Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Maria Agapi Kaperoni
Student number	5620627

Studio		
Name / Theme	Transitional Territories	
Main mentor	Nikos Katsikis	Urbanization theory, geospatial analysis, territorial design
Second mentor	Luca Iuorio	environmental design, urban design
Argumentation of choice of the studio	As countries decarbonize the power sector, coal regions in central Europe (Germany, Czech Republic and Poland) need to figure out this transition. Through my thesis I aspire to further investigate the spatial dimension of the transition that will mark a new era, triggering spatial transformations and socio-economic changes, challenges and opportunities. The studio approaches fragile, at risk, transitional spaces and situates them at the intersection of urban design, landscape architecture, environmental studies, social sciences and politics, developing narratives across different scales. Through these lenses, I am highly motivated to develop my skills in researching, deepen my knowledge and writing my thesis.	

Graduation project	
Title of the graduation project	Coal regions in transition: spatial transformations and temporalities in central Europe
Goal	
Location:	Germany, Poland and Czech Republic
The posed problem,	It is of course undeniable that we are reaching earth's natural limits, but human needs for recourses and energy cannot be held back- however unless we change the way we live and think, we might have to live in an epoch of scarcity. The urgent need to decarbonize the energy sector marks the end of the fossil fuel era, forcing the coal sector to close down. The transition will bring a domino of changes, spatially but also economically, affecting large groups of people. This thesis investigates the coal phase out happening in Europe's 'coal

heartland', affecting primarily Germany, Czech Republic and Poland but with consequences spreading outside their borders.

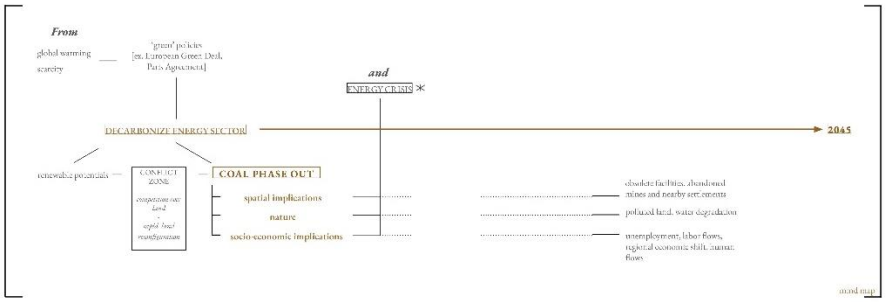
Since 4th November 2016 EU members are actively committed to achieve climate neutrality by 2050, by signing the first ever universal legally binding global climate change agreement, adopted at the Paris climate conference (COP21) in December 2015. Becoming climate-neutral, means that EU members must significantly reduce their greenhouse gas emissions, but also compensate for the unavoidable emissions. Phasing out coal is a major yet complex part of this process, as the 20% of Europe's total electricity is being generated by coal, providing more than 230.000 direct jobs in mines and power plants in 31 regions and 11 countries as well.

The climate change is unavoidable and the scale up of renewables is urgent, the coal phase out is an open call for change. **This thesis focuses on the spatial aspect of it, a twofold problem, that of land supply and demand, that stems from the two contradictory conditions: the abundance of vacant land (supply) that results from the coal phase-out and the spatial pressure (demand) that the emerging renewable energy market triggers.**

A condition we know: The coal phase out is in progress, however each country has different goals to meet and thus different speeds, even regions within the same country react differently, a lack of concrete strategies leave too much room for ambiguous interpretations and market driven actions. If that remains, we limit our potentialities and we put at risk the transition; one that must be fair for all.

The problem posed here is the spatial transformations that are happening now (the unregulated ones) and those that should be planned and happen in order to maintain a balance between the land supply-demand, something that can only be achieved by comprehending all the sites not as stand-alone entities but rather as one dynamic systemic zone.

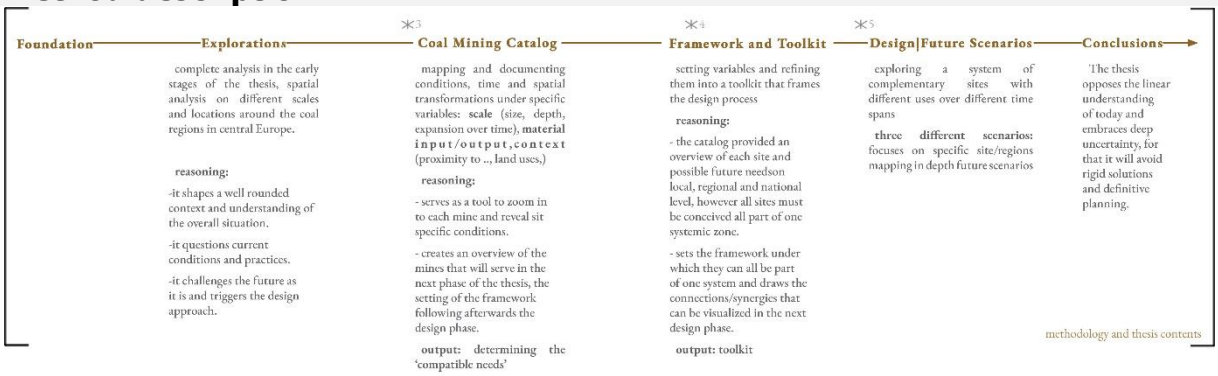
A condition we anticipate: However, there is one more condition to consider. As technology progresses, the spatial demand for renewables will drop rapidly, again we will be faced with land supply. That is why it is of paramount importance to anticipate this, and plan accordingly the next, meta-scenario of the coal regions in transition. That sets out the framework on designing with future society goals constantly being reconsidered and revalued.

	
research questions and	**Given the coal phase out and the implications that will be triggered from it, how we can we redefine and restructure these dynamic coal regions to facilitate and accelerate the energy transition while anticipating the meta-renewable phase, shaping a more desirable future for all.** *- How can we organize a system (or systemic zone) that supports the green transition and balance spatial demand and supply?* *- How to anticipate future society needs/goals and how can this be translated into the proposed systemic zone?* *- How to plan this system under deep uncertainty for multiple forms of coexistence?* *- How to plan a system that integrates top-down and bottom-up practices that guarantees synergy and community involvement?*
design assignment in which these results.	So, we are about to inherit dynamically and strategically important territories that right now, are being converted to renewable-scapes, not always supported by structured frameworks and substantial policies, with great influences from private sector initiatives. Amid the 2030 European goals, the process might be accelerated, jeopardizing the already fragile region. That calls for a shift in the current understanding of land exploitation that has been taking place for years. The proposed systemic zone could benefit Europe supporting current needs. The current need for Europe is stability, however at the time being, it seems that the coal phase out brings energy instability in times of energy uncertainty. By conceiving former coal mining sites into a system, we can tackle the green transition and facilitate current known needs. At the same time, we can plan the system to anticipate unknown needs. Following the research phase and the explorations (mapping and exploring conditions), the thesis focuses on creating a **catalog of mines** in the three countries. The catalog will zoom-in to each coal mine and coal power plant; even though they must be perceived as a

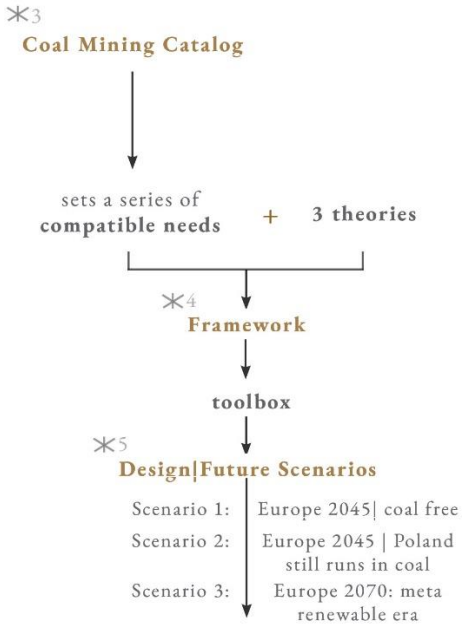
	system, each location has specific needs, requirements and potentials; thus, it is needed to first formulate a good understanding of each site in order to later create the framework that will trigger the design phase. In the catalog there are certain variables that are used to map and document the sites and can be divided into three themes, *scale, material and context*. The scale investigates the mine and its size, depth and expansion over time, material shows energy input/output, flows, connectivity to the energy grid and finally context depicts the surroundings, land uses and proximity to important infrastructure. Finally, it draws comparisons between different cases in an attempt to better illustrate special spatial characteristics. **The catalog results in 'compatible needs, a series of potential activities that can be facilitated on site** - one site can facilitate more than one activity. **The 'compatible needs' combined with 'three theories' (*ephemeral urbanism, weak urbanism and Dynamic Adaptive Planning (DAP)*) structures a framework or rather a toolkit that can instruct the next phase, the creation of future narratives.** The toolkit that will be produced is far from a fit-for-all solution giver, but a rather a tool to anticipate and plan the future scenarios. **The thesis reaches its end by exploring three scenarios:** Scenario 1: Europe 2045 – coal free Scenario 2: Europe 2045 – Poland still runs in coal Scenario 3: Europe 2070 – meta renewable phase Overall, the contribution of the thesis is a catalog which can be used for further references concerning the topic, a toolkit and the exploration of three scenarios.

Process

Method description



For this thesis the methodology used is very much related to our studio approach. The academic year started with the Studio Intensives, during which the studio's lectures introduced us to two concepts – that of accumulation and clearance. We began by trying to visualize these, later trying to map a palimpsest and after that drawing our own understanding of composition, alternation and limits. The final step was the transposition, an early attempt to think of the changes we propose. During the Studio Exploration (Geographical Urbanism) we were introduced to the matrix city, more-than- city, human, more-than-human. We explored how we can visualize these producing our own matrix and a synthesis drawing of our future intentions.
As we started the second quarter of the graduation year, the lectures focused on exposing us to a variety of topics, the seminars under the theme Positions of Care were supporting the drawing exercises Lines of Inquiry. For the exercises, as we needed a location, I decided to focus only in Germany. The reason behind my decision was the availability of the data, my better familiarity with the given context and the linguistic understanding as opposed to Poland and Czech Republic. The tools, thinking and approach that I used to produce the Lines of Inquiry for the case of Germany could be applied to the other two countries. The series drawings will be presented in the next chapter 'Explorations', as they will gradually approach the complexity of the coal phase out, underline conflicts and potentials and seek for the next steps.
Having the above explorations, a catalog will be made for all active (during the research) coal mines and coal power plants in Germany, Poland and Czech Republic. Opposing to the Lines of Inquiry or the material prepared during the Studio Exploration the catalog will zoom-in to each coal mine and coal power plant; even though they must be perceived as a system, each location has specific needs, requirements and potentials; thus, it is needed to first formulate a good understanding of each site in order to later create the framework that will trigger the design phase. In the catalog there are certain variables that are used to map and document the sites and can be divided into three themes, scale, material and context. The scale investigates the mine and its size, depth and expansion over time, material shows energy input/output, flows, connectivity to the energy grid and finally context depicts the surroundings, land uses and proximity to important infrastructure. Finally, it draws comparisons between different cases in an attempt to better illustrate special spatial characteristics. The catalog results in 'compatible needs, a series of activities that can be facilitated on site - one site can facilitate more than one activity. The 'compatible needs' combined with 'three theories' (ephemeral urbanism, weak urbanism and DAP) forms a framework or rather a toolkit that can form a narrative. The toolkit that will be produced is far from a fit-for-all solution giver, but a rather a tool to anticipate and plan the future scenarios. With that said it triggers the later phase of the thesis, a narrative of spatial interventions or the future scenarios.



(A) Literature review: exploring scientific theories and methods on the energy transition and the coal phase out, spatial transformation and geo engineering
(B) Critical review of policy documents related to the coal phase out and the energy transition, on global, European and national context, to gain an understanding of the current and suggested framework.
(C) Analytic cartography: mapping current spatial condition while further exploring conditions, potentials, threats and limits on site.
(D) Coal mines catalog: documentation and spatial visualization of current coal mines in Germany, Czech Republic and Poland.
(E) Construction of a framework that results in a toolkit: setting variables and refining them into a toolkit that frames the nest phase, the design one
(F) Narrative/design phase: based on the above there are three future scenarios that are being explored. Scenarios operate in different scales and time span.

Literature and general practical preference

Alan Berger
Drosscape : Wasting Land in Urban America (2007)

Dirk Sijmons
Landscape and energy : designing transition (2014)

Pierre Bélanger
Landscape as infrastructure : a base primer (2016)

Rania Ghosn
New Geographies 02: Landscapes of Energy (2010)

Andrea Branzi
Models of Weak Urbanization (2006)
Reversible Urbanism (2016)

Rahul Mehrotra and Felipe Vera
Ephemeral Urbanism: Learning from Pop-up Cities (2014)

EU coal regions: opportunities and challenges ahead
Policy report JRC112593 (2018)

Clean energy technologies in coal regions
Policy report JRC117938 (2020)

Recent trends in EU coal, peat and oil shale regions
Policy report JRC123508 (2021)

Approaches on Decision Making under Deep Uncertainty

Kerb 29: Wild
Journal of Landscape Architecture (2021)

Maria Puig de la Bellacasa
Matters of Care (2017)

Explorations

Catalog

Setting a new framework

Design and Future scenarios

---- Coal regions in transition ----

Belanger, P. (2016). *Landscape as Infrastructure*. Taylor And Francis.

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New Geographies 06: Grounding Metabolism. (2014). In D. Ibañez & N. Katsikis (Eds.), *New Geographies* 6 (Issue 6). Harvard University Graduate School of Design.

Pope, A., & Vasallo, J. (2019). Cellulose, Carbon, and Urban Reform. In D. Ibañez, J. Hutton, & K. Moe (Eds.), *Wood Urbanism: From the Molecular to the Territorial* (pp. 318–323). Actar Publishers.

Sijmons, D., Hugtenburg, J., Anton Van Hoorn, & Feddes, F. (2014). *Landscape and energy: designing transition*. Nai010 Publishers.

Waldheim, C. (2016). *Landscape as urbanism: a general theory.* Princeton University Press.

Policy documents

Alves Dias, P., Conte, A., Kanellopoulos, K., Kapetaki, Z., Mandras, G., Medarac, H., Nijs, W., Ruiz Castello, P., Somers, J., & Tarvydas, D. (2021, March 15). *Recent trends in EU coal, peat and oil shale regions.* JRC Publications Repository. https://publications.jrc.ec.europa.eu/repository/handle/JRC123508

Climate action and the Green Deal. (n.d.). Commission.europa.eu. Retrieved December 23, 2022, from https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/climate-action-and-green-deal_en

Coal regions in transition. (2022). Energy.ec.europa.eu. https://energy.ec.europa.eu/topics/oil-gas-and-coal/eu-coal-regions/coal-regions-transition_en

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Rocha, M., Parra, P. Y., Sferra, F., Schaeffer, M., Roming, N., Ancygier, A., Ural, U., & Hare, B. (2017). *A stress test for coal in Europe under the Paris Agreement*. In Climate Analytics. https://climateanalytics.org/media/eu-coalstresstest-report-2017.pdf

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

The project ***Coal regions in transition*** focuses on the spatial reconfigurations that are happening and will occur due to the energy transition and more specifically the coal phase-out. The topic falls within the research interests of the studio as it investigates the transition of a greater operationalized landscape (Brenner & Katsikis, 2020)– an intensive coal mining one - that shaped economically and socially three countries in central Europe. In the Transitional Territories studio, we choose to look into these territorial transitions as complex processes by unravelling the tangled existent situation and then weaving narratives that involve multiple perspectives, while maintaining a caring approach for all beings and entities. Regarding the MSc track (Urbanism) the project expresses the concern of the rapidly happening shift in the region that affects European economies and the current understanding of the linear city-non city relation, that relies on the nearby productive zones. Here the role of an Urbanist is highlighted, anticipating the ongoing changes in the current economic and productive system that results in alternative urban and peri-urban environments. The spatial implications in relation to the geopolitical maneuverings are reflected on nature but also on the society, thus it is important to put this project in a greater context, in the crossing of AUBS.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework?

In times of great instability and uncertainty, we often forget to see through the eyes of those being affected by our actions. It is only logical to say, that the ongoing coal phase-out will be reflected in those who live, work and make business with the coal industry; almost half a million people in Europe. The transition should be planned in way that addresses their concerns and is fair for all, taking into account the different dynamics of each country. **The project aims to contribute on the re-integration of the 'coal community' in the carbon-free era.**

Decarbonizing the energy sector is a difficult task and so that will keep us busy for the years to come. Human actions have left behind scars; our mining activities have a footprint that even when concealed, continues to exist. This thesis, will look closely at the coal footprint, the spatial implications that will be triggered from the phase-out and the deployment of the renewables; to propose actions that should restore the balance after years of land exploitation. **The thesis tackles a phase-out/transition process while proposing a hybrid approach – in this context it revolves around the coal phase-out however efforts will be made to standardize the method and proposed actions into a compact, re-applicable tool that could approach similar topics in the future (e.x decommission of solar farms).**

Our studio challenges us to think not the conventional ways; we no longer need to accumulate, it is a high time to make an action of clearance, and in my project, this comes by transforming the coal regions, offering a design that accepts the adaptability and the need for change. The role of an Urbanist is to mediate between different stakeholders and encourage the dialogue between those involved, be able to foresee problems and anticipate threats, but most importantly to raise issues by thinking unconventionally, unbiased, challenging the status quo and caring for all beings.