

# Powering Change in the Electric Energy System with Systems Thinking

*A New Course for Commissioners and their Staff*

## A Complex Environment

The electric energy system is the continuous outcome that results from the relationships and interactions among physical structures (e.g. generators, wires, energy-using equipment, appliances) and intangible structures (e.g., laws, rules, procedures), people (utility personnel, regulatory bodies, electric energy users, and other stakeholders), and place (including both structural and environmental characteristics). Over the years, the size and scope of the physical and intangible structures have increased dramatically, with ever more relationships and interactions. The system now is highly complex, confounding change efforts with consequences that, distant in time and space, further complicate the system and hinder system performance.

Meanwhile, forces within and at the system's boundary are creating great uncertainty; commissions and their staff must wrestle with matters that are irresolvable if tackled only from within the utility:

- Old technologies (e.g., cost and availability of traditional fuels and regulation of the effects of using those fuels)
- New, potentially disruptive technologies, including information technology and distributed generation
- On-going demographic shifts
- Evolving cultural beliefs about the use of energy
- Unpredictable effects of the global economy on local energy use

To continue to serve our purpose, the relationships and interactions of the electric energy system require attention: we must improve what still contributes to our desired outcomes and transform what no longer works toward the results we want. Blocking this attention are the silo approaches, linear responses, and entrenched positions that dominate the interactions among key stakeholders, both within and between organizations. Painstakingly and often in an adversarial environment, participants in the system “solve” one problem only to see it recur or another arise to take its place. Déjà vu, dead-ends, and frustration mounts.

**The greatest potential for improvement in the system, and better results for all participants, does not reside internally within each organization but, instead, in *improving the interactions between participants and participating organizations.***



## A New Approach to Dealing with Complexity

Systems Thinking is a set of tools to help change the nature of the conversation in the electric energy system. Using systems thinking, key stakeholders can:

- Collaboratively explore recurring issues within the system;
- Understand how and why interactions of elements within the system produce the issues, and
- Use that understanding as a means to dissolve issues and problems through system redesign.

## What is Systems Thinking

Systems Thinking is an iterative process that supports continuous learning about a complex system. The method provides:

- A learning framework within which a divergent group of stakeholders can create and sustain an open, inquiring attitude toward an issue:
  - Eliciting stories from each one's perspective
  - Exploring the relevant components, dynamics, and the boundary within which effective action exists
  - Making explicit each stakeholder's mental models
- A set of tools to visualize the structure of the system and places within that structure where intervention can be made to dissolve the issue
- The ability to rapidly create and test prototypes of interventions

## Systems Thinking Benefits

Taking a systemic approach to issues and changing the nature of the conversation will:

- Greatly improve productivity by designing or redesigning the system to eliminate the fundamental causes of issues and problems
- Inspire creativity and innovation
- Provide everyone in the system a more positive attitude toward the needed work
- Improve the long-term efficiency of the system

## Course Details

Designed specifically for the electric energy system, using examples and language from that system, the main objective of this two-day course is to help participants understand how to apply systems thinking to both traditional and emerging issues, within or across organizations.

### Session 1: Systems Thinking – An Approach to Complexity

- Introduction to the Systems Approach
- Beyond Events: Understanding Systemic Patterns of Behavior
- The Language of System Dynamics
- The Systems Thinking Method

### Session 2: The Power of Intangible Structures

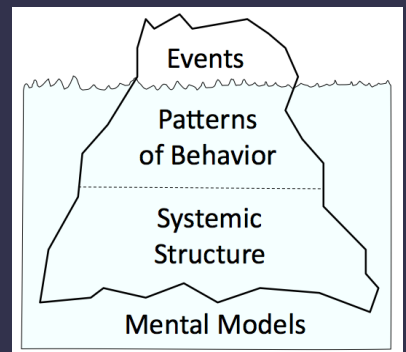
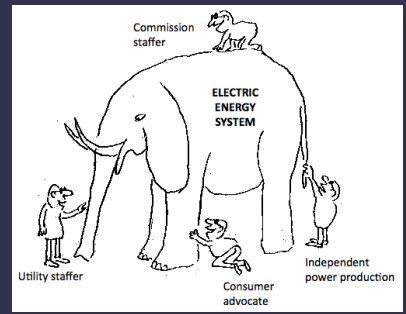
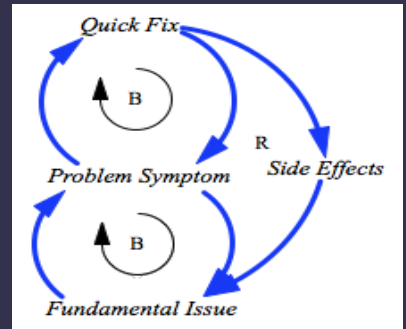
- Introduction to mental models

### Session 3: Drawing Our Way to Clarity with Systems Modeling

- Visualizing a system in causal loop and stock and flow diagrams
- Learning from Archetypes: story, behavior over time, interventions

### Session 4: System interventions and re-design

- The basics of an intervention
- Guiding principles and approaches for system re-design
- Resources for systems thinking and system dynamics



## Contact Information

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