

Greener, Leaner, and Smarter: Transforming the Electric Utility Industry

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American Council for an Energy-Efficient Economy



The American Council for an Energy-Efficient Economy is a nonprofit 501(c)(3) founded in 1980. We act as a catalyst to advance energy efficiency policies, programs, technologies, investments, & behaviors.

Our research explores economic impacts, financing options, behavior changes, program design, and utility planning, as well as US national, state, & local policy.

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Electric utility transformations underway

Business models

- **Traditional model decaying, new business/regulatory models emerging – still very uncertain**

Technologies

- **Existing technologies antiquated, aging**
- **New smart technologies and grid emerging**

Resources

- **Distributed resources growing rapidly**
- **Costs of renewables at parity in some cases**
- **Energy efficiency: large, growing, invisible resource**



Industry in upheaval: “death spiral?”

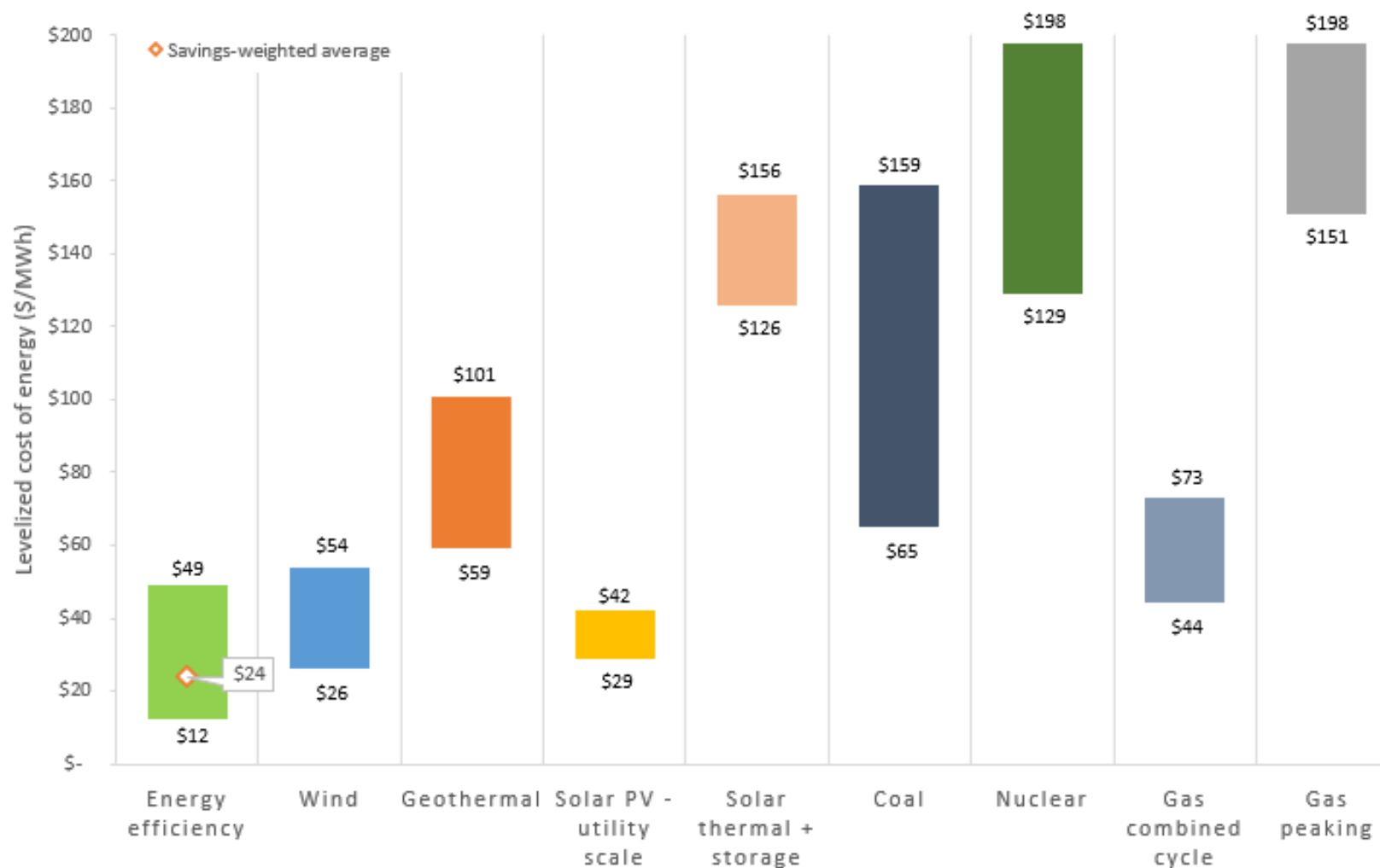
DEATH SPIRAL



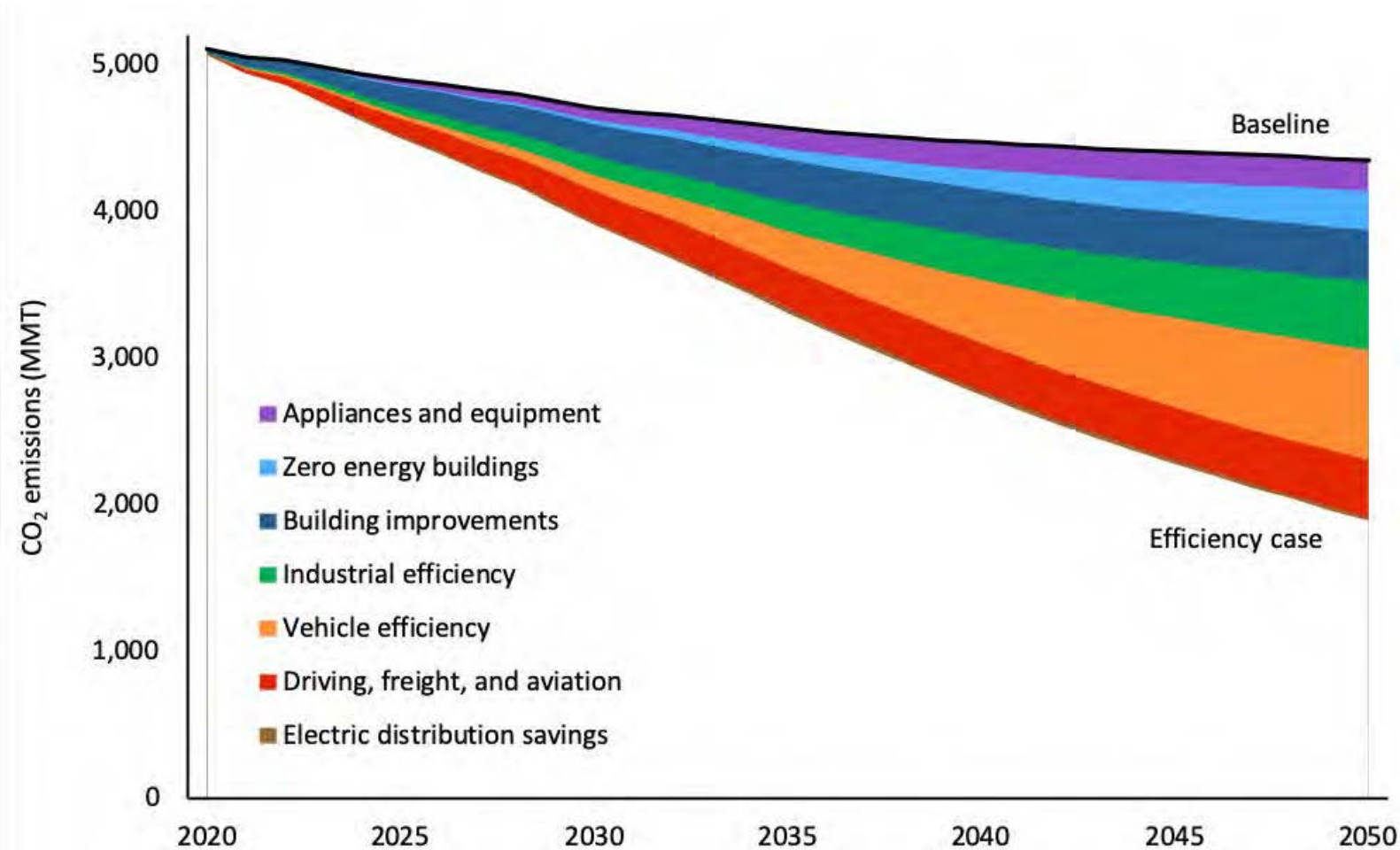
- High-cost infrastructure in place
- Competitive alternatives, e.g. customer-owned PV or community solar
- Customers generate own power — buy less from utility
- Customers also become more efficient — buy less
- Same high-cost system in place
- Costs distributed across fewer customers/kWh sold
- Rates increase → alternatives more competitive → more customers generate own power → more conservation → cycle repeats
- Threat is real, but ACEEE research shows that it is overstated – still marginal impacts

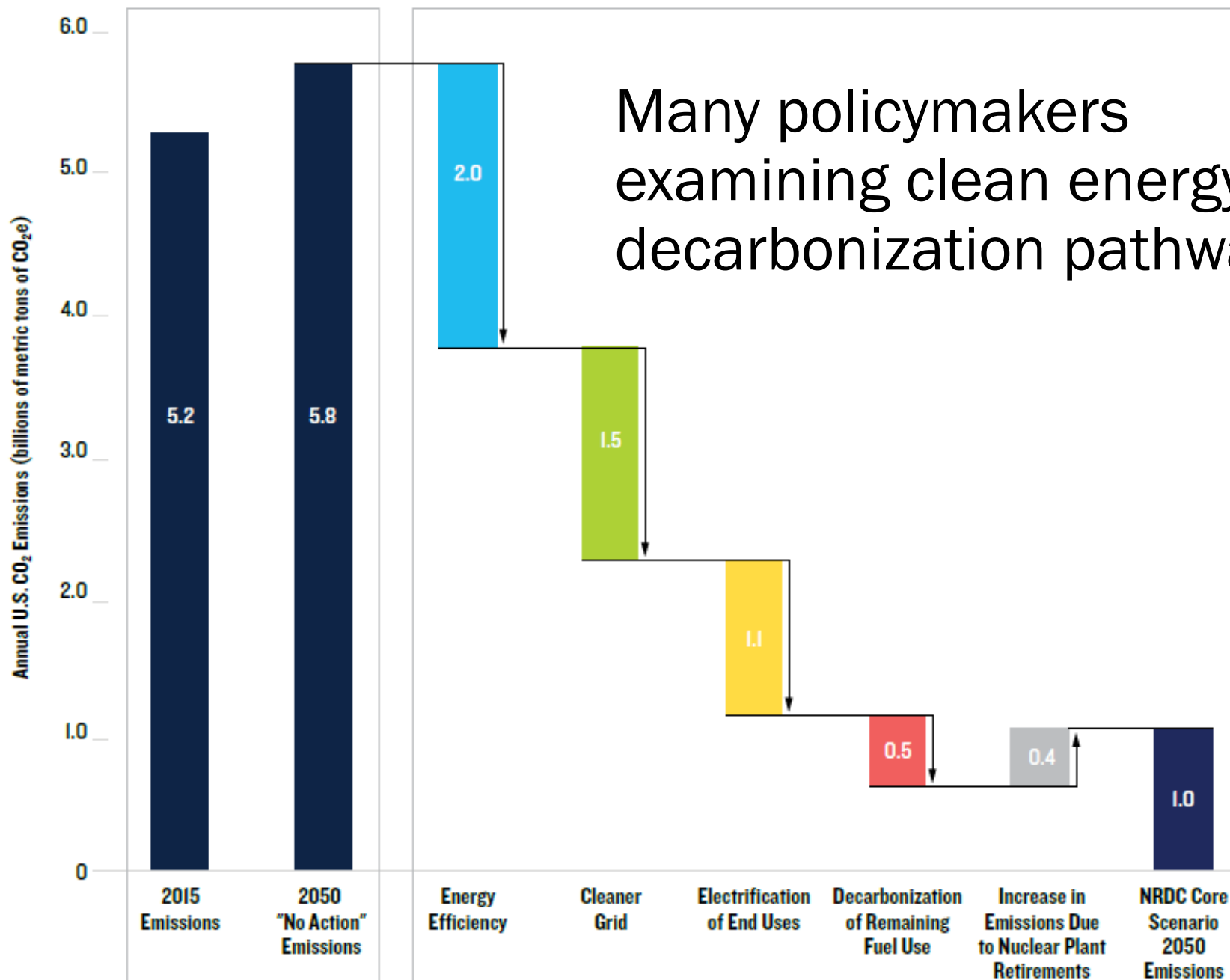
Reference: *The Future of the Utility Industry and the Role of Energy Efficiency*,
Steve Nadel and Garrett Herndon, ACEEE Research Report u1404

Energy efficiency: a low-cost utility resource



Half-way to zero carbon with energy efficiency,
(other half by electrification and decarbonization of the grid)





Other forces of change

- Smart grid and smart technologies
- Distributed resources (decentralized, customer-sited or community solar generation)
- Volatile, unpredictable energy markets
- Environmental regulation
- Pending new federal clean energy infrastructure investments
- Changing customer preferences → increased demand for clean power
- States, cities, and communities seeking clean energy goals



Rapid emergence of “smart grid”— no standard definition, but characterized by technologies that are:

- Connected
- Communicating
- Integrated
- Responsive
- Data-rich
- Real-time
- Diagnostic
- Analytical
- Predictive
- Learning



Smart, connected, interactive technologies create new opportunities for customers, utilities and grid operators: flexible loads, improved resilience and reliability

Rapid increase in distributed resources

- Costs of renewable generation have declined rapidly; increasingly competitive
- Greening of the grid: customer demand for renewable energy increasing rapidly
- Reliability, resilience increasing attraction of on-site generation (e.g., solar with battery storage)
- Energy efficiency: key role in distributed resources (complements renewables and electrification)
- Other emerging technologies such as electric vehicles and energy storage



Policies in flux

- Pending new federal clean energy/decarbonization infrastructure legislation
- Some push-back or stagnation of energy efficiency resource standards (EERS)
- New rate designs (esp. time varying)
- Concerns over rate impacts from energy efficiency
- Misperception that the energy efficiency potential has been largely tapped out due to:
 - More stringent codes and standards
 - Advances in technologies and market developments toward higher efficiency of products and services



Conclusions

- The transformations underway in the electric utility industry are transforming energy efficiency programs and creating new options and opportunities for customers, utilities, and grid operators
- Some changes may work against customer energy efficiency, renewable energy (customer-sited or community), and other distributed energy resources, such as storage and demand response
- To prevent such harm, policies guiding this transformation need to address utility customer energy efficiency, renewable energy, smart technologies, and other distributed energy resources

Thank you!

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