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## CONSIDERATION OF THE DRAFT PROGRAMME AND BUDGET FOR 2012-2013 (36 C/5) AND RECOMMENDATIONS OF THE EXECUTIVE BOARD

### STRENGTHENING OF ENGINEERING AT UNESCO

#### SUMMARY

This document has been prepared in response to a request to the Director-General by the Executive Board at its 185th session (185 EX/Decision 12) to make a proposal regarding the strengthening of education, capacity-building and research in the field of engineering, in the context of the submission of the Draft Programme and Budget for 2012-2013 (36 C/5).

The discussion at the 185th session of the Executive Board followed 182 EX/Decision 66 and 35 C/Resolution 32 requesting the Director-General to conduct a feasibility study for the establishment of an international engineering programme at UNESCO. The feasibility study was presented and discussed at 185 session. The study highlighted increasing concern regarding a shortage of engineers around the world. It also indicated the need for the strengthening of engineering at UNESCO, with emphases on engineering education and capacity-building, and with a particular focus on applications of engineering for poverty alleviation and sustainable development.

During the discussion at the 185th session, there was very strong support for the concept of strengthening engineering at UNESCO, but no clear consensus as to the most appropriate mechanism of accomplishing that goal. Some Member States favoured the creation of a new International Engineering Programme, while others urged the Secretariat to explore strengthening engineering within existing organizational structures.

In this document the current vision of the Natural Sciences Sector for strengthening engineering at UNESCO is put forward. Neither the creation of a new stand-alone "International Engineering Programme" nor the maintenance *in toto* of the existing organizational structure is advocated. Rather it is proposed to create a cross-cutting thematic "UNESCO Engineering Initiative", which will bring together engineering capacity from all of the existing organizational units in an innovative, pragmatic and cost-effective manner. Furthermore, existing and new partnerships will be mobilized with engineering professional societies, such as the World Federation of Engineering Organisations, and with governments, non-governmental organizations, and the private sector. The rationale and details of the proposed approach are provided below.

The opinion of Member States is sought on the proposed model for strengthening engineering at UNESCO and on their interest in contributing extrabudgetary financial resources toward this objective.

## RATIONALE FOR STRENGTHENING ENGINEERING AT UNESCO

1. Engineering is a major driver for social, economic and human development, underpins our knowledge societies and infrastructures, is a key factor in innovation and is vital in addressing the global issues and challenges we face. At the same time, engineering, a complex and increasingly diverse area of activity, faces its own issues and challenges. These include increasing reported shortages of engineers around the world, reflecting a decline of interest and enrolment in engineering by young people, especially young women, problems of brain drain for many developing countries and need for greater awareness by the public and policy-makers.

2. The vital importance of engineering in sustainable economic and social development, addressing basic needs, the reduction of poverty and the Millennium Development Goals has been emphasized at meetings and reports of the United Nations, G8, G20, the African Union and NEPAD, the Johannesburg World Summit on Sustainable Development in 2002, and at World Engineers' Conventions in 2000, 2004, 2008 and is on the agenda of WEC2011 in Geneva. These topics are also the main focus of the UNESCO report, "Engineering: Issues, Challenges and Opportunities for Development", launched at the 185th session of the Executive Board.

3. The main focus in strengthening engineering at UNESCO relates to the key challenges of engineering education, capacity-building and development – why young people around the world are turning away from engineering and how this may be addressed, promoting the public understanding of engineering and the effective application of engineering and innovation to poverty reduction, sustainable development, climate change and the need for green technology.

4. This document has been prepared in response to the decision of the Executive Board at its 185th session (185 EX/Decision 12) and request to the Director-General to "make a proposal thereon to it at its 186th session in the context of her submission of the Draft Programme and Budget for 2012-2013, document 36 C/5, and to present solutions on how to strengthen research, education and capacity-building in the field of engineering, focusing on UNESCO's comparative advantages and taking into account the discussion by the Executive Board at its 185th session". Provided below is an overview of the specific model proposed for strengthening engineering at UNESCO, and a summary of how activities in engineering are incorporated in the draft document 36 C/5.

## MECHANISMS FOR MOVING FORWARD: A UNESCO ENGINEERING INITIATIVE

5. A variety of models can be envisioned for strengthening engineering at UNESCO. These include creation of a new stand-alone "International Engineering Program", on the one hand, or simply enhancing the level of support to the existing unit on "Engineering and Technical Capacity Building" in the Division of Basic and Engineering Sciences, on the other. After considerable reflection and discussion, this proposal is instead for the creation of a cross-cutting thematic "UNESCO Engineering Initiative". This initiative would be structured so as to draw on engineering-related strengths across the Natural Sciences Sector as well as in other sectors of UNESCO, and to invoke high levels of partnership with professional societies, academia and the private sector worldwide. While it is expected that considerable extrabudgetary resources can be attracted, this initiative can be launched within existing budgetary constraints.

6. There are a number of reasons why this model of a cross-cutting initiative on engineering is proposed:

- Social, ethical and human dimensions of engineering can be optimized: solutions to engineering problems are deeply constrained by social, political and economic factors. This cross-cutting thematic structure will promote enhanced incorporation of these factors in our initiatives, leading to a greater awareness among our youth.
- It is cost-effective: this initiative can be launched within existing budgetary constraints.

- It is flexible: based on the lessons learned in the upcoming biennium, we can modify the organizational structure of the cross-cutting initiative with time.
- Prospects for external support and partnership can be optimized: by structuring our approach to strengthening engineering in this manner we can expect to be very successful in attracting support from donors from a variety of sectors of society.
- It can serve as a model for other cross-cutting interdisciplinary initiatives: we expect that lessons learned in this new approach will have general applicability at UNESCO.

Furthermore, from an internal management perspective:

- It can promote the breaking down of silos in the Natural Sciences Sector: there are already significant numbers of staff with engineering-related experience in multiple units within the Natural Sciences Sector, but they lack effective coordination.
- It enables greater collaboration across UNESCO: The structure of a cross-cutting initiative will facilitate better connections with colleagues in the Social and Human Sciences, Education and Communication and Information sectors.

7. As currently envisaged, the team leader for this initiative would report directly to the Assistant Director-General for Natural Sciences. Team members would be drawn from throughout the Natural Sciences Sector, incorporating expertise in engineering dimensions of science policy, disaster risk reduction, natural resources management, climate change adaptation, water and environmental engineering.

8. Participation in this thematic working group will also be welcomed from individuals from other sectors at UNESCO. It is also important to note that strong interest in collaboration on this UNESCO Engineering Initiative has been expressed from the World Federation of Engineering Organizations, in partnership with related organizations including the International Council of Academies of Engineering and Technological Sciences (CAETS), International Federation of Consulting Engineers (FIDIC) and Engineers Without Borders/*Ingénieurs Sans Frontières* (EWB/ISF).

## **PROPOSED ACTIVITIES WITHIN DOCUMENT 36 C/5**

9. The plans for the Natural Sciences Sector in the draft document 36 C/5 are structured to incorporate initial activities under the UNESCO Engineering Initiative. Under BSP 1, on “strengthening STI ecosystems”, there are three MLAs, each of which has strong engineering dimensions. Specifically, under MLA 1, on strengthening science policy, cooperation with Member States will seek to ensure that the engineering dimensions of Science, Technology and Innovation are effectively addressed in policy. Under MLA 2, on capacity-building in science and engineering, the focus would be on strengthening engineering capacity at the higher education level, particularly in developing countries, and with a regional prioritization on Africa. MLA 3, on mobilizing popular participation and support, will incorporate a strong focus on enhancing the participation of women and girls in engineering, and on increasing popular understanding. Under BSP 2, engineering dimensions will be strengthened in the existing Intergovernmental Science Programmes.

10. Lessons learned in the initial implementation of the UNESCO Engineering Initiative will place the Sector in a good position to craft the plans for the next Medium-Term Strategy to include a strengthened and thoughtfully designed focus on engineering.

## **FINANCIAL RESOURCES**

11. As outlined above, the UNESCO Engineering Initiative can be launched within existing budgetary and staff resources. Clearly, though, the scope and scale of the projects undertaken will

depend on the degree of success in attracting extrabudgetary funds. It is expected that the initiative will be very attractive to multiple sectors of society, and especially to the private sector, as also to a number of Member States.