Safe, Resilient, Customer-Focused Infrastructure

Kathryn Kline, Senior Research Associate

National Regulatory Research Institute

SURFA Conference

April 20, 2018

Topics

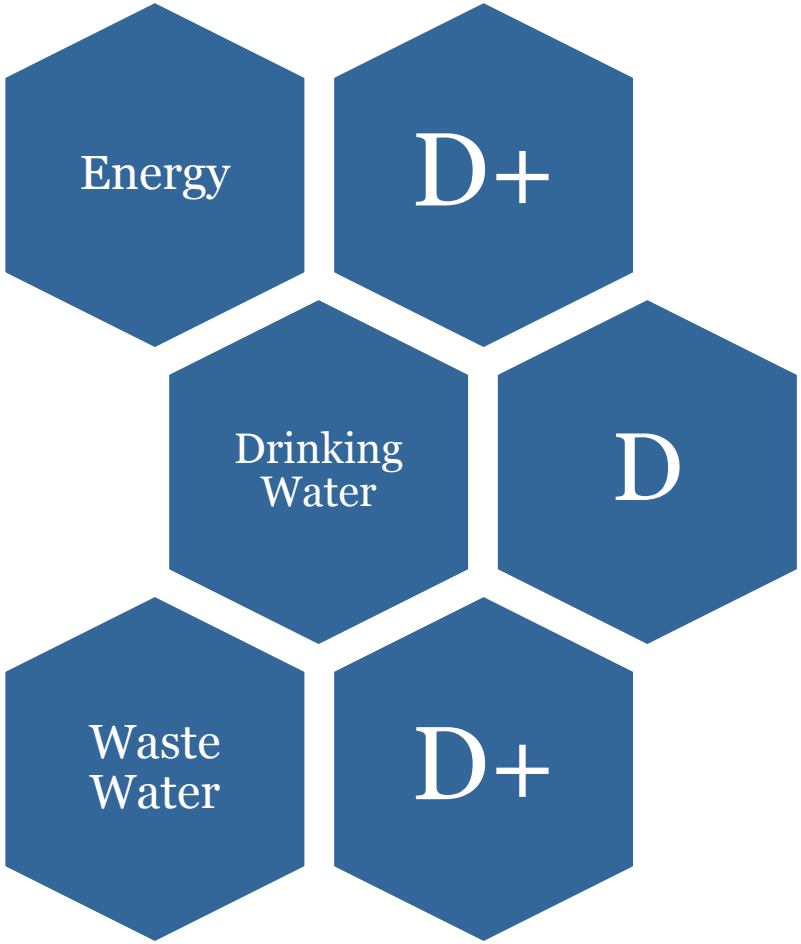
- What's driving infrastructure investment?
- Let's do the numbers
- What challenges do stakeholders face?
- Possible infrastructure finance considerations

What's driving Infrastructure Investment?

What's driving infrastructure funding needs?

- Governmental mandate for growth/improvement
  - Regulatory standards (e.g. Safe Drinking Water Act)
  - Congressional Mandate (USF & National Broadband Plan)
- Aging infrastructure
- Historic underinvestment
- Health concerns (lead service lines)

American Society of Civil Engineers Infrastructure Assessment Report Card



Let's do the numbers

KK2

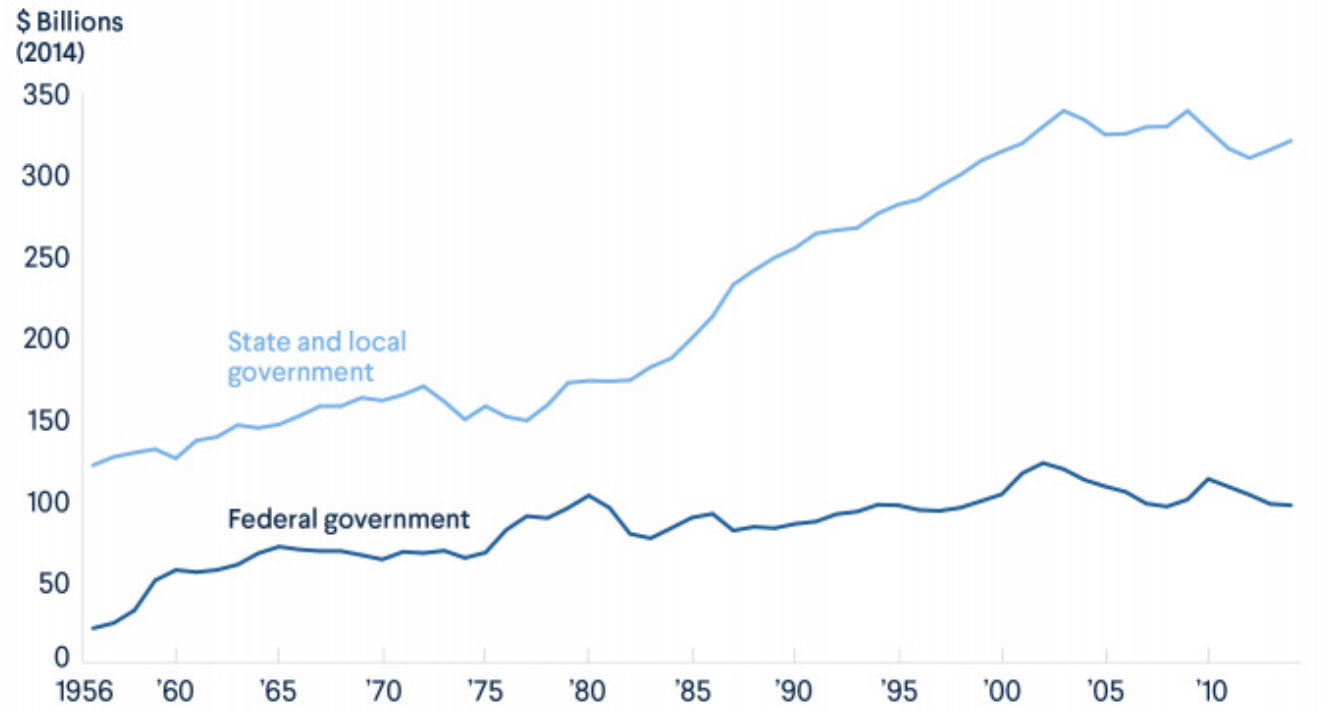
Infrastructure Estimates for next 20 years…

- American Society of Civil Engineers estimate that the US will need to spend **$177 billion by 2025** to fill the investment gap for energy transmission infrastructure and generation facilities under modest growth estimates
- The EPA estimates that **$632 billion will be needed for over the next decade** for distribution, treatment, and wastewater management facilities
- According to AWWA, upgrading existing water systems to meet drinking water infrastructure needs of a growing population will require **at least $1 trillion**
- "Deloitte Consulting LLP analysis estimates that the US requires **$130-150 billion** of fiber investment in the next 5-7 years to support broadband competition, rural coverage, and wireless densification" (Communications infrastructure upgrades: the need for deep fiber, 2017, pg. 13)

Slide 7

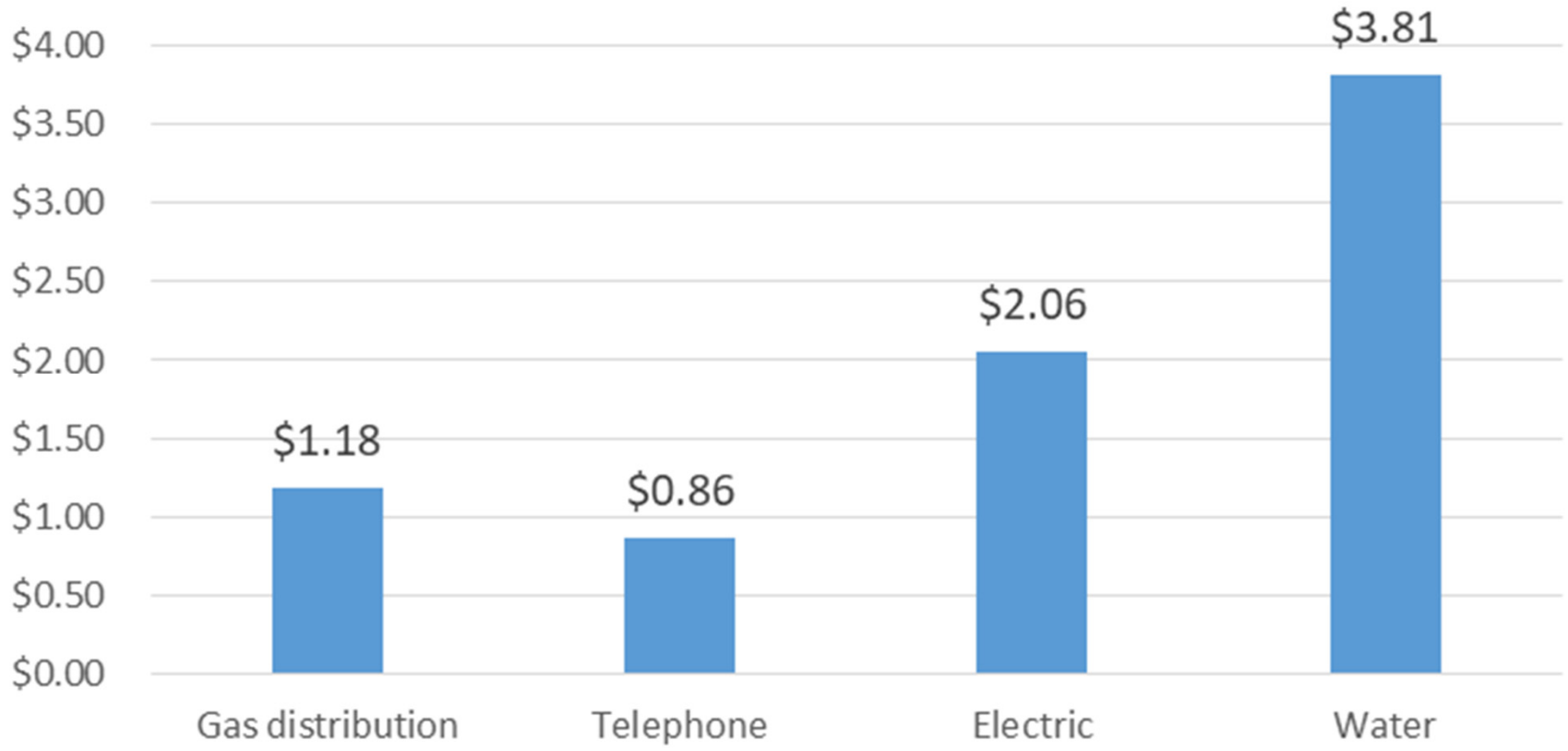
KK2 let's find a way to present this visually
Kathryn Kline, 4/11/2018

Spending on Transportation and Water Infrastructure: Public Spending by level of gov't, 1956-2014



- according to the CBO, the federal contribution to national water infrastructure spending has fallen from 63% of the total in the 1970s to just 9% in 2014.
- As the CBO explains, this is largely because over that time federal support has shifted from grants to low-interest loans.

Capital Investment Required to Produce $1 of Revenue



Source: 2009 AUS Utility Report

What challenges do stakeholders face?

Challenges

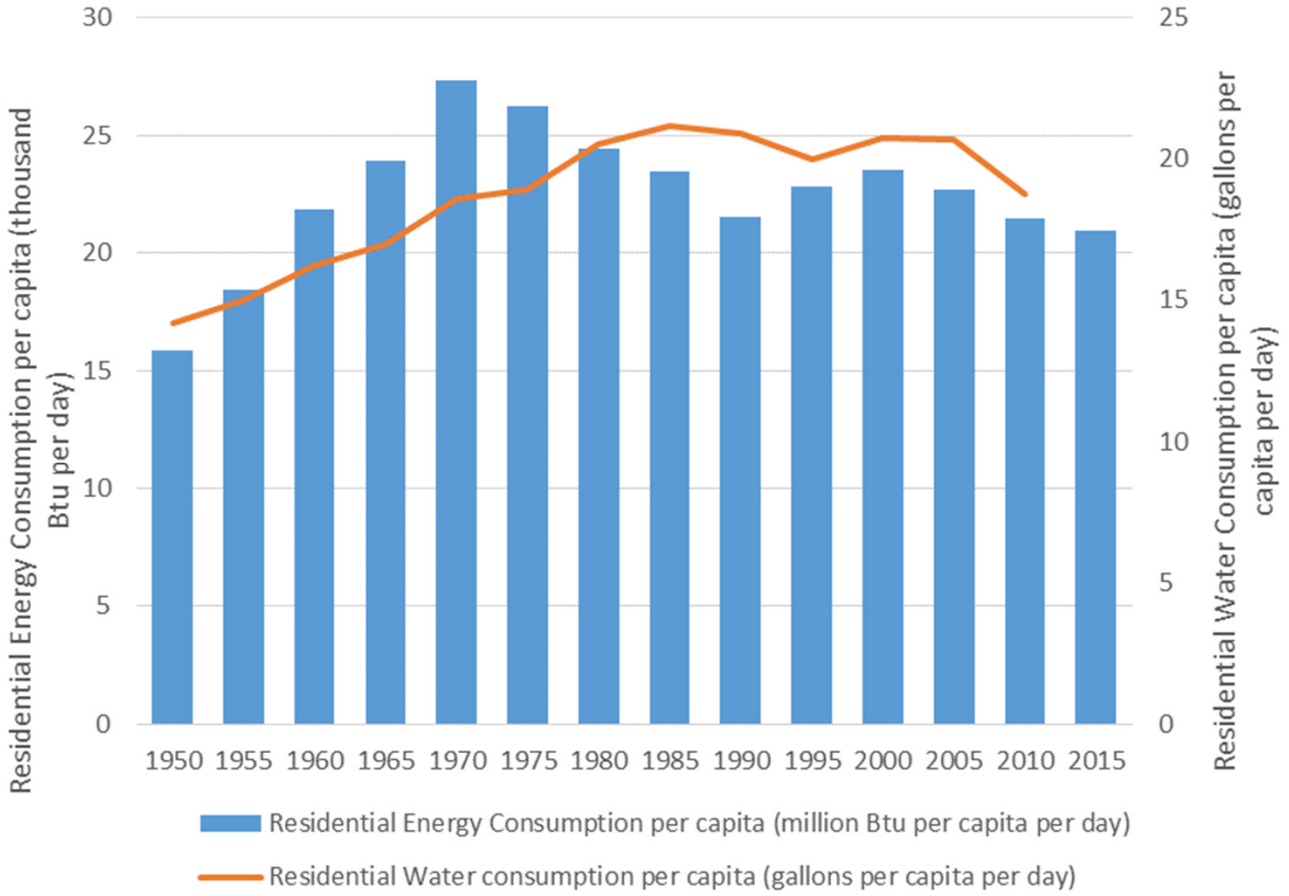
- Rate-making Paradigm shift
- Age of Infrastructure
- Affordability

Rate making paradigm shift

- Utilities rely on demand growth to increase the amount of money they can collect to cover infrastructure maintenance, as demand has plateaued, this has been an issue
- Traditional rate making is based on the assumption of increased demand
- Consumption has stopped growing due to:
  - shifts in population patterns,
  - greater efficiency/conservation of resources, and
  - conservation measures due to drought or high energy costs
- General rate case system is better suited to large systems– can be taxing to smaller water systems

KK1

Residential Consumption per capita trends



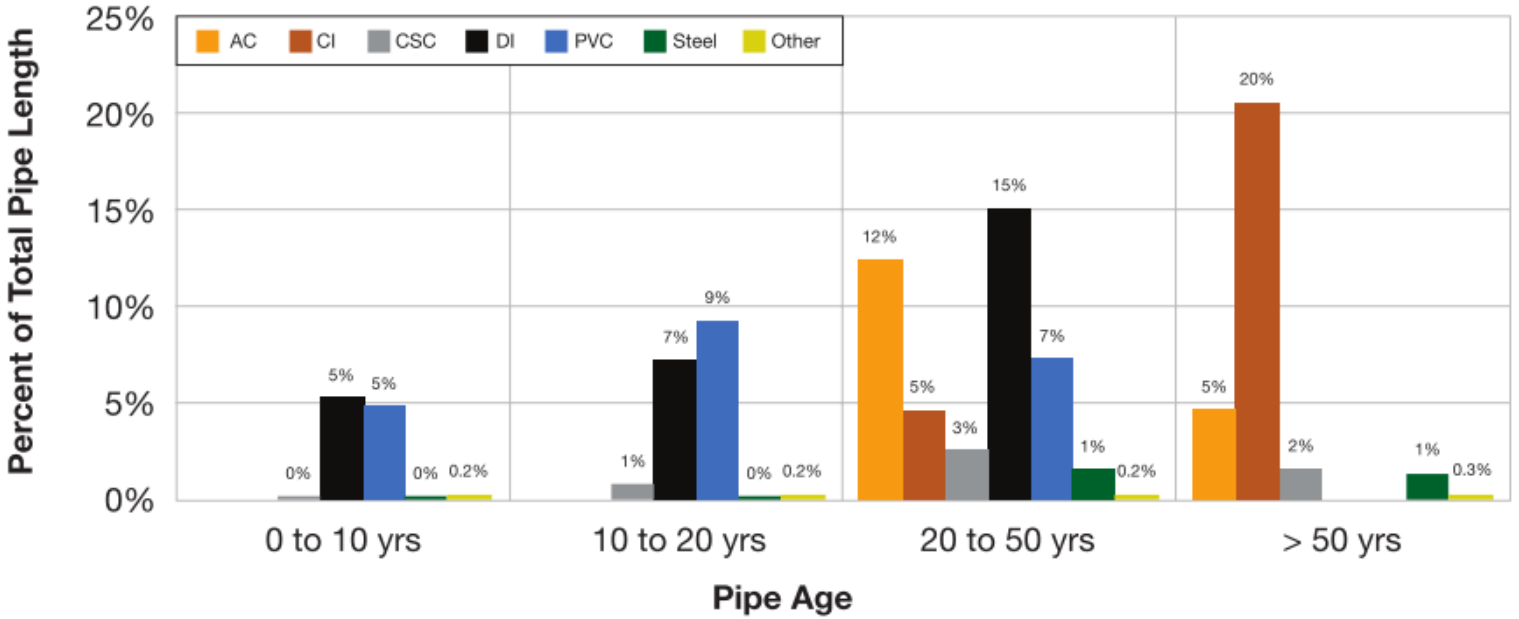
Source: energy data: EIA; water data: USGS water-use data companion publications found in: Donnelly & Cooley. *Water Use Trends in the United States, (2015)*

Slide 13

KK1 check unit conversion on BTU-- right magnitude?
Kathryn Kline, 4/4/2018

Age of Infrastructure

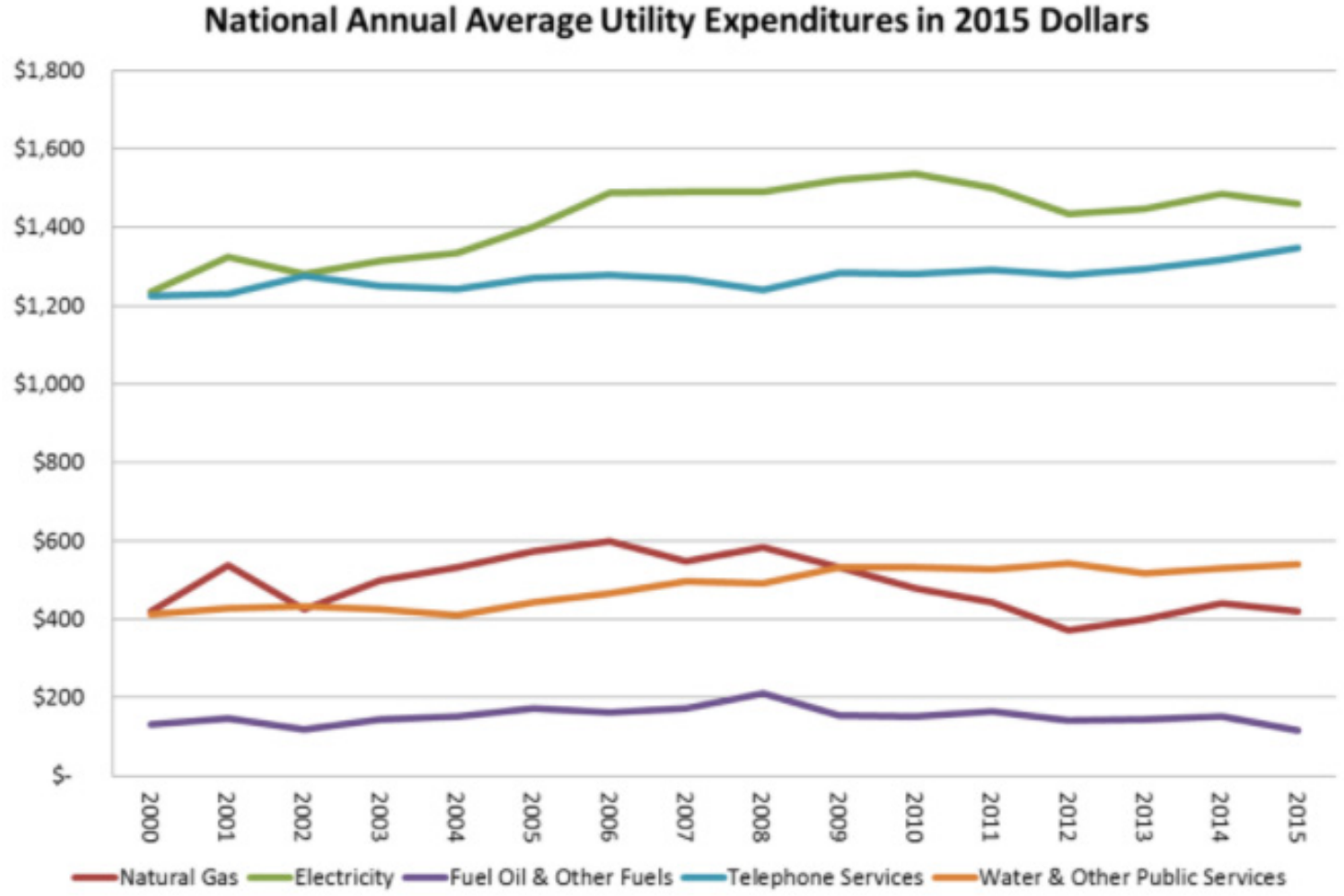
Percent of Total Length of Pipe by Age



Source: Folkman, Steven. *Water Main Break Rates In the USA and Canada: A Comprehensive Study*. (2018).

- break rates have increased **27% in the past six years**
- Over 16% of Installed water mains are beyond their useful life
- Putting out fires is expensive

Affordability



Source: UNC Environmental Finance Center (Talley, 2016)

Affordability (continued)

Table 1: Inflation Adjusted National Average Annual Expenditures (2015 Dollars)

Expenditure	2000 Average	2015 Average	$ Change	% Change
Natural Gas	$ 420	$ 421	$ 1	0.28%
Electricity	$ 1,235	$ 1,460	$ 225	18.25%
Fuel Oil & Other Fuels	$ 131	$ 116	$ (15)	-11.29%
Telephone Services	$ 1,225	$ 1,347	$ 122	9.96%
Water & Other Public Services	$ 413	$ 540	$ 127	30.78%
Utilities, Fuels, & Public Services	**$ 3,423**	**$ 3,885**	**$ 462**	**13.49%**

- The total average annual expenditure for all utilities, fuels, and public services increased **$462, or about 13.5% in the 15 years** since 2000 (as a share of pre-tax income, expenditure has grown from 4% to 5.6%)
- Households spend more on electricity and similarly more on telephone services than on natural gas, fuel oil, and water & other public services combined
- Should take these findings with a grain of salt (national averages obscures more granular variation)

What are some solutions?

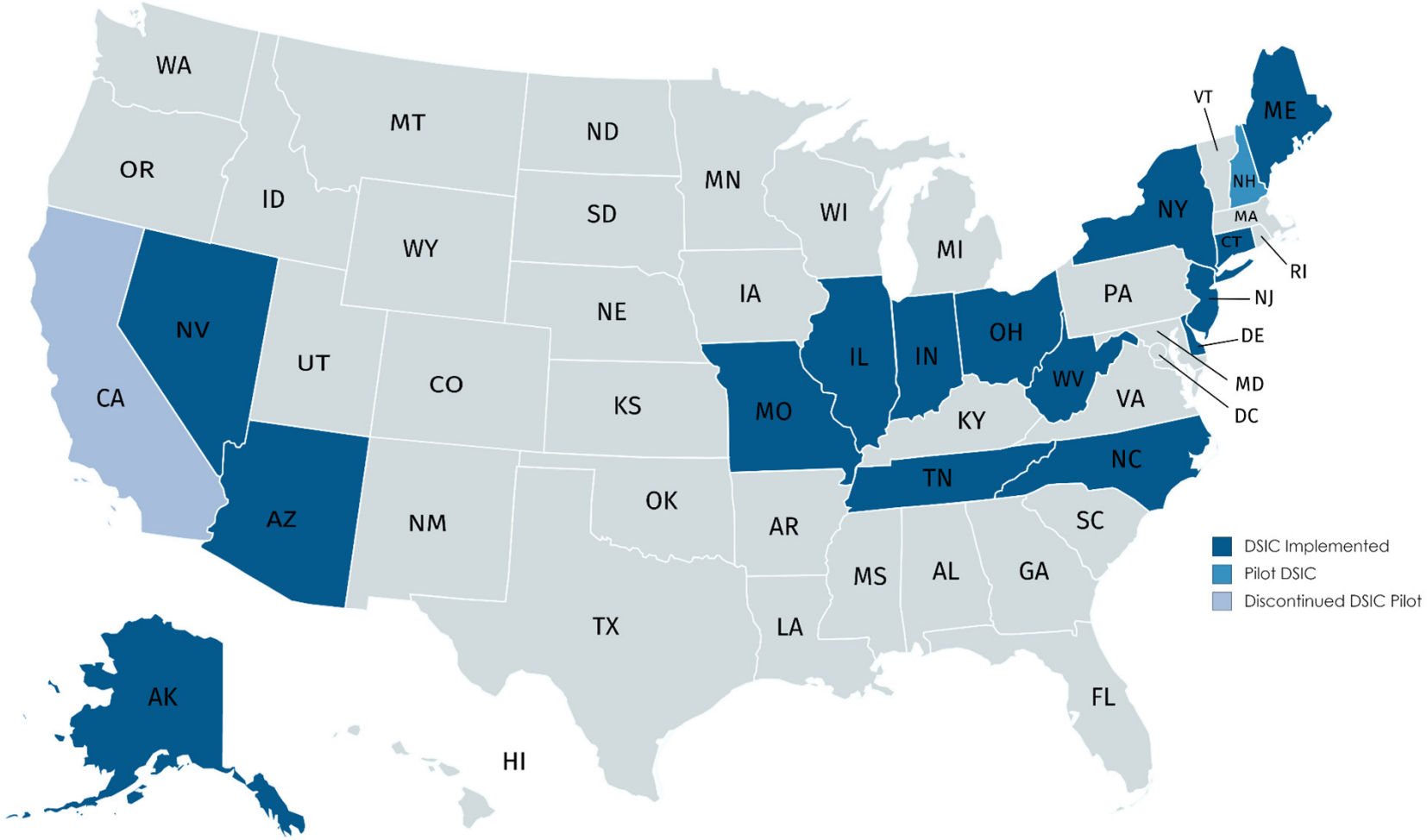
Possible Infrastructure Finance Considerations

- DSICs
- Dig-once Policies
- Water energy nexus approach
- Series of trade-offs paradigm

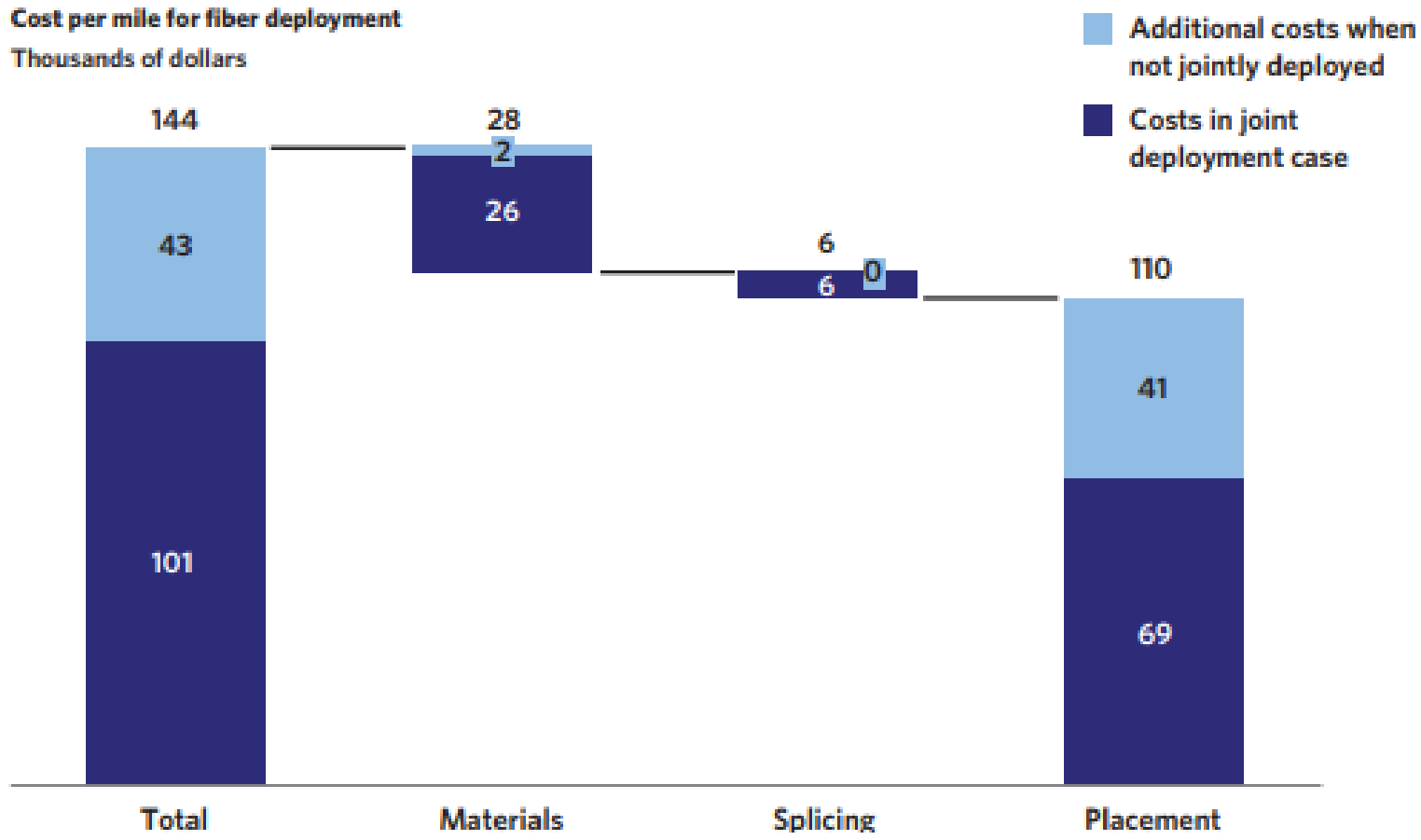
Distribution System Improvement Charges (DSIC)

- Distribution System Improvement Charges allow for non-revenue producing improvements to be funded through interim rate increases which are separate from formal rate case decisions
- Enables investments to be funded and made on an ongoing basis with regulatory oversight, but without prolonged wait for contested rate proceedings
- 17 states allow for some form of DSIC, while others are considering DSIC, or have used DSIC in the past
- DSIC is limited to revenue neutral projects, DSIC does not increase revenue
- DSIC Differs from Construction Work in Progress (CWIP) because DSIC requires projects to be used and useful before companies may collect

Distribution System Improvement Charge (DSIC)

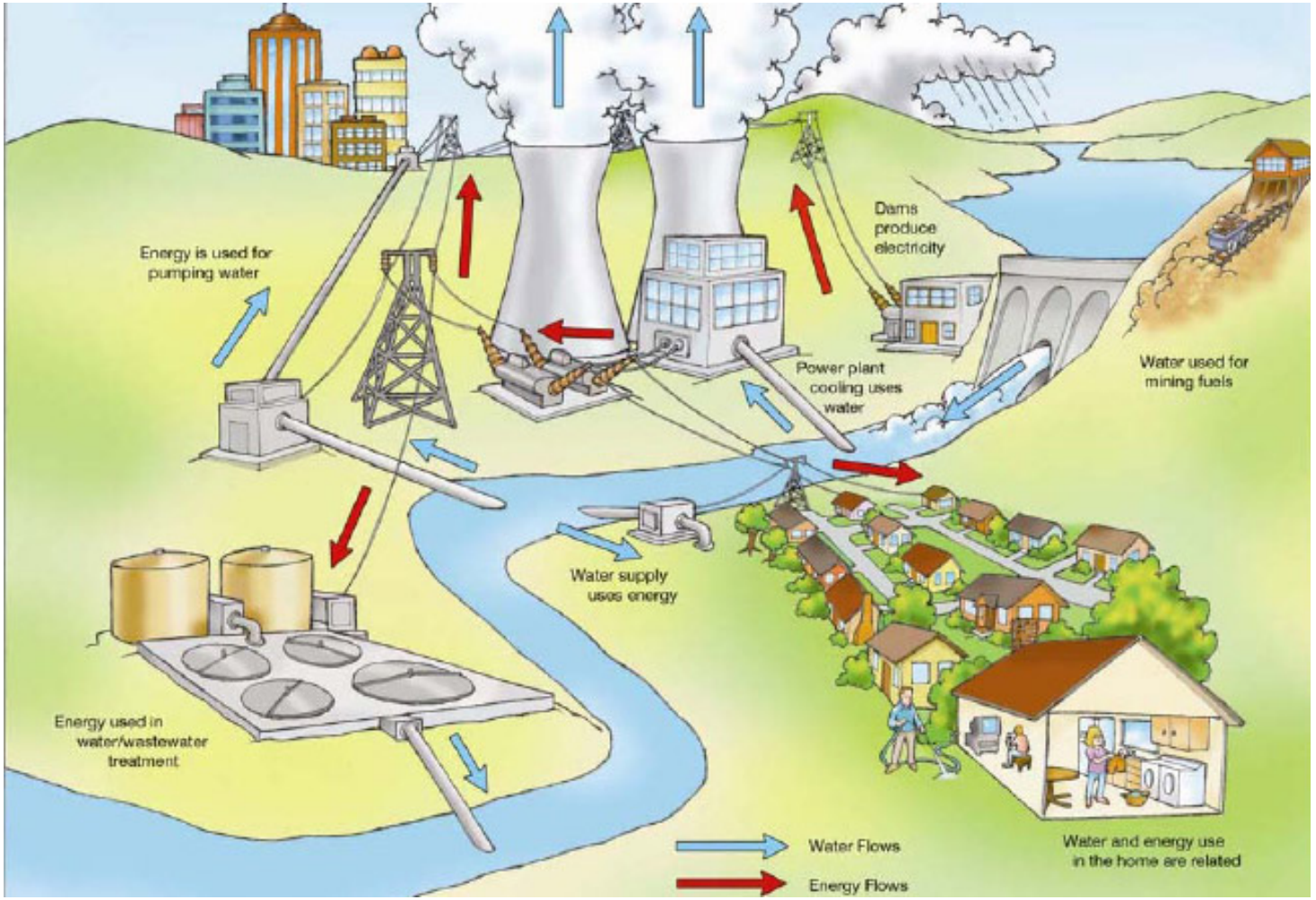


Dig Once (Joint Deployment)



Source: National Broadband Plan, pg. 114 (2010)

Water/Energy Nexus Considerations



Source: NCSL, Overview of the Water-Energy Nexus in the US

Pot of Money vs. Series of Tradeoffs Paradigm

"If we see our infrastructure spending more as a finite pot of money that must be spent on the most advantageous projects through a series of trade-offs rather than as set of funding holes that must be filled up by outside money, we can start to see infrastructure more as it is than what we want it to be. This thinking will also drive communities to start thinking holistically about all of their infrastructure (water, wastewater, roads, buildings, bridges, community facilities, parks, etc.) in a comprehensive asset management way. " (Himmelberger, 2018)

More Reading

https://www.cfr.org/backgrounder/beleaguered-us-water-system

https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Wastewater-Final.pdf

https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Drinking-Water-Final.pdf

https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Energy-Final.pdf

https://www.bloomberg.com/view/articles/2018-01-08/u-s-needs-a-well-designed-infrastructure-plan

http://efcnetwork.org/not-gap-trade-off/

http://www.circleofblue.org/2015/world/price-of-water-2015-up-6-percent-in-30-major-u-s-cities-41-percent-rise-since-2010/

http://efc.web.unc.edu/2016/10/07/households-utilities-fuels-public-services/

https://www.cfr.org/backgrounder/state-us-infrastructure

http://www.ncsl.org/research/environment-and-natural-resources/overviewofthewaterenergynexusintheus.aspx