

The Itron logo features the word "Itron" in a bold, red, sans-serif font. A yellow lightning bolt graphic is positioned above the letter 'o'.

Knowledge to Shape Your Future

Global

Electric / Gas / Water

Capabilities and Solutions



Use of Technology in Solving Regulatory Issues

- Regulatory Issues
- Interval Data Metering Technology

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Itron, Inc
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Presenters

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Itron, Inc

Itron's MV-90 product is the leading interval data collection and management system, used at more than 600 utilities in more than 40 countries. MV-90 systems are used to collect and manage the interval meter data used for billing more than \$250 billion annually, worldwide. Puerto Rico uses this product.





Agenda

Regulatory Issues

Technological Solutions

What is Interval Data?

Why do Utilities Collect Interval Data?

What does MV-90 xi Do?

What is the Interval Data Collection and Management Process?

Transformer Losses

Questions and Answers





Regulatory Issues and Technology

Public Energy Enemy No. 1 – Non-technical loss

Public Energy Enemy No. 2 – Outages/Restoration

Public Energy Enemy No. 3 – Risk Mitigation/Estimation

Public Energy Enemy No. 4 – Peak Control





Regulatory Issues and Technology

Public Enemy No. 1 – Non-technical loss

Technology Solution – Revenue Assurance

Public Enemy No. 2 – Outages/Restoration

Technology Solution – Asset Optimization

Public Enemy No. 3 – Risk Mitigation/Estimation

Technology Solution – Forecasting tools

Public Enemy No. 4 – Peak Control

Technology Solution – Interval data collection



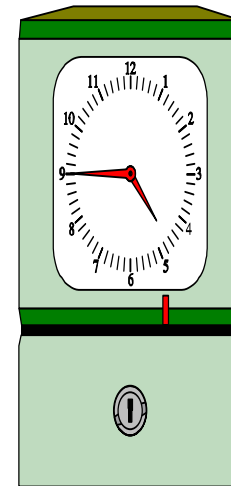


What is Interval Data?

Interval data is time stamped readings taken every x minutes

Typical intervals on which readings are taken are:

- 5 minute
- 15 minute
- 30 minute
- 60 minute





What is Interval Data?

Typical measured quantities are:

Electric

KWH D

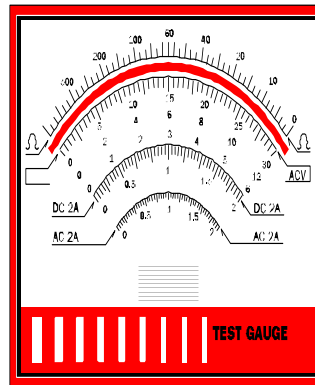
KWH R

KVARH D

KAVRH R

V2H

I2H



Gas

U-Vol

C-Vol

PSI

Diff-PSI

Energy – BTU

Energy Therm

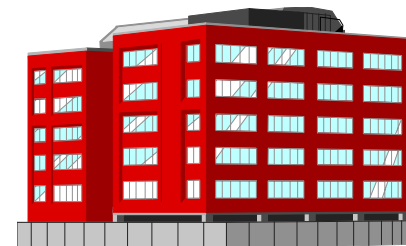
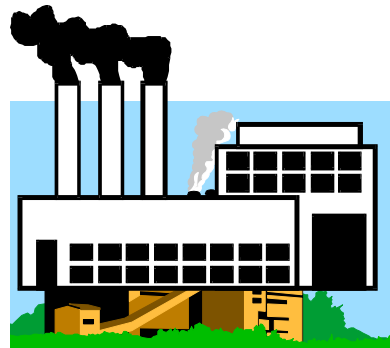
Temp





What is Interval Data?

Interval meters are typically deployed at less than 1% of a utility's customers, but those customers typically represent about 40% of a utility's revenue





What is Interval Data?

Even with this small percentage of interval meters deployed, a mid-size utility will collect more than 100 million interval readings per year and will keep several years of that data on-line.

A large utility may collect up to a billion new interval readings per year.

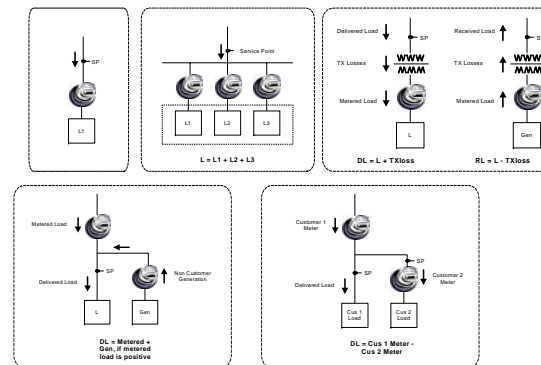




Why do utilities collect interval data?

Billing

- Complex contracts
- Real time pricing (RTP)
- Curtailable/Interruptible rates
- Remote meter reading
- Aggregate billing
- Loss calculations
- TOU rates
- Demand response

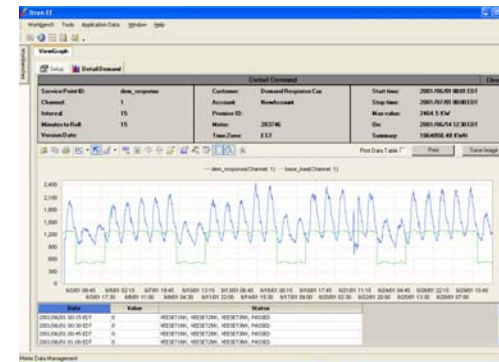
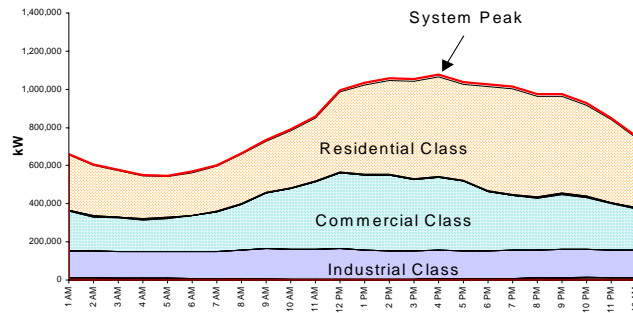
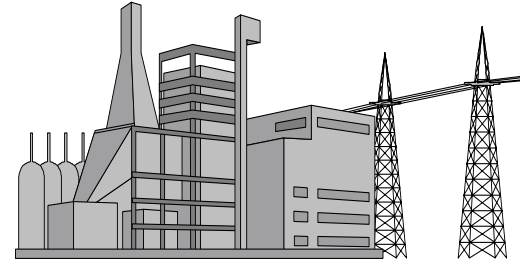




Why do utilities collect interval data?

Peak Load Control

- Demand Response Programs
- Curtailable/Interruptible rates
- Direct Load Control





Why do utilities collect interval data?

Open Markets Operations

Hourly* market operations

Hourly* market settlements

Hourly* pricing

*hourly or less

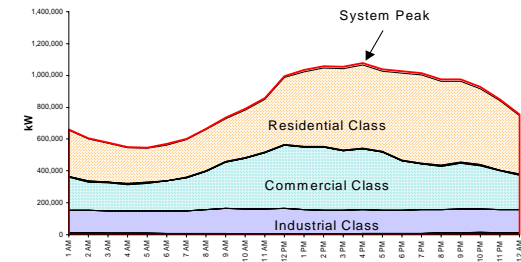




Why do utilities collect interval data?

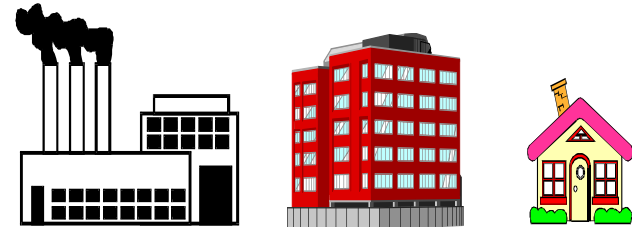
Load Research

- Traditional rate studies
- Long term load forecasting
- Short term load forecasting
- Load profiling



Market Research

- Customer segmentation studies
- Market strategies
- Customer programs





Why do utilities collect interval data?

Theft Detection

Tamper Codes:

- > Meter Reprogram
- > Demand Reset
- > Clock Reset
- > Loss of Phase
- > Tilt/Removal
- > Other

Changes in Load Pattern



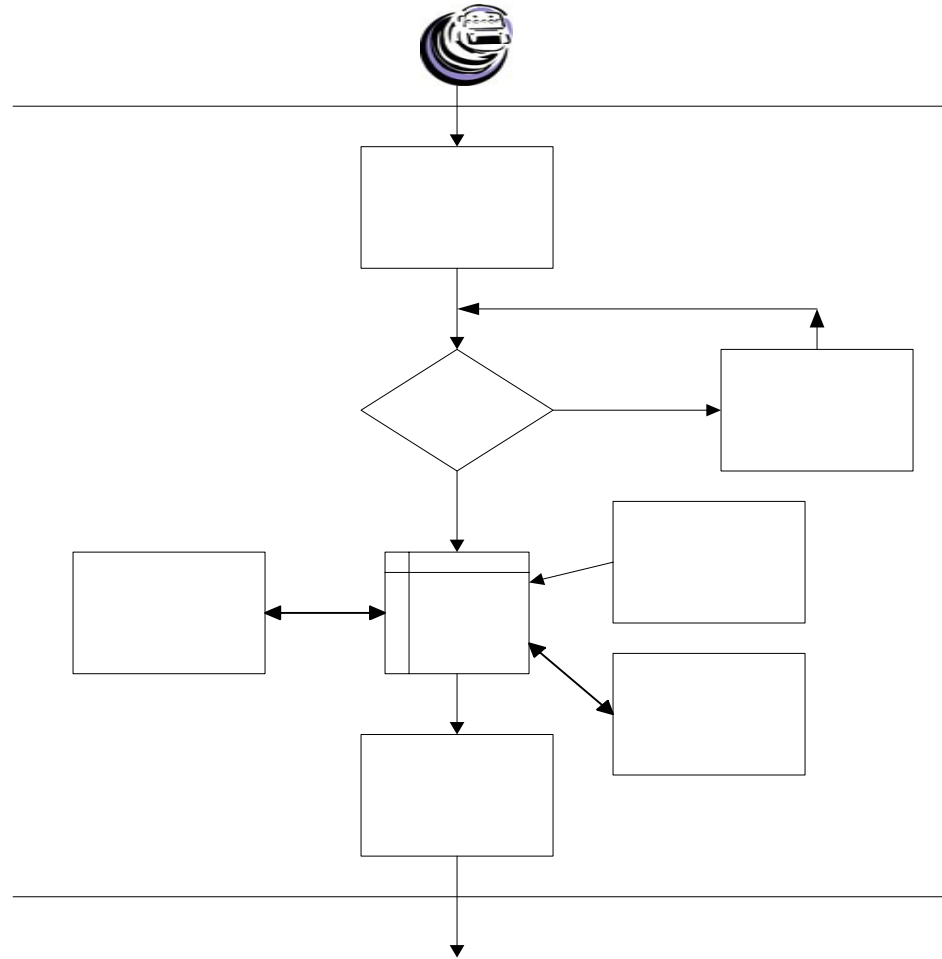


What is the Interval Collection and Management Process

Typical interval collection and management involves the following functions:

- **Data Collection**
- **Data Validation**
- **Data Estimation and Editing**
- **Data Storage**
- **Data Aggregation and Time of Use**
- **Reports and Graphs**
- **Data Export to Business Systems**







Data Collection- Common Methods

- Outbound Telephone
- Inbound Telephone
- Analog Cellular
- Digital Cellular
- IP (Internet)
- Pagers/Messaging
- Radio
- Power Line Carrier
- Other Remote Mechanisms
- Hand Held





Data Validation

Why do we need to validate data?

- Meters programmed incorrectly
- Meters installed incorrectly
- Meters tampered with
- Memory overruns/missing data
- CT (Current Transformer) and PT (Potential Transformer) failures
- Cold load pick-up
- Erroneous edits
- Business rules validation/alarming

Types of Validation

- Meter returned status and condition validation
- Data gap and data overlap validation
- Validate interval data against known accumulating register readings
- Over or under threshold validations
- Validate new data against historical data





Transformer Losses

Electric utilities serve customers of all sizes – One distribution transformer may be used to serve several residential size customers.

Losses attributed to each individual residential customer are rather insignificant relative to the expense that would be incurred to measure those losses.

Rate structures for most commercial customers typically require demand (KW) as well as energy for calculation of customer bills. Metering of most commercial customers is also done with kilowatt—hour meters with the addition of a demand register.

Losses for most commercial customers are also rather insignificant relative to the expense that would be incurred to measure those losses.

Large industrial customers (also large commercial and wholesale customers) require more complex rates to accurately reflect the cost of providing service. These rates may take into account reactive power (KVAR) and power factor. Recorders typically are used to measure active and reactive power. This allows rate structures that can take into account both the reactive power and power factor. Kilowatt—hour and Reactive (or Q—Hour) meters are used to measure energy usage with data pulses stored in a recorder.

Power transformers are used to step voltages down from transmission levels to the level required by larger industrial customers. Losses from the power transformer can be very significant for these large industrial customers. In order to compensate for losses through a power transformer, a utility has the following choices.

- Meter on the primary side of the transformer which is expensive
- Use loss compensators with the meters on the secondary side
- Estimate losses using a fixed percent
- Meter on the secondary side of the transformer and calculate transformer losses based upon voltage and current.





Transformer Loss Measurement

In order to calculate transformer losses on an interval by interval basis, voltage and current must be available. Voltage can be measured by using a Volt Squared Hour (V2H) Meter. Since voltage is measured on the secondary side of the instrument transformer for a single phase, it must be converted to primary voltage with the potential transformer (PT) ratio. This voltage then reflects the secondary side of the power transformer.

If a V2H meter is not used, a constant voltage can be used which is the buss voltage. If a constant voltage is used, the buss voltage should be regulated to obtain the most accurate results.



Thank you for your time.

