



# Capacity Building Plan

## WP 5

Institute: Hamburg University of Technology / Institute of Environmental Technology and  
Energy Economics

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## 1. Background

### 1.1 Aims and objectives of the project (EGREEN)

Jordan and Syria face serious problems regarding climate change, accessing water resources and environmental quality. These problems require innovative engineering approaches that take into consideration the uniqueness of local situations in this region. Under the given conditions of scarcity it is important to manage physical resources in ways to achieve the optimal outcome for all stakeholders.

Against this background the project “EGREEN – Development of environmental engineering and injection of climate change concepts for undergraduated curriculum: EU experience for Jordan and Syria” has been funded with support from the European Commission. It aims for improving five Jordanian and three Syrian universities’ ability to face the “environmental challenge” through developing and implementing a sustainable bachelor degree programme, building staff capacity and also enhancing the awareness of the Bologna process. Therefore some courses should be developed, integrated, accredited and evaluated.

The project is divided into eight different work packages. The first work package is called “networking” and aims for involving different stakeholders to the project. The second work package deals with scoping and market needs analysis. Stakeholders are meant to provide accurate information in a market needs survey. This information should be used to represent the status quo in the field of environment and climate change issues in Jordan and Syria. In the third work package the universities are going to develop study plans and curricula that face the given challenges regarding climate change. In addition to the new study plans, two e-learning courses are going to be developed in work package four.

A **capacity building and staff development programme** in the field of environment and climate change should be developed within work package five. Through establishing an environment training center as a local resource and training point in Jordan and Syria, human resources will be developed and skills and capacities will be upgraded.

This capacity building plan aims for developing human resources, upgrading skills and capacities of university professors, technical assistants and students as well as enabling researchers of Jordanian and Syrian universities to evaluate existing environment curricula and effectively redesign the courses to include state-of-the-art-technologies.

Work package six is going to monitor and evaluate the progress of the project and to ensure that all its activities are carried out properly. Work package seven deals with the dissemination and exploitation to spread the idea of “EGREEN”. The project managing is task of work package eight.

The project coordinator of the EGREEN project is Prof. Ahmed Al-Salaymeh, Chairman of Mechanical Engineering Department at the University of Jordan.

## 1.2 Short and long term impact indicators

The project's short term impacts, target groups and indicators are shown below in Table 1.

Table 1: Project's short term impacts and target groups

Short term impact	Target groups / potential beneficiaries	Quantitative indicators	Qualitative indicators
Improved environmental and climate change study programmes at beneficiary universities	Undergraduate students	Number of hours students attend on environmental topics	Spectrum of covered related topics
Improved knowledge level of graduates	Local and regional industry and community	Number of programme's graduates	Level of knowledge
Improved knowledge of instructors	Beneficiary universities	Number of trained instructors (teachers)	Ability to deliver the gained knowledge
Improved knowledge amongst regional and international students and scholars	e-learning beneficiaries	Number of e-learning members	Form of knowledge implementation (e.g. for teaching or self-education)
Better exchange amongst project partners	Instructors and students	Number of exchange students and instructors	Degree of experience gained at host institution

The project's long term impacts, target groups and indicators are shown below in Table 2.

Table 2: Project's long term impacts and target groups

Long term impact	Target groups / potential beneficiaries	Quantitative indicators	Qualitative indicators
Developed environmental and climate change market	National and regional economy	Volume of the market: successful projects and new companies	Contribution in national GDP
Improved environmental and climate change research	Researchers at beneficiary universities	Number of publications regarding to environmental and climate change topics	Journals impact factors / quality of conferences
Sustainable education regarding to environmental and climate change topics	Beneficiary universities	Number of universities having study programmes that include environmental	Accreditation of the study programmes



		and climate change topics	
EGREEN teaching materials	Undergraduate students	Number of implementing universities	Accreditation
Sustained training programmes for EGREEN materials	Instructors at beneficiary universities	Number of trained instructors	Continuity of teaching the EGREEN teaching materials
Effective dissemination of EGREEN materials	e-learning members and stakeholders	Number of downloads	Usage form, e.g. teaching or self-education

## 2. Capacity Building Plan

### 2.1 Definition

The term “Capacity Building” (also “Capacity Enhancement”) stands for efforts aiming for improving organizations’, institutions’ or individuals’ capability to solve problems. This includes, that donor organizations are not going to solve existing problems on their own. Instead, their work should be of an educational, consultative and supportive nature. Within the project “EGREEN” capacity building is defined as enhancing the abilities of individuals (university professors, teachers, students, etc.), organizations (stakeholders) and academic institutions to undertake and disseminate high quality teaching/research in the field of environmental engineering and injection of climate change concepts.

Following this definition there are 3 levels of Capacity Building:

- Human resource development: involving the educational development of students, work-groups and academics to design and instruct academic courses.
- Organizational development: elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors leading e.g. to think tanks. This should result in the beneficiaries’ ability to fund, manage and sustain themselves.
- Institutional development: making legal and regulatory changes over time to enable organizations at all levels to enhance their capacities.

### 2.2 Characteristics of a Capacity Building Plan

A good Capacity Building Plan (CBP) should display the following characteristics and should be built upon the following principles:

- Capacity Building is a process. If it is to be sustained it needs to be a dynamic and relational process. It requires continuous planning, action and adaption of experiences.
- Capacity Building should strengthen existing processes. Therefore the CBP should be built upon existing strengths and assets.

- Capacity Building should have a local ownership. It can't be imposed by an external authority. Working with local stakeholders will have an impact both on the process itself and its outcomes. The external experts should only increase the skill set and support the local organization.
- Capacity Building should lead to a paradigm shift in the way of working. Capacity building should become an integral part of all research and communication activities.
- Capacity Building should pay attention to the context. The capacity building strategy has to be linked to the context of the organization. The needs for its skills and resources have to be regularly assessed.

### **2.3 Scope**

The scope of this Capacity Building Plan is to define the aims, roles and responsibilities as well as processes to implement the project “EGREEN - Development of environmental engineering and injection of climate change concepts for undergraduated curriculum: EU experience for Jordan and Syria” effectively from project planning to delivery.

Therefore, the CBP includes a training time table for the planned academic visits to European partner universities, the suggested agenda that has been agreed on during the Kickoff meeting from February 20<sup>th</sup>-22<sup>nd</sup>, 2017 in Amman and the selection criteria for staff and students who will be taught within the academic visits at European partner universities.

By means of the CBP a staff development programme in the field of environment engineering and injection of climate change issues should be developed. The capacity-building programme will be designed by Hamburg University of Technology in close cooperation with the Co-Coordinator of work package 5 in beneficiary countries (German Jordanian University and Al-Baath University) as well as all other project partners.

The focus of the capacity building activities will be to develop human resources and to upgrade skills and capacities in the field of environmental engineering and injection of climate change concepts by providing exposure to practical training, experiments and equipment. The activities related to capacity building will include actual training on experiment and laboratory running, technical assistance and counseling services which will be organized for professors, researchers, students, engineers and technicians.

### **2.4 Objectives of the Capacity Building Plan**

The objectives of the CBP include:

- Development of a Long-Term Capacity Building Plan for building human resource capacity including university professors, technical assistants and students with upgraded skills in the field of environmental engineering and injection of climate change concepts.

- Selection of Training Staff.
- Training sessions for teaching staff from non-EU partners at European partner universities.
- Training sessions for researchers and students from non-EU partners at European partner universities.
- Academic workshops for transferring know-how and skills for teaching staff and researchers trained at European universities and students through targeted workshops.

## 2.5 Roles and Responsibilities in the EGREEN Capacity Building Plan

Table 3 below shows the roles and responsibilities of organizations involved in the project's CBP.

Table 3: Main Roles and Responsibilities during Capacity Building

Role	Responsibility
Coordinator of work package 5 (TUHH)	<ul style="list-style-type: none"> <li>- Development of a Capacity Building Programme</li> <li>- Definition of selection criteria for staff and students who should be taught at European partner universities</li> <li>- Preparation of a time table for the training workshops</li> </ul>
Project coordinator (UJ)	<ul style="list-style-type: none"> <li>- Review and approve the Capacity Building Plan</li> <li>- Coordinate and manage the project activities and insure the implementation of the activities</li> </ul>
Co-Coordiators of work package 5 (GJU, ABU)	<ul style="list-style-type: none"> <li>- Review the Capacity Building Plan and assist in its development</li> <li>- Participate in surveying and benchmarking activities</li> <li>- Implement action items from quality reviews</li> </ul>

## 2.6 Duration

The Capacity Building Plan will run for the entire project duration. It starts at May, 2017 and ends 14<sup>th</sup> October, 2019.

## 2.7 Maintaining the Capacity Building Plan

The capacity building plan should be at a current stand over the entire project lifetime. Therefore it is necessary, that the coordinator of work package 5 identifies and implements required revisions to the plan. The coordinator also has to be in constant communication with all European partners to check the availability for hosting the workshops.

## 2.8 Partners

To achieve the project's objectives, the main focus of the activities will be on developing human resources and upgrading skills and capacities by providing exposure to practical training, experiments and equipment. This will include actual training on experiment and laboratory running, technical

assistance and counseling services which will be organized for professors, researchers, students, engineers and technicians. The partners who will be trained are shown as shaded in the table below.

Table 4: Participating organizations

Institution	Country	Acronym
University of Jordan	Jordan	UJ
German-Jordanian University	Jordan	GJU
Al al-Bayt University	Jordan	AABU
Al-Zaytoonah University of Jordan	Jordan	ZUJ
Mutah University	Jordan	MUTAH
Jordan University of Science and Technology	Jordan	JUST
Al-Baath University	Syria	ABU
Aleppo University	Syria	AU
Tishreen University	Syria	TU
Hamburg University of Technology	Germany	TUHH
Hochschule Ostwestfalen-Lippe	Germany	OWL-UAS
University of Innsbruck	Austria	UIBK
Catholic University of Portugal	Portugal	UCP
Paulo & Beatriz – Consultores Associados	Portugal	P&B

### 3. Methodology

#### 3.1 General Overview

There are many different approaches aiming for developing capacity. For an effective sequencing of the process often cycles of planned change are used. Such a schematic approach is displayed in the figure below. The scheme is based on an approach of the United Nations Development Programme (UNDP) and just shows a simplification of the real process that is actually more iterative and messy.

The key steps are generally and shortly explained below:

1. **Engage stakeholders on capacity development:** The engagement of stakeholders has a high influence in succeeding. The aims and the strategy should be brought into line with the stakeholder's expectations.
2. **Assess capacity assets and needs:** Within this step the main strengths and weaknesses of the research and institutional framework should be identified at the individual, organizational and institutional levels.
3. **Formulate a capacity development response:** The activities required to deliver the desired outcomes should be planned. Following questions have to be answered in this step:



- How many individuals have to be trained during the planned workshops?
- What skills and knowledge are needed to reach the aims?
- Is training the best possibility to reach the aims or should other interventions (such as internal mentoring or buying in an external specialist) take place?

Formulating a capacity development response also includes costs and timescales. The response should build on existing capacity assets to address the gaps identified in a capacity assessment. Therefore e.g. SWOT analysis and 7 “S” model (structure, system, skills, style, strategy, staffing and shared values) can be used. The process has to be managed carefully and transparently with the involvement of all relevant stakeholders. Stakeholders can be detected by a stakeholder analysis at country or sector level that aims for clarifying the key actors involved (government, universities, research institutes, civil society, private sector, international community).

4. **Implement a capacity development response:** In this phase the process turns from planning to acting. The key roles of all partners are defined and the planned examples of action at individual, organizational and institutional level are executed.
5. **Evaluate capacity development:** In this phase the success of the project’s outcomes is measured. The framework of monitoring and evaluation has to be comprehensive enough to capture the key issues but not too extensive to handle them.

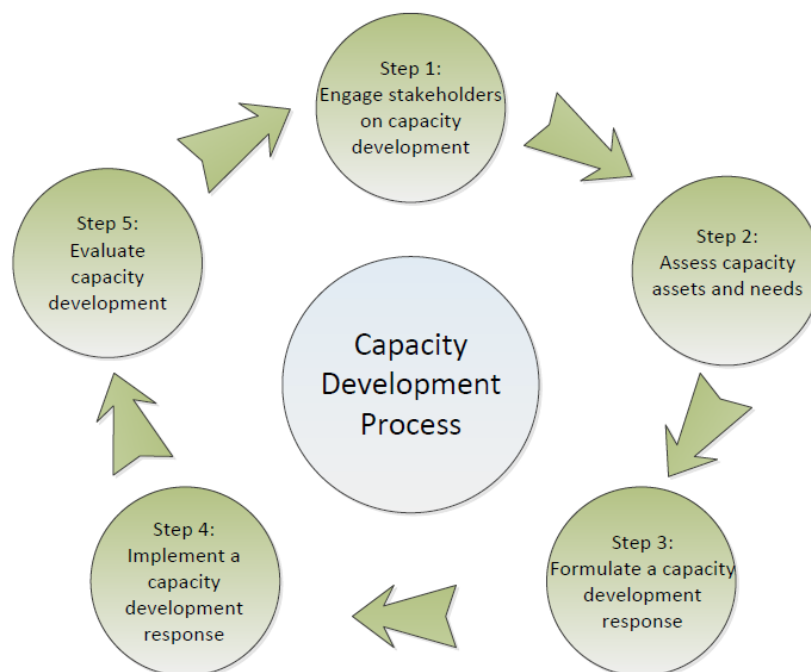


Figure 1: Scheme of the Capacity Development Process

## **3.2 Scheme of action**

As mentioned before, capacity building should always be characterized by local ownership. Hence, the European partners will act advisory and supportive. There will be distance consultations as well as face to face consultations within the project. For the face to face consultations there will be academic and study visits to the European host organizations.

### **3.2.1 Engage stakeholders on capacity development**

To engage stakeholders to the EGREEN project, a partnership agreement was developed and disseminated. The agreement includes an explanation of the project's aims and benefits. All partners were informed about the stakeholders who signed the agreement. The agreement is shown in the annexes (Annex 1).

### **3.2.2 Assess capacity assets and needs**

The task of this phase is to develop an appraisal of the current situation and institutional frameworks. Therefore a scoping and needs analysis has been developed. The investigation did commence with surveys and interviews with appropriate stakeholders, including enterprises and governmental bodies as well as international projects and initiatives, focusing on all academic programmes being in offer in Jordan and Syria in the field of environmental and climate change issues, actual market demands, trends and needs as well as government policies and regulations. Also a survey on teaching and management facilities and on the structure of the partner universities has been executed to make sure that the project training content can be carried out successfully.

It was necessary to design a market needs analysis and to integrate the Jordanian and Syrian methodologies with European teaching and training methods. This was part of work package 2. The results of the market needs analysis have to be shared with all partners and therefore are integrated to the present capacity building plan in the annexes (Annex 2).

### **3.2.3 Formulate a capacity building response**

The aims of the project were formulated before its start. The curricula at different universities should be updated and new pilot courses should be designed. During the kickoff meeting in Amman from February, 20<sup>th</sup> to 22<sup>nd</sup>, 2017 a course selection workshop took place. The participants were grouped into three groups (energy, water and environment) and each group viewed the available courses at each partner university related to the group theme. The results of this workshop are displayed in the annexes (Annex 3). The listed courses are the basis for developing new contents. During second steering committee meeting in Höxter from September, 13<sup>th</sup> to 15<sup>th</sup>, 2017 there were committees formed, which are responsible for the development of the courses (Annex 4).

To assist the Jordanian and Syrian partners, the European partners are going to host academic visits. The timetable for the visits was terminated during the meeting in Höxter from September 13<sup>th</sup> to 15<sup>th</sup>, 2017 and is listed below.

Table 5: Timetable for the academic visits

Destination	Date
University of Applied Sciences Ostwestfalen-Lippe	June 25 <sup>th</sup> -29 <sup>th</sup> , 2018
University of Innsbruck	July 02 <sup>nd</sup> -06 <sup>th</sup> , 2018
Hamburg University of Technology	July 09 <sup>th</sup> -13 <sup>th</sup> , 2018
Catholic University of Portugal	July 16 <sup>th</sup> -20 <sup>th</sup> , 2018

The results of the market needs analysis should be used to select suitable staff to be taught at the European partner universities. Two teaching staff from each Jordanian and Syrian Partner University (a total of **18 persons**) will be selected to be trained during several **1-week (5 days)** academic visits (each staff member has to visit each European partner university, meaning Hamburg University of Technology, Hochschule Ostwestfalen Lippe, University of Innsbruck and Catholic University of Portugal). The criteria for selecting the teaching staff for the visits are as follows:

- Professional background / academic degree
- Time of apprenticeship
- English skills
- Plans for the professional future at the university
- Gender

The contents for the workshops at the European partner universities have to be developed according to the compiled needs and the strengths and experiences of the hosting universities. The academic visits should take place in **summer of 2018**.

To promote an international exchange and to enhance the capacities of future staff, there will be also student visits to the European partners. Five students from five different universities in Jordan and Syria (a total of **45 students**) are going to visit the European partner universities. In comparison to the academic visits, there will be four groups of students (about 10 persons in each group). Every group is going to visit only one European Partner University with a planned duration of **14 days**. The student will focus upon how the European universities organize their training. Therefore different workshops have to be developed, students have to be selected and training materials have to be prepared. The student visits should take place in **summer of 2019**, one year after the academic visits.

### 3.2.4 Implement a capacity building response

Implementation should be managed through national systems and processes. This can help to strengthen essential capacities such as project management and procurement. Due to the reason that capacity building has to take account of politics and power relations, the process is as much about negotiation and accommodation as it is about the supply of resources and tangible assets. Therefore

it is very important to identify all factors that stimulate or inhibit the process of capacity building. The key approaches for a successful capacity building process include:

- Paying attention to context
- Investing time
- Sequencing planned change
- Evaluation
- Working with stakeholders
- Absorptive capacity and managing new knowledge.

During this phase the planned operations will be executed. Skills and resources will be improved, e.g. through support to individuals and through assistance in developing new curricula. Also the interface between policy and research is going to be developed and consolidating change has to be forced. This involves that the motivation for change is maintained. It should also involve supporting networks and partnerships by creating incentives for inter-organizational collaboration.

The usage of outside expertise ensures that the changing process can be facilitated and steered objectively and sympathetically.

### 3.2.5 Evaluate capacity development

Evaluation is task of work package 6, executed by German Jordanian University and supported by all partners. For the evaluation a Quality Committee was formed during the kickoff meeting in Amman from February 20<sup>th</sup> to 22<sup>nd</sup>, 2017. The members of the Quality Committee are listed below.

University	Representative
German Jordanian University	Dr. Louy Qoaidar (Chairman)
Hamburg University of Technology	Prof. Martin Kaltschmitt (Co-Leader)
The University of Jordan	Prof. Mohammad Hamdan
Tishreen University	Dr. Bassam Hasan & Dr. Bousha Neemeh
University of Innsbruck	Prof Wolfgang Streicher

The duty of the quality committee is to monitor and evaluate the progress of the project and to ensure that all its activities are carried out properly according to European Standards and Guidelines for Quality Assurance and ensuring proper execution of the project to achieve its objective.

The quality committee controls and directs the quality manager. The Quality Manager will design a proper evaluation process and be responsible for creating a set of indicators. In coordination with the project manager and other project consortium members, the Quality Manager will set criteria for the selection of members of the “External Evaluator”.

External Evaluator will conduct constructive evaluation by working according to the terms of reference and 'rules of engagement' set by the project Quality Manager and the manager of the project. The External Evaluator will advise and train partner universities to use suitable tools of evaluation for the sustainability of the program quality. The expert will write intermediate reports, one each 6 months, and a final report, to readdress the project in case of going off from indicated objectives and methodologies. The evaluators will conduct the evaluation beginning of 2018, to give the project consortium time for improvement and adaptation.

GJU will monitor the project at different points using different types of evaluation including exploratory evaluation to support the process, and experimental and quasi-experimental study designs to evaluate the outcomes. Summative final evaluation will include an impact study and a benchmarking study to evaluate the quality of the resulting courses, labs and e-learning.

### **3.2.6 Objects to add during the process**

This chapter lists relevant objects that have to be developed and added to the capacity building plan. Those are:

Work package 2:

- A questionnaire that verifies Partners' facilities
- A final report for the questionnaire results

Work package 6:

- A benchmarking study to evaluate the quality of the resulting courses, labs and e-learning
- A monitoring and evaluation plan for the EGREEN project concerning all work packages

## **3.3 Conceptual framework – Guide for systematical approaches**

- 1.) The first step was to find matching stakeholders (e.g. former project partners, government departments, companies with special interests regarding the project's subjects) and to integrate them to the consortium network. Therefore formal documents (e.g. letter of agreement, statute of collaboration) have to be provided. Subsequently it is very important to continuously update the stakeholder's database (e.g. every 3 months).
- 2.) Questionnaires have to be developed to focus on the elaboration of real training needs. Content of these questionnaires should be the number of departments and students, laboratories, refectory, library, existing courses for EGREEN program and their contents, number of professors and their previous experiences, international relations, methodologies of accreditations and many other facilities. A summary of the results has to be written and distributed to all project partners (translation if necessary). The results of the questionnaires



have to be used to develop the content of the planned courses. Each course committee has to develop its course properly, the first draft should be finished by middle of November, 2017.

- 3.) The skills and knowledge that should be gained within the project were defined through the results of the questionnaires. The next step is to develop plans to reach the desired goals. Sub-steps will be planning of train-the trainer workshops, design of training materials and research visits.
- 4.) Subsequently the planned actions (workshops and visits) have to be executed.
- 5.) After the workshops, feedback sheets will be distributed and evaluated. Afterwards an external evaluator with scientific experience will be selected to evaluate the achievements of the project and inform the project partners about possible improvements for future projects.



## 4 Annexes

### 4.1 Annex 1: Memorandum of collaboration between the members of the EGREEN Network

#### *The EGREEN Project*

The EGREEN project – “*Development of Environmental Engineering and Injection of Climate Change Concept for Undergraduated Curriculum: EU Experience for Jordan and Syria*” – is a project involving Jordanian and Syrian universities and European universities and companies. The main objective of EGREEN is to establish and accredit a high didactic and contents for courses in the environmental engineering and climate change field at the Jordanian and Syrian partner universities in order to enhance its capacity. This program has been designed with the collaboration of the European partners involved in the project.

The specific objectives of EGREEN are:

1. To develop, integrate, accredit and evaluate some courses at a bachelor degree program with an appropriate laboratory component in environment jointly taught by universities in Jordan and Syria and brought into line with the Bologna requirements;
2. To engage faculty in the development of interactive instruction techniques for lectures and laboratory courses and sharing experiences with EU partner universities;
3. To develop and implement course content using distance learning;
4. To extend services and training in collaboration with the local and regional industry and community;
5. To improve the human capacity of Jordanian and Syrian universities by providing training and upgrading opportunities in the EU.

#### *The EGREEN Network*

In the scope of the project an EGREEN Network will be established. The aim of the EGREEN Network is:

- To support the identification of the market need in Jordan and Syria in terms of the competence of staff in subjects within the field;
- To support the revision of the curriculum, attending some workshops and seminars or by giving lectures and seminars about the latest development in environmental technology and climate change phenomena;
- To facilitate exchange of good practises between the members through the EGREEN website and twinning procedures in order to promote transfer of knowledge among its members;
- To encourage the submission of common proposals and development of projects among the members of the network;
- To enable the students to make their practical placement by the suitable companies.



### ***The EGREEN benefits***

The benefits for the EGREEN Network members are:

- To benefit from the contribution to enhance the capacity of Jordanian and Syrian universities in this field leading to improve the qualifications and skills of their students;
- To access to a transnational forum of discussion in environmental and climate change issues;
- To be able to participate in common actions between the members of the EGREEN Network, such as: workshops, seminars, submission of proposals and development of projects, submission of publications in scientific journals and scientific conferences.
- The exchange of good practises between the members through the EGREEN website and twinning procedures in order to promote transfer of knowledge among its members.

### ***Membership:***

I, \_\_\_\_\_, in representation of the undersigned organisation, declares a commitment to the above mentioned principles on becoming member of the EGREEN Network.

**Organisation:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Responsible:** \_\_\_\_\_

**E-mail:** \_\_\_\_\_ **Phone:** \_\_\_\_\_ **Fax:** \_\_\_\_\_

**Date:** \_\_\_\_/\_\_\_\_/\_\_\_\_ **Signature:** \_\_\_\_\_

(In alternative, you can send this information by e-mail to: **egreen@ju.edu.jo**, under the subject: EGREEN Network Membership).

In order to up-load the information from your organization in the EGREEN website please provide:

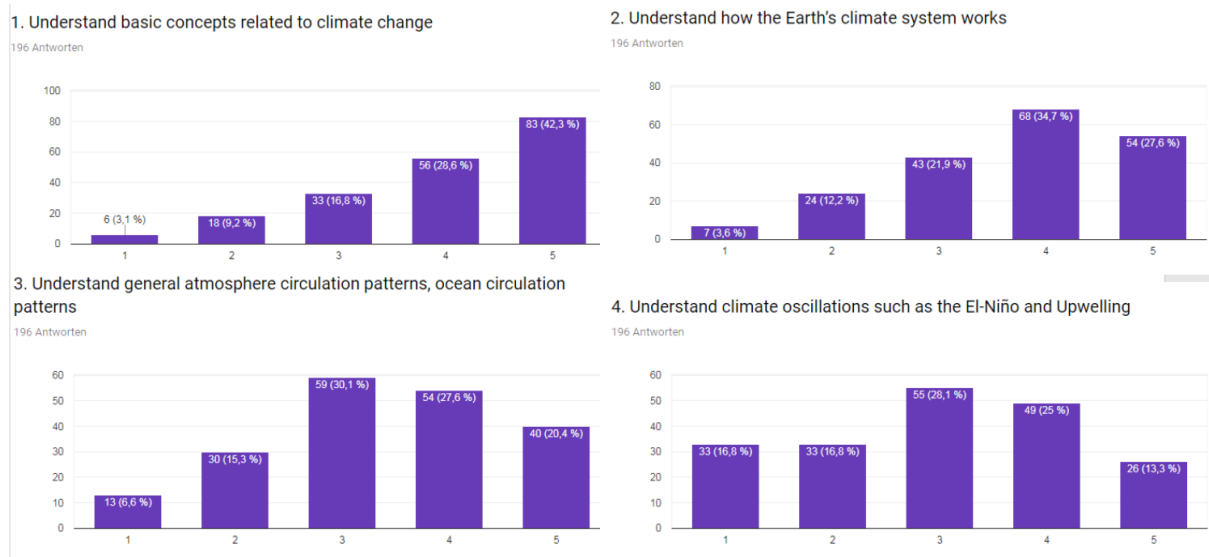
- The logo of your organization (in jpeg format)



- A short description of your organization (up to 1500 characters)

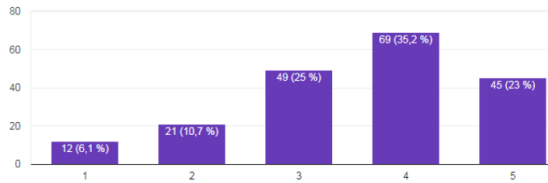
## 4.2 Annex 2: Results of the Scoping and Market needs analysis

Three different questionnaires have to be developed during work package 2. The first questionnaire was an online complementary google questionnaire with the goal to cover a broader field of stakeholders and general information. In sum there were 196 participants from all 9 participating universities from Jordan and Syria (34,7 % from Syria and 65,3 % from Jordan). The results of this questionnaire are listed below. There were 5 different categories to choose (1 means there is very low interest and 5 means that there is very high interest in the particular field).



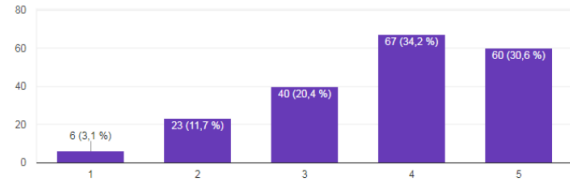
5. Illustrate components of the Earth's carbon cycle

196 Antworten



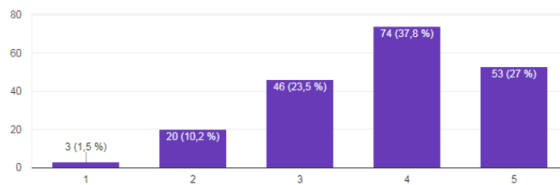
6. Quantitatively describe how addition of greenhouse gases GHG to the atmosphere through burning fossil fuels will influence the climate

196 Antworten



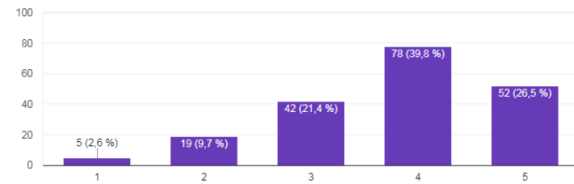
7. Understand and quantify CO2 mitigation influenced by applying energy efficiency measures and using Renewable Energy systems

196 Antworten



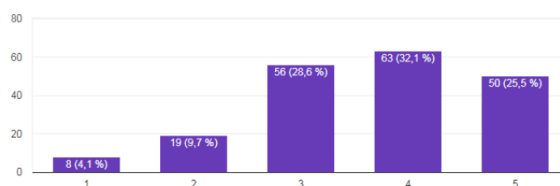
8. Understand the concept of green buildings and their main components

196 Antworten



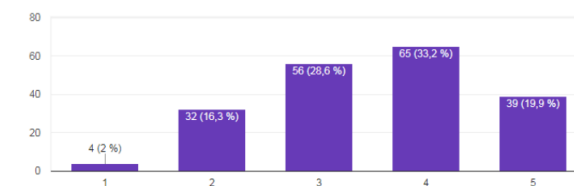
9. Gain the scientific basis to analyse and understand policy issues related to global warming

196 Antworten



10. Understand Ozone depletion phenomena

196 Antworten



The second questionnaire was distributed via Excel spreadsheet to Jordan and Syrian stakeholders with the goal to develop a scoping and market needs analysis. It aimed to identify the needed knowledge areas that have to be introduced in the undergraduate curriculum in the field of environmental engineering. The questionnaire was separated in 3 different parts. Part A dealt with analysing the needs, part B targeted on requirements and competencies and part C dealt with evaluation of the program. The results of this questionnaire were presented during the second steering committee meeting in Höxter (13<sup>th</sup>-15<sup>th</sup> September, 2017). All partners have access to the results via following link: <https://www.dropbox.com/sh/a75hz2o8ut9dzp9/AAATqniFxuk54GUa283V3R3Ka?dl=0>

The third questionnaire has to be distributed to Jordan and Syrian teaching institutions with the goal to analyse the teaching and management facilities. The results have to be included to the capacity building plan as well.

### 4.3 Annex 3: Lists of potential courses to be developed for Jordanian and Syrian partner universities

Energy group courses	Water group courses	Environment group courses
<p><b>Course 1: Energy Efficiency and sustainability (intelligent energy service)</b></p> <p>Part 1: how to integrate sustainability and ecology aspects (in an overall point of view) Part 2: Buildings Part 3: Mobility Part 4: Industry Part 5: Energy Rankings and Certificates</p>	<p><b>Course 1: Waste water treatment (new approaches and technologies)</b></p>	<p><b>Course 1: Waste Management</b> Contents which have to included:</p> <ul style="list-style-type: none"> <li>• Recycling, Energy Recovery</li> <li>• Solid Waste (e. g. Electronic and electric waste)</li> <li>• Liquid Waste</li> <li>• Hazardous Waste</li> </ul> <p>Existing courses / University:</p> <ul style="list-style-type: none"> <li>• Solid Waste Management</li> <li>• Waste Resource Management (TUHH)</li> <li>• Recycling of Construction and Demolition Wastes</li> <li>• Bioenergy and Waste Management</li> <li>• Hazardous Waste</li> </ul>
<p><b>Course 2: Energy efficient building services</b></p> <ul style="list-style-type: none"> <li>• HVAC</li> <li>• Refrigeration</li> <li>• Heating systems</li> <li>• electricity</li> <li>• ...</li> </ul>	<p><b>Course 2: Water resources engineering (management, protection and economics)</b></p>	<p><b>Course 2: Climate Change &amp; Sustainability</b> Contents which have to included:</p> <ul style="list-style-type: none"> <li>• Global Climate Change</li> <li>• Renewable Resources</li> <li>• Sources of Emission</li> <li>• Impact (Social, Technical, Economic)</li> </ul>
<p><b>Course 3: Electricity: Energy economics, management and distribution</b></p> <ul style="list-style-type: none"> <li>• Energy distribution systems (electric networks)</li> <li>• Change of networks characteristics with increased decentralized el. producers</li> <li>• Storage of electricity</li> <li>• Energy tariff system and management</li> <li>• Policies and regulations, local subsidies and fundings, Economics</li> </ul>	<p><b>Course 3: Non-conventional water resources (reuse, harvesting, desalination, ...)</b></p>	<p><b>Course 3: Environmental Policies, Regulations &amp; Laws</b> Contents which have to included:</p> <ul style="list-style-type: none"> <li>• Global Climate Change and Regulations</li> </ul>



<p><b>Course 4: Heat/Fuel: Energy economics, management and distribution</b></p> <ul style="list-style-type: none"> <li>• Energy distribution systems (fuel distribution, cooling networks ?)</li> <li>• Storage of heat and cold</li> <li>• Tariff system for fuels</li> <li>• Policies and regulations, local subsidies and funding's, Economics</li> </ul>	<p><b>Course 4: Water Supply (OWL UAS, new)</b></p> <ul style="list-style-type: none"> <li>• 1) Properties of water (Introduction to Hydrochemistry)</li> <li>• 2) Water demand and quality requirements for drinking water, process water and irrigation water</li> <li>• 3) Abstraction and transport of water from different sources</li> <li>• 4) Drinking water treatment: Removal of particles</li> <li>• 5) Drinking water treatment: Desalination</li> <li>• 6) Drinking water treatment: Removal of organic substances</li> <li>• 7) Drinking water treatment: Removal of inorganic impurities</li> <li>• 8) Drinking water treatment: Disinfection</li> <li>• 9) Drinking water treatment: Process combinations</li> <li>• 10) Drinking water treatment: Management of residuals</li> <li>• 11) Storage and distribution of drinking water</li> <li>• 12) Operation and maintenance of water supply systems</li> <li>• 13) Energy efficiency in water supply systems</li> <li>• 14) Water reuse schemes</li> </ul>	<p><b>Course 4: (Methods of) Environmental Assessment</b> Contents which have to included:</p> <ul style="list-style-type: none"> <li>• Life Cycle Assessments</li> <li>• EMAS (European environmental auditing system)</li> <li>• Technology assessment</li> <li>• REACH (Chemical Certification)</li> </ul> <p>Existing courses / University:</p> <ul style="list-style-type: none"> <li>• TUHH</li> </ul>
<p><b>Course 5: Conventional efficient Energy Supply</b></p> <ul style="list-style-type: none"> <li>• Applied Thermodynamics</li> <li>• Gas combined cycle, Gas Turbine, Rakine Cycles,...)</li> <li>• Increased Efficiency power stations (CHP)</li> </ul>		<p><b>Course 5: Environmental Engineering (incl. measurement technologies and laboratory)</b> Contents which have to included:</p> <ul style="list-style-type: none"> <li>• Air Quality Management</li> <li>• Noise reduction (new)</li> </ul>



		<ul style="list-style-type: none"> <li>• Laboratory</li> </ul>
<b>Course 6: Renewable energy Supply Energy Supply</b> <ul style="list-style-type: none"> <li>• Photovoltaics</li> <li>• Solar Thermal</li> <li>• Wind</li> <li>• Biogas</li> <li>• Geothermal</li> </ul>		<b>Course 6: Clean Production and Green Marketing / Industrial Ecology</b> Contents which have to included: <ul style="list-style-type: none"> <li>• Sustainability Monitoring</li> </ul>
		<b>Course 7: Meteorology and climatology (OWL UAS, new)</b> <ul style="list-style-type: none"> <li>• Introduction to the atmosphere (history, agriculture, our economy and society)</li> <li>• Heating the Earth’s surface and atmosphere</li> <li>• Radiation</li> <li>• Temperature and Heat</li> <li>• Moisture and atmospheric stability</li> <li>• Air pressure and wind</li> <li>• Weather maps</li> <li>• Circulation of the atmosphere</li> <li>• Clouds, precipitation and evaporation</li> <li>• Air sea interaction</li> <li>• Air pollution</li> <li>• World climates</li> <li>• Greenhouse effect</li> <li>• The changing climate</li> <li>• Urban and bio-climate</li> <li>• Local climate management</li> </ul> Basics of climate modelling and prediction
		<b>Course 8: Air pollution, control and management (OWL UAS, new)</b> <ul style="list-style-type: none"> <li>• Major sources of Air pollution</li> <li>• Types of pollutants</li> <li>• Emission control</li> <li>• Health effects of pollutants</li> <li>• Regulatory framework</li> <li>• Meteorology in the atmospheric boundary layer</li> <li>• Plume rise, Source effects</li> </ul>



		<ul style="list-style-type: none"> <li>• Gaussian plume model for continuous sources</li> <li>• Statistical model for diffusion from continuous point sources</li> <li>• Puff diffusion</li> <li>• Similarity models of diffusion</li> <li>• Gradient transport (K-) models</li> <li>• Urban diffusion models</li> <li>• Removal mechanisms</li> <li>• Cooling tower plumes and drift deposition</li> <li>• Air pollution meteorology in complex terrain</li> <li>• Long range transport and diffusion</li> </ul>
		<p><b>Course 9: Environmental Monitoring Systems (OWL UAS, new as e-learning course)</b></p> <ul style="list-style-type: none"> <li>• Introduction to environmental monitoring</li> <li>• Basics of monitoring</li> <li>• Basics of environmental data acquisition</li> <li>• Concepts and Implementation of monitoring systems for environmental data</li> <li>• Methods for automatic decision-making</li> <li>• Workflow management</li> <li>• State of the art research</li> <li>• Application scenarios</li> </ul>

#### 4.4 Annex 4: Courses and committees to develop the contents

#	Course Title	Committee
1	Water Resources Engineering including non-conventional water resources	<ol style="list-style-type: none"> <li>1. Dr. Paulo Baptista (P&amp;B)</li> <li>2. Prof. Joachim Fettig (HS-OWL)</li> <li>3. Prof. Adnan Ghata (ABU)</li> <li>4. Prof. Omer Maaitah (MUTAH)</li> </ol>
2	Water and Wastewater Treatment including Bio-Techniques for Waste Water Treatment	<ol style="list-style-type: none"> <li>1. Prof. Martin Oldenburg (HS-OWL)</li> <li>2. Prof. Adnan Ghata (ABU)</li> <li>3. Prof. Fahmi Abu Al-Rub (JUST)</li> <li>4. Prof. Amal Dayok (TU)</li> </ol>



3	Design of Sustainable Buildings including Energy efficient building services	1. Prof. Wolfgang Streicher (UIBK) 2. Dr. Louy Qoaidar (GJU) 3. Dr. Hamzeh Ali (ABU)
4	Air Pollution and Air Quality Management	1. Prof. Klaus Maßmeyer (HS-OWL) 2. Dr. Mo'ayyad Shawaqfah (AABU) 3. Prof. Khalaf Alabdullah (AU) 4. Prof. Adnan Ghata (ABU)
5	Environmental engineering and sustainable development	1. Prof. Martin Kaltschmitt (TUHH) 2. Prof. Fahmi Abu Al-Rub (JUST) 3. Prof. Moussa Al-Samara (TU)
6	Introduction To Environment and Climate Change including Meteorology and Climatology	First sub-committee for Introduction To Environment and Climate Change : 1. Prof. Martin Kaltschmitt (TUHH) 2. Dr. Eduardo Luís Cardoso (UCP) 3. Prof. Moussa Al-Samara (TU) 4. Dr. Mo'ayyad Shawaqfah (AABU) 5. Prof. Klaus Maßmeyer (HS-OWL) 6. Dr. Saeb Khresat (JUST) Second sub-committee for Meteorology and climatology: 1. Dr. Eduardo Luís Cardoso (UCP) 2. Prof. Klaus Maßmeyer (HS-OWL) 3. Prof. Adnan Ghata (ABU) 4. Prof. Khalaf Alabdullah (AU) 5. Prof. Moussa Al-Samara (TU)
7	Energy Resources and Engineering and Energy conversion Technologies	1. Prof. Martin Kaltschmitt (TUHH) 2. Prof. Wolfgang Streicher (UIBK) 3. Prof. Mohammad Hamdan (UJ) 4. Dr. Iyad Hafeth (TU) 5. Dr. Loui Dabbour (ZUJ)
8	Design of Renewable Energy Systems	1. Prof. Martin Kaltschmitt (TUHH) 2. Prof. Wolfgang Streicher (UIBK) 3. Prof. Salman Ajib (HS-OWL) 4. Prof. Suhil Kiwan (JUST) 5. Prof. Ahmed Al-Salaymeh (UJ) 6. Dr. Eduardo Luís Cardoso (UCP) 7. Prof. Mohammad Smairan (AABU) 8. Prof. Chehadeh Moussa (ABU) 9. Dr. Choab Mahmoud (TU) 10. Dr. Louy Qoaidar (GJU)
9	Heating Ventilating and Air Conditioning Systems including solar energy driven system	1. Prof. Salman Ajib (HS-OWL) 2. Prof. Wolfgang Streicher (UIBK) 3. Dr. Mohammad Majali (MUTAH) 4. Dr. Osama Ayadi (UJ) 5. Eng. Eman Abdelhafez (ZUJ)
10	Power and Refrigeration Cycles	1. Prof. Salman Ajib (HS-OWL) 2. Prof. Wolfgang Streicher (UIBK) 3. Prof. Mohammad Hamdan (UJ) 4. Dr. Mohammad Majali (MUTAH)



11	Modulation and Simulation of Power Plant Cycles; This needs a software (Epsilon)	<ol style="list-style-type: none"> <li>1. Prof. Wolfgang Streicher (UIBK)</li> <li>2. Prof. Suhil Kiwan (GJU)</li> <li>3. Dr. Mohammad Majali (MUTAH)</li> <li>4. Dr. lyad Hafeth (TU)</li> </ol>
12	Waste Resource Management including Solid Waste Management	<ol style="list-style-type: none"> <li>1. Prof. Martin Kaltschmitt (TUHH)</li> <li>2. Dr. Mo'ayyad Shawaqfah (AABU)</li> <li>3. Dr. Rasin Zakieh (ABU)</li> <li>4. Dr. Louy Qoaider (GJU)</li> </ol>