



Transitioning to a Modern Grid

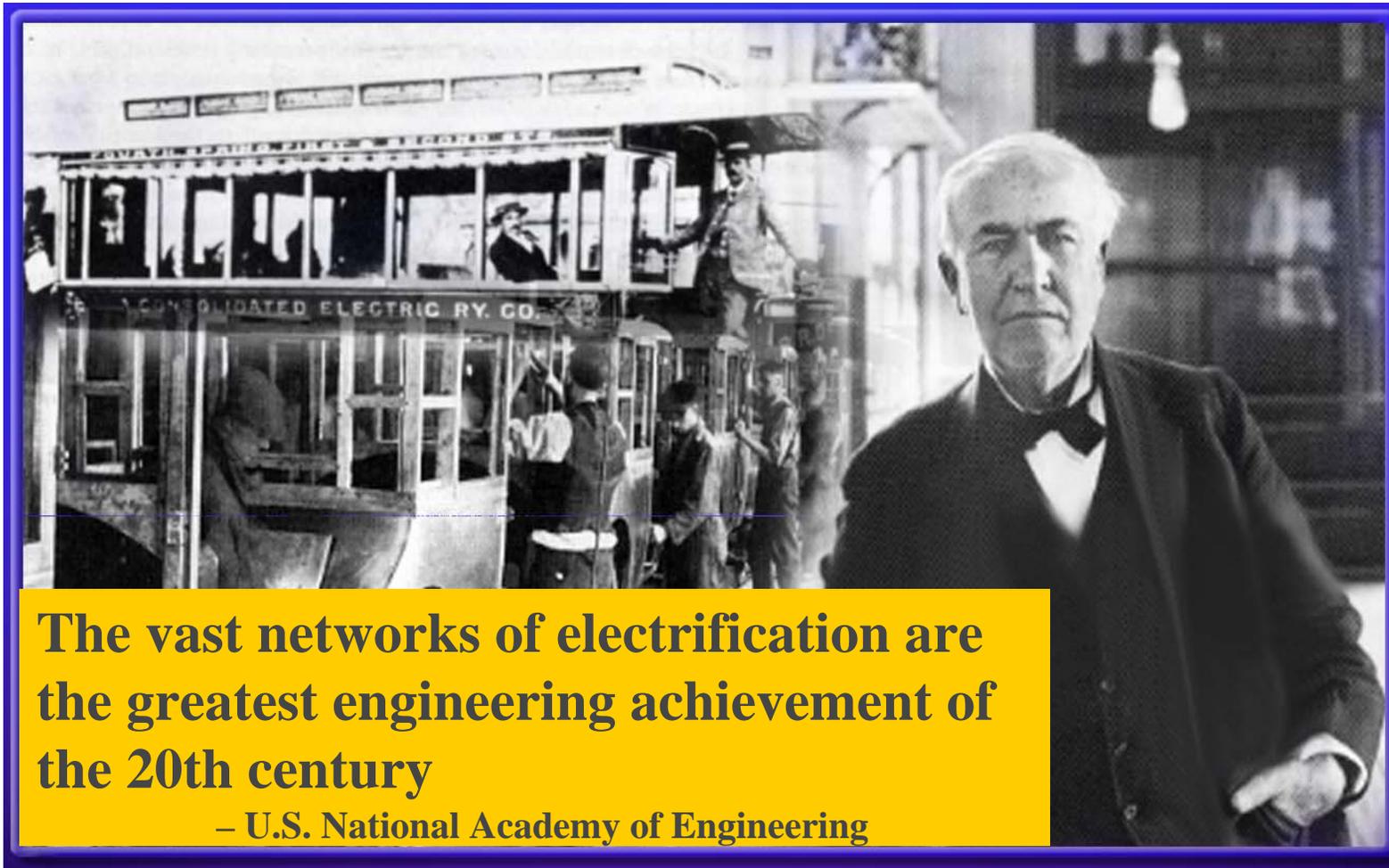
August 10, 2006

Nashville, Tennessee

Kurt Yeager

www.galvinelectricity.org

Transforming Society



**The vast networks of electrification are
the greatest engineering achievement of
the 20th century**

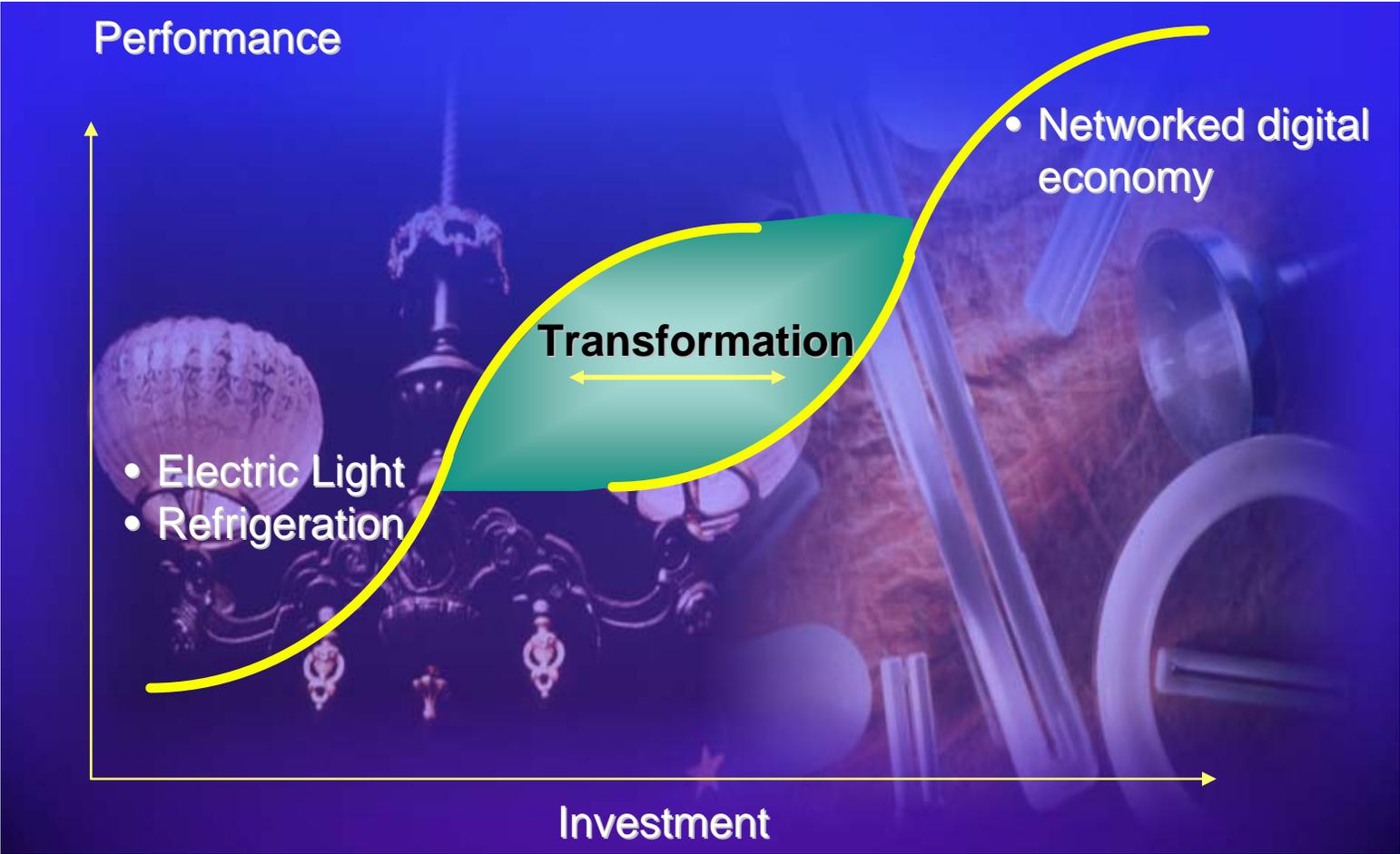
– U.S. National Academy of Engineering

Key Issue to be Resolved



Will the bulk electricity system evolve to become the critical infrastructure supporting the digital society of the 21st century, or be left behind as an industrial relic of the 20th century?

Breaking the Limits on Electricity Value



GOAL

“The perfect power system will ensure absolute and universal availability of energy in the quantity and quality necessary to meet every consumer’s needs. It is a system that never fails the consumer.”

Bob Galvin
2005

The Transformed Electricity Grid for the 21st Century

- Electronically control the power system**
- Integrate electricity & communications**
- Transform meter into a two-way consumer services gateway**
- Incorporate CHP & Distributed Resources**
- Reintroduce Direct Current (DC) Circuits/Microgrids**
- Enable smart, efficient end uses**



Value of the 21st Century Transformation



Increasing the functionality and value of electricity through consumer benefits that far outweigh the cost

Transformed power system security & functionality

Increased U.S. productivity & GDP growth rates

Substantially improved energy efficiency & electricity intensity

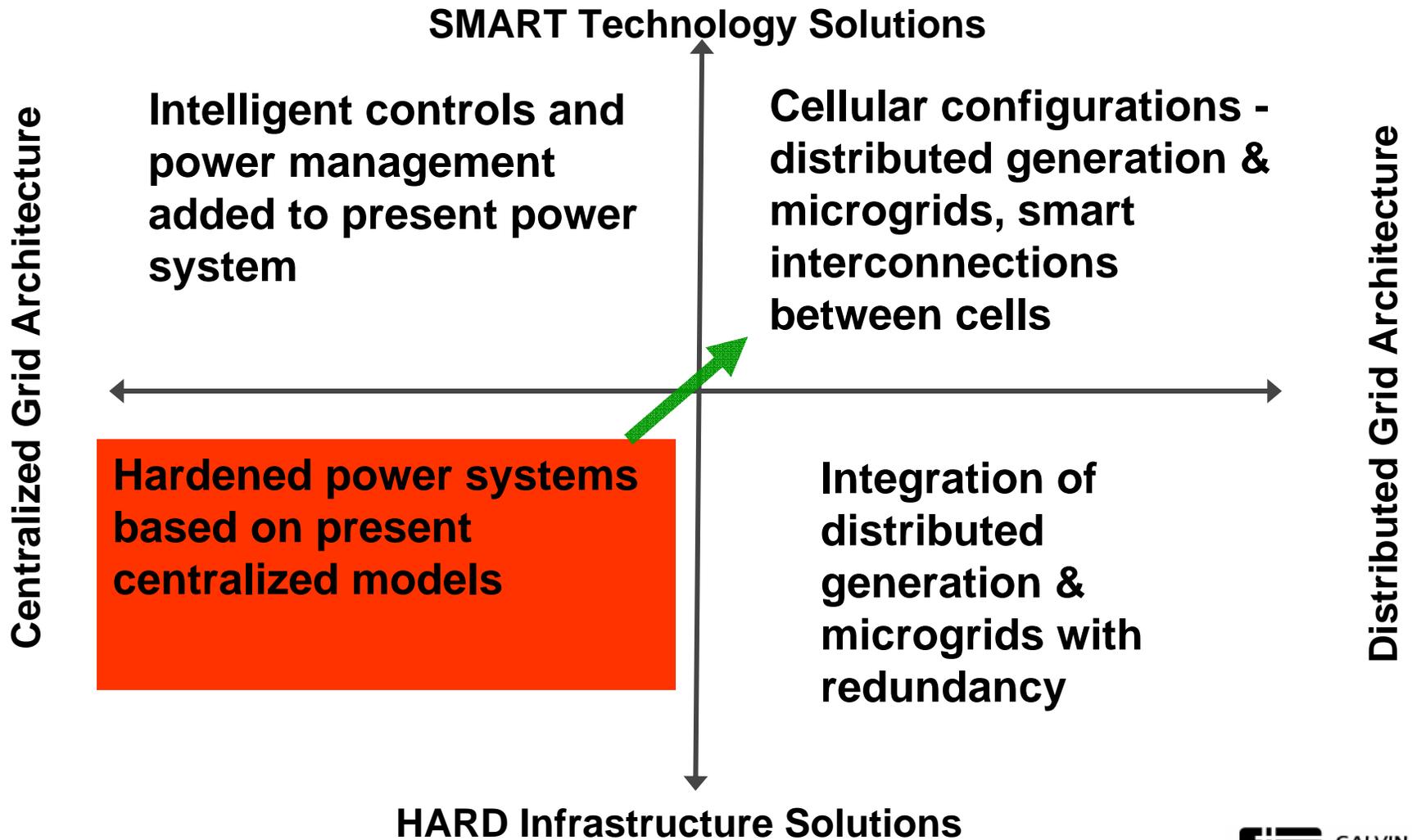
Accelerated reduction in carbon emissions

Reduced cost of infrastructure upgrades & expansion

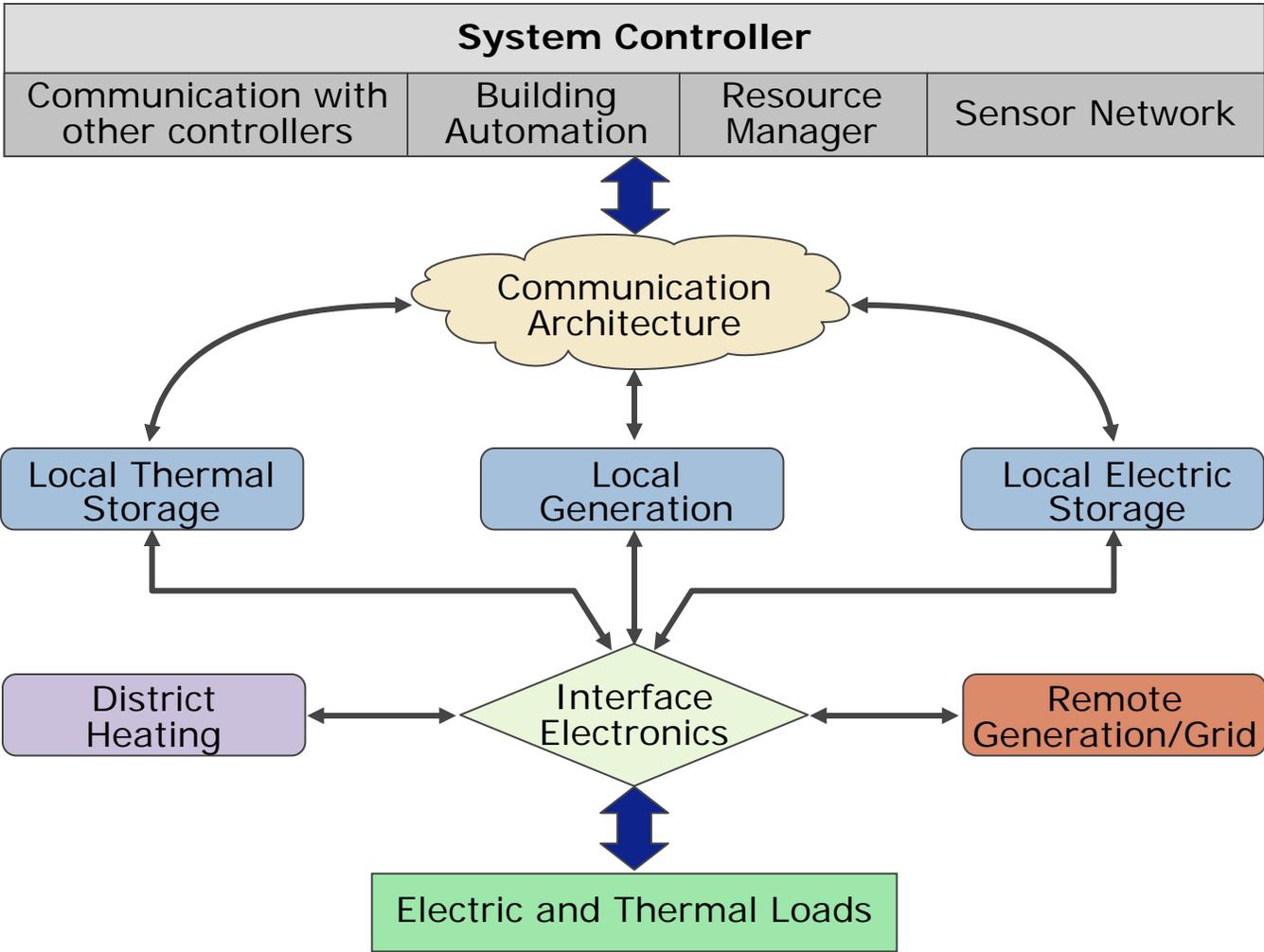
Powering the Digital “On-Line” Generations Must Emphasize:

- **Universal Connectivity**
- **Power Quality**
- **Portability**
- **Smart, Self-Correcting Infrastructure**
- **Value-Based Cost**
- **Control of Service Terms & Conditions**

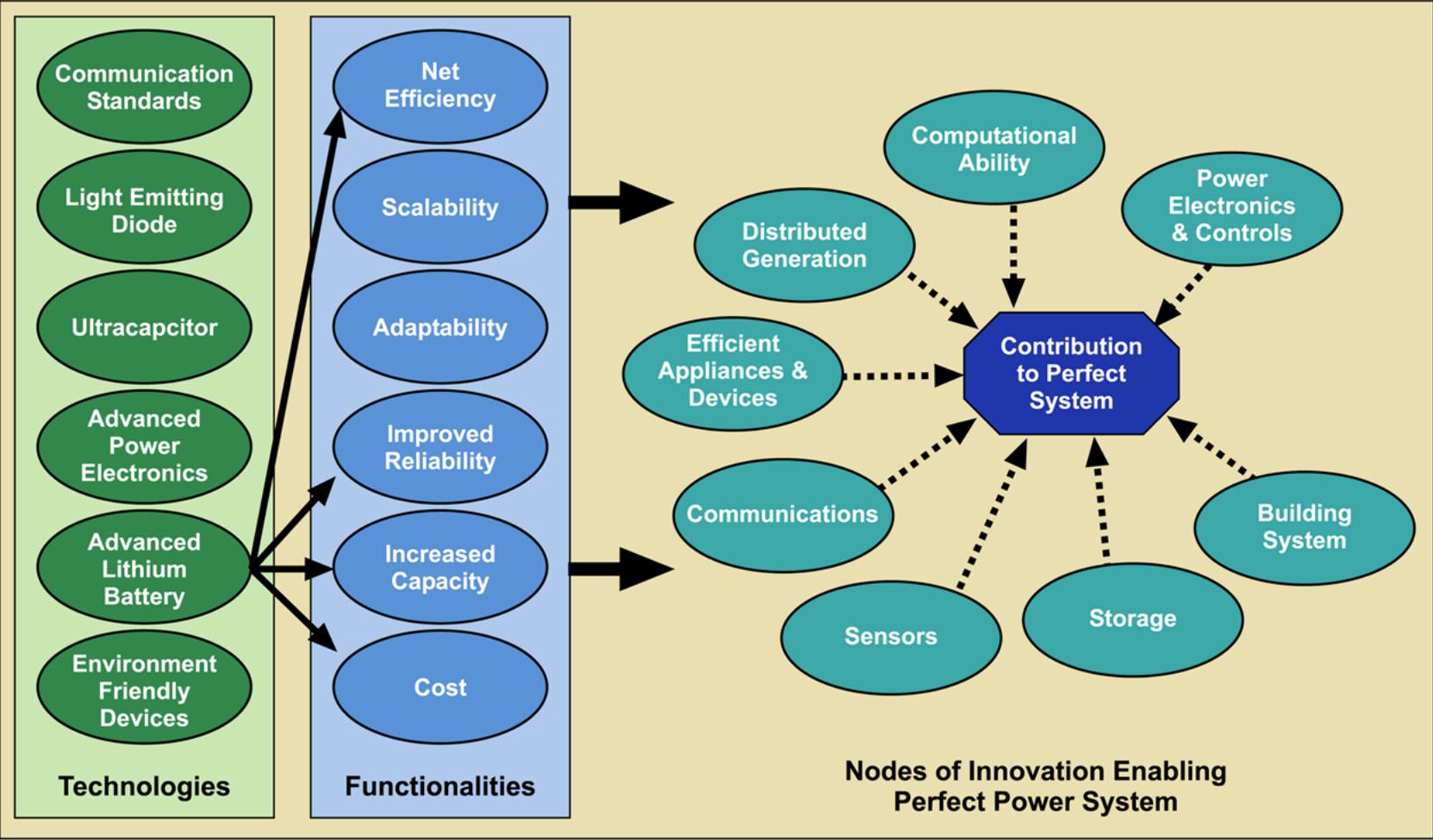
Conceptual Framework for Alternatives



Local Distributed Power Systems



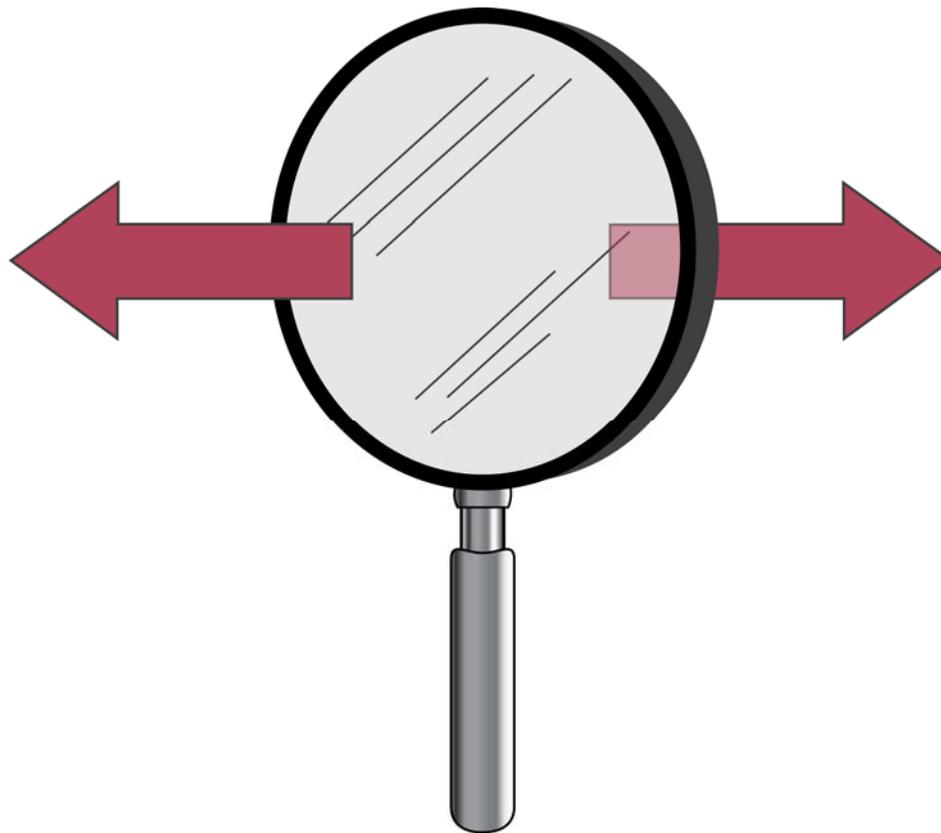
Technologies, Functionalities & Nodes of Innovation



Through the Looking Glass of Quality

Microgrid

Eliminate
unscheduled
backup power
needs



Utility

Provide
dependable
on-peak
power

Results

PHASE I of the **Galvin Electricity Initiative** established an architectural foundation for the *Perfect Power System*.

PHASE II develops a three dimensional blueprint for building the *system* on this foundation.

- **Technical** - Ensure configurations are technically viable with complete engineering assessments and blueprints
- **Commercial**– looking through the lens of market viability, define business templates & form consortia of key implementation players
- **Operational** – Perfect the human dimension with quality management procedures & training programs

PHASE III will commercially implement the distributed utility path to the perfect power system using limit breaking innovative technology

COMMUNICATE - EDUCATE

A Message of Enduring Truth

“Often, the counter-intuitive leads us to the solution . . . I am not concerned about being the minority . . . Things don’t get changed unless the leaders of the minority view take charge.”

Bob Galvin