Water utility pricing and affordability
Household expenditures on utilities in the U.S.

Consumer expenditures on utilities for a four-person household in 2017
($5,001 nd 6.2% of total household expenditures)

- Natural gas (.6% of exp.), $482, 9%
- Fuel oil and other fuels (.1% of exp.), $98, 2%
- Water and other public services (1% of exp.), $788, 16%
- Telephone (2.3% of exp.), $1,843, 37%
- Electricity (2.2% of exp.), $1,789, 36%

Source: IPUMS based on 2013 data.

Consumer expenditures on utilities by household size (2017)

Source: IPUMS based on 2013 data.
Household expenditures on utilities over time

Annual consumer expenditures on utilities for a four-person household ($)

- Water and other public services
- Fuel oil and other fuels
- Natural gas
- Telephone
- Electricity

Consumer expenditures on utilities for a four-person household (% of total expenditures)

Source: IPUMS-MSU based on BLS data.
Utilities expenditures by income level and regressivity

**Consumer expenditures on utilities by income quintile (all consumers $2017)**

- **Water and other public services**
  - Lowest quintile: $1,004
  - 2nd quintile: $1,312
  - 3rd quintile: $1,410
  - 4th quintile: $1,538
  - Highest quintile: $1,835

- **Fuel oil and other fuels**
  - Lowest quintile: $1,059
  - 2nd quintile: $1,320
  - 3rd quintile: $1,384
  - 4th quintile: $1,709
  - Highest quintile: $1,528

- **Natural gas**
  - Lowest quintile: $1,060
  - 2nd quintile: $1,131
  - 3rd quintile: $1,166
  - 4th quintile: $1,683
  - Highest quintile: $2,036

- **Telephone**
  - Lowest quintile: $706
  - 2nd quintile: $820
  - 3rd quintile: $855
  - 4th quintile: $986
  - Highest quintile: $558

- **Electricity**
  - Lowest quintile: $3,220
  - 2nd quintile: $4,730
  - 3rd quintile: $5,550
  - 4th quintile: $6,770
  - Highest quintile: $880

**At a tale of two countries**

The share of U.S. pre-tax income accruing to the bottom 50 percent and top one percent of income earners, 1962-2014

**Consumer expenditures on utilities by income quintile (all consumers 2017%)**

- **Water and other public services**
  - Lowest quintile: 1.26%
  - 2nd quintile: 0.64%
  - 3rd quintile: 0.64%
  - 4th quintile: 1.00%
  - Highest quintile: 0.75%

- **Fuel oil and other fuels**
  - Lowest quintile: 0.23%
  - 2nd quintile: 0.021%
  - 3rd quintile: 0.17%
  - 4th quintile: 0.15%
  - Highest quintile: 0.14%

- **Natural gas**
  - Lowest quintile: 2.71%
  - 2nd quintile: 2.70%
  - 3rd quintile: 2.60%
  - 4th quintile: 2.46%
  - Highest quintile: 1.74%

- **Telephone**
  - Lowest quintile: 3.86%
  - 2nd quintile: 3.34%
  - 3rd quintile: 2.79%
  - 4th quintile: 2.28%
  - Highest quintile: 1.57%

**Source:** IPUMS based on BLS data.

---

Beecher – afford2019
Aggregate trends: electricity, gas, and water
CPI trends for utilities (US)

Trends in the Consumer Price Index (CPI) for public utilities

- Water & sewer (1953)
- Cable/sat. television (1984)
- Garbage (1985)
- Postage (1935)
- CPI (1983=100)
- Fuel oil (1935)
- Electricity (1913)
- Natural gas (1935)
- CPI (1997=100)
- Landline tel. services (2009=100)
- Internet (1997=100)
- Wireless (1997=100)

Source: IPU-MSU based on BLS data.
Expenditure and price trends combined

Household expenditures and CPI for electricity

- Electricity expenditures (nominal)
- Electricity expenditures ($2016)
- Electricity CPI

Household expenditures and CPI for natural gas

- Natural gas (nominal)
- Natural gas expenditures ($2016)
- Natural gas CPI

Household expenditures and CPI for water and sewer maintenance

- Water expenditures (nominal)
- Water expenditures ($2016)
- Water CPI

Source: IPUMSU based on BLS data.
Inflationary pressure on water costs and prices

- Water system cost and price profiles vary substantially
  - By system type, age, and location
  - Water, wastewater, and stormwater costs may be combined
  - Prices of privately owned systems are higher (taxes, returns, practices)

- Capital cost pressures
  - Combined infrastructure needs of $1 trillion over next 25 years
  - Asset valuation at fair value and private investment

- Operating cost pressures
  - Labor, energy, chemicals, and purchased water
  - Quality standards and compliance costs
  - Lead service line replacement
  - New contamination threats
  - Water supply constraints
  - Population growth (locational)

- Flat or declining water usage (pricing, programs, population, recession)

- Move to full-cost pricing as fiscal necessity for local government (vs. taxes)
  - Promoted as “rational” by economists, consultants, and regulators (including USEPA)
  - Investor-owned utilities invariably charge full cost, including overhead, taxes, & returns
Water infrastructure needs

BRIDGING THE WATER INFRASTRUCTURE GAP
INVESTMENT BY 2020 WILL IMPROVE ECONOMIC RESULTS

BY INVESTING AN ADDITIONAL $84B
WE CAN PREVENT:

$147B
Increased Costs to BUSINESSES

$59B
Increased Costs to HOUSEHOLDS

By 2028, family budgets will be squeezed by
$900
on water rates, fees and personal income lost.

AND PROTECT:

• Almost 700,000 jobs
• $541B in personal income
• $416B in GDP
• $6B in U.S. exports

Invest more in www.coe.org/water2035

INVESTMENT GAPS AND
Potential Sources of Funding

Forested Annual Investment Gaps

<table>
<thead>
<tr>
<th>Transportation</th>
<th>Water</th>
<th>Communications</th>
<th>Energy</th>
</tr>
</thead>
</table>
| $2.7 billion  | $1 billion | $70 million | N/A

Forested Investment Gaps Over the Next 20 Years

<table>
<thead>
<tr>
<th></th>
<th>Transportation</th>
<th>Water</th>
<th>Communications</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>$40 billion</td>
<td>$19 billion*</td>
<td>$600 million</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Potential Sources of Funding

• Federal funding
• Water infrastructure user fees
• Gas tax increase
• Premier rate increases
• Subsidies
• Private investment
• Federal funding
• Provider rate increases
• Dedicated sales tax
• Dedicated statewide property tax

* This figure includes an estimated $600 million annual gap in water and sewer infrastructure needs. This is considered a conservative estimate using the best information available. As condition assessments are completed, this estimate is expected to increase.
Infrastructure funding vs. financing

- Funding for infrastructure is from taxpayers or ratepayers or both
  - Taxes (federal, state, or local) vs. user fees and charges (increasingly)
  - Rates are more regressive and taxes can be less regressive
  - Capital financing comes from debt or higher cost private debt and equity
  - Funding & financing options can be combined - privatization is not a source of “funding”

- Utility enterprise model and full-cost pricing are strongly favored over taxes
  - Regardless of ownership form or economic and social basis – vs. historical experience
  - Institutional constraints undermine investment and pricing (MI’s Headlee and Bolt)

<table>
<thead>
<tr>
<th>Capital funding (providers)</th>
<th>Public (debt and public equity)</th>
<th>Private (debt and private equity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital funding (users)</td>
<td>User fees</td>
<td>Public enterprise</td>
</tr>
<tr>
<td></td>
<td>Public service</td>
<td>Private enterprise</td>
</tr>
<tr>
<td>Taxes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private partnership</td>
</tr>
</tbody>
</table>
Differential effects of utility rates and taxes

Source: IPU-MSU based on BLS data.
Paying for infrastructure: Michigan’s rock and a hard place

- The rock of no taxes
  - Headlee amendment to the Michigan Constitution (1978)
  - Sec. 26. “There is hereby established a limit on the total amount of taxes which may be imposed by the legislature in any fiscal year on the taxpayers of this state. This limit shall not be changed without approval of the majority of the qualified electors voting thereon…”
  - Sec. 31. “Units of Local Government are hereby prohibited from levying any tax not authorized by law or charter when this section is ratified or from increasing the rate of an existing tax above that rate authorized by law or charter when this section is ratified, without the approval of a majority of the qualified electors of that unit of Local Government voting thereon…”

- The hard place of no user fees
  - According to Bolt v. City of Lansing (1998) a service fee must
    - serve a regulatory purpose rather than a (general) revenue raising purpose;
    - be proportionate to the necessary cost of the service; and
    - be voluntary in that users can refuse or limit their use of the commodity or service.
  - “We conclude that the storm water service charge imposed by Ordinance 925 is a tax and not a valid user fee. To conclude otherwise would permit municipalities to supplement existing revenues by redefining various government activities as "services" and enacting a myriad of "fees" for those services. To permit such a course of action would effectively abrogate the constitutional limitations on taxation and public spending imposed by the Headlee Amendment…”
Publicly owned utilities: local finances

Local government finances for utilities in 2016 ($billions)

Revenues  Expenditure  Difference

U.S. local government finances for water and sewer through 2016 ($bil.)


Water revenues  Sewer revenues  Water expenditures  Sewer expenditures
Closing the funding gap

- Closing the funding gap from the top – lower costs
  - Efficiency practices
  - Technological innovation
  - Market-based approaches (bidding)
  - Industry restructuring
  - Integrated resource and asset management
  - System (re)optimization relative to demand

- Closing the funding gap from the bottom – raise funding
  - Public funding for infrastructure (taxes, e.g., transportation)
  - Cost-based rates for water services (user fees)
  - Comprehensive economic regulation by PUCs address costs and rates
  - EPA’s four pillars: management, efficiency, pricing, watershed protection

- Some communities might avoid necessary investment
  - Avoiding politically unpopular rate increases and addressing affordability
  - These are separable issues
## Sustainable utility enterprises

<table>
<thead>
<tr>
<th>System revenues relative to expenditures</th>
<th>System expenditures relative to optimized compliant service level</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 revenues are below expenditures</td>
<td>&lt; 1 expenditures below optimum (&quot;cost avoidance&quot;)</td>
</tr>
<tr>
<td></td>
<td>= 1 expenditures are optimal</td>
</tr>
<tr>
<td></td>
<td>&gt; 1 expenditures above optimum (&quot;gold plating&quot;)</td>
</tr>
<tr>
<td>below optimum (&quot;price avoidance&quot;)</td>
<td>Deficient system</td>
</tr>
<tr>
<td></td>
<td>Subsidized system</td>
</tr>
<tr>
<td></td>
<td>Budget-deficit system</td>
</tr>
<tr>
<td>= 1 revenues are equal to expenditures</td>
<td>Underinvesting system</td>
</tr>
<tr>
<td></td>
<td>SELF-SUSTAINING SYSTEM</td>
</tr>
<tr>
<td></td>
<td>Overinvesting system</td>
</tr>
<tr>
<td>&gt; 1 revenues are above expenditures</td>
<td>Revenue-diverting system</td>
</tr>
<tr>
<td>above optimum (&quot;profit seeking&quot;)</td>
<td>Surplus system</td>
</tr>
<tr>
<td></td>
<td>Excessive system</td>
</tr>
</tbody>
</table>
## Cost of service and its recovery

<table>
<thead>
<tr>
<th>Societal level</th>
<th>System level</th>
<th>Ratepayer level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full social or “true” cost</strong></td>
<td>Full economic cost</td>
<td>Full-cost accounting</td>
</tr>
<tr>
<td>Environmental, economic, social externalities (spillovers)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Opportunity and avoided costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Accounting costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Capex (financing)</td>
<td>• Federal and state grants</td>
<td></td>
</tr>
<tr>
<td>• Opex</td>
<td>• Lease and other income</td>
<td></td>
</tr>
<tr>
<td>• Depreciation</td>
<td>• Property taxes</td>
<td></td>
</tr>
<tr>
<td>• Taxes</td>
<td>• General fund transfers</td>
<td></td>
</tr>
<tr>
<td>• Reserves</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Economics of price signals and welfare effects

**Prices too high**
- Extracts rents from essential usage (Ramsey pricing)
- Regressive deprivation and endangerment
- Drag on the local economy (income effect)
- Excess capacity and stranded investment
- High reserves and transfers from system
- Foregone revenues lost sales, theft, bypass, defection

**Prices too low**
- Weakens price signals for discretionary usage
- Excessive and wasteful use of resources
- Inadequate infrastructure investment
- Poor capacity utilization and congestion
- Low reserves and subsidies to system
- Financial effects of revenue inadequacy
Modern criteria for evaluating utility rates*

- **Criteria**
  - Financial viability
  - Economic efficiency
  - Equitable allocation
  - Operational performance
  - Network optimization
  - Environmental stewardship (social equity)
  - Distributive justice (social equity)

- **Constraints and considerations**
  - Understandable, unambiguous, transparent
  - Technically feasible and cost effective
  - Legally defensible and politically acceptable

*Building on Bonbright (1961)
Economic regulatory jurisdiction for water

- Michigan is one of six U.S. jurisdictions that has no economic regulatory jurisdiction for the water sector
  - Wisconsin fully regulates all municipal energy and water utilities

- Regulation “in the public interest” is protective of both utilities and ratepayers
  - Substitutes both for competitive market and governmental provision of the monopolies providing essential services at “just and reasonable” rates
  - Multiple implementation models are available

---

Source: Surveys by IPU and Wisconsin PSC.
Defining affordability for water (AWWA, M1)

- Affordability may be defined in terms of the ability of
  - Poorest households in the service area to afford their water and wastewater bills.
  - Average or median household in the service area to afford its water and wastewater bill.
  - An unconnected household or business to afford connection
  - Community to bear the total costs of providing water infrastructure and services.
  - Community to afford these costs as measured by the USEPA or other relevant entities.

- How USEPA measures affordability for regulatory purposes (currently debated)
  - Water at 2.5% of MHI and wastewater at 2% of MHI (4.5% total)
  - Infers a combined annual water and wastewater bill of 4.5%
  - AWWA and others have adopted similar metrics
Alternative affordability metrics (Teodoro, 2018)

- Conventional methods are flawed and may be misleading
- Proposed method
  - Measures household-level affordability (rather than the entire utility’s financial capability)
  - Provides for basic water needs (rather than average consumption)
  - Focuses on low-income households (not average- or median-income customers)
  - Accounts for essential costs other than water and sewer
- Two complementary metrics
  - \( AR = \) affordability ratio
  - \( AR_{20} = \) at the 20th income percentile
  - \( HM = \) hours of labor at minimum wage

**TABLE 2** Affordability metrics for Dallas, Tex.\(^a\)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Basic monthly water and sewer cost</td>
<td>$59.82</td>
</tr>
<tr>
<td>AR</td>
<td></td>
</tr>
<tr>
<td>B. ( AR_{20} ) annual income</td>
<td>$18,585.00</td>
</tr>
<tr>
<td>C. Monthly income (B + 12)</td>
<td>$1,548.75</td>
</tr>
<tr>
<td>D. Estimated monthly essential expenses(^b)</td>
<td>$864.11</td>
</tr>
<tr>
<td>E. Monthly disposable income (C – D)</td>
<td>$684.64</td>
</tr>
<tr>
<td>( AR_{20} ) (A + E)</td>
<td>8.74%</td>
</tr>
<tr>
<td>HM</td>
<td></td>
</tr>
<tr>
<td>F. Minimum wage per hour</td>
<td>$7.25</td>
</tr>
<tr>
<td>( HM ) (A + F)</td>
<td>8.25</td>
</tr>
</tbody>
</table>

\( AR = \) affordability ratio, \( AR_{20} = \) affordability at the 20th income percentile, \( HM = \) hours of labor at minimum wage

\(^{a}\)Based on 2017 rates
\(^{b}\)Estimates based on regression analysis of 2015 Consumer Expenditure Survey. See appendix.
Affordability policy options

- Payment credits or assistance (including voluntary funding)
- Tax exemption for water bills
- Arrearage forgiveness
- Budget billing
- Bill timing (monthly)
- Payment convenience (kiosks)
- Lifeline and other rate structures
- Smart meters (tamper resistant)
- Service limiters (time or flow limited)
- Coordinated outreach and counseling
- Disconnection policies (including prohibition)
- Tailored efficiency programs and dynamic pricing
- Prepaid meters (self-rationing, self-disconnection) – for everyone?
- Fixed charges calibrated to property values with usage allowance (water)
Options identified for Michigan (Detroit and Flint)

- Detroit Blue Ribbon Panel on Water Affordability recommendations
- Flint Interagency Coordinating Committee recommendations
The rationale for customer assistance programs

- Utility funded customer assistance programs
  - Emphasize an enterprise model based on full-cost recovery and pricing without subsidy
  - Presume public tax support will be prohibited by law, unavailable, or insufficient
  - Easier for larger systems with a diverse customer base, lower costs, and lower poverty

- Business case
  - “Frequent service shut-offs and resolving bad debt from customers who cannot afford their rates can be more expensive for a utility than instituting a CAP and assisting customers in paying their bills.”
  - “Utilities might use this argument that differences in rates based on income are justified, not only because it is socially responsible but because it helps the utility operate more efficiently.”
  - “The benefit to the utility of having discounts or lower rates for low-income customers is the increased likelihood of collecting payment from these customers; the subsidy makes it possible for these customers to pay more of their bills more regularly and promptly” (Curley 2014) (Mehan and Gansler, 2017)

- Ratemaking issues
  - Cost recovery from ratepayers is also regressive and will adversely impact the near poor
  - Program audits to ensure proper use of funds and program effectiveness (metrics)
  - Expansion, enhancement, and consolidation of existing programs (i.e., LIHEAP)
Basic rate-design options

Note: rate blocks can be understood like income taxes, that is, rates usually are incremental or marginal and the customer’s bill reflects cumulative calculations.
Rate design impact depends on details and perspectives
# Fixed vs. variable charges: tradeoffs

<table>
<thead>
<tr>
<th>Recovering more costs from fixed charges</th>
<th>Recovering more costs from variable charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static view of infrastructure</td>
<td>Dynamic view of infrastructure</td>
</tr>
<tr>
<td>(more sunk costs)</td>
<td>(less sunk costs)</td>
</tr>
<tr>
<td>Enhances revenue stability</td>
<td>Reduces revenue stability</td>
</tr>
<tr>
<td>(less sales revenue risk to utility)</td>
<td>(more sales revenue risk to utility)</td>
</tr>
<tr>
<td>Weakens price signals</td>
<td>Strengthens price signals</td>
</tr>
<tr>
<td>(less resource efficiency)</td>
<td>(more resource efficiency)</td>
</tr>
<tr>
<td>Familiar &amp; understandable but less acceptable</td>
<td>Familiar &amp; understandable but more acceptable</td>
</tr>
<tr>
<td>(more predictable and less controllable)</td>
<td>(less predictable and more controllable)</td>
</tr>
<tr>
<td>Less affordable for low-income households</td>
<td>More affordable for low-income households</td>
</tr>
<tr>
<td>(more regressive)</td>
<td>(less regressive)</td>
</tr>
<tr>
<td>Encourages self supply and grid defection</td>
<td>Preserves grid supply and participation</td>
</tr>
<tr>
<td>(may raise some costs)</td>
<td>(may lower some costs)</td>
</tr>
<tr>
<td>Possible advantage for combined households</td>
<td>Possible stability from first blocks</td>
</tr>
<tr>
<td>(one fixed customer charge)</td>
<td>(relatively inelastic usage)</td>
</tr>
</tbody>
</table>
Pricing to promote universal access and affordability

- **Pricing and affordability**
  - First usage block is highly price-inelastic: use standards, programs, assistance, lifelines
  - Additional blocks of usage are price-elastic: set prices to encourage efficiency

- **Lifeline rates**
  - Limited by policies and practices related to price discrimination and subsidies
  - Programmatic discounts to qualified customers (low-income, seniors)
  - Low-priced first block, sometimes including a quantity allowance

- **Income-based rates and rates based on household size**
  - Does not comport with legal and practice frameworks (discrimination not based on cost)
  - Intuitive but complicated and expensive to administer and not necessarily equitable
Water usage by income level

- Income and water usage
  - Low income does not always mean low usage
  - Low-income customers are unlikely to drive peak demand and related costs (e.g., multi-family housing)
  - Low-income customers can be price sensitive, even for essential usage

Fig. 7 Average DWU *per capita* with personal income and education


Fig. 8 Frequency distribution of DWU among 50 houses

Why not income-based rates?

- **Communities should have discretion to design their rates and address equity**
  - Income-based and “lifeline” rates have intuitive appeal – e.g., Philadelphia Water Dept.
- **Implementation issues**
  - Depart from prevailing legal and practice frameworks (cost-based pricing, efficiency)
  - Resistance from consultants, utilities, ratepayers, regulators, politicians
  - Subject to legal challenge based on undue discrimination (based on cost of service)
  - Complicated and expensive to administer and consumer privacy issues (income data)
  - Income is an imperfect measure – can be distorted, gamed, and does not reflect wealth
  - Averages and medians for costs and income mask wide variations
  - Thresholds are arbitrary and imperfect at any level (e.g., 2%)
  - Price signals remain relevant for discretionary water usage
- **An inclusive progressive rate structure can ensure affordability for essential use**
  - Can be reconciled with cost-of-service principles
  - Lower cost of implementation and less distortion
  - May be perceived as more fair and equitable (vs. “targeting”)
- **Considering household size in rate design**
  - Household size raises issues of choice affecting cost of service
  - Assistance programs take both income and children into account
  - Also imperfect and administratively complicated
  - Utilities can also provide medical exceptions
Water systems: five products, one set of pipes

- Water systems are service “co-generators” of differentiated products
  - Essential water usage is nondiscretionary – not conducive to private model price signals
  - Water and wastewater services are symbiotic and can be bundled
  - Wastewater is a byproduct and a resource – water, energy, and nutrients

Diagram:

- Community water system
  - Discretionary: irrigation and other outdoor uses (price elastic)
  - Home hygiene: laundry and cleaning (price inelastic)
  - Personal hygiene: washing and sanitation (price inelastic)
  - Consumption: drinking and cooking (highly price inelastic)
  - Fire protection (capacity with intermittent usage)
  - Wastewater (price inelastic)
Public fire protection costs (Wisconsin study)

Figure 10. Public Service Commission Cost-of-Service Model

Table 3. Average PFP Cost-of-Service as a Percentage of Total Cost-of-Service (n=218)

<table>
<thead>
<tr>
<th>Utility Class</th>
<th>Average PFP Cost-of-Service as Percentage of Total Cost-of-Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>18%</td>
</tr>
<tr>
<td>C</td>
<td>29%</td>
</tr>
<tr>
<td>D</td>
<td>34%</td>
</tr>
</tbody>
</table>
A new paradigm: universal equity-efficiency rate (Beecher)

- Universal, principled, and defensible
  - Applicable to all water customers – satisfying intraclass equity concerns
  - May become more relevant for network-intensive industries
  - Theoretical, practical, and normative support – possible stakeholder appeal

- Beyond conventional dogma of ratemaking
  - Theoretical, practical, and normative rationales

Minimum bill calibrated to assessed property value with health-based usage allowance

Block pricing based on equitable and efficient cost allocation

Prohibit disconnection to protect system and public health
A new paradigm: universal equity-efficiency rate (Beecher)

- Minimum bill calibrated to assessed property value
  - Constitutes a demand-correlated network capacity charge
  - Includes an essential usage allowance for all households and should be tax-exempt
  - Works best with systems of scale and additional assistance may still be needed

- Block pricing based on equitable and efficient cost allocation
  - First: essential usage based on public health criteria (included in minimum bill)
  - Second: basic usage priced with a uniform volumetric rate
  - Third: discretionary usage priced for efficiency based on marginal cost

- Prohibit water service disconnection consistent with the human right to water
  - Would focus the policy mind – as has been lacking in this area
  - Disconnection is not good business, governmental, or social practice
  - Unlikely to reduce (may raise) system cost of service – not cost based
Universal equity-efficiency rate (Beecher)
Rationale for a new paradigm

- **Theoretical rationale**
  - Reconciles theory & conceptions of efficiency & equity (intra/inter-class cost of service)
  - Consistent with full-cost recovery and enterprise model for utilities
  - Provides mechanism for supporting network capacity (demand) in falling usage context
  - Maintains economic price signals for discretionary usage (where they matter)
  - Recognizes non-allocable cost and value of public fire protection
  - Added theoretical support: insurance, taxation, social-good, historical pricing models

- **Practical rationale**
  - Co-benefits of “base” capacity for system health, public health, fire protection
  - Mitigates effects of rising costs and declining usage on low-income & low-volume users
  - Cost-effectiveness and implementation ease (vs. disconnection, income-based rates)
  - Provides revenue and rate stability to maintain the distribution network
  - Makes use of tax information but is still a user fee and not a tax
  - Adaptable as to details (allowance based on household size, block pricing, prepayment)

- **Normative rationale**
  - Consistent with broad principles of equity and fairness in cost allocation, as well as the social value of service
  - Human right to water and sanitation (security) and protection of innocents (children)
  - Not just a business case for compassion – but a compassion case for compassion
Usage allowance

- Inclusion of a usage allowance in a fixed tax-exempt minimum bill
  - Useful in satisfying preference for universal equity (fairness)
  - Distorts end-use efficiency incentives only if usage is discretionary
  - May be more appropriate for water given storability, renewability, and externalities

- World Health Organization recommendations
  - Minimal provision of 50-100 liters per person per day for human health
  - Consider default at 25 gpcd (100 liters) or about 3,000 gal. per household per month
  - Indoor household usage in the U.S. varies but generally exceeds this amount

- Timely metered consumption data would facilitate self-rationing
Service limiter (flow restriction) instead of disconnection

- Disconnection is punitive with negative externalities
- Service (flow) limiter instead of disconnection (shutoff)
  - Flow, volume, or time-limiting (tamper-proof valves, meters)
  - Comparable to voltage limiter in electricity
Utility services as human rights

- **Is affordable access a basic human right?**
  - Life, liberty, and the pursuit of happiness
  - Equal protection under the law
  - Security of person
  - Freedom from want
  - Dignified existence
  - Social inclusion

- **Environmental justice**
  - Economic and racial dimensions
  - Incarcerated individuals

- **Sector differences**
  - Water for drinking – right to compliance vs. service
  - Energy – heating and cooling
  - Broadband communications

- **Intractable nature of poverty and inequality**
  - Policy roles and challenges
IPU’s Ratemaking Course

- Focusing on the financials for a high-performing regulated water utility
  - University sponsored and professionally designed and delivered
  - Comprehensive but concise (2.5 days)

- Topics covered
  - Foundations of Public Utility Ratemaking
  - Capital Expenditures (Capex)
  - Operating Expenditures (Opex)
  - Financing Utility Infrastructure
  - Cost Allocation and Rate Design