

# WERF's Energy Production and Efficiency Research Program – Building on 8 years of applied energy research for the wastewater sector



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## Water Environment Research Foundation

- Since 1989, WERF is America's leading non-profit organization dedicated to research on wastewater, water quality, biosolids and stormwater.
- Conducted 400 research projects, valued at more than \$130 million. The results of that research are enormous.



## WERF “*Energy Solutions*” Results, Next Steps, and Research Needs

- Consistent ***use of Best Practices*** can reduce energy demand by 40% but it cannot achieve energy neutral
- ***Maximize carbon management*** for energy recovery or reuse. Improving primary treatment/solids capture had the greatest positive impact of those evaluated
- ***Further enhance*** Anaerobic Digestion with CHP to produce more biogas for energy recovery
- Investigate the potential for ***heat recovery*** from wastewater and heat reuse opportunities
- Advance ***short-cut nitrogen treatment*** development and implementation as low energy alternative treatment process
- Develop processes to ***recover remaining energy*** from dewatered biosolids

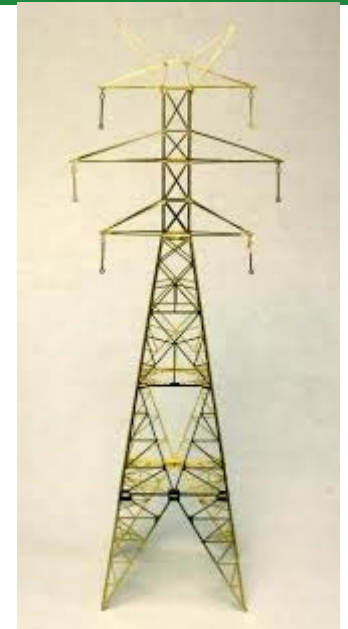
## Barriers and Solutions to Advance Energy Efficiency and Recovery



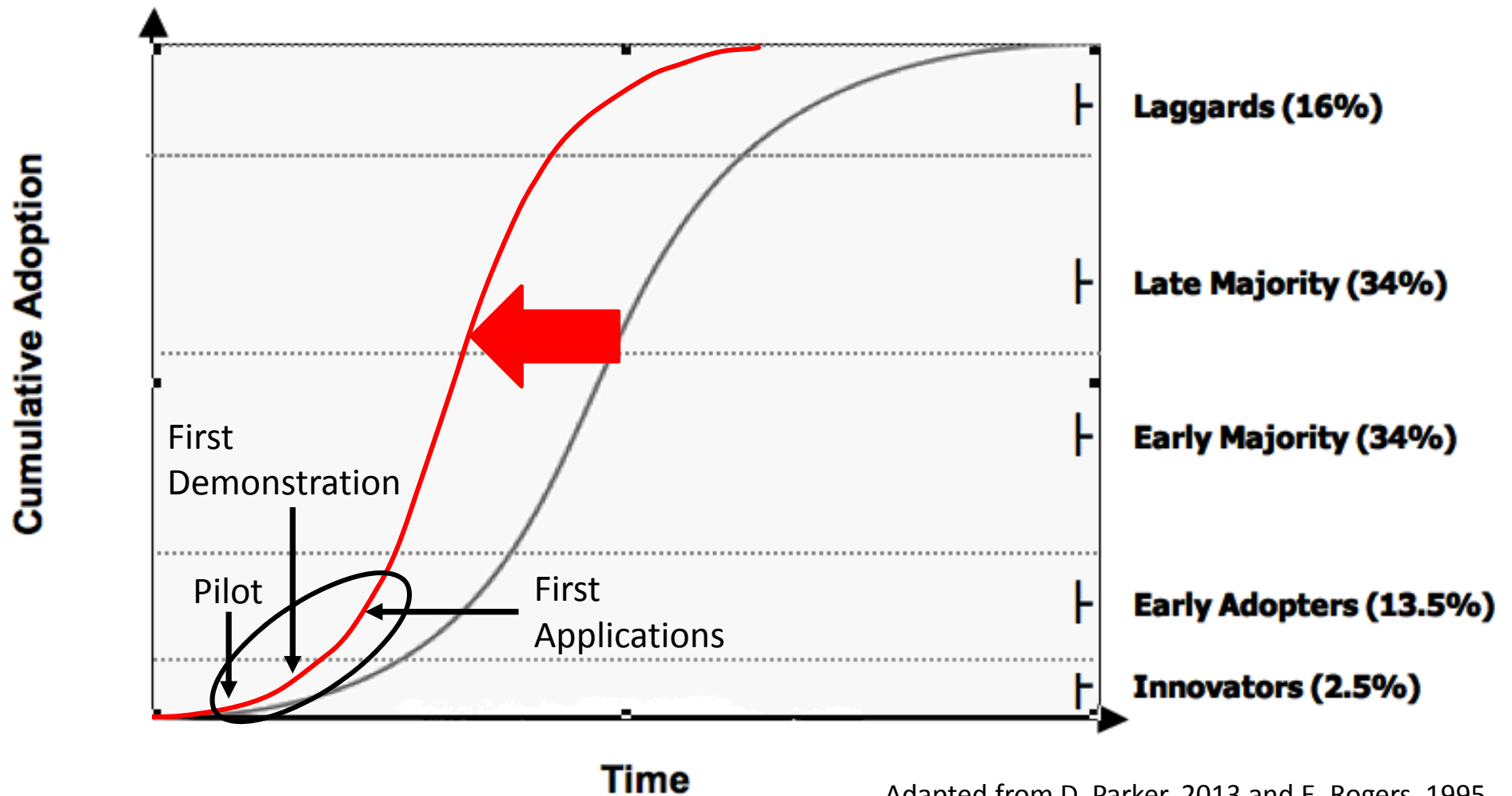
- Barriers are primarily economic
  - ***Payback does not meet expectations*** – switch to life cycle financial decision-making
  - ***Financing for capital projects not available*** – look at innovative sources of funding such as grants, incentives, ESCOs, and PPAs
  - ***WRRF are largely in the public sector and need to learn to work with the private sector*** – examine public/private agreements

## Barriers to Energy Efficiency and Recovery *without Simple Solutions*

- Legacy power grid/utility regulations and issues for the power providers with distributed power sources
- Stove-piped (water, air, solid waste) environmental regulations, not **integrated, sustainable regulations** that include carbon footprint
- Long-lived assets without adequate asset management and a user-pay business model that **undervalues water**
- Conservative, risk-adverse management; the **unintended consequence of litigation** and penalties

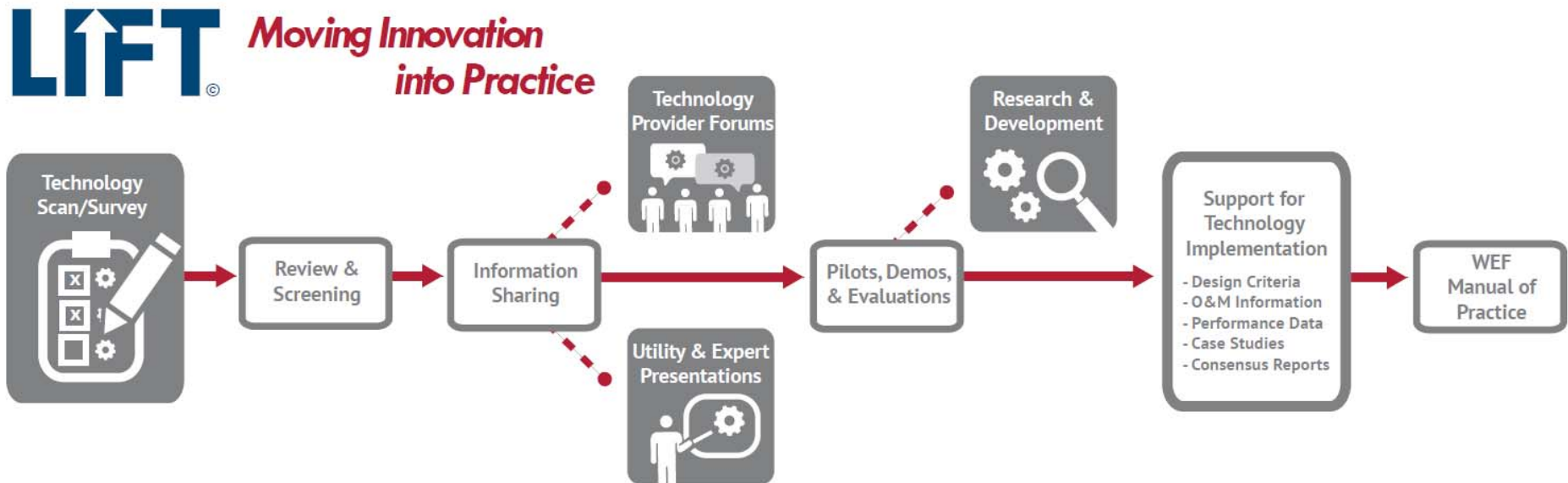


# New Technologies – Innovation Adoption Curve



Adapted from D. Parker, 2013 and E. Rogers, 1995

# Solution – Leaders Innovation Forum for Technology



WERF/WEF initiative to identify, screen, and evaluate new technologies and share the risk and cost of conducting demonstrations

## LIFT Focus Areas

- 1 Shortcut Nitrogen Removal
- 2 P-Recovery
- 3 Digestion Enhancements
- 4 Biosolids to Energy
- 5 Energy from Wastewater
- 6 Collection Systems
- 7 Green Infrastructure



New





# THANK YOU

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