Regulation of Private Water and Wastewater Companies

Natural Monopoly Theory and Need for Regulatory Oversight

Natural Monopoly

- Monopoly Presence of a single seller of a good good or service legally protected from entry of potential competitors.
- Natural Monopoly A firm whose costs decline as output increases such that one firm is more efficient than two or more could be.

Candidates for Natural Monopoly Treatment

- Utilities Required to serve all comers at reasonable rates.
- · Granted a monopoly service area.
- · Regulatory authorities established to:
- · Protect ratepayers
- Protect Investors
- Ensure an opaque and fair process

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Natural Monopoly Theory (Caveat)

- With a decline in information and transaction (monitoring) costs the level and type of regulatory oversight changes
- Rail, Air, Road, Communications and Power, Motor Freight
- Water and Wastewater Services are still considered natural monopolies

Economic Regulation of Water and Wastewater Systems

- Most states regulate investor owned water and wastewater companies
- Regulatory entities are generally called Public Utility Commissions (PUCs) or Public Service Commissions (PSCs)
- Most municipal water and wastewater companies are self regulating
- There are exceptions where both private and public utilities are regulated.

Case Study - California

- California investor owned utilities (IOUs) are regulated by the California Public Utilities Commission (CPUC)
- CPUC regulates service quality (rules) and rates for IOUs.
- Rates and service rules constitute regulatory tariffs.

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California - Laws and Rules

- An example of a long-established regulatory system is the California Public Utilities Commission (CPUC). The CPUC draws its powers from the state constitution and various legislative bills. It regulated a broad spectrum of utilities.

 • CALIFORNIA CONSTITUTION -ARTICLE 12 PUBLIC
- UTILITIES SECTION
- State of California, Public Utilities Code
- Chapter 3 Rights and Obligations of Public Utilities
 SPECIFIC UTILITIES Water Companies (2701-2714)" provides details on the regulatory authority vested in the CPUC

Major Elements of Regulation

- · Regulatory system expectations
- · Rate Making
- · Rules Operating standards
- · Planning future supplies
- · Health standards
- Maximize benefits at least cost to ratepayers and ensure a fair return on investment

In California investor-owned utilities are regulated by the CPUC

- ⇔ In California state, water/wastewater services are provided to the public by over the 250 utilities, among which only 10 small IOUs which provide only wastewater services
- ⇒ The investor-owned utilities (IOUs), among which water and wastewater utilities, are regulated by the <u>California Public Utilities Commission</u> (CPUC)



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The CPUC regulates service quality and rates of IOUs

The CPUC regulates $\underline{\text{service quality}}$ and $\underline{\text{rates}}$ of investor-owned water and sewer system utilities

- The CEUC regulates privately-owned telecommunications, electric, natural gas, railroad, rail transit, and passenger transportation; companies.
 The Commission has no jurisdiction over mutual water corporations or municipal water companies or districts.

 Mutual water utilities (expressions in which each customer owns one share of stock) or companies owned by homeowner associations are exempt also, if they serve only their stockholders or members (no outside parties)

- The CPUC issues Service Rules which must be contained in the "tariff" sheets" or "service agreements" between an investor-owned utility and its customers.
- These Service Rules cover aspects like quality of the service, billing, discontinuance and restoration of service, measurement of service,...

It is important to note that the word "tariff" is used in two different ways; either it can mean "rate" or it can be used in a broader sens meaning the written terms, conditions, rules and rates governing a utility's conduct in providing public service.

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The process of rate regulation at the **CPUC**

- Rate making is the administrative process by which prices are established in regulated industries:
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 Before any regulated company can change its service or rates, it must be approved by the Commission
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The principles behind the rate regulation at the CPUC

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- Sewer rates can be roughly estimated at 0.5 BEF per m³ discharged water. Sewer billing is based on a discharged quantity which is 70% of the quantity of metered input water.

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- The Commission also has a Public Advisor who assists the public in participating in Commission proceedings, and a unit that is charged with informally resolving consumer complaints.

Rate Design

- Establish system revenue requirements (RR)
- · Assign amount of RR due fixed costs
- · Number of customers for each Connection size
- Forecasted annual sales (water produced and purchased less unaccounted for water)
- Determine percentage of fixed costs to be recovered in service charge (50%, 60%, 100%)

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Meter Size And Ratios

Meter Size	Ratio
5/8x3/4 inch	1
3/4 inch	1.5
1 inch	2.5
1-1/2 inch	5
2 inch	8
3 inch	15
4 inch	25
6 inch	50
8 inch	80
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Apportioning Revenues by Service and Commodity Charges

- Calculate the service for company by determining revenue requirements attributable to fixed costs (50%, 60%, 100%)
- Service charges = Multiply the dollar amount by percentages then spread dollars using meter size ratios
- Commodity charge Recovers rest of revenues divided by expected annual sales (physical units)

Sewer Rate Design

- Similar to a flat rate design all similar customers should pay same rate
- Differing rates should be based on differing costs incurred by the utility to provide these services.

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Example Wastewater Rates

- Residential rates are based on water use times a factor apportioned to treatment needs. Apartments pay 90% of water rates times. Residential customers with lawns as low as 70% based on treatment costs
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- · Wastewater Systems in the U.S.
- Environmental Regulation of Wastewater Systems
- Economic Regulation of Wastewater Systems
- · Case study: California
- Annexe: Service Rules set by the CPUC for water supply utilities

Wastewater treatment in the U.S.



- In the U.S. wastewater is treated by <u>Publicly-Owned Utilities</u> (POUs) and <u>Investor-Owned Utilities</u> (IOUs)
- Each POU and IOU is given an exclusive (monopoly) <u>service area</u> wherein it is responsible for providing wastewater treatment services
- Service areas are geographical areas which do not necessarily correspond with political boundaries
- Within its service area a POU or IOU owns and operates both the
- Wastewater treatment services and water supply services can be combined in one IOU or POU but not necessarily

Wastewater systems in the U.S. are largely publicly-owned

- - Torre set apprix: 14,000 sphilicly-connel treatment works (ROTWs) which set owned and operated by Pablicly-Connel Utilities are called musciopation? or "districts" (for example: the Eastern Municipal Water District in Colifornia).
 The POTW's treat denotes revenge from houses, other sanitary wastewater, waster from commercial and industrial facilities (stems water may be collected by municipal separate or combined sever systems).
 The POTW can be designed to protein primary, secondary or true my tensions. This off of the man and the secondary of the secondary of the protein protein
- The rest of the wastewater services are supplied to the public by investor-Owned Utilities (for example: California Wiser Service Company)
- Beside the treatment works owned by the POUs and IOUs there are small-scale domestic treatment plants which are not owned by municipalities

There is an on-going discussion about privatization of publicly-owned utilities

- There is a move to privatization of federally funded wastewater treatment facilities
 - construction of public wastewater treatment projects (including sewage treatment plants, pumping stations, and collection and intercept sewers; rehabilitation of sewer systems; and the country of combined sewer overflows) has been financed in the 1970's and 1980's by federal government grants and since 1987 by low cost-
- The role of the pulic sector is evolving in the context of budgetary constraints, contractual outsorcing and tough environmental laws

 Some states encourage degrees of private sector involvement, others are neutral, and some discourage it.

 Privatization can be in the form of asset acquisition or contract operations

- First changes are mainly in the contract and operations field, rather than in asset transfers (reluctance to transfer assets from the public to the private sector)

 Contracting and out-sourcing are preferred methods of achieving some privatization

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Environmental Regulation of Wastewater Systems in the U.S.

- In the U.S. conformantal regulation is very complex as a result of regulation on sing at different levels:

 Pederal level (EPA+Emvironmental Protection Agency)

 State level (EPA)

 Local subfinite level

 Both, public and inventor-convent valuations are subject to convironmental regulations:
- Both public and inventor-conned ubilities are subject to environmental regulations.

 The Clean Water Art (1972, last smoothed in 1987) (also known as the Federal Water Pollation Control Art) addresses the neighbor of pollutation under waters. It replaces are changes to undersways from weaterwater (sewages) treatment facilities which are efficiently called publicly-conned treatment works (PCTW).

 EPA (Office of Water) is responsible for implementing the Clean Water Act and Safe Drinking Water Act (the latter addresses the quality of tay water).
- addresser the quality of kap water)

 In physics reverse works and POTW are regulated under NPDES, but are misject to different regulation, even their copys in identical. NPDES (National Politicals Pickshape Elimination System) Permit Program controls water politions by regulating point sources the discharge politication to water of the US:

 Industrial, municipal, and other facilities must obtain permits if that or damping op aftered to neaffer waters, Individual bourse that are connected to a muscaped system, but was explored system or that do not have a entire of acknape, do not noted in NPDES permit.

 The NPDES opens in a daminative by the states (after they have been authorized)

- The EPA issues effluent guidelines for wastewater discharges to surface waters and for waste POTWS

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Who is regulated and who is regulating?

- state laws.

 **Note of the states (48 of the 60) have an entity which regulates private (investor-owned) waterwater utilities: these are the <u>Public Utility Commissions</u> (PUCs) and the Public Service Commissions (PSCs)

 **In most states, with majer exceptions, the (publicly-owned) municipal or district systems are self-regulating with regard to rates and service conditions

 **By exception, PUCs regulate publicly-owned utilities (for example: the Colorado PUC)

 **Tay NATION COMMISSION CONTRACTOR (Contractor of the Colorado Contractor of the Colorado Contra
- PUC)

 By The NARUC (business Association of Regulatory Utilises Commissioners) represents the governmental species (PUCs and PSOs) in the filty States that regulate the activities of talecommunications, energy, and water/waterwater utilise. The NARUC has a representative role but has no impact on the way the regulation takes place.
- The PUCs arose about 100 years ago to prevent the abuse of power by companies and utilities due to monopoly position

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Role of the Public Utility Commissions

- It is important to note that although the regulation is not exactly the same in every state, all PUCs have very similar regulating activities

- In general, the PUCs role of economic regulator consists of:

 authorizing utility race changes
 approving testificith sure to arr calcular and regulations for receiving service (familis are the written terms, conditions, rales and rates governing a utility's conduct in providing public service)

 receiving complaints by customers against utilities
 processing upwarded utility marketing and billing services
 overseining the merger and restructure of utility corporations
 servicing annual reports

- customers

 The concept of rate regulation, as detailed in following slides for the California PUC, varies slightly from state to

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 State level (EPA)

 Local anticontect level
- The Clean Water Act (1972, List amonded in 1987) (dish tomas as the Federal Water Politican Control Act) addresses the enforce of pollutation to surface waters. It regulates the subsects to surface waters. It regulates the subsects to waterways from waterwater (seem, teatment facilities which are officially subsect possible entertained stacking towards with a set of finally subsects water entertained stacking the Clean Water Act and Safe Draining Water Act (the Institute of the Water Act (
- mat mens une quattry or tag water)

 Buch girstet a presume words and PCTVVs are regulated under NEDES, but are subject to different regulations even if
 their closure is detailed. NEDES (National Publishes Duchtung Elimination Dyriems) Formal Program controls water
 their coloration by regulating point sources the discharge pollutation into water of the U.S.

 Individual, bosten for are consistent with the present of their discharge go discretely to ratific the waters,
 Individual bosten for the reconstructed to a receivage of puress, the use a septic system or that do not have a

 The NEDES program is administered by the rater (after they have been authorized)
- The EPA issues effluent guidelines for wastewater discharges to surface waters and for wastewater discharges to

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Who is regulated and who is regulating?

- Regulation is not uniform throughout the U.S. due to the fact that the governance of local utilities is a function of the interplay of local ordinances and federal and state statutes. Regulation is a function of the interplay of local ordinances and federal and
- statutes. Regulation in a function for the more pay to rock or state laws:

 Most of the states (46 of the 50) have an entity which regulates private (investor-owned) waterwater utilities: these are the <u>Public Utility Commissions</u> (PUCs) and the Public Service Commissions (PSCs)

 In most states, with majer exceptions, the (publicity-owned) municipal or district systems are self-regulating with regard to rates and service conditions

 By acception, PUCs regulate publicity-owned utilities (for example: the Colorade PUC)

- PT-U3)

 The MARLIC (National Association of Regulatory Utilities Commissioners) represents the governmental agencies (PUCs and PS-U3) in the fligt States that regulate the activities of falsocommerciations, energy, and waterwaterwater utilities. The MARUC has a representative role but has no impact on the way the regulation takes place.
- The PUCs arose about 100 years ago to prevent the abuse of power by apanies and utilities due to monopoly position

Role of the Public Utility Commissions

- The regulating commissions have a dual rote:

 to commer the establishment and maintenance of services as required by the public convenience and necessity, and
 - use to ensure that these services are provided at rates and conditions that are just, reasonable and conditions that ar
- It is important to note that although the regulation is not exactly the same in every state, all PUCs have very similar regulating activities
- In general, the PUCs role of economic regulator consists of

 - soutenance want years changes
 approving tariffs that set out rules and regulations for receiving service (tariffs are the written terms, conditions, rules and responsing subility's conduct in providing public service)
 supervision services mustbe

- file: dis 1 see pro-com-pagnical participation opticipation and processing and pulling reaching complisits by cascers against utilitie or processing under distillution and tilling activate and overseing the merger and restrictive of utility com-valuate reviewing amount proof to the contract of utility com-valuate monitoring the safety of utility and transportation operations will be under the complex of the complex of the complex of the com-redementating energy efficiency programs, low-inconcerness and belecom
- implementing energy efficiency programs, low-income rates and telecommunications services for disabled customers ancept of rate regulation, as detailed in following slides for the California PUC, varies slightly from state to

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In California investor-owned utilities are regulated by the CPUC

- \Leftrightarrow In California state, water/wastewater services are provided to the public by over the 250 utilities, among which only 10 small IOUs which provide only wastewater services
- The investor-owned utilities (IOUs), among which water and wastewater utilities, are regulated by the <u>California Public Utilities Commission</u> (CPUC)



Appear, Will roles 681700,



The CPUC regulates service quality and rates of IOUs

The CPUC regulates service quality and rates of investor-owned water and sewer system utilities

- The CPUC regulates privately-owned telecommunications, electric, natural ass, railroad, nail transit, and passenger transportation companies.
 The Commission has no jurisdiction over mubal water corporations or municipal water companies or districts.
- Mutual water utilities (corporations in which each customer owns one share of stock) or companies owned by homeowner associations are exempt also, if they serve only their stockholders or members (no outside parties)

- The CPUC issues Service Rules which must be contained in the "tariff" sheets" or "service agreements" between an investor-owned utility and its customers.
- These Service Rules cover aspects like quality of the service, billing, discontinuance and restoration of service, measurement of service,....

Regulating the rates (next slide)

It is important to note that the word "taiff" is used in two different ways, either it can mean "rate" or it can be used in a broader meaning the written terms, conditions, rules and rates governing a utility's conduct in providing public service.

The process of rate regulation at the **CPUC**

- Rate-making is the administrative process by which prices are established in regulated industries:

 The Commission has quasi-legislative power to hold hearings and adopt rules

 Before any regulated company can change its service or rates, it must be approved by the

 - In a first stage the company has to prepare a filing in which it explains the reasons for a request of rate change.
 - The Commission investigates the company's request
 - During public hearings, which are formal legal proceedings, the company (supported by its
 experts) defends its point of view

 - experts) definds its point of view

 The main patties in most such rate cases are the Coramission Staff, the company, and
 ratepayers, who are represented by a special Attorney General

 The Coramission takes the decisions, balancing the interests of the company and the public.

 These decisions are embodied in written Orders, which summarize the issues in the case, parties
 and their positions on issues, and findings of fact and conclusions.
- Rate changes occur every 3 to 6 years when the business environment justifies a rate change



The principles behind the rate regulation at the CPUC

- The rate regulation of ICUs is based on the principle that a firm should be able to generate sufficient level of revenues to cover "allowable" costs and to have a certain return on invested capital. Both "allowable" costs and return on invested capital are determined by the Commission.
- determined by the Commission.

 The desprimence of "allowable" coars: is then integed to red-cushing, it is the Commission that defines what "allowable" coars in board on the reportise. Outing the public hearings the "allowable" coars are discussed together with the other regulated superior.

 The beat creature requirements are determined as RCO+D+T+D with

 Ext "recovers requirement.

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 De secured deperciation charge

 + Coperciation in reguestly around 4.5% per year:

 + Coperciation in the form of copining the secured of 50 to 50 year:

 T trace:

 " primited state of frame, found of applied" weighted one of the cost of debt capital and the cost of equity capital

 + Accordance of creating cost of Scotland above the cost of debt capital and the cost of equity capital

 + Accordance of creating cost of Scotland accordance commissions.
- - a repemited rate of critical, count of capital) is resigned out of the total debt capital and the count of equity

 A count of cabit capital in the cabital attence of the count of cabital capital in the cabital attence of the capital capital

 - V = rate base valuation
 d = accumulated depreciat



The principles behind the rate regulation at the CPUC

- · All the components of the above formula (like the operations and maintenance expenses for example) must be argued by the company at the public hearings
- · The prices needed to generate R must be designed so that the sum revenues from all customer classes equal the cost components
- Sewer rates can be roughly estimated at 0.5 BEF per m³ discharged water. Sewer billing is based on a discharged quantity which is 70% of the quantity of metered input water.



The organisation of the CPUC

- The Governor appoints five Commissioners, who must be confirmed by the Senate, for six years. The Governor appoints one of the five to serve as Commission President.
- The CPUC employs economists, engineers, administrative law judges, accountants, lawyers, and safety and transportation specialists.
- The Office of Ratepayer Advocates is an independent arm of the CPUC that represents consumers in Commission proceedings, pursuant to statute.

 The Commission also has a Public Advisor who assists the public in
- participating in Commission proceedings, and a unit that is charged with informally resolving consumer complaints.

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