REDUCING ELECTRIC POWER CONSUMPTION IN SMALL WATER SYSTEMS

A MONEY ISSUE AND AN
ENERGY ISSUE AND A
GREEN ISSUE

WOULD YOU SPEND THE EFFORT?

BASIS

- *PAPER - SMALL SYSTEM ELECTRIC POWER USE -- OPPORTUNITIES FOR SAVINGS, John E. Regnier and Richard Winters*
- *ELECTRIC UTILITY RATE STRUCTURES*
- *DEMAND AND CONSUMPTION CONTROL*

BASIS

- SMALL WATER SYTEMS SPEND MINIMUM OF $300,000,000 TO $500,000,000 PER YEAR ON ELECTRICITY !!!
- DEMONSTRATED SAVINGS OF 10 TO 20% AT NO COST TO SYSTEM
- CASE HISTORIES
  - 1000 CUSTOMERS - $12,000
  - 1200 CUSTOMERS - $18,000
  - 2500 CUSTOMERS – $50,000

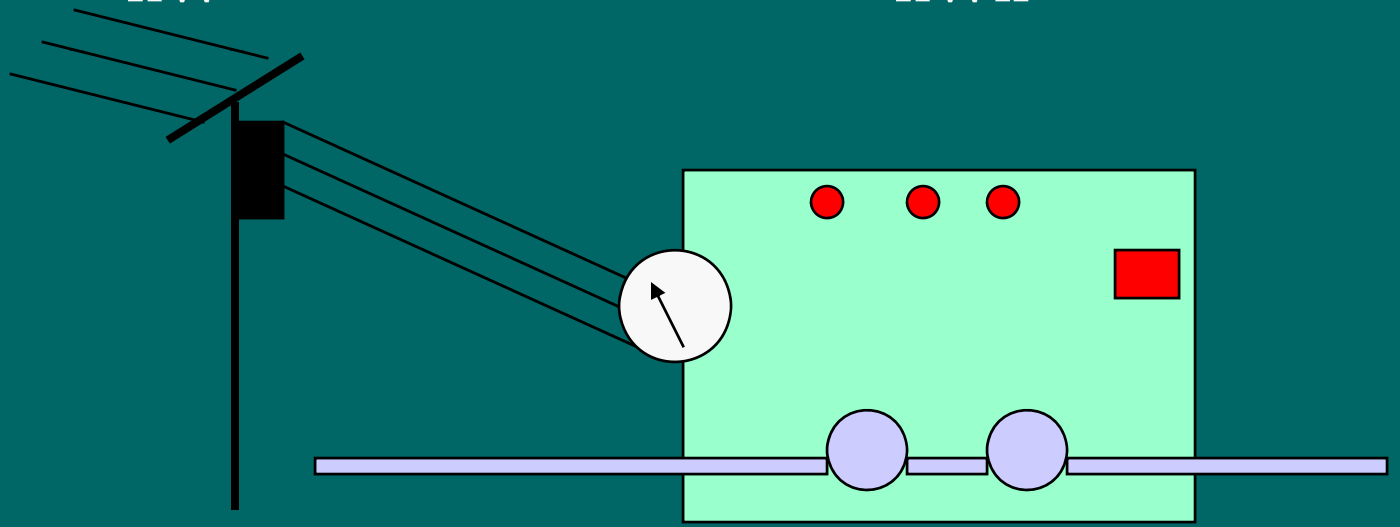
GREEN BENEFITS

- Each kilowatt-hour results in about 1.3 pounds of CO_2 produced
- Each $1.00 saved saves about 10 kWh
- For projected annual savings of $50,000,000, save 500,000,000 kWh
- This means avoiding production of 650,000,000 pounds of CO_2 per year

HOW POWER IS CHARGED

Demand **plus** **Time at Demand**

kW **kWh**



RATE STRUCTURES

- *Procedures range from simple to highly complex*
- *Usually called structures, schedules or tariffs*
- *Common characteristics – next slide*

RATE CHARACTERISTICS

- *Penalties for excess demands especially in high use periods – ratchet clauses*
- *Lower off-peak rates*
- *Higher kWh amounts often lower price*
- *Demand costs $ per kW*
- *kWh costs cents per kWh*

IMMEDIATE SAVINGS OPPORTUNITIES

- *Eliminate bad electric meters*
- *Identify most efficient pump(s)*
- *Demand Control*
- *Kilowatt-hour control*

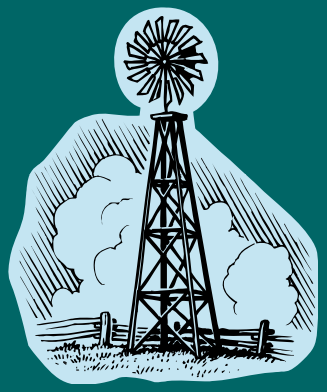
SAVINGS OPPORTUNITIES

Bad Electric Meter(s)

- **Compare Billed kW and kilowatt-hours with what you know**
  - **Demand should be slightly less than horsepower**
  - **Kilowatt-hours divided by demand should be a reasonable time based on your knowledge**

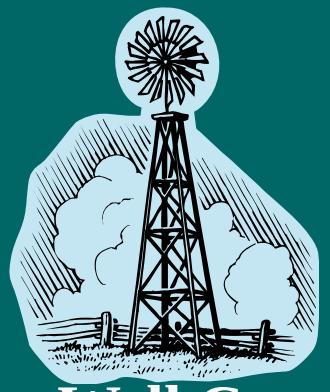
SAVINGS OPPORTUNITIES

Pumping Efficiency



Well A

Well B



Well C

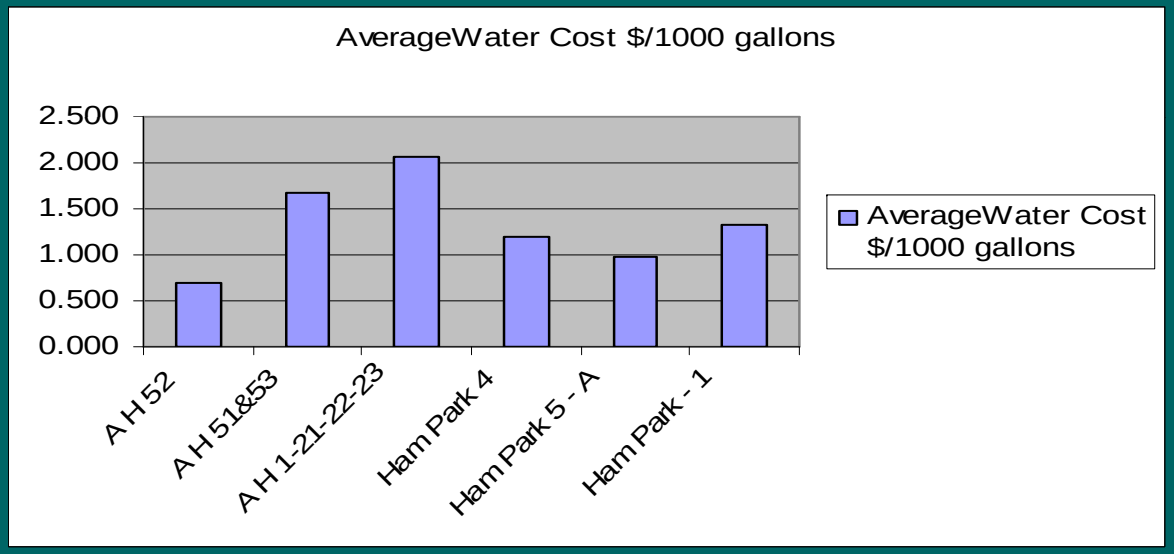
Well D

Well E

Well F

PUMPING EFFICIENCY

- *For each well chart water cost per 1000 gallons*

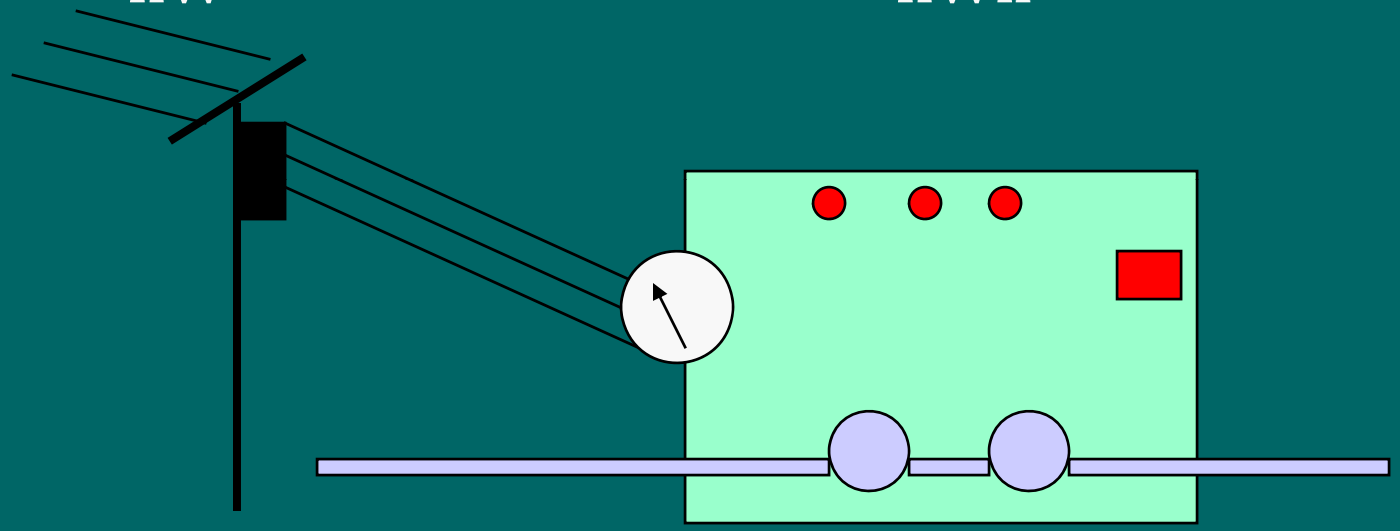


- *Concentrate production on most efficient wells*

DEMAND CONTROL

Demand **plus** **Time at Demand**

kW **kWh**



- *Minimize simultaneous pump operation*
- *Extra 50 hp pump for 2 hours – cost $400*
- *Ratchet clause can make that $4000/yr*

KILOWATT-HOUR MANAGEMENT

Situation

- *Power rates usually offer price breaks at higher kilowatt-hour usages, and*
- *Price is usually lower in off-peak times (nights and weekends/holidays)*
- *Savings can be extreme – see next slide*


Well A


Well B


Well C


Well D


Well E

CASE HISTORIES

- *System 1 – shift from 2 wells to 1 – savings = $12,000/year*
- *System 2 – concentrate production on one well of 3 – savings = $18,000/year*
- *System 3 – shift to off-peak and load production on one well – savings $50,000/year*

CONCLUSIONS AND RECOMMENDATIONS

- *Electric use audits like water loss audits can be very cost effective*
- *Audits can be easily performed on system specific or statewide basis using information readily obtained from electrical bills and operating records*
- *Small systems spend $300,000,000 to $500,000,000 annually on electric power. Savings potential is very significant.*
- *Pilot studies in Alabama have demonstrated potential savings of $12,000 to $50,000/year*

REFERENCES

- *White Paper – Small System Electric Power Use – Opportunities For Savings --- NRWA Web Site*

  nrwa.org click on white papers
- *Newsletter – Ergs, Joules & Such*

  Want on the mailing list ?– it's free

  email me – John Regnier –

  highpnt@mindspring.com