TOPIC: PROPOSAL TO OFFER A MASTER OF SCIENCE DEGREE IN SYSTEMS ENGINEERING AT COLORADO STATE UNIVERSITY

PREPARED BY: MARGOT PLOTZ

I. SUMMARY

Colorado State University (CSU) has submitted a proposal to offer a Master of Science degree in Systems Engineering. This proposed program will primarily focus on demand, supply and distribution of energy systems under a systems engineering approach. This program will be vital to the collaboration of all departments at CSU in the field of systems engineering and energy systems as well as add courses in power engineering, energy conversion, systems architecture and energy storage.

II. BACKGROUND

The following is summarized from Colorado State University's request:

> Engineering problems increasingly require the development of complex multidisciplinary systems. This trend has driven the need for Systems Engineering as a formal discipline. Systems Engineering provides both a framework and a rigorous theoretical underpinning for the design and management of complex engineering systems. This necessitates a multidisciplinary approach, utilizing tools from a variety of fields including control systems, operations research, reliability and performance engineering, risk analysis, software engineering, and networking and security.

ROLE AND MISSION SUPPORT

This degree supports the role and mission of Colorado State University. The statutory mission states:

> *There is hereby established a university at Fort Collins to be known as Colorado state university. Colorado state university shall be a comprehensive graduate research university with selective admission standards offering a comprehensive array of baccalaureate, masters, and doctoral degree programs. C.R.S. 23-30-101.*

EVIDENCE OF STUDENT DEMAND

> Systems engineering is naturally a multidisciplinary field of study with many components, including control systems, operations research, reliability and performance engineering, risk analysis, software engineering, networking and security. Many practicing engineers in the field have formally trained in one of these areas and then migrated into systems engineering with on-the-job training. Academia can offer a

broad, but also deep, study of the field that is virtually impossible to duplicate outside the university setting.

DUPLICATION/SIMILAR PROGRAMS IN THE STATE

There are four other programs in related areas in Colorado:

- Colorado Technical University offers a Master of Science in Systems Engineering. This program is designed to provide students with a skill set in Systems Engineering directly targeted to the workplace.
- Colorado State University at Pueblo offers a Master of Science in Industrial and Systems Engineering. This program focuses primarily on planning and control, decision analysis, and project management. It also includes human factors and ergonomics.
- The University of Colorado at Colorado Springs offers a Master of Engineering in Systems Engineering. This program is similar to the program currently offered at Colorado State University at Pueblo except that it is only offered in a distance education mode, with no in-class option.
- Colorado School of Mines offers Master of Science and Doctor of Philosophy degrees in Engineering Systems. These programs focus more on the component level (e.g., power electronics and inverters), and less on the higher systems level, involving design/management of complex systems of interacting components, which is the target area for the proposed CSU program.

III. STAFF ANALYSIS

The Department staff has reviewed this proposed program to ensure that it meets the State's performance measures outlined in C.R.S. §23-5-129(6) (b). The program meets all performance measures set forth by the state.

IV. STAFF RECOMMENDATIONS

Staff recommends that the Commission approve the Master of Science degree in Systems Engineering to be offered by Colorado State University.

V. SUPPLEMENTAL INFORMATION

Copies of all relevant materials are on file in the Academic Affairs office and are available upon request

STATUTORY AUTHORITY

C.R.S. §23-5-129(6) (b)