



Erasmus+ KA2 Knowledge Alliances project

“Greening Energy Market and Finance – GrEnFln”

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WP9 – D9.2 - Report on the Internal discussion to elaborate the qualitative and the quantitative insights coming from the external monitoring
Annual Quality Report (PQB)
Report 1, on the period M1-M12

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Report 1, on the period M1-M12

<h3>1. Summary of the project</h3>

GrEnFin is an Erasmus+/Knowledge Alliance project that aims to develop a training program for sustainable energy experts with interdisciplinary expertise on the technological, financial and economical dimensions of sustainable energy.

The project is put forward by a consortium of 14 partners:

- 6 European universities: University of Bologna (Italy), University Paris-dauphine (France), Birbeck College London (UK), Ludwig-Maximilian University Munich (Germany), Wirtschaft University Vienna (Austria), University of Katowice (Poland).
- 6 European companies operating in the energy field and energy sustainability: HERA srl (Italy), Tauron Energia (Poland), EgoTrade srl (Italy), PSE-Planet Sustainable Energy LDA (Portugal) Speed Development Consultants (Greece),
- 1 international research institute: IMPA– Institute of Pure and Applied Mathematics (Brazil).
- 1 technical partner: Pixel (Italy).

The key outcome of the project will be the development of an innovative Joint Master Degree in the Green Energy and Finance targeting young students, but also a Professional Module to train companies' staff and experts already active in the job market.



2. Comment on the structure of the program

The preliminary draft of the basic structure of the course and learning outcomes describes potential templates for the structure of the curriculum. The challenge is to overcome the tension between the needs (i) to provide a comprehensive, if not holistic, perspective on sustainable energy to the students, (ii) to design a program that is aligned with the previous training of the students and their specific learning objectives and (iii) to design a program that can be implemented in the existing institutional setting.

The draft structure identifies a pathway to handle (ii) and (iii) by developing parallel tracks, possibly embedded in two disciplinary structures (LM 16 and LM28). It seems less clear at this stage how to create an interdisciplinary core that can provide to all the students a common perspective. Indeed:

- The content of the preparatory courses seems a bit biased towards economic and financial aspects. At this stage, the curriculum corresponds more to an interdisciplinary approach to economics and finance than to a dual degree in technology and finance (at least at the current stage).
- The share of core courses (36 ECTS in the latest version of the curriculum, feasibility check) could possibly be extended (to 48 ECTS as planned in D3.1)
- It might be relevant to add constraints on the number of credits taken in each of the discipline (econ, finance, tech) not only in the common core but throughout the curriculum (and thus constraining a bit the choice of electives).
- Detailed role of industrial partners is not extremely clear in the current description of the curriculum. More professionally oriented courses could be added it could also be clarified whether relevant professional experience could guarantee the validation of a certain number of credits.



3. Comment on the content of the program

According to the latest version available of the curriculum, the core courses consist in 36 ECTS and correspond to:

- Risk modelling and probability (12 ECTS)
- Commodity Markets and Climate risks (12 ECTS)
- Introduction to Financial Markets & Corporate Finance (12 ECTS)

It seems to me this core could be completed by (i) a sequence of courses on energy engineering: an introductory course on energy systems and a specific course of renewable energy systems, (ii) an introductory course on climate change covering key concepts in climate science, climate impact research and climate policy, e.g. using a structure that mirrors that of the IPCC assessment reports.

WP3 Feasibility check then mentions 3 tracks:

1. Sustainable Energy Expert- Renewable Technologies Track
2. Sustainable Energy Expert- Environmental Finance Track
3. Sustainable Energy Expert- Environmental Finance Track

The specialized courses for the renewable technology track are:

- Climate Science & Models 1 (Basics of Climate science, simulation models, prediction of climate paths)
- Technology for production and storage of renewable energy 1
- Technology for production and storage of renewable energy 2
- Data Science & New Technologies
- Technology for production and storage of renewable energy 3
- Capstone course

It seems to me that the Data Science & New Technologies course, which is in fact present in the three tracks, rather belongs to the (methodological) common core of the program. With respect to the “Climate Science & Models” course, as mentioned above, it seems to me that a general introduction to climate change should be provided in the common core. The specific dimensions that seem to me most relevant for the renewable technologies track are climate impacts, mitigation, adaptation and the interactions between these. This seems to me closer to the module Climate Science & Models 2 (Mitigation strategies and technologies) but the impact and adaptation dimension should be considered as well, e.g. through the lens of nature-based solutions. Furthermore, unless this is assumed to be covered in the preparatory course “Commodity Markets and Climate risks”, it seems to me to consider introducing a specific economic & finance course covering the economic and financial aspects of electricity markets as well as the corporate finance issues linked to energy finance.

The specialized courses for the environmental finance track are:

- Climate Science & Models 1 (Basics of Climate science, simulation models, prediction of climate paths)
- Technology for production and storage of renewable energy 1
- Data Science & New Technologies
- Advanced risk modelling and probability
- Advanced mathematical finance
- Insurance and actuarial science



As above, it seems to me that the Data Science & New Technologies course, which is in fact present in the three tracks, rather belong to the (methodological) common core of the program. A course considering specific applications of data science to environmental finance, e.g. presenting methods that allow to combine and analyze multiplex data from the financial, economic and environmental spheres, could be introduced here. More broadly, it might be relevant to better distinguish between mathematical methods and their applications, i.e. (i) clarify what are the learning objectives in mathematical methods: e.g. advanced understanding of stochastic calculus, optimization and statistics and (ii) identify key domains of applications, e.g. credit-risk, weather and electricity derivatives, extreme-value statistics applied to natural hazards. With respect to the “Climate Science & Models” course the specific dimensions that seem to me most relevant for the environmental finance track are climate impacts, mitigation and adaptation. More precisely, it seems to me two specific courses would be required: one on climate impacts and adaptation and one on mitigation.

The specialized courses for the climate science track are:

- Climate Science & Models 1 (Basics of Climate science, simulation models, prediction of climate paths)
- Climate Science & Models 2 (Mitigation strategies and technologies)
- Technologies for production of renewable energy
- Data science and new technologies
- Economics & the pursuit of social good
- Climate sciences and models 3 (atmosphere-ocean coupled general circulation model for global change prediction, earth system model to handle human activities such as carbon dioxide emissions and deforestation).

In my understanding, the objective is not to train climate scientists but rather engineers/economists with a strong background in climate science. From this perspective, it seems to me that the most relevant aspect of climate change to consider are impacts, adaptation and mitigation (i.e. the topic of WG2 and WG3 of IPCC) rather than general circulation models and the fundamentals of climate science. Moreover, it seems to me that an additional course covering the social dimensions of climate change beyond economics could be relevant.



4. Evaluation of the milestones

I provide in the table below a more quantitative assessment of the project evolution, based on the milestone that were defined by project partners at its beginning. Part of these milestones could not be evaluated yet as they are mostly covered by work planned in subsequent periods, but enough progress was made on others. The latter show an overall satisfying degree of attainment.

Milestone	Description	Target month	Grade	Comment
MS2.1	Design of a GrEnFin database	M3	8	The database has been delivered and is consistent with description.
MS2.2	Completion of report on needs and gaps of the main target groups, state-of-the-art in sustainable finance and energy market education and professional service-learning education. Definition of the consultation's document structure and submission	M6	9	Relevant stakeholders have been identified and have provided useful inputs.
MS3.1	Test of learning outcomes concerning the academic path	M9-M21	8	Tests have been performed through summer schools and have allowed to identify strengths and weaknesses of the academic path
MS3.2	Completion of the design of the academic educational path and community training materials	M24	7	A first version of the academic tracks have been developed. In latter iterations, the technological part could be strengthened. Some institutional hurdles (e.g. accreditation) have to be overcome.
MS5.1	Completion of the final academic curriculum	M36	NA	The project is at a too early stage to assess this milestone.
MS6.1	Preliminary definition and test of the learning outcomes/methodologies concerning the professional module	M12-M21	7	Content of the professional module needs further development and evaluation with stakeholders
MS6.2	Completion of the description of the facilities and services to implement in the GrEnFin-Hub VPlatform	M12	9	The description has been successfully completed and implementation
MS7.1	Completion of the final design of the professional module and community training materials	M29	NA	The project is at a too early stage to assess this milestone.



MS8.1	Development of the GrEnFin Website	M11		The website is online, functional and is of high quality with respect to higher education institutions standards.
MS8.2	Development of the GrEnFin-Hub VPlatform: e-learning services, didactical materials, services/utilities for industries, lab services	M29	NA	The development of the platform is in progress but further material is required for evaluation.
MS9.1	Development of the project quality plan and quality assurance survey	M1-M36	9	The project quality plan and the quality assurance surveyed have been developed. They follow a robust methodology and are consistent with industry standards.
MS10.1	Completion of the evaluation process through questionnaires	M32	5	The rate of response to questionnaire appears insufficient.
MS10.2	Implementation of recommendations from partners and evaluation questionnaires	M36	NA	The project is at a too early stage to assess this milestone.
MS10.3	External evaluation of the quality of the project	M12-M24-M36	NA	To be evaluated by a third party
MS11.1	Completion of the local and global exploitation plan of the project results	M36	NA	The project is at a too early stage to assess this milestone.



5. Summary

This is an extremely timely and relevant program. A few adjustments could be made to the overall structure of the program and to the detailed content of the curriculum. Also, the types of courses, internships, job opportunities that could be offered by industrial partners could be further detailed.

Greening Energy Market and Finance



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