

The Transition Institute 1.5

The ambition for an actual transition

PRESS KIT

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[@TTI5_MinesParis](#)



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The Transition Institute 1.5

The ambition for an actual transition

A NEW RESEARCH INSTITUTE

The Transition Institute 1.5, 1.5 to echo the temperature target put forward by the IPCC, is an initiative launched by Mines Paris – PSL with the support of its Foundation. The ambition of this institute, dedicated to designing the low-carbon transition, is to provide informed scientific responses to the major challenge of carbon neutrality.

AN AMBITIOUS RESEARCH PROGRAM

Research focuses

FOCUS 1: The transition design

The transition design sets out to identify the mechanisms to be adopted to guarantee the decarbonization targeted.

FOCUS 2: An electric planet?

An electric planet? Investigates the implications of a vision involving decarbonization that would mean massive electrification: trajectories, operations, lifestyle, vectors, resources, competition, substitution, channels, technologies and costs.

FOCUS 3: The inclusive planet

The inclusive planet is devoted to identifying solutions and tools to involve all stakeholders in the transition, combining the multi-scale challenges of the climate challenge and the multiple constraints that each faces.

FOCUS 4: The planet as an area of influence

The planet as an area of influence analyzes the transition from a perspective of international issues, to consider the planet as an area of influence: geostrategic, commercial, economic, and political.

DIVIDED INTO A SYSTEMIC VISION

Through 9 angles of analysis



Technological products

Including innovative processes and materials, prospective scenarios and software technologies, etc.



Vectors and resources

Vectors and energy resources.



Systems operation and flexibility

Physical systems: electricity, gas, energy, energy efficiency, demand-side management, etc.



Spatiality and pace of implementation

Pace of implementation of technologies, industries, GIS, etc.



Lifestyle and society

Behaviors, usages/demand, acceptability, nudges, etc.



Governance, regulation, and institutional conditions

Governance frameworks and influence on multiple levels (international, national, organizations, companies, regions), legal aspects, environmental responsibility, development policies, environmental policies, measures, engineering, historical analysis, etc.



Externalities and environmental impacts

LCA, biodiversity, information technologies, recycling, natural resources (water, materials for energy, all types of pollution, land use, etc.).



Cost and financial engineering

Investments, O&M, finances, markets, subsidies, taxes, etc.



Land-use management

Networks (all types), centralization/decentralization, urban planning, cities, industrial ecoparks, circular economy, flood plains, etc.

FEDERATING A MULTITUDE OF DISCIPLINARY FIELDS at Mines Paris – PSL

17 RESEARCH CENTERS

5 RESEARCH FIELDS

Earth sciences and environment

Energy and processes

Mechanical and materials engineering

Mathematics and systems

Economics, management and society

ORIGINAL DISSEMINATION OF SOLUTIONS DEvised at Mines Paris – PSL

- Information notes and position papers
- Summaries of research by focus area
- Podcasts
- Organization of regular public scientific seminars
- Training aimed at decision-makers
- Doctoral student blog



AN INSTITUTE BUILT AROUND ITS STUDENTS

DOCTORAL TRACK

Interdisciplinary thesis subjects to encourage exchanges between centers and departments

Thesis subjects that correspond to the TTI.5 scientific program

ACADEMIC TRACK

Creation of a TTI.5 course for Mines Paris – PSL students

Specialized TTI.5-accredited courses

In-depth experience related to themes covered by TTI.5: Research term and Internship

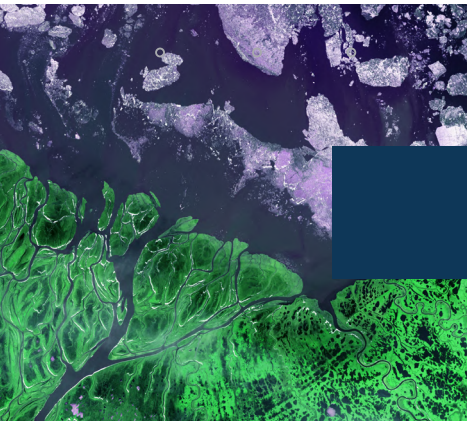


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The Transition Institute 1.5°

An ambition for real transition



A scientific response to the climate challenge

To tackle the urgent issue of climate change and pursue the IPCC recommendation of limiting global warming to 1.5°C, our societies are making variable efforts to achieve carbon neutrality. However, numerous questions remain unanswered, and there is no place in the world where this unprecedented transition is being implemented in a truly “convincing” way.

This approach, which integrates interactions in their entirety and puts people at the heart of processes, requires multidisciplinary scientific reflection that is both rigorous and exhaustive. Thanks to the diversity and excellence of its research activities, Mines Paris – PSL is equipped to provide a response. Its numerous collaborations with economic and academic spheres, and its highly decentralized operating model, possessing key assets and unique expertise, mean it can contribute in a concrete and original way to constructing the design of this transition.

With this in mind, Mines Paris and its Foundation have got together to launch a new institute with the ambition of bringing scientific responses to today’s climate challenges: TTI.5, The Transition Institute 1.5: 1.5 to echo the target put forward by the IPCC.

TTI.5 is a structure based on a shared vision put together jointly by different bodies at Mines Paris – PSL. Centered on an ambitious scientific

project, the Institute interconnects in-house skills and works in association with prestigious networks. TTI.5 therefore plays both a federating and attracting role: on the one side, it gives greater visibility and clarity to technical, economic and social research and development carried out by all of those working on the transition at the School; on the other side, it positions the School as a key player in the search for a way out of the deadlocks currently impeding climate change issues.



Bringing about the much-awaited transition

Our aim is to provide decision-makers with the elements they need to build a strategy that can guarantee a bifurcation. These will need to take into account both climate and development issues to devise concerted social and economic plans.

This challenge means working on future “states of the world” in order to identify the bifurcation points that enable or prohibit carrying out this strategy. This cannot be done by simply juxtaposing statements by experts from different disciplines, intuitive conjectures, and normative judgements. Only a systemic approach that considers all multifactorial impacts and the acceptability of the measures planned is likely to identify realistic transition pathways to a low-carbon era.

For this reason, TTI.5 proposes to take a totally innovative approach to different aspects of the transition. The institute’s work is based on an original comparison of several temporal and discipline lenses. It associates engineering science with economic and social sciences, while combining empirical and theoretical approaches and disciplines that are already present at Mines Paris. The program will be broken down into technical, economic, historical, prospective, socio-political and conceptual analyses, and will set out to establish the design of decarbonized transition subject to specific regional constraints. The challenge will involve differentiating this low-carbon transition from transitions observed in the past, which were essentially driven by an ambition to increase productivity. With this objective, we propose to consolidate the lessons learned from past and current field analyses, and their association with theoretical concepts

related to the transition and bifurcation, in order to tackle the question of a future system (energy-based, political, technical, societal, economic, etc.) compatible with low-carbon ambitions.

The “design” of this transition will draw from the “low-carbon” solutions available (some of which are the object of research at the Mines Paris - PSL labs). They will be discussed systemically, integrating constraints related to: technological supply (including forthcoming technologies such as CCS, CCUS, fusion and innovative materials), vectors (including hydrogen), questions of systems operation and flexibility, spatiality, the pace of setup, land planning, lifestyle, cost and financial engineering, governance, regulation and institutional conditions, and externalities (information technologies, natural resources), all of which are subjects of predilection at the School’s laboratories.



Collaboration and influence

TTI.5, by integrating all of this work into its scope of reflection, will increase the visibility of the School and improve the interconnections between its contributions. This should ensure the position of Mines Paris as a place of influence that closely interacts with society, to inform public debate and decision-makers, and should also rehabilitate the voice of engineers in the face of a challenge that questions their role.

TTI.5 also has a role of structuring teaching at the School to center on the transition by setting up dedicated “tracks”. This fits in with an overhaul of the syllabus, which aims to better match the expectations of engineering, research and master’s students, many of whom want to give more meaning to their professional career in the long term.

By clearly mobilizing the School's potential on a theme of the future, the creation of this Institute is likely to boost its attractiveness and contribute to its influence, both internally (students, researchers, staff) and externally (public and private partners, government bodies, network of alliances and national and international collaborations, etc.).

An organization which is both inclusive...

Our objective is to maintain a systemic approach and a global vision to tackle the complex question of transition. For this reason, and to guarantee a mix of disciplines, it is essential to keep all actors within the school dynamically involved in TTI.5, and add on national and international networks of excellence. Since the scope is global and the transitions to be “designed” are as numerous as the regions in which they will be implemented, pertinent regional input will also need to be guaranteed. This will involve setting up a network of international partners spread throughout the different regions and tackling the same subject in a similar way (selection in process).

This approach requires devising an original format. In our view, the most promising channel to guarantee exchanges between the School's centers and the international network is the students. The institute will therefore be based on:

- Inter-center theses, which it will finance
- Association of doctoral students from other universities
- Visiting fellows (doctoral or post-doc) from target regions
- Civil engineering students following the TTI.5-accredited transition course
- Students following specialized courses (master's, specialized master's), students from Cords des Mines, PSL students, etc.

An institute team will be responsible for operation, management, coordination, dissemination and fund-raising. To integrate the dimensions of

internal interconnection and consolidation between the School's centers, and ensure its external influence, the institute will operate through wider governance. To this end, two levels of monitoring are planned:

- Mines de Paris - PSL monitoring committee: made up of lecturers/ researchers and students from different centers and programs at the School, it will establish the scientific policy of the Institute and ensure its implementation: it will set up the juries for selecting PhD thesis applicants, regularly follow up on the institute's work, and validate the budget and its allocation.
- A scientific committee made up of external members: meeting annually, it will produce consultative opinions on the Institute's position, production and evolution.

The Institute operates on the principle of patronage and its method of financing is subject to the PSL Ethics Committee.



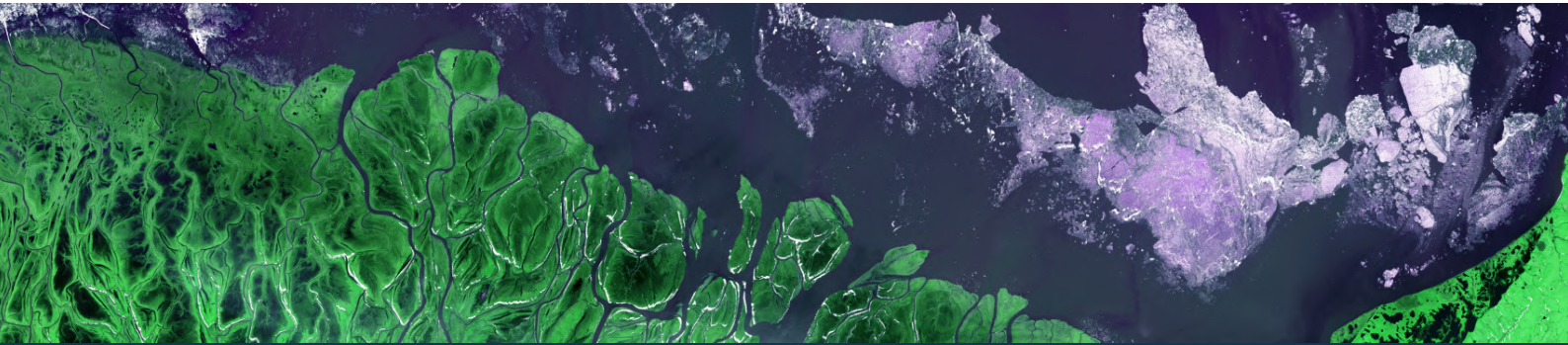
...and outward looking

To guarantee its visibility and ensure its reputation, TTI.5 will coordinate the community attached to the Institute beyond its walls with different events:

- A program reporting on TTI.5 solutions dedicated to stakeholders (companies, governmental, national and international institutions)
- Regular scientific seminars: to ensure multidisciplinary dialogue, in particular setting up a community of students and research students involved
- Extending the offer for summer/winter schools (one-week teaching programs targeting an international audience) at Mines Paris - PSL

In addition to standard academic output, publications and specific dissemination will guarantee the influence of TTI.5, including the following:

- Position papers
- Top-level training course aimed at decision-makers (creation of an institute for advanced studies centered on transition issues)
- Special editions of journals (Annales des Mines for France)
- Showcasing of work in association with museums/libraries/press: exhibitions, publications, etc.
- Awards for the best work (all courses combined)



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The Transition Institute 1.5

The ambition for an actual transition



SCIENTIFIC PROGRAM

The scientific program of TTI.5 focuses on the conditions surrounding the emergence and management of a low-carbon transition, related to the ambition advocated by the IPCC to restrict average global warming to 1.5 degrees. This means taking seriously all the implications of such a particularly ambitious global decarbonization objective, while the strategies to achieve it are struggling to prove their effectiveness. The research we conduct are driven by the question :

How can the advent of carbon neutrality be achieved and what is the extent of the transformations needed to reach this objective?

In order to find answers to this complex question, the Institute's scientific program is divided in 4 areas. The first research axis in TTI.5, **Design of the transition**, aims to clarify the mechanisms required to guarantee the desired decarbonization. Axis 2, **an electric planet**, explores the implications of an associated vision of decarbonization, including massive electrification. The third axis, **the inclusive planet**, is dedicated to identify solutions and tools to engage all actors in the transition, reconciling at the same time the multi-scale issues of the climate challenge and

the multiple constraints that they are both facing. Axis 4 will be dedicated to the analysis of the transition through the prism of international issues, to take into account **the planet as an issue of influence** of all kinds : geostrategic, commercial, economic, political, etc.

The institute offers a resolutely holistic approach that requires the issues addressed to be discussed by integrating a set of unavoidable constraints in terms of : technological supply, vectors and resources, issues of operation and flexibility of systems, spatiality, pace of implementation, land use planning, lifestyles, costs and financing engineering, governance, regulation and institutional conditions, and externalities.

This scientific program has been designed to bring coherence, enhance, and extend the various research projects already conducted at Mines Paris - PSL. It should also make possible the initiation of new research on topics that have been rarely tackled until now, but which are necessary for the management of the transition. In addition, it will draw on the expertise of Mines Paris - PSL and the TTI.5 Institute's partners.

AXIS 1: DESIGN OF THE TRANSITION

Conception of the transition

The first part of this research theme seeks to unravel the mechanisms and dynamics of transitions. It aims to identify the mechanisms and processes that contribute to the triggering and realization of a strong and rapid decarbonization.

One of the applications of this axis is based on the development for transition models in order to support our analyses and reflections on a clarified framework. Such models will draw on analogies, for example with phase transition physics, or may be derived from retrospective analyses, etc. This should allow us to define clear objectives and evaluate the actual state of the transition of technical, social, economic, political systems and the conditions of their bifurcation towards a decarbonized system.

The second part proposes to study the nature of the movement and the forms of organization required to make this transition to a desired unknown reality. The approach could be inspired by lessons learned from different contexts, such as the semiconductor industry, where Moore's Law has led to the questioning of models and organizations in order to rethink our use of semiconductors and possible alternatives, taking into account the difficulties related to the complexities of globalized supply chains and the problems of resource availability. This work should allow us to reflect on new organizational and governance forms adapted to lead the desired transitions.

Transition engineering

In this section, we discuss low-carbon solutions and their regulatory environment, meaning the financial levers and public policies associated with this transition (investments, taxes, redistribution, subsidies) that should initiate and then drive the decarbonization process. This involves considering both solutions based on the decarbonization of production (green energies, CO2 capture, etc.) and solutions based on the modification of consumption (sobriety, efficiency, etc.). In order to avoid the solutions of the one becoming the problems of the other, these solutions will always be evaluated through different disciplinary, temporal and spatial prisms and their interaction and integration into the economic, energy, political and social system.

As an example, technological solutions concerning buildings will be discussed regarding their integration into the energy system at different scales, issues of associated consumption (self-consumption, digital externality), use of nudges, insulating materials, household equipment, behavior, policy, standards, subsidies, competitiveness, etc. Concerning the integration of CO2 capture, storage and utilisation techniques (CCUS) or hydrogen use in the reconfiguration of the industrial sector, we will address not only the technical issues, but also the issues of acceptability, the geopolitical consequences of the reorganisation of the sectors, the industrial policies of deployment of the technologies themselves, etc.



AXIS 2: AN ELECTRIC PLANET ?

This axis is dedicated to question the relevance of a vision regularly put forward as a desirable or even indispensable orientation for the transition : the deployment of the electric vector. The purpose is to explore issues inherent to electrification and propose to define the technical, social, organizational and political conditions as well as the modalities for the implementation of trajectories that are conducive to a low-carbon transition at different scales.

This requires exploring both technological and consumption trajectories that are compatible with decarbonized electrification. In this regard, we need to consider operational issues for the electricity system, production technologies, energy carriers and resources, as well as lifestyles. We also propose to explore the economic and political levers for implementing the identified trajectories. To ascertain the coherence and applicability of the analyzed measures, projects and solutions, the questions will always be approached in terms of accessibility, social appropriation and acceptability and we will propose multi-scale analyses allowing to take into account regional singularities, geopolitical conditions as well as various externalities such as the export of impacts (digital sector, consumption of rare metals, relocation, etc.).

For all considered options, research conducted at the Institute will aim to clarify the tensions that arise around energy choices related to electrification, through the analysis of their environmental impacts (in particular through life cycle analyses), issues

related to the management of resources needed to follow these trajectories, socio-political questions linked to these choices, and business models related to this bifurcation towards an electric planet.

For example, in the deployment of renewable energies, such as solar energy, all aspects related to the choice of this resource will be strengthened : life cycle analysis of panels, environmental risks, issues of materials and resources needed, resource forecasts, effects of the deployment of photovoltaic on competition in land use, planning issues related to integration into networks and in a territory, associated business models, investment needs, uses, regional acceptance, etc.

AXIS 3: THE INCLUSIVE PLANET

Since the transition responds to a global problem, it is necessary to integrate all scales and all actors in society while ensuring coherence between them in order to avoid, once again, that the solutions of some become the problems of others. This axis deals respectively with the issues of governance of this transition towards a decarbonization of our societies and the inclusiveness of this governance, which also remains framed by some physical constraints. Conditions of this inclusion are developed taking account of the multi-scale nature of climate challenges and the constraints we are facing to solve this decarbonization : in particular the physical limits linked to the planet's finiteness and all the associated consequences at the economic, social,



geopolitical level, etc.

Actors

The idea is to identify solutions that will allow us to engage the various actors in the transition. Initially, our work will focus on businesses and households. In order to question the various options for engaging businesses and industries in the transition, we will consider tools to clarify the approaches and strategic choices of companies, the incentives and coercive measures to be deployed, while integrating the challenges of viability, sustainability and adaptation. As an example, the developments envisaged on the scale of a territory will be evaluated according to their integration in the metabolism of this same territory (integration in the flows and stocks of materials within the territory, integration in the urban, economic and social fabric). Some of the tools that support this approach include the design and deployment of ecological accounting tools, the construction of indicators specific to decarbonation, the implementation of life cycle analyses, the consideration of environmental risks, business models and prospective approaches.

It also means designing tools to encourage the commitment of households to the transition and the reshaping of their lifestyles, to activate sobriety levers and to encourage the use of low-carbon solutions in the three sectors of mobility, housing and the consumption of goods and services. The questions raised will take into account the issues of acceptability and accessibility of solutions, services, infrastructures, resources and all that contributes (in terms of forms of governance) to the broadest possible social appropriation of these socio-technical choices related to decarbonization.

Coherence tools

We propose to deploy tools and approaches that allow the

coherence of various actors in the transition, among which are the circularity models. Faced with the challenges of finite resources, continuous growth of waste production and reduction of greenhouse gas emissions, circularity models aim, through recycling, reuse of products and reduction at source of waste and production, to simultaneously transform supply systems and consumer behavior. This involves reducing the material footprint of the economy by improving material efficiency, extending the life of products and technologies (reparability, reuse) and intensifying their uses (economy of functionality). Their implementation requires coordination of a large number of actors (local authorities, companies, households, associations) and raises questions about different scales of action and decisions. Therefore, they are relevant to reflect on the principles and conditions of implementation of the circular economy and industrial symbiosis.



AXIS 4: THE PLANET AS AN ISSUE INFLUENCE

This field is dedicated to the analysis of the ethical and geopolitical tensions that arise around the issue of environmental protection. Insofar as these issues can constitute factors of inertia and thus represent obstacles to the transition, it's essential to understand the fundamentals and to decipher the mechanisms that drive them.

Equity Issues

In this axis, we question the organizations, political instruments, financial mechanisms, as well as the rules, procedures and norms that regulate global processes of climate and biodiversity protection. In particular, we propose examining the ways in which global objectives are constructed and implemented. This insight is inseparable from an understanding of the technical, economic, social and political conditions associated with the various objectives adopted, and more particularly those related to temperature stabilization.

Discussion of how global objectives should be applied to different scales is also fundamental : this requires questioning the distribution of reduction efforts, and re-examining questions of differentiated responsibility and fair contribution to decarbonation. Behind these questions lie ethical issues related to resource management as well as engineering practices and, at a more political level, issues of environmental justice, ownership and value sharing, which must be linked to the constraints of climate physics. More specifically, a true low-carbon transition requires taking into account not only the point of view of developed countries, but also those of emerging countries whose visions and models may differ substantially from the developed ones. The issues surrounding the use of indicators as an information system in governance (issues of outreach and accountability; issues surrounding the conventions used; issues concerning the management of data and the intervention of the private sector) are also central.

Competition and geostrategy

While the transition is part of a global vision and context, it takes place at local levels, and is therefore confronted with diverse realities and competitive issues. The transition can also fuel economic competition between different economic actors: via patents, technological advances, the deployment of

sectors, standards, etc. Thus, the strategies of influence around the climate change The position displayed by several regions, from the EU-27 to China and the United States, of wanting to take power over the climate issue, is driving a reshuffling of international power relations, which is leading to a reappraisal of cooperation but also of forms of rivalry, especially over the control of resources. These relative positions are also elements that must be integrated in the reflection for the elaboration of a real low-carbon transition.



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ACADEMIC TRACK

ELIGIBILITY REQUIREMENTS

TTI.5-ACCREDITED COURSES

As part of this track, during the 2nd and 3rd years of their civil engineering studies, students must take TTI.5 -accredited specialized courses (see table on pages 2 & 3), amounting to a minimum of 16 ECTS. They can opt to do a Master's degree in parallel, also TTI.5-accredited (see page 4).

RELATED IN-DEPTH EXPERIENCE

Students must carry out either a term of research or an internship (either as a break from studies or during the end-of study period) on the theme of the low-carbon transition. This part represents 15 ECTS and must be validated by the institute.

CONTRIBUTIONS TO THE TTI.5 COMMUNITY

Contributions to the community can take different forms. Students must make at least two contributions from the following list:

- Contributions to the community can take different forms. Students must make at least two contributions from the following list:
- Write and publish a summary note
- Produce a video or podcast
- Organize an event related to TTI.5
- Give a presentation at a TTI.5 conference
- Contribute to the TTI.5 blog
- Write up the minutes of TTI.5 seminars
- Work on a computer project as part of EU 22
- ...

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TTI.5 SCIENTIFIC PROGRAM RESEARCH FOCUSES

FOCUS 1: The Transition Design

FOCUS 2: An electric planet?

FOCUS 3: The inclusive planet

FOCUS 4: The planet as an area of influence

THE ACADEMIC TRACK

The TTI.5 academic track is aimed at civil engineering students at Mines Paris – PSL. The track comprises a set of courses and involves related in-depth experience and contributions to the TTI.5 community.

Students put together their individual project using a document that they can download from the TTI.5 website and which must then be validated by the Institute.



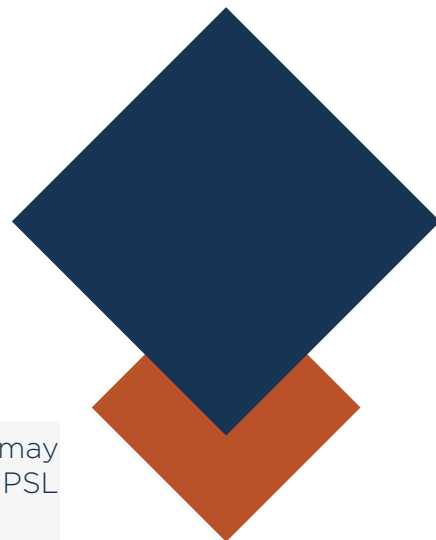
TTI.5-accredited specialized courses 2022-2023

This non-exhaustive list is given for information only. Other courses may be added. Note that additional courses from the TTI.5-accredited PSL and Athens week will be communicated at a later date.

Code	Course title	Department	T/S*	Bloc	ECTS
2A					
ES2A_EEP-01	Conception de procédés 1	Energétique et Procédés	T1	H-T1	2
ES2A_EMS-01	Recherche opérationnelle	Economie, Management, Société	T1	H-T1	2
ES2A_EEP-03	Conception de procédés 2	Energétique et Procédés	T2	H-T2	2
ES2A_EMS-02	Economie industrielle	Economie, Management, Société	T2	H-T2	2
ES2A-MES-05	Statistiques mathématiques	Mathématiques et Systèmes	T2	H-T2	2
ES2A_STE-01	Risques naturels	Sciences de la Terre & Environnement	T3	H-T3	2
3A					
ES3A_EMS-01	Conception et dynamique des organisations	Economie, Management, Société	S5	BLOC 5A	2
ES3A_PHY-01	Physique Nucléaire	Physique	S5	BLOC 5A	2
ES3A_EEP-01	Systèmes énergétiques	Energétique et Procédés	S5	BLOC 5A	2
ES3A_EMS-02	Institutions politiques	Economie, Management, Société	S5	BLOC 5B	1
ES3A_EMS-03	Introduction to value creation in industry	Economie, Management, Société	S5	BLOC 5B	1
ES3A_STE-01	Dynamique des climats	Sciences de la Terre & Environnement	S5	BLOC 5C	1
ES3A_EMS-04	Ethique des multinationales : responsabilité dans les relations nord-sud	Economie, Management, Société	S5	BLOC 5C	1
ES3A_PHY-04	Génie Atomique Avancé	Physique	S6	BLOC 6A	2
ES3A_STE-02	Gestion de la ressource en eau dans un monde en évolution	Sciences de la Terre & Environnement	S6	BLOC 6A	2
ES3A_EEP-02	Hydrogène pour l'énergie	Energétique et Procédés	S6	BLOC 6A	2
ES3A_EMS-05	Sociologie des marchés	Economie, Management, Société	S6	BLOC 6A	2
ES3A_EMS-06	Economie des matières premières	Economie, Management, Société	S6	BLOC 6B	1
ES3A_MEM-04	Corrosion et durabilité des structures	Mécanique et Matériaux	S6	BLOC 6C	1
ES3A_EMS-08	Finance d'entreprise	Economie, Management, Société	S6	BLOC 6C	1
MIXTE					
ESMI_EMS-01	Economie de l'environnement et du climat	Economie, Management, Société	S3/S5	01-V-MIXTE-SEPT	2
ESMI_EMS-02	Econométrie et analyse des données en sciences sociales	Economie, Management, Société	S3/S5	01-V-MIXTE-SEPT	2
ESMI_EEP-01	Introduction to power system analysis	Energétique et Procédés	S3/S5	01-V-MIXTE-SEPT	2
ESMI_STE-01	Géologie pour AST 2A	Sciences de la Terre & Environnement	Imposé	01-V-MIXTE-SEPT	2
ESMI_EMS-03	Technology and Innovation Strategy	Economie, Management, Société	S3/S5	02-V-ATHENS-NOV	2
ESMI_EMS-13	Circular Economy and Eco-design : "Urban mine" case	Economie, Management, Société	S3/S5	02-V-ATHENS-NOV	2
ESMI_MES-02	Geostatistics	Mathématiques et Systèmes	S3/S5	02-V-ATHENS-NOV	2
ESMI_MEM-01	Physics and Mechanics of Random Media	Mécanique et Matériaux	S3/S5	02-V-ATHENS-NOV	2

* T/S : T/S Term/Semester

** TR : RT: Research Term



TTI.5-accredited specialized courses 2022-2023

This non-exhaustive list is given for information only. Other courses may be added. Note that additional courses from the TTI.5-accredited PSL and Athens week will be communicated at a later date.

Code	Course title	Department	T/S*	Bloc	ECTS
MIXTE					
ESMI_MEM-02	Design, Processing, and Functionality of Polymeric Materials	Mécanique et Matériaux	S3/S5	02-V-ATHENS-NOV	2
ESMI_STE-02	Regional Oceanography of the Planetary Ocean	Sciences de la Terre & Environnement	S3/S5	02-V-ATHENS-NOV	2
ESMI_EMS-04	Eco-conception	Economie, Management, Société	S3/S5	03-V-PSL-NOV	2
ESMI_EMS-16	Marchés financiers : dynamiques, mesure de risques et tarification	Economie, Management, Société	S3/S5	03-V-PSL-NOV	2
ESMI_EMS-05	Systèmes de production et de logistique	Economie, Management, Société	S3/S5	03-V-PSL-NOV	2
ESMI_EEP-02	Efficacité Energétique des Systèmes	Energétique et Procédés	TR**	03-V-PSL-NOV	2
ESMI_EEP-05	Transition Energétique	Energétique et Procédés	TR**	03-V-PSL-NOV	2
ESMI_MEM-03	Design de matériaux pour les nouveaux défis	Mécanique et Matériaux	TR**	03-V-PSL-NOV	2
ESMI_PHY-04	Génie atomique	Physique	S3/S5	03-V-PSL-NOV	2
ESMI_STE-03	Milieus Naturels	Sciences de la Terre & Environnement	TR**	03-V-PSL-NOV	2
ESMI_STE-05	Bioéconomie	Sciences de la Terre & Environnement	S3/S5	03-V-PSL-NOV	2
ESMI_EMS-06	Concevoir Pour Innover	Economie, Management, Société	S3/S5	04-V-MIXTE-NOV	2
ESMI_EMS-07	Logistique durable	Economie, Management, Société	S3/S5	04-V-MIXTE-NOV	2
ESMI_EEP-03	Evolution du système électrique dans un contexte de transition énergétique	Energétique et Procédés	S3/S5	04-V-MIXTE-NOV	2
ESMI_MES-04	Modélisation prospective et politique de lutte contre le changement climatique	Mathématiques et Systèmes	S3/S5	04-V-MIXTE-NOV	2
ESMI_STE-09	Bases de biologie et fonctionnement des écosystèmes	Sciences de la Terre & Environnement	S3/S5	04-V-MIXTE-NOV	2
ESMI_EMS-09	Sociologie des techniques	Economie, Management, Société	TR**	05-V-PSL-MARS	2
ESMI_EMS-11	Nouvelles entreprises et Gouvernance Responsable	Economie, Management, Société	S4/S6	05-V-PSL-MARS	2
ESMI_EMS-12	Economie de l'énergie	Economie, Management, Société	S4/S6	05-V-PSL-MARS	2
ESMI_MES-12	Optimisation combinatoire et stochastique	Mathématiques et Systèmes	S4/S6	05-V-PSL-MARS	2
ESMI_EEP-04	Rôle des Gaz dans la Transition Energétique	Energétique et Procédés	TR**	05-V-PSL-MARS	2
ESMI_STE-06	Géophysique de la subsurface	Sciences de la Terre & Environnement	S4/S6	05-V-PSL-MARS	2
ESMI_EMS-13	Europe utile, une approche industrielle	Economie, Management, Société	S4/S6	06-V-ATHENS-MARS	2
ESMI_EMS-15	City logistics : supply chain & public policies	Economie, Management, Société	S4/S6	06-V-ATHENS-MARS	2
ESMI_EEP-06	Life Cycle of Energy Systems	Energétique et Procédés	S4/S6	06-V-ATHENS-MARS	2
ESMI_STE-08	Geointelligence for Natural Resources Evaluation and Sustainable Management	Sciences de la Terre & Environnement	S4/S6	06-V-ATHENS-MARS	2

* T/S : T T/S Term/Semester

** TR : RT: Research Term

Parallel TTI.5-accredited Master's

Students can also opt to take a TTI.5-accredited Master's degree in parallel with the civil engineering course. In this case, they follow a smaller number of specialized courses (minimum 8 ECTS during the last two years of the program). In this case, please submit your proposed Master's degree.



How to apply?

The TTI.5 academic track is presented at the start of the year to civil engineering students. Students who would like to apply must submit their project to the Institute for validation using a document downloadable from the TTI.5 website. This detailed project should include both general/fundamental and applied lessons. Second- and third-year students will be able to request a derogation.

Completed track projects should be sent to the following address:
tti.5@minesparis.psl.eu

2022-2023 calendar of TTI.5 seminars

These seminars take place every two months by video. Connection information will be published on our different communication channels (email, website, social media).

Each session is centered on a theme and is led by a specialist. It generally comprises two or three scientific presentations by members (including doctoral students) from the TTI.5 community followed by a free or guided discussion.

PUBLIC SEMINARS FROM 1.30 PM TO 3.30 PM

Monday 9 September 2022

Friday 18 November 2022

Thursday 19 January 2023

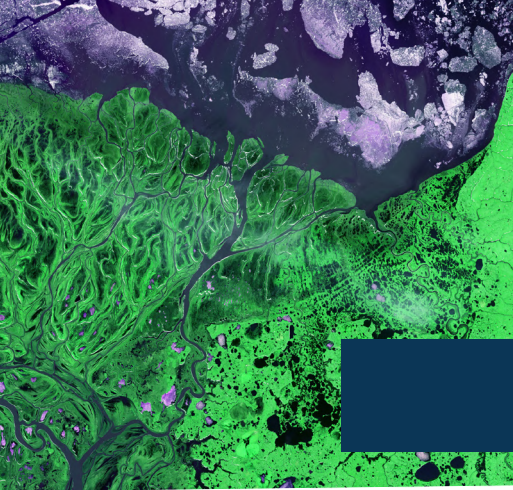
Tuesday 21 March 2023

Wednesday 17 May 2023



Contact

the-transition-institute.minesparis.psl.eu
tti.5@minesparis.psl.eu
04 93 95 75 22



The Transition Institute 1.5°

The ambition for a real transition

TTI.5 PATRONS' INFORMATION SHEET

To be a TTI.5 patron is:

	PRIVATE INDIVIDUAL	COMPANY
<p>A CONVICTION</p> <p>Participate in a visionary and innovative project, focused on youth, training, solutions and insights into strategies</p>	✓	✓
<p>TO FEED AND EXCHANGE ON THE RELEVANCE OF THE RESEARCH ISSUES CARRIED OUT BY THE INSTITUTE</p> <p>Participate to the TTI.5 Committee: three annual sessions to exchange in a privileged way on the Institute's program</p>		✓
<p>A PRIVILEGED RESTITUTION OF OUR RESULTS AND AN ACCESS TO THE EXPERTISE OF RESEARCHERS AND STUDENT</p> <p>Patrons will be invited to all our seminars, symposiums and to the annual TTI.5 Forum</p> <p>We will discuss with them about scientific mediation and training actions to be implemented within their entity, involving our renowned research teachers</p> <p>We will organize special meetings upon request: with the students of the TTI.5 academic program for the realization of internships and/or projects, and with our researchers</p>	✓	✓
<p>Privileged and preview access to our productions</p>	✓	✓
<p>COMMUNICATION</p> <p>Display of your logo on the TTI.5 website according to your category of patronage</p>		✓



Patron categories :

CORPORATE PATRONAGE: We are looking for a 5-year commitment that, if it reaches the following amounts, leads to the title of:



Any other option will of course be considered.

Tax deductions on donations are:

60 %

of the amount of your donation is deductible from your corporate tax (within the limit of 0.5% of your turnover).*

To support us, you can contact us at: ✉ tti.5@minesparis.psl.eu

PRIVATE PATRON: We propose options for financing specific projects that can be followed by patrons in a privileged way. For example:



Any other option will of course be considered.

Tax deductions on donations are:

66 %

of the amount of your donation is deductible from your income tax (up to 20% of your taxable income).*

75 %

of the amount of your donation is deductible from your real estate wealth tax (within the limit of 50 000 €).*

Every donation counts



<https://the-transition-institute.minesparis.psl.eu>

tti.5@minesparis.psl.eu

+33 4 93 95 75 22

Support us

• By credit card on the following website

<https://www.jedonneenligne.org/fondationminesparistech/TTI5/>

• By check

Payable to the Fondation Mines ParisTech

• By bank transfer

Fondation Mines ParisTech : BNP Paribas

IBAN : FR76 3000 4027 9000 01027794 648 – BIC : BNPAFRPPAA

AEF INFO

April 22, 2022

« Mines Paris-PSL lance «The Transition Institute 1.5», un institut «sans mur» pour la transition bas carbone »

Link: <https://www.aefinfo.fr/depeche/671733-mines-paris-psl-lance-the-transition-institute-15-un-institut-sans-mur-pour-la-transition-bas-carbone>

GREEN FINANCE

April 22, 2022

« Lancement de « The Transition Institute 1.5 »

Link: <https://green-finance.fr/lancement-de-the-transition-institute-1-5/>

NATURA SCIENCE

April 22, 2022

« TTI.5, la formation scientifique pour construire un monde décarboné »

Link: <https://www.natura-sciences.com/s-adapter/the-transition-institute-former-enjeux-climatiques.html>

ENVIRONNEMENT MAGAZINE

April 25, 2022

« L'institut TTI.5 place la recherche scientifique au coeur de la transition écologique»

Link: <https://www.environnement-magazine.fr/politiques/article/2022/04/25/139248/institut-tti-place-recherche-scientifique-ur-transition-ecologique>

LA GAZETTE DU LABORATOIRE

April 25, 2022

« Lancement de TTI.5 - « The Transition Institute 1.5 », Institut dédié aux défis de la transition bas-carbone »

Link: <https://www.gazettelabo.fr/breves/11972Transition-Institute-bas-carbone.html>

PRESSE AGENCE

May 1, 2022

« SOPHIA ANTIPOLIS : TTI.5, nouvel institut dédié aux défis de la transition bas-carbone »

Link: <http://www.presseagence.fr/lettre-economique-politique-paca/2022/05/01/sophia-antipolis-tti-5-nouvel-institut-dedie-aux-defis-de-la-transition-bas-carbone/>

CARBONEZÉRO LA RADIO

May 4, 2022

« 3 ans pour conserver un monde “viable” : info, intox ou mauvaise interprétation ? »

Link: <https://carbonezero-laradio.fr/podcast/3-ans-pour-conserver-un-monde-viable-info-intox-ou-mauvaise-interpretation/>

ENERGIES DE LA MER

May 9, 2022

« Mines Paris - PSL franchit une nouvelle étape avec la création du TTI.5»

Link: <https://www.energiesdelamer.eu/2022/05/09/mines-paris-psl-franchit-une-nouvelle-etape/>

MONDE DES GRANDES ÉCOLES ET UNIVERSITÉS

May 10, 2022

« Mines Paris - PSL lance TTI.5 - « The Transition Institute 1.5 », Institut dédié aux défis de la transition bas-carbone »

Link: <https://www.mondedesgrandesecoles.fr/mines-paris-psl-lance-tti-5-the-transition-institute-1-5-institut-dedie-aux-defis-de-la-transition-bas-carbone/>

LE FIGARO

September 28, 2022

« Formation à l'écologie: les pionniers ouvrent la voie »

Link: <https://www.lefigaro.fr/actualite-france/formation-a-l-ecologie-les-pionniers-ouvrent-la-voie-20220916>

MONDE DES GRANDES ECOLES

November 23, 2022

« Transition énergétique & école d'ingénieurs : Mines Paris - PSL labellise un parcours académique TTI.5 »

Link: <https://www.mondedesgrandesecoles.fr/transition-energetique-ecole-dingenieurs-mines-paris-psl-labellise-un-parcours-academique-tti-5/>