Education and Workforce Development: Part 2. University Perspective

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Critical Needs for Multi-Disciplinary Approach to Teaching Electric Energy Systems

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Abstract—This paper concerns the overall challenge and opportunities of introducing students to problems underlying the ongoing electric energy systems evolution. It is critical to teach both breadth and depth, but the overcrowded curricula does not allow for the huge number of courses. This calls for introducing principles of modeling, analyzing and designing future electric energy systems using concepts familiar to students from more general disciplines; of course, background in these disciplines is necessary. We give simple examples illustrating how such more general concepts at the same time help pose problems in the emerging smart grids.

Index Terms—Control, Electric Energy Systems, Modeling, Numerical Methods, Smart Grids.

I. INTRODUCTION

As the society faces major challenges in meeting rapidly fundamentally change production, delivery and consumption of electric energy as we know it today, much the same way as telephony has transformed into today’s telecom.

In this paper we warn that these perceived opportunities to digitize electricity services may easily turn into a bust of yet another cycle in the field of electric power systems. The initial conditions are difficult, given many years of failing to nurture broad and deep thinking in this field, including at top US universities. A combined shortage of faculty teaching power systems with limited space in the overcrowded curricula give little room for longer-term strategic thinking. This paper addresses the education aspects of the field and proposes possible ways forward. In Section II we assess the