-led epidemiology groups – a form of civic monitoring, understood here as a practice of destabilisation – showed a dramatic spike of certain forms of cancer directly linked to the coal-fired power plants.

⁴ See, for instance: <https://ilmanifesto.it/centrale-enel-a-civitavecchia-ecco-la-svolta-green-della-cgil>.

⁵ Just to catch a glimpse into the complexity of the financial ramifications of this FM whose fulcrum was Enel, it is useful to point out that in the company's 2010-2016 investment prospectus the shareholders holding more than 2% of the shares were the Ministry of Economy and Finance with a direct control of 13.88%, Cassa Deposito e Prestiti with 17.30% and Blackrock Inc. indirectly through Blackrock Investment Management (Uk) Limited with 3.02%. In 2009 Enel entered into a financial agreement totalling €8 billion with the following institutions: Banco Bilbao Vizcaya Argentaria, S.A., Banco Santander Central Hispano S.A., BNP Paribas S.A., Caixa d'Estalvis i Pensions de Barcelona "la Caixa", Caja de Ahorros y Monte de Piedad de Madrid, Calyon S.A. Milan Branch, Intesa SanPaolo S.p.A, Mediobanca, Natixis S.A. Milan Branch, The Bank of Tokyo Mitsubishi UFJ Ltd Milan Branch, The Royal Bank of Scotland Plc, Unicredit Market Investment Banking through Bayerische Hypo Und Vereinsbank Ag, UniCredit Bank AG, Milan Branch (*Prospetto Enel relativo all'offerta pubblica di sottoscrizione e alla contestuale ammissione a quotazione sul mercato telematico delle obbligazioni del prestito denominato "Enel tf 2010-2016" e delle obbligazioni del prestito denominato "Enel tv 2010-2016"*: <https://www.deutsche-bank.it/files/documents/sezione-prospetti/offerte-pubbliche-di-scambio/ProspettoEnel.pdf>).

⁶ For instance, the coal used in the Torrevaldaliga Nord plant over time came from different coal fields around the world (Poland, South Africa, the United States, Venezuela, Colombia, Indonesia, China and Australia; See: <https://va.mite.gov.it/File/Documento/274296>).

3.2 Methodological approach and ATs involved

One main objective of our empirical investigation was to map the destabilisation and disruption practices used since 2019 by Civitavecchia ATs to disable the city's FM. We carried out our research from February to September 2022, collecting material through interviews and digital media (Caliandro & Gandini, 2019). We conducted non-structured and structured interviews online with relevant primary and operational ATs to gather information on i) the disablement axes ATs mostly used, ii) the actual destabilisation and disruption practices they carried out along axes to target the FM's components, and iii) the evolution of destabilisation and disruption practices. To complement and contextualise these interviews, we used digital ethnography methods, which consisted of following the interviewed ATs and their networks in online spaces (social networks, news portals, etc.) (Marres, 2017). The digital infrastructure also allowed access to articles published in magazines, online newspapers, and discussion forums.

Between April and June 2022, a total of 8 non-structured interviews were carried out with Civitavecchia's primary and operational ATs, as reported in Table 2, along with the axes they predominantly worked on and examples of destabilisation and disruption practices they carried out.

In September 2022, two structured interviews (in addition to previous non-structured interviews) were conducted with the two ATs with the most comprehensive knowledge of the issues at stake and of the role of all the other ATs involved.⁷ The objective was to get a more general perspective on destabilisation and disruption. Furthermore, these interviews made it possible to directly consider the temporal dimension of these practices with a focus on the evolution of social goals within these practices.

It should be noted that a future development of this article envisions a methodological refinement. It consists in extrapolating from the interviews carried out a qualitative-quantitative assessment of the impact of the different actions with respect to the outcome on an ordinal scale to evaluate the weight of the individual axes of disablement and their interactions. Besides establishing a replicable framework to compare different situations, this more robust methodological approach would make it possible also to infer ex-ante policy directions.

⁷ To avoid possible conflicts, we cannot disclose the identity of the two ATs interviewed in this second round since they were asked to discuss and 'evaluate' destabilisation and disruption practices of all other ATs.

Table 2 – ATs interviewed, axes, and types of practices of destabilisation and disruption

AT	Axis	Practices of destabilisation/disruption
Città Futura (environmental group)	Social cohesion, Science and Technology, Culture, Education and awareness, Media and communication	Meetings; research; cultural events; educational events; information through social media and various other channels
Comitato Sole (environmental group)	Social cohesion, Science and Technology, Culture, Education and awareness, Media and communication	Meetings; research; cultural events; educational events; information through social media and various other channels
Confederazione Nazionale dell'Artigianato (the Civitavecchia chapter of the National Confederation of Crafts and Small and Medium-sized Enterprises)	Economy, Governance, Law, Policy	Lobby; participation in institutional and political processes;
Forum Ambientalista (environmental group)	Social cohesion, Science and Technology, Culture, Education and awareness, Media and communication	Meetings; cultural events; educational events; information through social media and various other channels; demonstrations; citizen science
Fridays for Future (social movement)	Social cohesion, Science and Technology, Culture, Education and awareness, Media and communication	Meetings; cultural events; educational events; information through social media and various other channels; demonstrations
No al Fossile (social movement)	Social cohesion, Science and Technology, Culture, Education and awareness, Media and communication	Meetings; cultural events; educational events; information through social media and various other channels; demonstrations; protests
Technical committees (professionals, firms and agencies to support the offshore wind farm and 'Porto Bene Comune' projects)	Social cohesion, Science and technology	Technical support to developing non fossil alternatives
Unione Sindacale di Base (labour union)	Social cohesion, Economy, Governance, Law, Policy	Participation in institutional and political processes; strikes; "state of agitation"

Source: our elaboration

4 Destabilisation and disruption in Civitavecchia along disenablement axes

4.1 *The bubbling cauldron of destabilisation and disruption*

According to the ‘Città Futura’ AT group, protest against fossil energy production and its implications started in earnest in the 1980s. The first destabilisation practices demanded the right to health, to a clean environment, and to non-fossil-based jobs for local workers and besides the plants targeted mostly political parties, unions, and local associations; by and large, this just produced a juxtaposition between those parts of the FM that defended the environment and those who defended jobs. In the words of a member of the ‘No al fossile’ group:

“Until 2003, the year of the authorisation [to shift energy production from oil to carbon], there was major tension in Civitavecchia that literally caused a rift between parties, unions, associations, and even families. Huge numbers participated, the municipal council of Civitavecchia was occupied for several days. We also occupied the Rome-Genoa-Ventimiglia railway line, interrupting service. Conflict raged, but we couldn’t couple the struggle for environmental and public health with that for good employment. The historical context was different, and the immature technologies we had meant that the adoption of any alternative was unlikely in the short term” (De Girolamo & Pezzopane, 2022).

Conflict mostly centred on uncertainties about the local health impacts of fossil production. ATs began to wage political battles around the contrast between environment/health and economy/employment. This juxtaposition was used to justify pro-fossil choices and ensured the support of many citizens, unions, and political groups at the expenses of health and environmental concerns, eventually tearing apart the fabric of the community. As an AT of the Forum Ambientalista group (and former member of the Communist Refoundation Party) states: “Enel has polluted not only the environment, but also people’s consciousness.”

In turn, as several ATs testify, one of the reasons for the limited capacity for opposing fossil continuity was that parts of the FM and the community remained locked into this narrative of contrast. This prevented them from opening up to issues beyond the environment/job dichotomy and limiting the relationships that could be established with other ATs in the territory.

More recently, according to an ATs from Fridays for Future, “The fundamental thing is to give a chance to young people by creating a different future. Instead of leaving the city and looking for job in Rome, we fought to be able to stay. But to stay in a place that not only offers jobs, but quality of life too.” When the question of jobs became a problem for the ATs opposing the coal-fired power plant on

environmental grounds, they began to engage directly with the most vulnerable workers, i.e. direct and indirect employees of power plants.

In 2019, Enel presented its plan for the conversion to gas of the existing coal plants and the installation of new gas plants. According to ‘No al fossile’ AT: “The switch from coal to gas would not guarantee jobs for those living in the polluted territories, nor environmental protection or public health.” At this point in time, the proposal of an ‘alternative’ – a portfolio of projects based on renewable energies – became a strong foundation for the elaboration of other socio-technical imaginaries beyond fossil fuels. This implied that ATs belonging to environmental groups became sensitive to the concerns of other agents who depended directly on the FM – either for work or for the energy needs of their professional activities.

According to an AT from the ‘Unione Sindacale di Base (USB)’ – which used to be part of the FM under investigation – the job issue was successfully addressed by the alternatives and was critical to ensuring social and political support for the exit from fossil fuel production and eventually “to deactivate the Enel narrative”.

The first alternative project proposed – the ‘Porto Bene Comune’ – focused on the energy conversion of the port of Civitavecchia and was submitted to the Italian Ministry of Economic Development (Ministero dello Sviluppo Economico – MISE) within the EU-ERC Horizon 2020 call for proposals. In addition to the other renewable project described below (the wind farm), according to ATs, the port is a critical transition point for socio-economic models with a lessened impact on health and the environment. Although it may seem to be a hub for energy consumption rather than production, it was through the port that ATs began to develop socio-technical alternatives. The port was a laboratory that allowed them to make that step forward from mere protest to constructive proposals. The port project envisaged the use of green hydrogen to make this infrastructure the first zero emission port in the Mediterranean.⁸ This project was considered fundamental since, according to an AT from the ‘No al Fossile’ committee, it synthesised the local energy transition process. It brought together not only unrelated ATs, but also complex technical issues and diversified socio-technical imaginaries (Jasanoff, 2015) through which the local future was planned and built from the perspective of clean energy production.

The second alternative project is the offshore wind farm. It has a total capacity of 270 MW and an annual production potential of approximately 935 GWh. Its construction would provide between 300 and 1,000 jobs in Civitavecchia; this project was submitted to the (then) Ministry for the Ecological

⁸ In this way, even the port started to be perceived as “autonomous from the city of Civitavecchia, [...] a city within the city” as described by one of the ATs working on the ‘Porto Bene Comune’ project.

Transition for an environmental impact assessment (valutazione di impatto ambientale – VIA). Altogether it is an inclusive and overarching project which pays particular attention to job creation.

It should be pointed out that several sources emphasised that the existence of a favourable national and international context (e.g., the 2020 Italian PNIEC⁹ and EU Green Deal) to carbon transformation increased the credibility and feasibility of alternatives to fossils.

4.2 Preparing destabilisation and disruption

Most of the discussions on alternatives for Civitavecchia took place during the Covid-19 health emergency when public face-to-face meetings were prohibited. Their presentation and discussion were made possible by the local media system: ATs were given free access to the local television network, TRC.¹⁰ They also extensively used two digital social networks to foment intergenerational dialogue and build an alternative counter-narrative. Facebook was used for sharing documents and information; this allowed ATs to interact with the population. Instagram conveyed and distributed images of meetings, activities, or environmental damage caused by fossil fuels.

Since 2019, ATs realised that the first necessary step to challenging the FM was to raise awareness about the wrong choices that “had been made and were still being made regarding the development model and social life of Civitavecchia”. ATs decided to use the space provided by the local TV network (also streamed on social media) to construct a storyline that framed the conversion to gas within the broad spectrum of development policies, underlining the health and environmental damages caused by fossil fuels over the last 70 years since the first power plant was installed in the city.¹¹

The second step was to study the gas conversion project to understand its implications and consequences. To this end, a technical working group was created that, in addition to associations and citizens, included experts and scientists. The first study carried out found that the conversion to gas would cut 90 percent of jobs at the plant. As described in the newspaper ‘Il Manifesto’:

“The mobilisation started from the initiative of a small group of workers, with the assistance of some experts, and was consolidated as a series of forces, first citywide, then nationwide, gathered around this project. First of all, the Fiom, Uilm [national unions, that used to be parts of the

⁹ When in January 2020 the Italian ‘National Integrated Energy and Climate Plan’ (*Piano Nazionale Integrato per l’Energia e il Clima* – PNIEC) set 2025 as the year of the exit from coal, demands for the complete cessation of fossil energy production became more explicit.

¹⁰ This local TV channel broadcasted debates between the different ATs that could reach a broad audience that did not make use of social networks or virtual meeting platforms.

¹¹ According to ATs there is no family in Civitavecchia that did not have a member who had not fallen ill over the years for reasons directly associated with the continued burning of fossil fuels in the area.

Civitavecchia's FM] and some grassroots unions present at the plant, which successfully called two strikes to demand the realisation of the project. Then various committees and associations, both within the city and external (including the 'Laudato si' association), then parishes, the diocese, the municipal administration, local businesses, and the regional environmental councillor's office, which have set up or taken part in various conferences and city events in support of the project. A project that has already found planners and investors ready to implement it" (Viale, 2021).

In March 2021, the Lazio Region established the Department for Ecological and Digital Transition (*Assessorato alla Transizione Ecologica e alla Trasformazione Digitale*, ATETD), which according to all ATs interviewed was fundamental – especially its political head, the Five Stars politician Roberta Lombardi – for the advancement of the alternative projects and the consolidation of the new local socio-political structure. The ATETD showed interest in the alternatives from the very beginning: according to a CNA AT: "Had it not been for the political impetus given by the ATETD and by two regional councillors, it would have been very complicated." Later, in October 2021, the ATETD organised a conference on new technologies for the energy transition in Civitavecchia. All ATs were present and encouraged to contribute; different rapporteurs, scientists, professional categories, as well as experts in renewable energy generation officially presented the alternative projects (focusing mainly on offshore wind energy, but to a lesser extent also involving the port), thus broadening the audience that could be concerned with the proposals. One of the lines repeated by almost all participants was that in "Civitavecchia nobody wanted a future linked to fossil fuels anymore."¹² Since this presentation, the ATETD office sped up work on wind power projects and initiated a working relationship with the now defunct national Ministry of Ecological Transition.

4.3 Examples of destabilisation and disruption carried out

This broad overview clarifies that the rejection of fossil continuity, the building of alliances, and the emergence of new collective subjects must be considered on a timeline where different ATs carry out various forms of destabilisation and disruption diachronically. These practices are not limited to the local dimension; international, national, or regional decisions can interfere (favouring or obstructing) the efforts to engage with the Civitavecchia FM.

As stressed above, the multiple forms of destabilisation and disruption can be considered in a relational and dynamic way along the axes outlined in Table 1. In concrete terms, for instance, the availability of a TV channel not aligned to the FM allowed for an efficient communication campaign on

¹² See: https://www.facebook.com/watch/live/?ref=watch_permalink&v=2175019059344879.

the ‘Media and communication’ axis; or, with regard to the ‘Policy’ axis, votes against the conversion to gas of the coal-fired power plants that occurred in the municipal and regional chambers set a limit to the action of the FM (first of all, resolution 130 of 24 October 2019 of the Civitavecchia City Council and the 2021 regional provision banning fossil production in the city). Or, again, disruption practices occurred along the axes ‘Economy’ and ‘Governance’, with ‘states of unrest’ (*stato di agitazione*)¹³ or strikes called against specific components of the FM, namely the plants and the supply chain linked to them. In relation to the ‘Law’ axis, while in 2003 groups opposed the conversion of oil to coal filed an unsuccessful appeal in the courts to stop it, in 2019 ATs planned to resort to legal action if Enel – the hinge of this FM – had continued with its initial coal to gas conversion project; the successive decision to abandon the project made it unnecessary.

On the ‘Social cohesion’ axis ATs made use of classic conflict repertoires, whether authorised or unauthorised, mostly through street demonstrations, the occupation of public buildings, the obstruction of railways and highways, and hunger strikes to cement the social fabric of the community. Attacks and direct confrontations with public authorities, thus targeted as components of the FM, and Enel’s leaders were also recurrent – one such instance involved throwing vegetables at Enel executives visiting the city. On the ‘Media and communication’ axis, reports of environmental damage and of health impacts on the population – largely based on input from activists and researchers – were used to show the consequences of fossil production on the territory. Innovative initiatives were also launched, such as the open microphone proposed by the local chapter of Fridays for Future, to encourage citizens to have their say. Along the ‘Culture’ axis, ATs have endeavoured to create content – songs, banners, shows – influencing the public perception of the harmful implications of fossil fuels and of the territorial dependence on fossil energy monoculture. Along the ‘Governance’ axis, consensus that the future of the city should develop outside of the realm of fossil fuels made the coming together of different parties to discuss models of governance of new alternative projects possible. Political parties on either end of the spectrum, initially “part of the FM”, according to an AT from ‘Città Futura’, became ATs that drove territorial demands and perspectives at the institutional level. They established permanent negotiation spaces, effectively creating political representation on an institutional level.¹⁴ Table 3 categorises some of the more remarkable practices of destabilisation and disruption along disablement axes.

¹³ The state of unrest was proclaimed to protest the possible approval of a decree simplifying the licensing procedures for high-impact activities that directly affected Civitavecchia (<https://www.fiomromalazio.it/2021/05/dl-semplificazioni-stato-di-agitazione-appalti-tvn/?fbclid=IwAR0xQtfrpo d7asda5w6Pz9N2dWIXzZndXdcNDE1TAUzFdpXlA3qcYOK3to>).

¹⁴ In 2021 a ‘permanent table’ was created with the objective to build a low-carbon future. The document was signed by the mayor of Civitavecchia, Ernesto Tedesco, councillor Brunella Franceschini, the representative of Allumiere, the mayor of Tolfa, Landi, the political parties PD, M5S, Fratelli d’Italia, Lega, Rifondazione Comunista, Verdi and included most of the ATs reported in Table 2.

Table 3 – Destabilisation and disruption practices in relation to the Civitavecchia’s FM

Axis	Destabilisation	Disruption
Social cohesion	Communitarian meetings, assemblies, and demonstrations to strengthen the local protests and communities by connecting them to regional and national level similar cases	Job creation through alternative projects
Economy	Lobby by the business community against, and exit from, fossil fuels	Strikes
Science and technology	Environmental and health monitoring Citizen science campaigns	Advancement of technical solutions for the alternative projects
Governance	Bottom-up initiatives – meetings, demonstrations, and protests and alliances – that bonded the local community to political representatives at various levels, in particular the regional one	Permanent table for a low carbon future Strikes
Law	Pollution reporting to legal institutions Environmental rules and regulations (bottom-up proposals)	Lawsuits (projected, not implemented)
Policy	Occupation of city councils	Regulations and laws at the municipal and regional level
Culture	Tour of the power plants Songs Banners Online graphics	n.a.
Education and awareness	Awareness campaigns (e.g., on the possibility of overcoming of the job/health dichotomy) Self-education programmes Citizen science epidemiology, physics, chemistry	n.a.
Media and communication	Shaping narratives Careful use of social media (Facebook, WhatsApp, Instagram)	Subtraction of narrative spaces for the reproduction of fossil fuels

Source: our elaboration

5 Looking into the Civitavecchia's FM disenablement: lessons and ways forward

The analysis carried out falls short of giving a full account of the process of disenablement of the FM that took place in Civitavecchia: however, it allows for some considerations to be drawn, as illustrated below.

A first lesson is that the disenablement of an FM requires multiple ATs to operate at different levels and at different points in time. More broadly, while in the current transition literature destabilisation and disruption practices are just one point in a process to phase out incumbents, the use of the FM as an analytical category evinces that these practices have a much broader scope since they are all along the process of disenablement, indeed they *are* the process itself.

The empirical analysis carried out confirms that ATs are both primary and operational, and that the same AT can play both roles on the same disenablement axis, not necessarily at different times, as well as that there is a potential revolving door between the status of AT and of component of the FM.

The case analysed shows that, as opposed to an emerging perspective of the phase out literature claiming that sustainability transitions are not compatible with the current capitalist political-economic systems (e.g. Van Oers et al. 2021), in Civitavecchia the successful coalition of ATs includes anti-capitalistic agents using capitalistic means to destabilise and disrupt the FM (e.g., the services of engineering firms to deliver the alternative projects and legal initiatives), as well as capitalistic agents using anti-capitalistic strategies (e.g. strikes and blockades). At the same time, our analysis suggests that, contrary to a top-down approach, effective disenablement requires a bottom-up approach that involves the largest possible number of active stakeholders (i.e., ATs). Additionally, in our case study, destabilisation and disruption practices occurred without being spearheaded by charismatic leaders, in contrast to what some of the phase out literature (e.g., Kivimaa, Laakso, Lonkila, & Kaljonen, 2021) seems to postulate.

While by and large phase out literature suggests that disenablement is extremely onerous, in our case study, destabilisation and disruption are not excessively knowledge-, resource-, people-, and time-intensive; as long as these practices are sufficiently widespread the disenablement of an FM can be triggered from relatively limited technological, financial, and human input within a restricted timeframe.

The application to the empirical case under scrutiny of the unique distinction between destabilisation and disruption show how these practices can be practically further differentiated due to an important characteristic: if the former can be successfully carried out by a single AT, the latter requires the collaboration of multiple ATs; since disruption aims to obstruct and occupy the various spaces for fossil reproduction, it needs to be enacted on different parts of the FM, in a variety of forms, and for prolonged periods.

Finally, consistent with the demand for a systemic perspective as voiced by the more recent transition literature (e.g., Davidson, 2019; Kivimaa, Laakso, Lonkila, & Kaljonen, 2021; Van Oers, 2021), a focus on the Civitavecchia's FM highlights how disenablement blurs the usual distinction between sectoral and systemic levels, and shows that a process apparently targeted only to decarbonise the local energy system can involve an entire community/socio-economic ambit and can thus be part of a systemic effort towards a sustainable future.

This evidence prompts four major analytical ways forward. First, both practices of destabilisation and disruption to be carried out successfully along disenablement axes need to operate relationally and are expected to be accelerated by the multiple connections and interactions that ATs establish, and by the convergence of their objectives. Second, the larger the number of the components of the FM targeted by practices of destabilisation and disruption, the larger the chance to successfully disable the FM. Third to disable the FM, the existence of feasible renewable alternatives is fundamental. Fourth, while disenablement axes can be used as analytical tools to frame and understand disruption and or destabilisation practices, they are at the same time powerful metaphors to support transformative narratives centred on FMs.

In a pragmatic perspective, the analysis carried out leads to a further major way forward in terms of policy-oriented analysis; in particular, such future investigation can scrutinise the impacts of the Civitavecchia case on the welfare of local communities, compare the outcomes of this work with similar evidence, and identify their potential connections with the multiple existing national and supranational plans for the energy transition.

6 Conclusions

The approach outlined provides a framework to analyse the disenablement of FMs carried out by ATs through practices of destabilisation and disruption targeting its components that take place along disenablement axes. This article analysed the disenablement of the Civitavecchia's FM that, from 2019, began to unfurl. The results of this exercise are detailed in Sections 4 and 5: it suffices here to underline the wealth of information and knowledge on the dynamics, logic, and rationales on the disenablement of an FM and the lessons and ways forward that the approach used offers.

In a different perspective, the exercise carried out provides an empirical justification to the analytical categories introduced – the FM, destabilisation and disruption – as such justification requires their analysis and contextualisation to ensure their real potential, actual scope, and limits are clarified. In brief, it seems that the application of the notion of FM, destabilisation, and disruption to a complex

case study such as Civitavecchia evinces that these categories are fit for purpose to help understand and disentangle the multi-layered complexity of the fossil world and to understand how to win its resistance to move toward a low carbon future. It seems therefore safe to argue that the current approach can be applied to carbon-centric systems to understand how to overcome resistance to exiting fossil fuels.

References

- Anand, N., Gupta, A., & Appen, H. (2018). *The Promise of Infrastructure*. Duke University Press.
- Anders, G. (2007). *L'uomo è antiquato* (Vol.2). Bollati-Boringhieri.
- Appel, H. (2019). *The licit life of capitalism: US oil in Equatorial Guinea*. Duke University Press.
- Appel, H., Mason, A., Watts, M., & Hubber, M. T. (2015). *Subterranean Estates: Life Worlds of Oil and Gas*. Cornell University Press.
- Avelino, F., & Rotmans, J. (2009). Power in transition: An interdisciplinary framework to study power in relation to structural change. *European Journal of Social Theory*, 12(4), 543-569.
- Bakke, G. (2016). *The Grid: The Fraying Wires Between Americans and Our Energy Future*. Bloomsbury.
- Banoub, D., & Martin, S. J. (2020). Storing value: The infrastructural ecologies of commodity storage. *Environment and Planning D: Society and Space*, 38(6), 1101-1119.
- Barry, A. (2006). Technological Zones. *European Journal of Social Theory*, 9(2), 239-253.
- Berners-Lee, M. and Clark, D. (2013). *The Burning Question: We Can't Burn Half the World's Oil, Coal and Gas. So How Do We Quit?*. Profile Books.
- Bova, S., Rosenthal, Y., Liu, Z., Godad, S. P. & Yan, M. (2021). Seasonal origin of the thermal maxima at the Holocene and the last interglacial. *Nature*, 589, 548-553.
- Bradshaw, C. J. A., Ehrlich, P. R., Beattie, A., Ceballos, G., Crist, E., Diamond, J., et al. (2021). Underestimating the challenges of avoiding a ghastly future. *Frontiers in Conservation Sciences*, 1, <https://doi.org/10.3389/fcsc.2020.615419>.
- Caliandro, A., & Gandini, A. (2019). *I Metodi Digitali nella Ricerca Sociale*. Carocci.
- Chagnon, C. W., Durante, F., Gills, B. K., Hagolani-Albov, S. E., Hokkanen, S., Kangasluoma, S.M., et al. (2022). From extractivism to global extractivism: the evolution of an organizing concept. *The Journal of Peasant Studies*, 49(4), 760-792.

- David, M. (2017). Moving beyond the heuristic of creative destruction: Targeting exnovation with policy mixes for energy transitions. *Energy Research & Social Science*, 33, 138-146.
- Davidson, D. J. (2019). Exnovating for a renewable energy transition. *Nature Energy*, 4(4), 254-256.
- De Girolamo, G., & Pezzopane, F. (2022). Una comunità contro il fossile. *Jacobin Italia*. <https://jacobinitalia.it/una-comunita-contro-il-fossile/>.
- Elliot, L. (2023). UN head accuses fossil fuel firms of business models ‘inconsistent with human survival’. *The Guardian*. <https://www.theguardian.com/business/2023/jan/18/un-head-accuses-fossil-fuel-firms-of-business-models-inconsistent-with-human-survival#:~:text=%E2%80%9CToday%2C%20fossil%20fuel%20producers%20and,cold%2C%20hard%20scientific%20fact.%E2%80%9D>.
- Fisch, M. (2019). *Anthropology of Machine: Tokyo's Commuter Train Network*. University of Chicago Press.
- Ford, A., & Newell, P. (2021). Regime resistance and accommodation: Toward a neo-Gramscian perspective on energy transitions. *Energy Research & Social Science*, 79. <https://doi.org/10.1016/j.erss.2021.102163>.
- Frank, L., & Schanz, H. (2022). Three perspectives on regime destabilisation governance: A metatheoretical analysis of German pesticide policy. *Environmental Innovation and Societal Transitions*, 44, 245-264.
- Geels, F. W. (2014). Reconceptualising the co-evolution of firms-in-industries and their environments: Developing an inter-disciplinary Triple Embeddedness Framework. *Research Policy*, 43, 261-277.
- Geels, F. W., Sovacool, B. K., Schwanen, T., & Sorrell, S. (2017). Sociotechnical transitions for deep decarbonization. *Science*, 357, 1242-1244.
- Gramsci, A. (1929). *Quaderni dal Carcere*. Einaudi (reprinted in 2020).
- Grasso, M. (2022). *From Big Oil to Big Green. Holding the Oil Industry to Account for the Climate Crisis*. MIT Press.
- Grasso, M., & Delatin Rodrigues, D. (2022). Disrupting to decarbonise socio-energy systems: the ‘carbon transformation axes’ framework. *Energy Research & Social Science*, 90. <https://doi.org/10.1016/j.erss.2022.102657>.
- Guattari, F. (2018). *Qu'Est-Ce Que l'Écosophie?*. Edition Lignes.
- Gunningham, N. (2017). Building norms from the grassroots up: Divestment, expressive politics, and climate change. *Law & Policy*, 39, 372-392.
- Healy, N., & Barry, J. (2017). Politicizing energy justice and energy system transitions: Fossil fuel divestment and a “just transition”. *Energy Policy*, 108, 451-459.
- Hui, Y. (2020a). Cosmotechnics. *Angelaki*, 25(4), 1-2.

- Hui, Y. (2020b). Machine and ecology. *Angelaki*, 25(4), 54-66.
- IISD – International Institute for Sustainable Development (2022). *Navigating Energy Transitions: Mapping the road to 1.5°C*. IISD.
- IPCC – International Panel on Climate Change (2021). *Climate Change 2021: The Physical Science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.
- IPCC – International Panel on Climate Change (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.
- Jasanoff, S. (2015). Future imperfect: science, technology, and the imagination of modernity. In S. Jasanoff & S. H. Kim (Eds.), *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*. University of Chicago Press.
- Jamieson, D. (2017). Slavery, carbon, and moral progress. *Ethical Theory and Moral Practice*, 20, 169-183.
- Kaufman, D., McKay, N., Routson, C., Erb, M., Davis B., Heiri, O., et al. (2020). A global database of Holocene paleotemperature records. *Scientific Data*, 7, 115.
- Keohane, R. O., & Victor, D. G. (2011). The regime complex for climate change. *Perspectives on Politics*, 9(1), 7-23.
- Kivimaa, P., Laakso, S., Lonkila, A., & Kaljonen, M. (2021). Moving beyond disruptive innovation: A review of disruption in sustainability transitions. *Environmental Innovation and Societal Transitions*, 38, 110-126.
- Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., et al. (2019). An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions*, 31, 1-32.
- Kühne, K., Bartsch, N., Tate, R. D., Higson, J., & Habet, A. (2022). “Carbon Bombs” - Mapping key fossil fuel projects. *Energy Policy*, 166. <https://doi.org/10.1016/j.enpol.2022.112950>.
- Latour, B. (2018). *Down to Earth. Politics in the New Climate Regime*. Polity Press.
- Lenton, T.M., Rockström, J., Gaffney, O., Rahmstorf, S., Richardson, K., Steffen, W., et al (2019). Climate tipping points — too risky to bet against. *Nature*, 575, 592-595.
- Macdonald, G. (2017). Containing oil: the pipeline in petroculture. In S. Wilson, A. Carlson & I. Szeman (Eds.), *Petrocultures: Oil, Politics, Culture*. McGill-Queen’s University Press.
- Mangat, R., & Dalby, S. (2018). Climate and wartalk: Metaphors, imagination, transformation. *Elementa: Science of the Anthropocene*, 6. <https://doi.org/10.1525/elementa.313>.

- Marres, N. (2017). *Digital Sociology: The Reinvention of Social Research*. Polity.
- Marriot, J., & Minio-Paluello, M. (2013). *The Oil Road: Journeys from the Caspian Sea to the City of London*. Verso.
- Mitchell, T. (2011). *Carbon Democracy: Political Power in the Age of Oil*. Verso.
- Morgunova, M. (2021). The role of the socio-technical regime in the sustainable energy transition: A case of the Eurasian Arctic. *The Extractive Industries and Society*, 8(3). <https://doi.org/10.1016/j.exis.2021.100939>.
- Newell, P., & Simms, A. (2020). Towards a fossil fuel non-proliferation treaty. *Climate Policy*, 20, 1043-1054.
- Paterson, M. (2021). The end of the fossil fuel age? Discourse politics and climate change political economy. *New Political Economy*, 26(6), 923-936.
- Roberts, C., Geels, F. W., Lockwood, M., Newell, P., Schmitz, H., Turnheim, B., et al. (2018). The politics of accelerating low-carbon transitions: Towards a new research agenda. *Energy Research & Social Science*, 44, 304-311.
- Rinscheid, A., Rosenbloom, D., Markard, J., & Turnheim, B. (2021). From terminating to transforming: The role of phase-out in sustainability transitions. *Environmental Innovation and Societal Transitions*, 41, 27-31.
- Simondon, G. (2016). *On the mode of Existence of Technical Objects*. University of Minnesota Press.
- Stewart, J. (2012). Making globalization visible? The oil Assemblage, the work of sociology and the work of art. *Cultural Sociology*, 7(3), 368-384.
- Swyngedouw, E. (2013). The non-political politics of climate change. *ACME: An International Journal for Critical Geographies*, 12(1), 1-8.
- Swyngedouw, E. (2022). Climate change consensus: a depoliticized deadlock. In L. Pellizzoni, E. Leonardi & V. Asara (Eds.), *Handbook of Critical Environmental Politics* (pp. 443-455). Edward Elgar Publishing.
- Turnheim, B., & Geels, F. W. (2012). Regime destabilisation as the flipside of energy transitions: Lessons from the history of the British coal industry (1913-1997). *Energy Policy*, 50, 35-49.
- Turnheim, B., & Geels, F. W. (2013). The destabilisation of existing regimes: Confronting a multi-dimensional framework with a case study of the British coal industry (1913-1967). *Research Policy*, 42(10), 1749-1767.
- UNEP – United Nations Environment Programme (2022). *Emissions Gap Report 2022: The Closing Window — Climate crisis calls for rapid transformation of societies*. <https://www.unep.org/emissions-gap-report-2022>.

- Van Oers, L., Feola, G., Moors, E., & Runhaar, H. (2021). The politics of deliberate destabilisation for sustainability transitions. *Environmental Innovation and Societal Transitions*, 40, 159-171.
- Viale, G., (2021). Civitavecchia e Gkn, esperienze apripista della transizione. *Il Manifesto*, 19 November 2021. <https://ilmanifesto.it/civitavecchia-e-gkn-esperienze-apripista-della-transizione>.
- Watts, M. J. (2005), Righteous oil? human rights, the oil complex, and corporate social responsibility. *Annual Review of Environment and Resources*, 30, 373-407.
- Watts, M. J. (2012), A tale of two gulfs: life, death, and dispossession along two oil frontiers. *American Quarterly*, 64(3), 437-467.
- Wilson, S., Szeman, I., & Carlson, A. (2017). On petrocultures: or, why we need to understand oil to understand everything else. In S. Wilson, A. Carlson & I. Szeman (Eds.), *Petrocultures: Oil, Politics, Culture*. McGill-Queen's University Press.