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SUSTAIN – CE

Integration of Sustainable Design and Circular Economy Concepts in
Civil Engineering Curricula

1st Biannual Evaluation Report

November 2020 – April 2021

PRODUCED BY ISQ

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SUSTAIN | CE



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1 INTRODUCTION

SUSTAIN-CE addresses circular economy concepts and principles within the construction sector, aiming at integrating principles of sustainable development and circular economy (SD/CE) in civil engineering curricula, which should consider all steps from raw material to the life cycle of the end-product in the construction sector.

Infrastructure is the backbone of sustainable development and forms much of the foundation for quality of life. However, it consumes vast material resources and energy. For this reason, it is of paramount importance that prospective engineers, who will design, construct, and maintain these systems for the next 50 or more years, are equipped with the awareness and knowledge of sustainable infrastructure design.

Civil engineering covers a wide range of disciplines that incorporates infrastructures: construction, environmental, geotechnical, water resources, structural and transportation engineering. Therefore, it is imperative civil engineering undergraduate students get accustomed to concepts and principles needed to meet the requirements of sustainability in civil engineering projects. As a response, SUSTAIN-CE project will attempt to enrich the contemporary civil engineering undergraduate programs' curricula, which are mainly focused on regulations, standards, codes and safety and serviceability of infrastructure systems, by incorporating sustainability, resilience and circular economy concepts in various stages of the design courses.

SUSTAIN CE will result in the co-creation of a new innovative undergraduate civil engineering curriculum that covers sustainable infrastructure design to ensure graduates can apply concepts and principles of sustainable design (SD) and circular economy (CE) in the design and construction of civil engineering projects.

In short, SUSTAIN-CE will result in the following deliverables:

- 1) The syllabus and contents of a new course supporting the SD/CE concepts in civil engineering
- 2) Three Training Events – Training Academies - implemented in Portugal, Greece, and Turkey.
- 3) Three evaluation reports summarizing the results of the three Training Academies
- 4) A guideline for other educational institutions willing to implement SUSTAIN-CE Training Academies.
- 5) One VLE platform (design, develop and content)

PARTNERSHIP

SUSTAIN project is being conducted by a consortium of six partners from three European countries: Turkey, Greece and Portugal. Comprised of three universities, one research centre, one construction company and one partner with extensive experience in curriculum design and circular economy, SUSTAIN consortium covers the expertise needed to successfully implement the project goals. Table 1 presents all six partners.

Table 1

PARTNER	Acronym	COUNTRY
YASAR UNIVERSITESI COORDINATOR	YU	Turkey
IZMIR INSTITUTE OF TECHNOLOGY	IYTE	Turkey
ARISTOTLE UNIVERSITY OF THESSALONIKI (ARISTOTELIO PANEPISTIMIO THESSALONIKIS)	AUTH	Greece
SOUTH-EAST EUROPEAN RESEARCH CENTRE (KENTRO EREVNON NOTIOANATOLIKIS EVROPIS ASTIKI MI KERDOSKOPIKI ETAIREIA)	SEERC	Greece
INSTITUTE FOR TECHNOLOGY AND QUALITY (INSTITUTO DE SOLDADURA E QUALIDADE)	ISQ	Portugal
FOLKART YAPI SANAYI TICARET A.S.	FOLKART	Turkey



QUALITY BIENNIAL EVALUATION REPORTS

SUSTAIN CE consortium has developed a Quality and Evaluation Handbook aiming at ascertaining the methodology and tools that will be used to evaluate and monitor the quality of the project and its deliverables.

Focusing on the 3P model¹ developed by ISQ, the Quality and Evaluation Handbook was designed to support the project management and to guide all partners on evaluation and quality issues. As such, besides the definition of the evaluation methodology, rooted in the 3P model and in specific questionnaires designed for the evaluation of (a) meetings, (b) training activities and (c) multiplier events, the Quality and Evaluation Handbook includes a set of **performance indicators** (see table 4 of the Quality and Evaluation Handbook), agreed upon by all partners, aiming at providing a quantitative measure of the project quality and performance and, hence, the possibility to act upon any less positive result in due time.

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In addition to a continuous monitoring of the quality of the project throughout its lifespan, interim and final reports will be delivered at the middle (month 16) and at the end (month 32) of the project lifecycle. These will be the most important milestones in terms of quality evaluation and monitoring, delivering a combined analysis of all the quality data collected thus far and, additionally, by the 3P questionnaire. The main goals of these two major evaluation reports are to demonstrate the strengths and the issues that need to be addressed in the project, as well as identify possible risks and mitigation actions.

Finally, a brief quality monitoring check will be made every 6 to 7 months, gathering the main results collected by the quality evaluation tools applied in that period. This comprises the production of 5 biannual reports, summarizing main findings in relation to quality and project management monitoring and evaluation for the period covered by each report. This is the first of those reports and pertains to the first six months of the project – from November 2020 to May 2021.

2 PROJECT ACTIVITY FOR THE PERIOD UNDER EVALUATION

On December 14th 2020 the SUSTAIN-CE consortium met for the kick-off meeting. The following months were used to set the project management tools going as well as to produce important documents such as the Quality and Evaluation Handbook, where the project performance indicators were defined and approved by all partners. As such, the only event considered for evaluation in this report will be the kick-off meeting.

3 QUALITY RESULTS FOR THE PERIOD UNDER EVALUATION

3.1 Meetings

Meetings are a fundamental component of project management and development: they are a valuable opportunity for discussion and decision-making. And for that reason, aspects pertaining to the preparation of the meeting by the coordinator, how prepared each partner attends the meeting and presents their point of view and work progress to date, and the overall attitude of a given partner during the meeting, do have considerable impact on the way work progress and quality go.

For quality evaluation purposes, two types of meetings are considered: Transnational Project Meetings (TPMs) and Follow-Up meetings (FUMs). TPMs are project meetings foreseen by the proposal and hence destined for specific decision-making moments, according to the project status when the meeting takes place.

¹ 3P stands for (i) Process and Project Management; (ii) Partnership and (iii) Products, the three dimensions evaluated at the middle and at the end of the project lifecycle.

Follow-up meetings are online meetings scheduled as and when the consortium feels the need to discuss and decide on a given subject.

Table 2 presents all meetings held from November 2020 to the end of May 2021.

Table 2

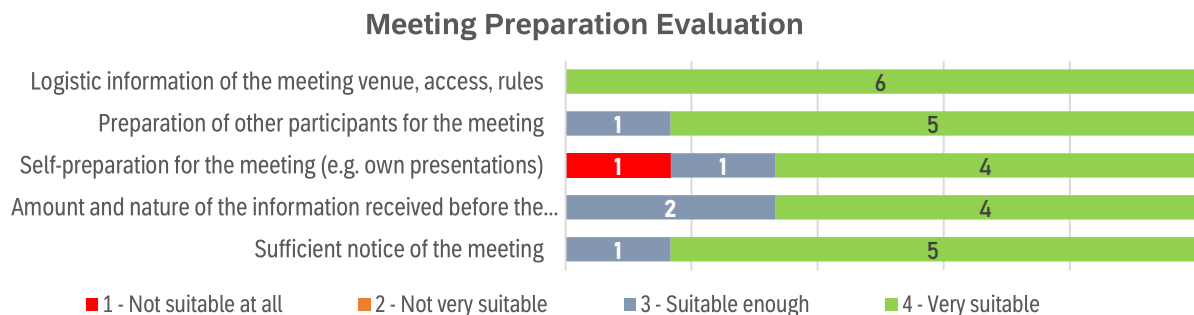
MEETING	DATE
TPM1: Kick-off meeting	14/Dec/20
FUM1: 1 st follow up meeting	07/May/21

In the case of the SUSTAIN-CE project, it was decided not to evaluate follow-up meetings given the fact that most of them were held only between the members of a specific working group and, hence, it would not be possible to compare meetings held by different groups of partners and hence to draw reliable conclusions from evaluating individual FUMs. So, only TPMs were evaluated, as these included members from all consortium partners.

The questionnaires developed by ISQ for transnational project meetings are organized around three main moments: *before* (meeting preparation), *during* and *after* the meeting. Additional dimensions evaluated are *attendance* and *technical discussions*. Please see next section for the evaluation results of the first TPM – the kick-off meeting.

3.1.1 Kick-off meeting (14/12/2020)

Graphs 1 to 5 depict results obtained for the closed questions of the evaluation questionnaire for the kick-off meeting and Box 1 shows responses to the open question (“Suggestions and comments”).

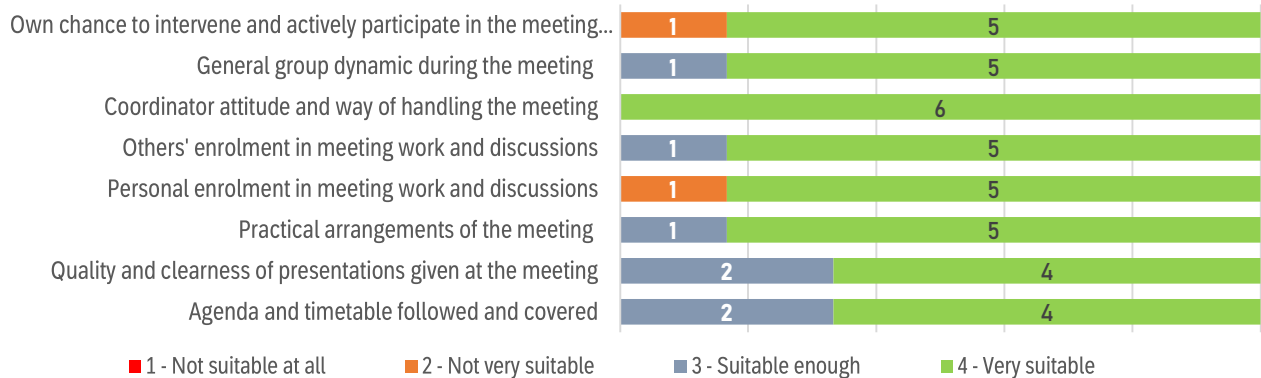


Graph 1: Before the meeting evaluation

The first dimension evaluated – “Meeting Preparation” – was positively evaluated by most partners. However, the “self-preparation” subdimension was poorly graded by two partners, probably due to not being clear about their role in the meeting, having in mind comment 3 in Box 1. This can somehow be explained by the fact that this was the first consortium meeting and, hence, perhaps a not familiar undertaking to some of the partners in the consortium. Lack of proper preparation by some partner(s) seems to be confirmed by the less positive grade (“suitable enough”) obtained by other subdimensions such as (1) *preparation of others for the meeting*, (2) *amount and nature of information received before the meeting* and (3) *sufficient notice*.

The “during the meeting” dimension (see Graph 2) was overall positively evaluated by partners. Two questions received one negative evaluation each, namely “*own chance to intervene and actively participate...*” and “*personal enrolment in meetings and discussions*”. “*Coordinator attitude*” was very positively evaluated by all partners.

Meeting Evaluation



Graph 2: During the meeting evaluation

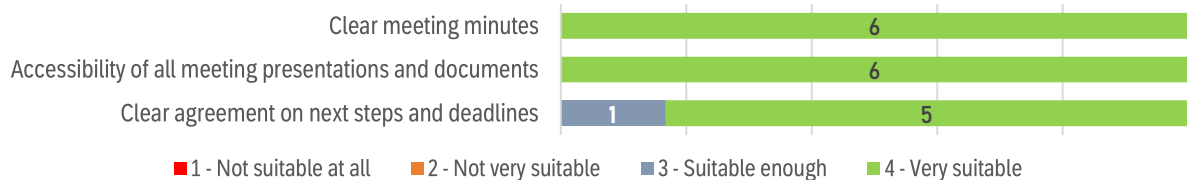
Did you stay for the whole meeting?



Graph 3: attendance

The “after the meeting” dimension was very positively evaluated by all partners, except for the question pertaining to “clear agreement on next steps and deadlines”, which received one less positive (“suitable enough”) evaluation.

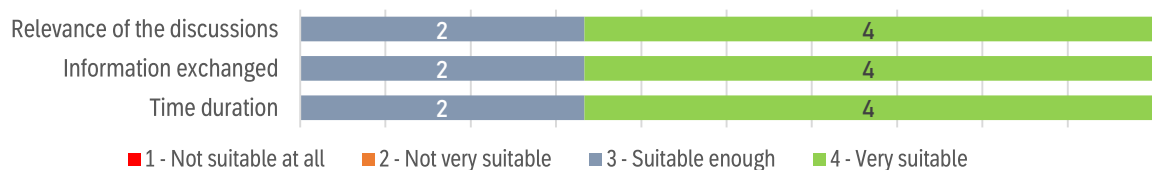
Post-Meeting Evaluation



Graph 4: After the meeting evaluation

The “Technical discussions” dimension was also positively evaluated by all partners.

Evaluation of the technical discussions held during the meeting



Graph 5: Technical questions evaluation

Box 1 shows results obtained for the open question (comments and suggestions).

Box 1

Comment 1

The preparation was excellent. The group seems passionate about the project. We are very grateful that we participate.

Comment 2

It was a very fruitful meeting! Clear and detailed presentations and very well conducted. Good time-management too. Happy to take part in this consortium.

Comment 3

As the host of the meeting we believe we should not participate in the first part :).

Results obtained for the evaluation of the kick-off meeting thus account for a motivated consortium, happy about their coordinator and still tuning in to project managing of the Sustain-CE project.

3.2 Performance Indicators

Table 3 depicts results for the performance of the quality indicators applicable (bound to be evaluated) in the current state of the project. These are classified according to a 3-colour scale:

- (1) *Green* for absolute compliance
- (2) *Amber* for minor deviations
- (3) *Red* for unaccomplished targets

Table 3

IO/WP	LEADER	PERFORMANCE INDICATOR (PI)	STATUS
IO1	SEERC	1.1. A quadruple-helix co-creation methodology is created identifying, at least 24 best practices;	Green
		1.2. Three stakeholders' lists (1 per country) are created;	Green
		1.4. Minimum of 60 best practices, in total, on a global or national level, are identified by partners on a benchmarking exercise of SD/CE;	Green
		1.5. One focus group per country (three in total) is formed to confirm and further elaborate on the skills matrix and benchmarking results;	Amber
IO2	IYTE	2.1. A list of SD/CE concepts is produced by the academic partners and incorporated to existent courses of Civil Engineering Curricula, for each of the previous selected subjects;	Green
Project Management	YU	6.3. At least, two "catch-up" virtual project meetings are organised during the project lifetime;	Green
		6.4. TPM meeting agenda sent to all partners at least 3 weeks before the meeting;	Amber
		6.5. Virtual project meetings' agenda sent to all partners at least 1 weeks before the meeting;	Green
		6.6. Meeting minutes sent to all partners within 2 weeks after the meeting;	Amber
Dissemination and Exploitation	YU	7.1. The project website is created within the first six months of the project;	Green
		7.6. Minimum of three social media channels, for dissemination purposes, are identified and used during the project lifetime (Facebook, LinkedIn, Twitter and other(s));	Green
Quality and Evaluation	ISQ	8.1. Quality and Evaluation Handbook with inputs from all partners;	Green

As can be seen from Table 3, most PI were fulfilled. The exceptions pertain to PI classified as “amber” pertaining to the **constitution of the focus groups** and the **notice with which meeting agendas/minutes** have been sent.

As for the former, focus groups are still being formed, at a different pace and in different format by different partners, given each partner institutional specificity and ease for gathering experts from different sectors (academia, industry, etc.). Still, as this is ongoing, there being no reasons for concern at this moment, in terms of the accomplishment of this PI, it is graded as *amber*.

PIs **6.4** (*TPM meeting agenda sent to all partners at least 3 weeks before the meeting*) and **6.6** (*Meeting minutes sent to all partners within 2 weeks after the meeting*) have not been fully accomplished. In the case of the kick-off meeting (TPM1) the meeting agenda was sent 17 days before the meeting. Yet, the meeting agenda was sent before a date had been agreed upon by all partners. It was sent as an attachment to the email sent by the coordinator with the link to the doodle to set up a date. So, even though PI 6.4 was not fully fulfilled, when the meeting date was finally agreed, all partners were already aware of what would be discussed, and so there was no risk of anyone not being given enough time to prepare, as all partners had their say regarding the date the meeting was set to. But mostly, one need to have in mind that, at the time the Kick-off meeting was held, the Quality and Evaluation Handbook had still not been produced and these PIs agreed upon by all partners. So, technically, one cannot fail a target that has still not been defined. This same argument applies to PI 6.6.

Table 4

MEETING	MEETING AGENDA SENT	MEETING HELD	MEETING MINUTE SENT
TPM1: Kick-off meeting	27/Nov/20	14/Dec/20	04/Jan/21
Days before / after	17		21
FUM1: 1 st follow up meeting	22/Apr/21	07/May/21	24/May/21
Days before / after	15		17

So, having in mind these targets had still not been set by the time TPM1 took place (the Quality and Evaluation Handbook was not finished until April 2021), there are no reasons to doubt they will be achieved henceforward.

4 FINAL REMARKS

The first months of the SUSTAIN CE project were used by the consortium to agree on a strategy and develop all necessary management and quality evaluation and monitoring tools.

Results obtained for the first TPM reveal a motivated and cooperative consortium group. Less favourable results pertained mostly to each partner’s participation in the meeting and can, thus, be explained by the fact that this was the first time all members met and gathered, whereby maybe not all expectations (high or low) were met. For this reason, there is still not enough data to define any trends or reasons for concern.