

Curriculum Recommendations – Sustainable Energy Policy

Review of the existing curricula at the State Engineering University of Armenia (SEUA) and Yerevan State University of Architecture and Construction (YSUAC)

Suggestions for improvement regarding

AM-54: SEUA - Energy efficiency technologies in the energy and industrial sector

AM-55: YSUAC - Energy efficiency technologies in the design, construction and operation of buildings

AM-56: YSUAC - New technologies in the development and use of renewable energy sources (RES)

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Review of the existing curriculum

- This review only relates to the energy policy aspects of the YSUAC energy related undergraduate degree and Master’s level degree courses undertaken at Yerevan
- A review of the existing curriculum for BSc and MSc degrees provided by the YSUAC coordinator relating to energy policy led to the following findings:
 - The 4-year degree, whilst it provides a very strong scientific basis in the majors subjects, does not consider energy policy separately, neither in Armenia nor abroad.
 - Most of the undergraduate courses show credits for courses that are partially related to energy policy (environmental protection in courses 271500, 270100, 271100, 270400, 271200, and Standards & Certification in courses 270100, 271100, 270400, 271200).
 - The masters level courses do not spend any time covering any energy related topics.
- In view of this, ITS developed its energy policy lecture content to be integrated into existing energy courses. Although it may have been easier to fit energy policy into the environmental protection module, the decision was to keep it out because that may have implied that energy policy is purely an environmental concern, which indeed it is not.
- ITS’ approach is to include Energy Policy as a subject at third year level where traditionally engineering courses begin to move from engineering theory and concept towards applications of engineering in the field. This is an opportune time to ensure that students have a good understanding of energy policy concepts.
- This approach is recommended to allow the material to be used in a manner that would complement effectively the content of the existing curriculum and expertise available among lecturing staff.

- Where students are pursuing a masters degree in engineering from a non-engineering background, or indeed from an undergraduate degree in another university, energy policy should be a component of their initial research brief that they would undertake and the lecture provided would assist them in fulfilling that component.

Learning Objectives

The lecture developed for energy policy by the ITS Expert has the following learning objectives:

- To give the student insight into the way that the EU regulatory framework operates
- To give the student an understanding of the EU Energy Policy Framework that exists
- To impart knowledge of fundamental principles and theory behind energy balance and energy flows in solar systems (from the solar cell/panel level to the overall solar energy system)
- To introduce to the student the key energy related European Directives and to give them the understanding of how EU expects these directives to assist in delivering the energy related improvements that they are designed to deliver
- To inform the student of the mechanisms typically used within EU member states to transpose the various EU Directives on Energy, allowing students to understand the reason why directives appear to be implemented differently in different states.
- To engage the student in considering how Armenian energy policy fits within the European Energy Policy framework in its current form.

Recommendations for lecture delivery

- The lecture material has been developed as a set of power point slides to support 1 lecture, of about 2 hours duration.
- Approximately 50 slides have been created for the lecture, assuming a pace of delivery of 2 minutes per slide with some time at the end for questions.
- Notes have been added to most slides, providing details on the slides' content and the basis of a narrative for the lecturer.
- Handouts can be easily printed out (choose Print Layout/Notes Page in the Print Menu in MS Powerpoint) with the notes underneath each slide, and can act as a syllabus for students.
- Recommendation to lecturers: Use the Presenter View option in the Slide Show menu so that notes appear on the lecturer's monitor while the full slide is projected on the auditorium screen.
- Suggestion to YSUAC staff: Request that students read a sample of the most recent directives online to allow them to become familiar with the approach taken to construction of European Directives.

- Suggestion to YSUAC staff: Make an assignment where students consider the requirements outlined in the EU energy related directives, shown in the slides, by going through the directives in more detail. The assignment would be to suggest how best these directives would be implemented in Armenia, the benefits that could accrue to Armenia, and a prioritized plan for implementation. This would better serve to develop the thought process for students in relation to energy policy as opposed to rote learning of the various directives.