

# *EnergyIP* Release 7.2 Billing Impacts to LDCs

Mississauga Living Arts Centre  
4141 Living Arts Drive, Mississauga, ON  
July 27, 2011



# Purpose of Today's Workshop

- To provide an overview to the changes to *EnergyIP* with Release 7.2 including the XML Billing Service Standard Interface, Register Read Calculator, VEE Post Processor, and changes to billing reports
- To introduce the changes to the MDM/R billing processes and the impacts on LDC business processes
- To discuss meter considerations in the context of impacts to LDC business processes
- To provide an overview of the transition process to the XML Billing Service Standard Interface

# Agenda

- *EnergyIP* Release 7.2 Overview
- Changes to MDM/R Billing Processes
  - Execution Window / Register Read Billing Window
  - Billing Exception Handling – ODEST and ManualReads
  - Register Read Calculator
  - VEE Post Processor – Billing Estimation
  - Calculated Read Data Change Monitor
- Billing Event Considerations
  - Bill Segmentation
  - New Smart Meter Installation
  - Smart Meter Physical Change
  - Smart Meter Logical Change
  - Smart Meter Removal
- VEE Post Processor – Retry Scaling
- Changes to Reports
- Transition to XML Billing Service Standard Interface

# *EnergyIP* Release 7.2 Overview



# Why are we doing this?

- *EnergyIP* Release 7.2 of the MDM/R will support LDC compliance with Measurement Canada's requirement to provide register reads on every consumer bill:
  - The deadline of January 1, 2012 for meeting this requirement was established by Measurement Canada to coincide with the existing deadline for required corrections to the displaying of Line Losses on consumer bills
  
- This is being done to support all CIS and AMI technologies
  - XML Billing Service Standard Interface will be used for all CIS technologies
  - The changes to *EnergyIP* Release 7.2 have been undertaken to support all AMI technologies

# Three Parts to Release 7.2

- XML Billing Service Standard Interface
  - This will be discussed today in the context of the core billing process
- Register Read Calculator
  - This will be discussed today in the context of the exception handling for the core billing process
- VEE Post Processor
  - This will be discussed today in the context of Billing Quantity Data validation, and
  - In the context of daily meter read data processing

# XML Billing Service Standard Interface



The IESO Custom pipe-delimited Billing Quantity Request / Response interface is being retired.

- The IESO Custom BQI cannot support the transmission of register reads

It will be replaced by the *EnergyIP* XML Billing Service Standard Interface – Request and Reply:

- There is a high level of data parity between the new XML Billing Service Standard Interface Request and Reply and the IESO Custom BQI Request and Response
- As with the existing IESO Custom BQI the XML Billing Service Standard Interface is file-based transmitted using FTS

# Register Read Calculator

The Register Read Calculator is a billing exception handling application that is activated when an actual register reading is not available at the requested start and/or end date\_time:

- Exception-handling application
  - If you have an actual register read where you need it, either at the start or the end of a billing period, we will use the actual register read
  - If you need a register read, the calculator will calculate either a start register read or an end register read, or both.
- It is a calculator – not an estimator
  - Calculates a register reading using an actual register reading and the value of the sum of the intervals between that actual register read and the billing period start and / or end date\_time

# VEE Post Processor

Works in two ways...

## Support for Billing Quantity Data Validation

- Billing Estimation: Triggered upon billing quantity processing when Billing Validation Sum Check fails on threshold.

## Support for Meter Read Data Processing:

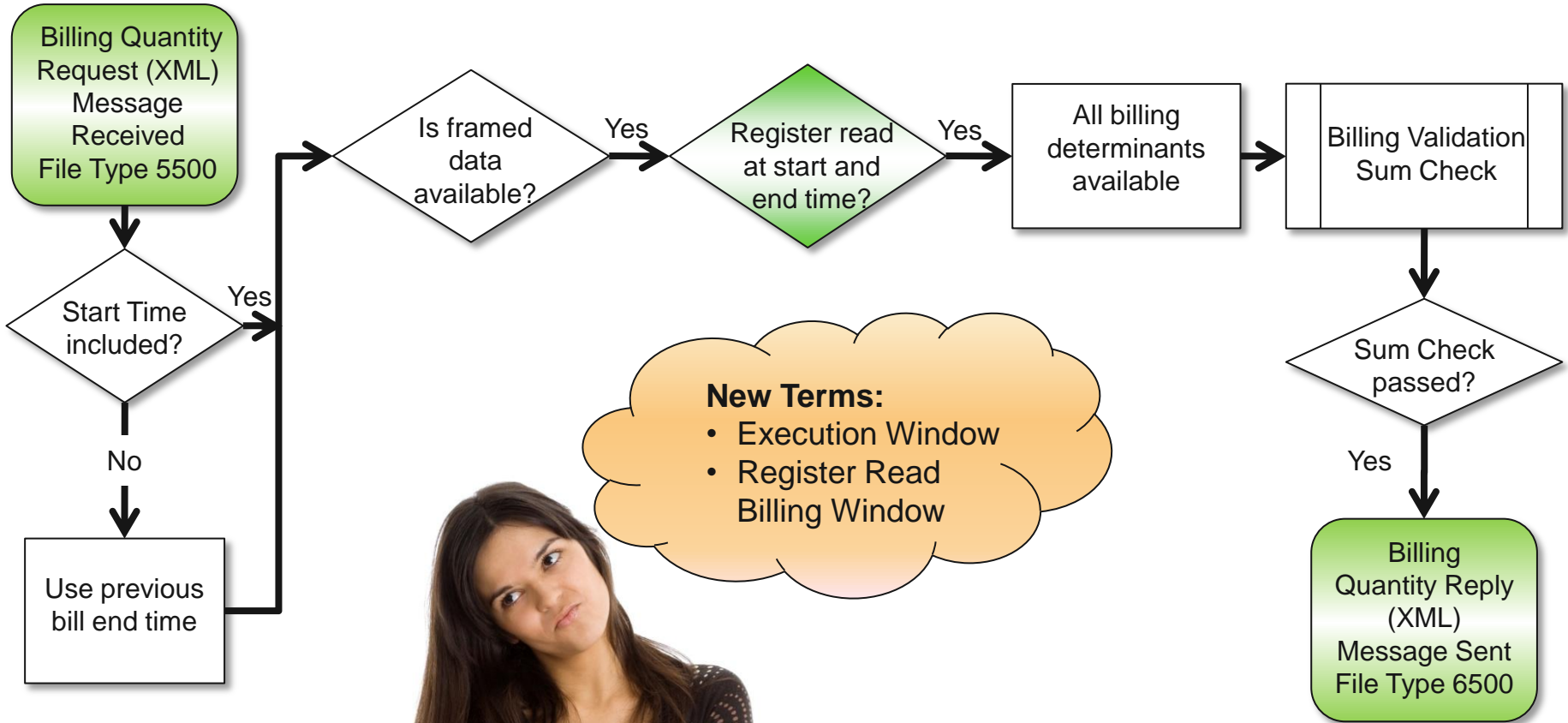
- Retry Scaling: Persistent process operating after real-time data collection and VEE Processing that will attempt to scale unscaled estimates.

# Changes to MDM/R Billing Processes



# What's New with *EnergyIP R7.2?*

## Happy Path – No Billing Exception Handling



# XML Billing Service Standard Interface

(1 of 3)

## What's going away...

- The existing IESO Custom pipe-delimited Billing Quantity Request / Response Interface (Custom BQI) will be retired including FTS file types 5000, 6000, 6100, 6200
  - The Custom BQI does not support the transmission of register reads for billing
  - The Custom BQI is not part of the core *EnergyIP* product
- The Custom BQI will not be available once the new XML Billing Service Standard Interface has been deployed by all LDCs

# XML Billing Service Standard Interface

(2 of 3)

## What's coming...

- The XML Billing Service Standard Interface will replace the Custom BQI
- The XML files will be submitted through FTS using AS2
- File-based XML Billing Request
  - New FTS file type 5500
  - One request file may be used for multiple SDPs (same as custom interface)
  - Request :
    - Billing period Start date\_time and End date\_time must be aligned with an interval boundary
    - Provides new LDC control over the timing of billing quantity processing with the introduction of the Process Start Date and Process End Date

# XML Billing Service Standard Interface

(3 of 3)

## What's coming...

- File-based XML Billing Reply
  - New FTS file type 6500 for Periodic, TOU, Hourly and Demand
  - One reply file may contain billing quantities for multiple SDPs (same as custom interface)
  - Will deliver the TOU / Periodic / Hourly and related starting and ending Register Readings as well as Demand measurements within one file
  - Will also deliver the total kWh of estimated interval data for each usage measurement

Samples of the XML Request and Reply files are provided in the [Sample Reports and Files](#) page on our website. The .xsd is provided on the [Design and Standards](#) page.

# New Terms

Execution Window and Register Read  
Billing Window

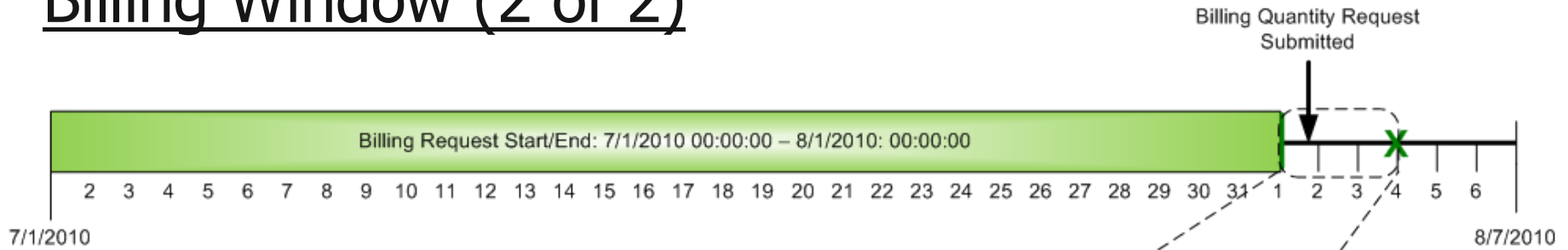


# Execution Window and Register Read Billing Window (1 of 2)

With the deployment of *EnergyIP* Release 7.2:

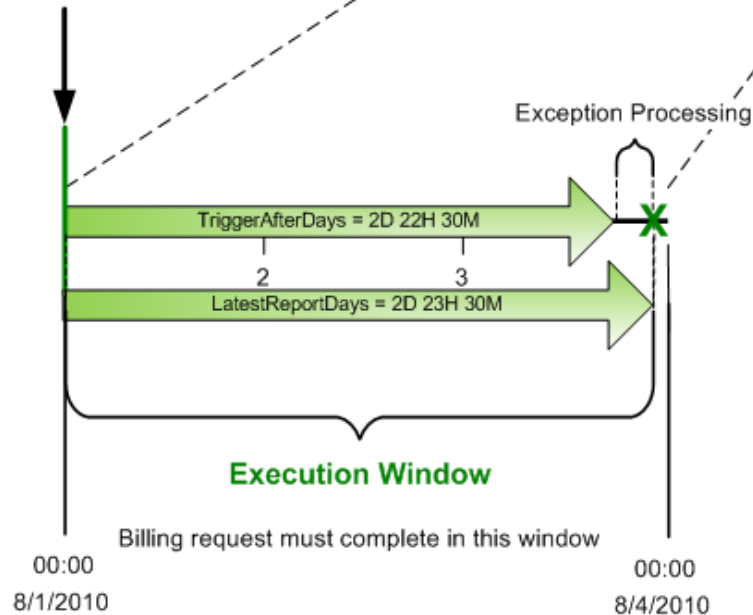
- The term “Execution Window” replaces the term “Billing Window”.
  - **Execution Window** – This is the range of time during which a billing quantity request continues to look for billing quantities.
    - Controlled by the XML Request <endTime> and the LatestReportDays parameter
  
- The term “Register Read Billing Window” is introduced
  - **Register Read Billing Window** – The window of time around the XML Request <endTime> within which a register read must be available.
    - Controlled by the XML Request <endTime> and the billing service parameters AllowableReadAge and ReadWindow – Max

# Execution Window and Register Read Billing Window (2 of 2)



## “Zero” Register Read Billing Window

AllowableReadAge = 0D(ays)  
 Read Window – Max = 0D(ays)  
 End register read at request 'endTime'



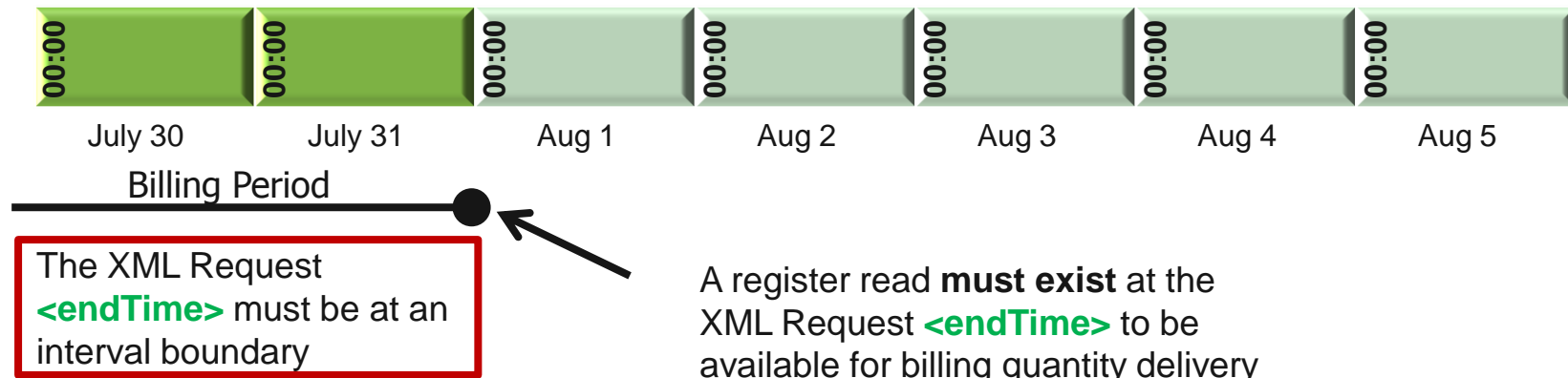
# Register Read Billing Window

Applies to On-Cycle and Off-Cycle Requests

## The Register Read Billing Window will be set to zero...

The MDM/R will look for a register read to be available exactly at the XML Request <endTime>, which is the end of a billing period, thus

- AllowableReadAge and the ReadWindow – Max are set to zero



### New in Release 7.2:

If there's not an actual register read where it's needed the Register Read Calculator will put one there, if it can.

# Execution Window

## How the Existing Configuration is Being Modified

- The Execution Window for on-cycle will be similar to the existing Billing Window in R 7.0.
  - The LatestReportDays was 3 business days and is being shortened by 30 minutes
  - The TriggerAfterDays was 2 business days and is being extended to 2 days, 22 hours and 30 minutes
- The Execution Window for off-cycle will be prompt.
  - The OffCycleLatestReportDays will be reduced from 3 business days to 1 hour
  - The OffCycleTriggerAfterDays is being reduced from 2 business days to zero
- As it is today exception handling is only available within the Execution Window.

# Execution Window

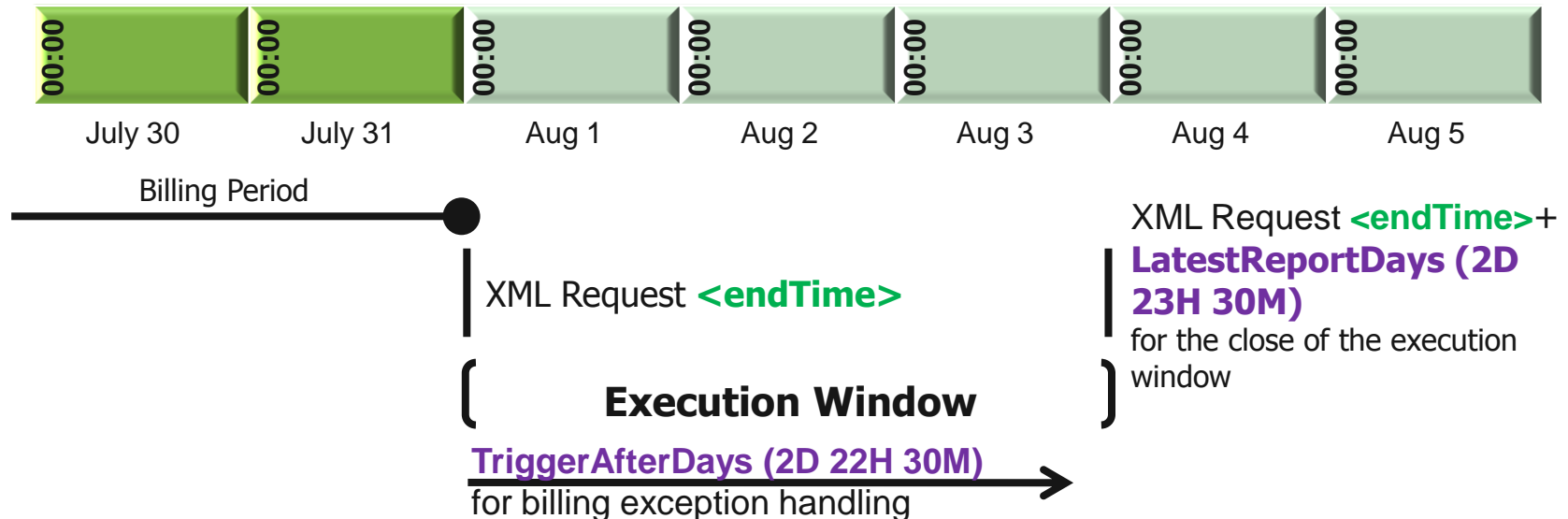
## New Options with Release 7.2

- LDCs will have the option to control the Execution Window by using the new `<processStartDate>` and `<processEndDate>` attributes of the XML Request
  - The use of this option enables LDC control of exception handling such that it can be available for an expanded period of time
- Note we have rules – Please see MDM/R Technical Interface Specifications Sections 2.4.3 Business Rules 5, 6 and 7.

# On-cycle Execution Window

## Billing Service Parameter Control

- The on-cycle Execution Window and billing exception handling is controlled by the XML Request `<endTime>`, and
- The `LatestReportDays` and `TriggerAfterDays` parameters configured as business days.
- This defines the “natural Execution Window” for on-cycle Requests.



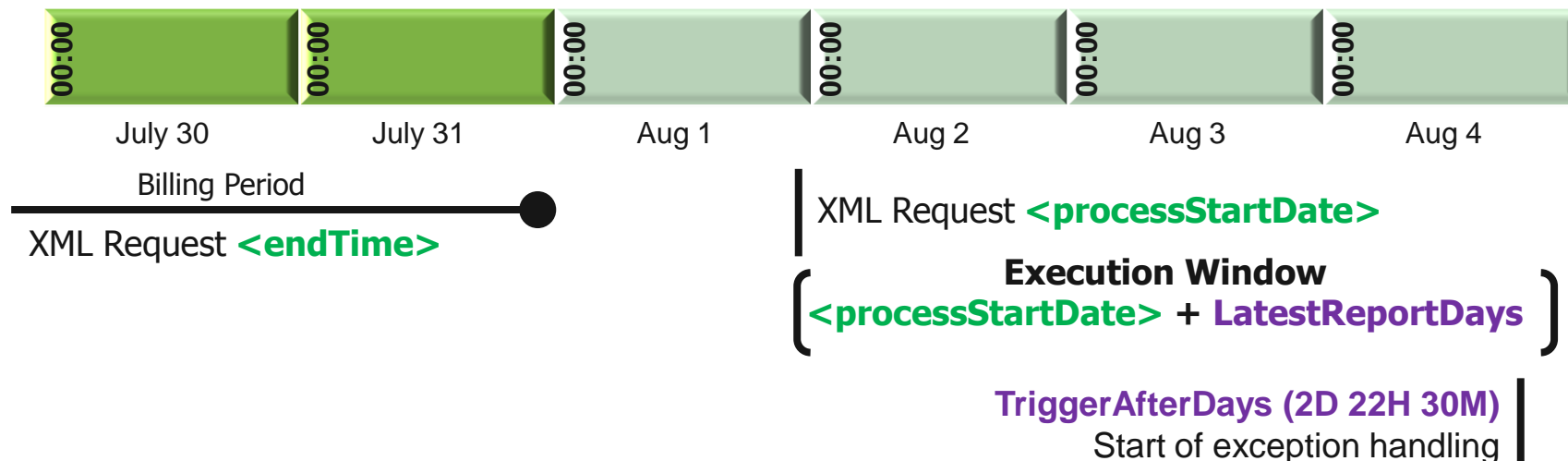
The XML Request `<endTime>` must be at an interval boundary

# On-cycle Execution Window

## Process Start Date provided - Optional

LDCs can provide the XML Request `<processStartDate>` to control the start of the Execution Window:

- The Process Start Date will define the start of the Execution Window
- The Billing Service Parameters then define the end of the Execution Window



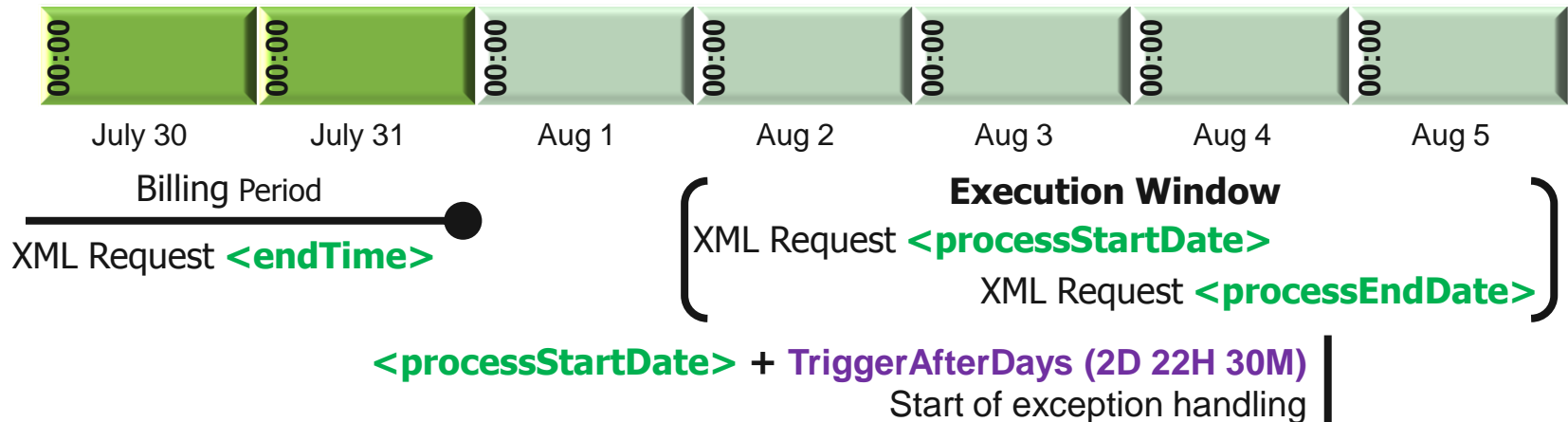
The XML Request `<processStartDate>` must be provided for on-cycle XML Requests submitted after the end of the “natural Execution Window” to enable billing exception handling.

# On-cycle Execution Window

Process Start Date and Process End Date provided - Optional

LDCs may control the duration of the Execution Window by specifying the XML Request `<processStartDate>` **and** `<processEndDate>`.

- XML Request `<processStartDate>` sets the Execution Window start date and time
- XML Request `<processEndDate>` sets the Execution Window end date and time

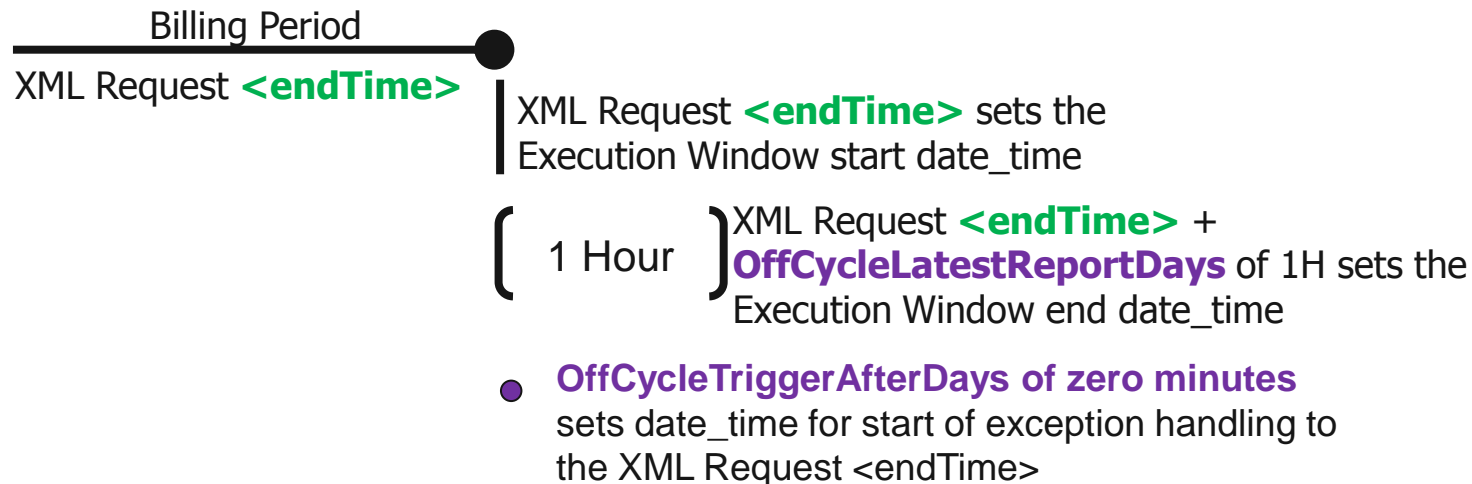


- The Execution Window must be open long enough to accommodate billing exception handling (TriggerAfterDays = 2D 22H 30M)
- The XML Request `<processEndDate>` must allow the Execution Window to close to provide no data responses when billing exception handling is unsuccessful, and thus allow reporting on the Billing No Reads Report BR06.

# Off-cycle Execution Window

## Billing Service Parameters Control

- The off-cycle Execution Window and billing exception handling is controlled by the XML Request `<endTime>`, and
- The `OffCycleLatestReportDays` and `OffCycleTriggerAfterDays` parameters.
- This defines the “natural Execution Window” for off-cycle billing requests.



# Off-cycle Billing Service Parameters

## Options

- If an off-cycle request is sent using the Billing Service Parameters after the “natural Execution Window” ends:
  - **Data Available:** The BSRP will run once upon receipt of the request and billing quantities will be delivered.
  - **Exception Handling Required:** The BSRP will run, but exception handling will not occur. The XML Request <processStartDate> or both <processStartDate> and <processEndDate> attributes can be provided to allow exception handling to be triggered.

The XML Request <processStartDate> or both <processStartDate> and <processEndDate> can be provided for off-cycle XML Requests submitted after the end of the “natural Execution Window” to enable billing exception handling.

# How do you get billing exception handling after the "natural Execution Window"?

Provide the XML Request <processStartDate> and <processEndDate>

## **Option for on-cycle requests:**

- Set the <processStartDate> equal to the XML Request <endTime>
- Set the <processEndDate> to a date\_time that is
  - greater than the <processStartDate> plus the TriggerAfterDays and
  - equal to a future date\_time that is the latest date\_time you are willing to wait for a response.

## **Option for off-cycle requests:**

- Set the <processStartDate> equal to the XML Request <endTime>
- Set the <processEndDate> to a date\_time that is
  - equal to a future date\_time that is the latest date\_time you are willing to wait for a response.

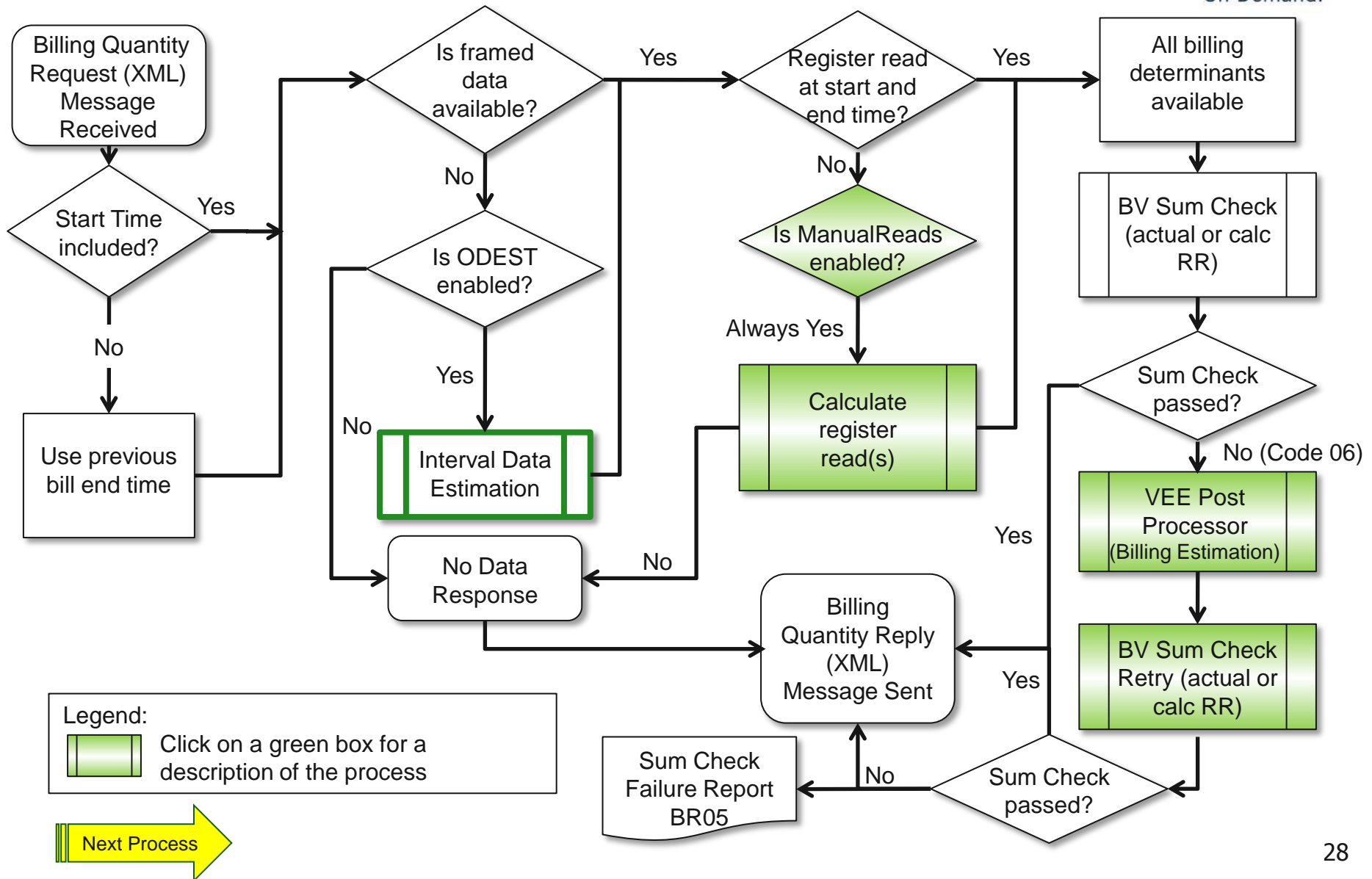
# Billing Exception Handling

ODEST and ManualReads



# What's New with *EnergyIP 7.2?*

## Exception Handling Needed



# Billing Exception Handling - ODEST

## Interval Data Estimation

- ODEST was the only exception handling that occurred at billing time, if enabled on the data delivery service.
  - ManualReads exception handling will be enabled on all data delivery services to enable register read calculation.
- The TriggerAfterDays was 2 days for both on-cycle and off-cycle billing requests.
- The TriggerAfterDays has been configured differently for on-cycle and off-cycle billing requests:
  - On-cycle: TriggerAfterDays = 2 Days / 22 Hours / 30 Minutes  
This will maximize the time available to submit meter read data prior to billing exception handling being initiated.
  - Off-cycle: OffCycleTriggerAfterDays = zero minutes  
This will allow billing exception handling to be initiated immediately, if the required billing determinants are not available



# Billing Exception Handling – ManualReads

## Register Read Calculator

### Why?

To include register reads in the XML Reply when they're not available. A register read must be provided at the start time and end time of a billing period

- The billing quantities must be equal to the difference between the start and end register readings
- The register reads must be at interval boundaries of the interval data included in the XML Billing Reply (midnight or other interval boundary)

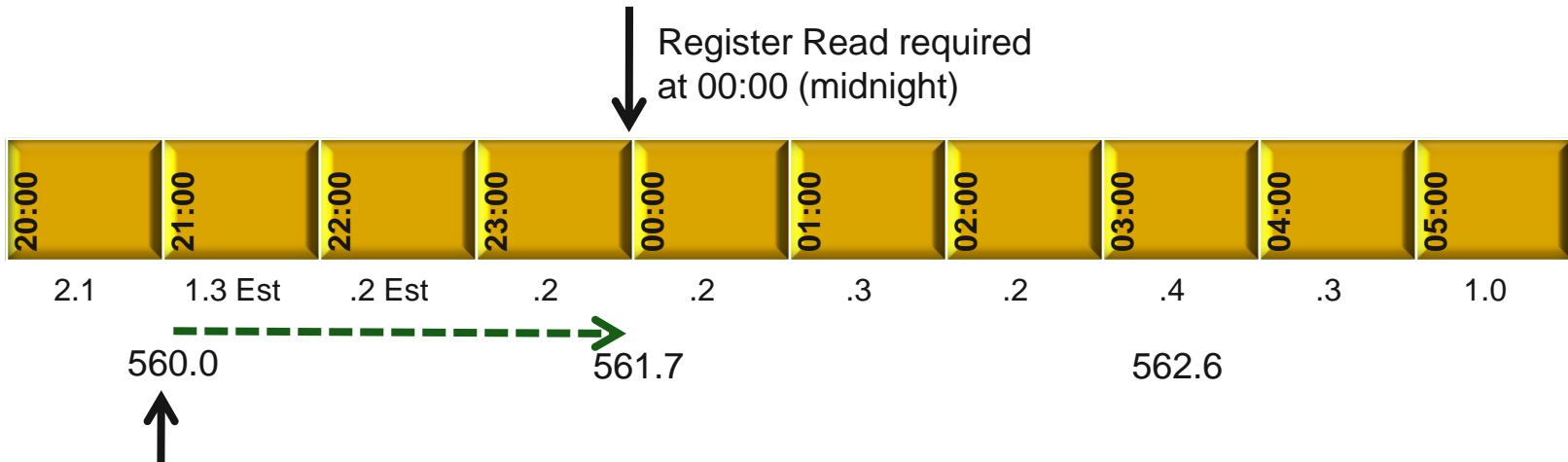


# Register Read Calculator

## How it works

The Register Read Calculator looks both ways from the XML Request <endTime> or the XML Request <startTime> for the actual register read that is closest to it.

- Calculated register reads will not be used for the purpose of calculating register reads.



### Actual Register Read at top of interval:

- Register Read Calculator will
  - Add the sum of the interval data values (1.7) to the actual register reading 560.0 to arrive at a calculated register reading of 561.7
  - Place the calculated register read at the required date\_time of 00:00

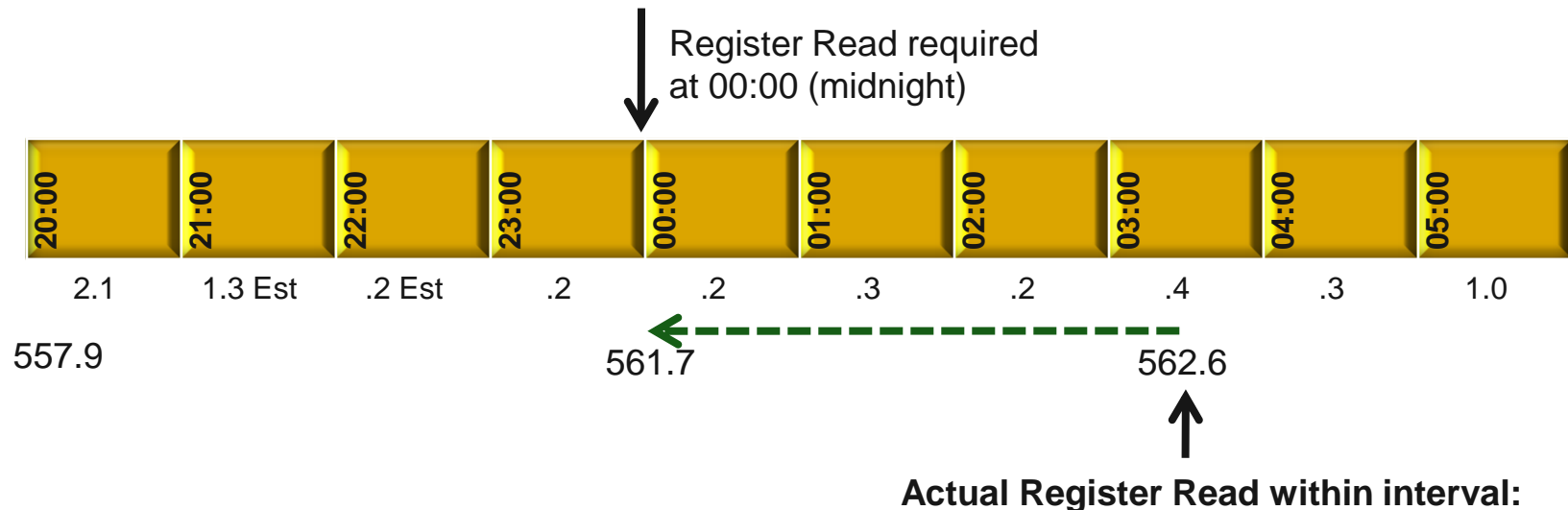


# Register Read Calculator

## How it works

The Register Read Calculator looks both ways from the XML Request <endTime> or the XML Request <startTime> for the actual register read that is closest to it.

- Calculated register reads will not be used for the purpose of calculating register reads.



- Register Read Calculator will:
  - The interval value of .4 between 03:00 and 04:00 and the intermediate register read of 562.6 is prorated by linear interpolation to a value of .2
  - Subtract the sum of the interval data values (.9) from the actual register reading to arrive at a calculated register reading of 561.7
  - Place the calculated register read at the required date\_time of 00:00



# Register Read Calculator

## Unsuccessful Calculation

The Register Read Calculator will be unable to calculate a register reading if:

- A missing interval or NVE interval exists between the actual register reading and the date\_time of the required calculation
- No actual register reading exists in either direction from the date\_time of the required calculation



# VEE Post Processor

## Billing Estimation Context

- Billing Validation Sum Check failure on tolerance will trigger the Billing Estimation context of the VEE Post Processor.
- The Billing Estimation context looks for all intervals within the billing period with the validation status of EST.
- EST intervals will be re-estimated or re-scaled using actual register reads:
  - Estimated intervals (Change Methods ESB, ESD, EDC and EDT) will be scaled between actual register reads
  - ADU scaled Class Load Profile estimated intervals (Change Method ESE) will be scaled between actual register reads
  - Estimated intervals (Change Methods ESC and ESF) will be re-estimated and re-scaled between actual register reads
  - Estimated intervals with Change Method equal to ESG and ESZ will not be subject to Billing Estimation



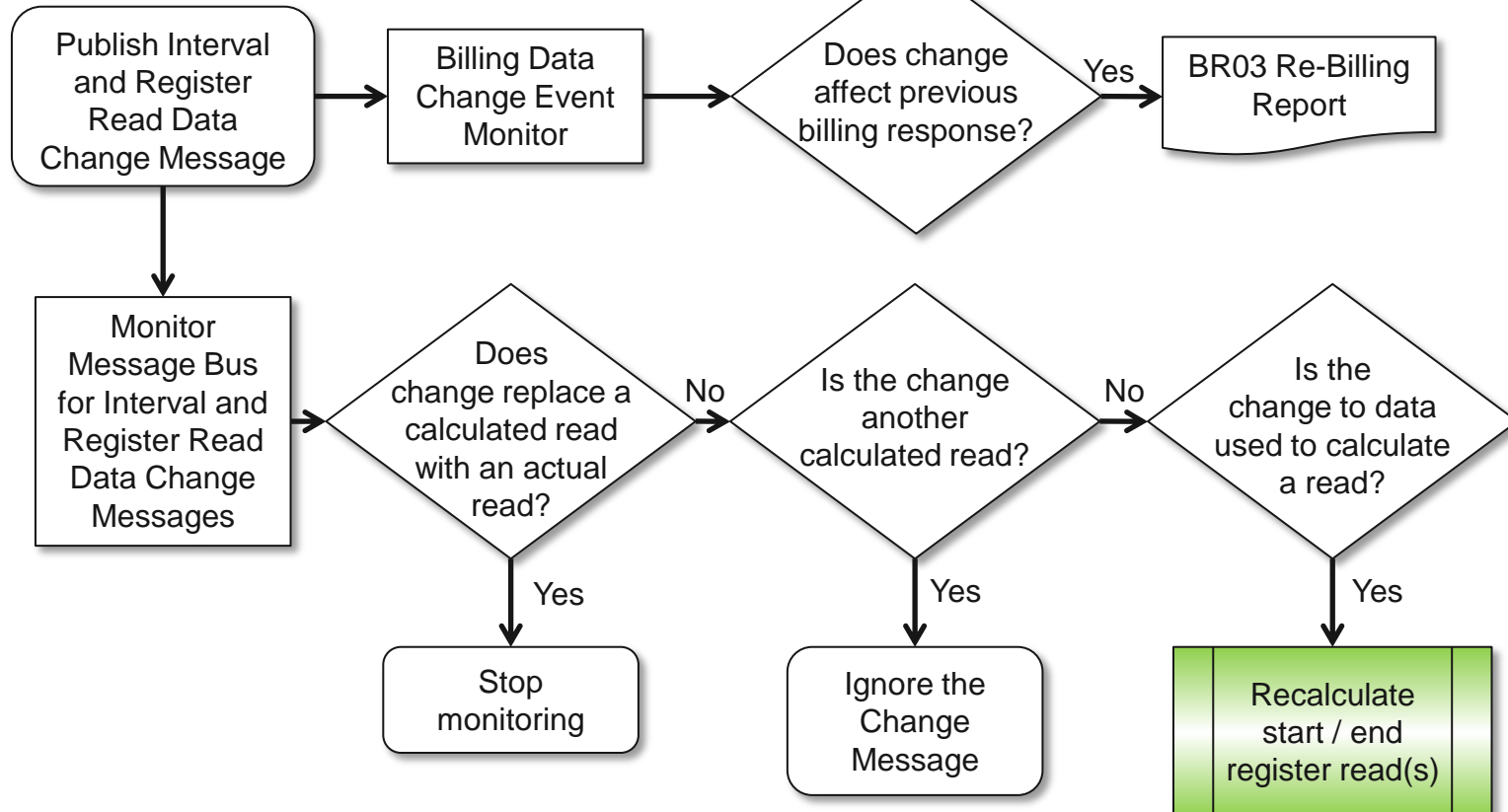
# Billing Validation Sum Check Retry

- After VEE Post Processor “Billing Estimation” the Billing Validation Sum Check is executed again
  - If successful, billing quantities are delivered in the XML Reply with a Reply Code of “0”
  - If unsuccessful, billing quantities are delivered in the XML Reply with a Validation Code of “6” – sumcheck failed and this failure is reported on BR05 Billing Validation Sum Check Failure Report



# What's New with *EnergyIP* R7.2?

## Recalculating Register Reads

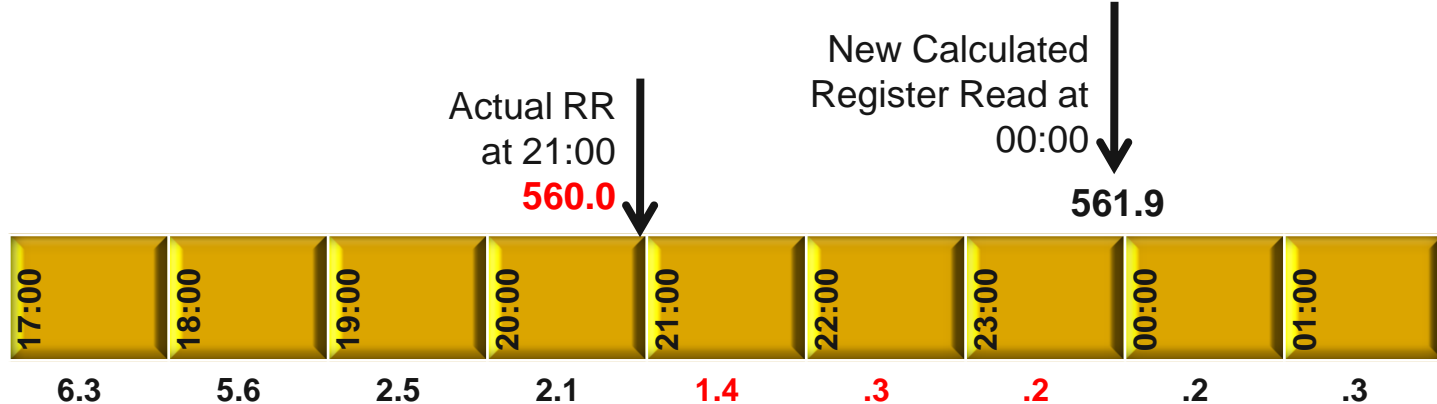


Calculated Read  
Data Change  
Monitor

# Calculated Read Data Change Monitor

## The Calculated Read Data Change Monitor:

- Replacement of a calculated register read by an actual register read will cause read data change monitoring to end
- Will monitor changes to register read data and interval data that is used as the basis of a calculated register reading and initiate re-calculation, if needed.



### You must monitor the BR03 Re-Billing Report!

- The core Billing Data Change Monitoring Process monitors changes to consumption already billed and reports such changes in the existing BR03 Re-Billing Report.
- A new XML Request for this billing period must be submitted to ensure the new calculated register read is used as the start register read of the next billing period.

# Billing Event Considerations

Billing Impacts of *EnergyIP* Release 7.2



# Billing Event Considerations

## Billing Impacts of *EnergyIP* Release 7.2

- Season Change (Global Rate Change)
- Framing Structure Change
- Account Change, if specified
- Meter Change



# Billing Event Considerations

## Bill Segmentation

- There are a number of business scenarios that are changing with the deployment of *EnergyIP* R7.2 in terms of business rules (TIS Section 2.5.3.2):
  - Season Change (Global Rate Change)
  - Framing Structure Change
  - Account Change, if specified
- LDCs can choose to segment using separate XML Requests or use automatic bill segmentation provided by the MDM/R
  - The XML Request <startTime> and <endTime> must be submitted at midnight
  - The effective date\_time of the change must be synchronized to occur at Midnight
- Meter Change XML Requests need to be segmented differently

# Meter Event Considerations

Billing Impacts of *EnergyIP* Release 7.2



# Meter Event Considerations

The start register reading and the end register reading is required on the customer's bill. These register readings are required on the bill at the time a meter is installed and removed.

- You have to think about...
  - The actual time at which the meter was removed / installed
  - The time of the SDP to Meter Relationships for the removed and installed meter
  - The transmission of the last register reading from the removed meter
  - The transmission of the first register reading from the installed meter
- We've got rules...
  - These rules are described in the MDM/R Technical Interface Specifications: Business Rules sections of the Billing Service Standard Interface Request and Reply
    - These rules have been updated with the posting of Version 3.3 of the MDM/R Technical Interface Specifications – Sections 2.4.3 and 2.5.3

# Meter Event Considerations

## New Smart Meter Installation



# New Smart Meter Installation

## Setting the Stage

- 06:47 – A new meter is installed.
- 06:48 – An actual displayed starting register read is recorded.



### Billing Considerations:

- Do you want to bill for all intervals transmitted by the meter after installation?
- Do you want to bill for the interval gap between the time the meter is installed and the first interval data transmitted by the meter?
- Do you want to bill for entire days?
- Note our rules require – The XML Request <startTime> must be at the top of an interval and must be after the start of the SDP to Meter Relationship

### Synchronization Considerations:

- We recommend that an SDP to Meter relationship start anytime other than at an interval boundary – this will enable the processing of a start register read at the top of an interval
- Note our rules require – The start date\_time of an SDP to Meter relationship should reflect the actual date\_time of the meter installation and the date\_time of the first register reading should be greater than the start date\_time to ensure it will be processed

### Meter Read Data Considerations:

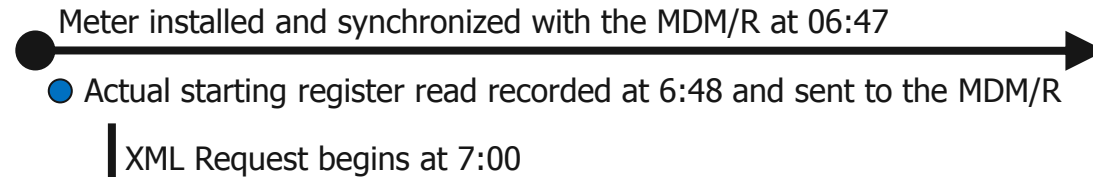
- Based on AML technology the meter may not start transmitting immediately
- If you want to bill from the time the meter was plugged in and your meter does not transmit the first intervals, you must transmit the missing data to the MDM/R
- You can only bill from the earliest received interval after the start of the SDP to Meter relationship

# New Smart Meter Installation

## One Billing Option

### **You want to bill for all intervals transmitted by the meter after installation.**

- The meter started talking promptly at the time of installation and knows what time it is
- The XML Request <startTime> is submitted as 07:00 based on the start of the first whole interval after the meter was installed and synchronized
- The first register reading transmitted by the meter is sent at 00:00 Midnight



### **Billing Results:**

- The start register read at 07:00 was calculated using the 00:00 Midnight actual register read.
  - The MDM/R will not use the register read transmitted at 06:48 to calculate the 07:00 register read because this would be a proration based on the partial interval consumption ending at 07:00.
- The MDM/R recognizes that it is the first day for the relationship and frames the partial day.
  - Framing for this partial day is performed by the Post Process Framer and occurs 24 hours after data submission
- The consumption between 6:47 and 07:00 is not billed.
- The actual register read that was recorded at 06:48 is available for VEE Post Processing.

# New Smart Meter Installation

## Considerations

- You have to look at the new meter installation from all angles:
  - How do you want to bill?
  - When will you set the start of the SDP to Meter relationship?
  - Will you be able to collect and transmit the actual displayed start register read at the time of installation?
  - What is your AMI system capability to collect and transmit the initial data recorded by the meter?
  - Do you have the business processes to fill in data that was not transmitted by the meter promptly after installation?
- All the above considerations help you determine the start date/time of the first XML Request

# Meter Event Considerations

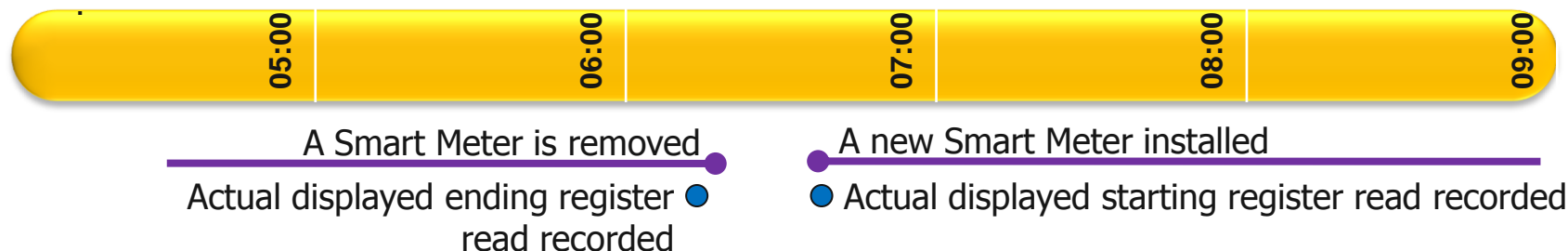
Smart Meter Physical Change



# Smart Meter Physical Change

## Setting the Stage (1 of 3)

- A Smart Meter is removed and a new Smart Meter is installed.
- The end register read of the removed meter is recorded and the start register read of the installed meter is recorded



### Billing Considerations:

- Do you want to bill to the end of the last whole interval for the removed meter and the start of the first interval for the installed meter?
- Note our rules require...
  - You must submit separate billing requests for the removed meter and for the installed meter so that the MDM/R can provide the required register reads.
  - The XML Request <endTime> for the removed meter must be at the top of an interval and must be before the end of the SDP to Meter Relationship for the removed meter.
  - The XML Request <startTime> for the installed meter must be at the top of an interval and must be after the start of the SDP to Meter Relationship for the installed meter.
  - You must have a minimum one-interval gap between the XML Request <endTime> for the removed meter and the XML Request <startTime> for the installed meter

You must have the ability to submit a Billing Quantity Request with a start or end time on an interval boundary that is not equal to midnight

# Smart Meter Physical Change

## Setting the Stage (2 of 3)

### **Synchronization Considerations:**

- We recommend that the SDP to Meter Relationship for the removed meter end anytime other than at an interval boundary – this will enable the processing of a end register read at the top of an interval
- We recommend that the SDP to Meter Relationship for the installed meter start anytime other than at an interval boundary – this will enable the processing of a start register read at the top of an interval
- Note our rules require...
  - The end date\_time of the SDP to Meter Relationship for the removed meter should reflect the actual date\_time of the meter removal and the date\_time of the last register reading should be less than the end date\_time to ensure it will be processed
  - The start date\_time of the SDP to Meter Relationship for the installed meter should reflect the actual date\_time of the meter installation and the date\_time of the first register reading should be greater than the start date\_time to ensure it will be processed

# Smart Meter Physical Change

## Setting the Stage (3 of 3)

### **Meter Read Data Considerations:**

- If your removed meter does not transmit the last intervals up to meter removal the MDM/R will estimate this data when the new meter starts transmitting data.
- If you want to bill from the time the meter was plugged in and your meter does not transmit the first intervals, the MDM/R will estimate those intervals when the new meter does start transmitting data.
- The end register read from the removed meter and the start register read from the installed meter cannot exist at the same date\_time because the MDM/R stores register read data for the same SDP in the same data channel.
  - If you submit the end read of the removed meter and the start read of the installed meter at the same date\_time:
    - Whichever reading is processed last into the MDM/R will be the only register read available at that date\_time.
    - The Billing Validation Sum Check will fail for either the reply for the removed meter or the reply for the installed meter
      - Such failure will trigger the VEE Post Processor Billing Estimation to re-estimate intervals based on a reading that has no basis in the actual register reading.

# Smart Meter Physical Change

We will explore physical meter changes using the following scenarios:

- Meter change within an interval
- Meter change across an interval boundary
- Meter change across multiple intervals without power in the gap

# Smart Meter Physical Change

## Within an Interval

**You want to bill to the end of the last whole interval for the removed meter and the start of the first interval for the installed meter.**

- The XML Request <endTime> for the removed meter is submitted at 10:00 based on the last whole interval before the meter was removed and synchronized.
- The XML Request <startTime> for the installed meter is submitted at 11:00 based on the first interval after the meter was installed and synchronized.
- The removed meter transmitted the interval data to the hour ending 10:00. The installed meter transmitted interval data starting at the hour ending 11:00



Meter removal synchronized at 10:13am  
End Register read recorded at 10:10 and  
submitted with a timestamp of 10:00am

Meter installation synchronized at 10:28am  
Start register read recorded at 10:29 and submitted with  
the time stamp of 11:00am

XML Request for removed  
meter ending at 10:00

XML Request for installed meter  
starting at 11:00

### Billing Results:

- The submitted end register read for the removed meter and the submitted start register read for the installed meter are available for billing.
- Consumption for the removed meter will be the sum of the interval data to the hour ending 10:00. This may or may not equal the register read difference to the end register reading.
- Consumption for the installed meter will be the sum of the interval data from the hour starting at 11:00. This may or may not equal the register read difference from the start register reading.

# Smart Meter Physical Change

## Within an Interval – Considerations

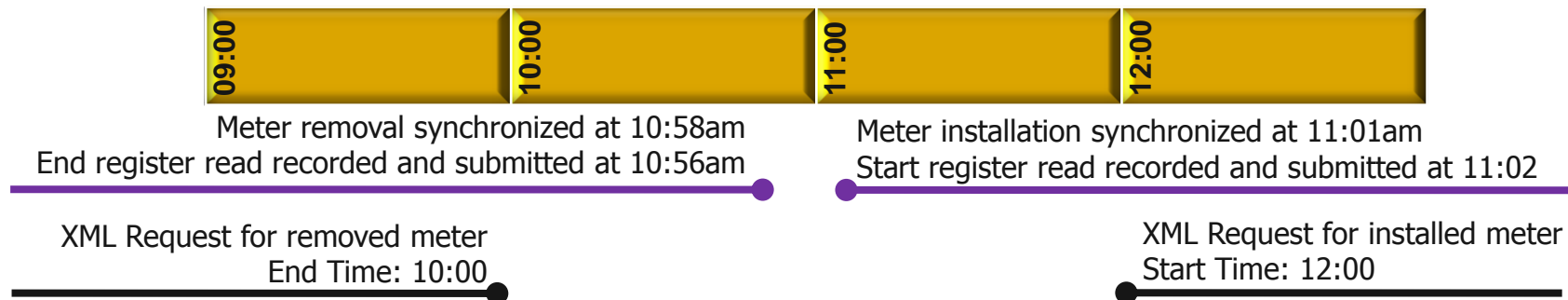
- If you manipulate the date\_time of the end register reading for the removed meter and the date\_time of the start register reading for the installed meter, these readings will be used for each XML Reply.
  - The sum of the usage data and the register read difference may not be equal.
  - This may or may not result in the failure of the Billing Validation Sum Check.
  - Failure of the Billing Validation Sum Check and subsequent VEE Post Processing Billing Estimation may not reconcile these differences.
- If, however, the end register read and start register read are submitted at the actual date\_time of removal and installation, the MDM/R will calculate each required register read.
  - The actual start and end register reads are available for the VEE Post Processor to be used for scaling of estimated interval data, if required.

# Smart Meter Physical Change

## Across an Interval Boundary

**You want to bill to the end of the last whole interval for the removed meter and the start of the first interval for the installed meter.**

- The XML Request <endTime> for the removed meter is submitted at 10:00 based on the last whole interval before the meter was removed and synchronized.
- The XML Request <startTime> for the installed meter is submitted at 12:00 based on the first interval after the meter was installed and synchronized because an XML Request cannot start before the start of the SDP to Meter Relationship.
- The removed meter transmitted the interval data to the hour ending 10:00. The installed meter transmitted interval data starting at the hour ending 12:00



### Billing Results:

- The Register Read Calculator calculates the register read for the removed meter at 10:00 and for the installed meter at 12:00 Noon.
- Consumption for the removed meter will be the sum of the interval data to the hour ending 10:00. This is expected to be equal to the register read difference to the end register reading.
- Consumption for the installed meter will be the sum of the interval data from the hour ending 1:00. This is expected to be equal to the register read difference from the start register reading.

# Smart Meter Physical Change

## Across an Interval Boundary – Considerations

- If the end register read and start register read are submitted at the actual date\_time of removal and installation, the MDM/R will calculate each required register read.
  - The actual start and end register reads are available for the VEE Post Processor to be used for scaling of estimated interval data, if required.
- You could synchronize the SDP to Meter Relationships for both the removed meter and the installed meter with a date\_time of 11:00
  - The consequence is that you will still need a 2-hour gap
- To minimize the XML Request gap to one hour, you could synchronize the SDP to Meter Relationship for the installed meter to coincide with the 10:58 end date\_time of the SDP to Meter Relationship of the removed meter.
  - The XML Request for the removed meter would have an <endTime> of 10:00
  - The XML Request for the installed meter would have a <startTime> of 11:00
  - The 11:02 start register read for the installed meter would be used to calculate the 11:00 starting register read for the XML Reply – this could be less than zero for most meter installations.

# Smart Meter Physical Change

## Across Multiple Intervals – No Power in Gap (1 of 2)

**You want to bill to the end of the last whole interval for the removed meter and the start of the first interval for the installed meter.**

- The XML Request <endTime> for the removed meter is submitted at 13:00 on Day 2 based on the last whole interval before the meter was removed and synchronized.
- The XML Request <startTime> for the installed meter is submitted at 09:00 on Day 4 based on the first interval after the meter was installed and synchronized.



Meter removal synchronized at 13:24 on Day 2 – End Register Read recorded and submitted at 13:23

XML Request <endTime> for removed meter is Day 2 at 13:00

Meter installation synchronized at 08:51 on Day 4 – Start Register Read recorded and submitted at 08:54

XML Request <startTime> for installed meter is Day 4 at 09:00

### VEE Results:

- New estimation method em19: Inactive Meter creates zero estimates in the gap.
  - Inactive Meter estimation will estimate zeros for all missing intervals from the hour of 14:00 on Day 2 through the hour ending 09:00 on Day 4

# Smart Meter Physical Change

## Across Multiple Intervals – No Power in Gap (2 of 2)

### Billing Results:

- The Register Read Calculator calculates the register read for the removed meter at 13:00 on Day 2 and for the installed meter at 09:00 on Day 4.
- Consumption for the removed meter will be the sum of the interval data to the hour ending 13:00 on Day 2. This is expected to be equal to the register read difference to the calculated end register reading.
- Consumption for the installed meter will be the sum of the interval data from the hour starting at 09:00 on Day 4. This is expected to be equal to the register read difference from the calculated start register reading.

# Smart Meter Physical Change

## Across Multiple Intervals – Considerations

- If the end register read and start register read are submitted at the actual date\_time of removal and installation, the MDM/R will calculate each required register read.
  - The actual start and end register reads are available for the VEE Post Processor to be used for scaling of estimated interval data, if required.
- Data manipulation need not be considered.
- If you manipulate the date\_time of the end register reading for the removed meter and the date\_time of the start register reading for the installed meter, these readings will be used for each XML Reply.
  - The sum of the usage data and the register read difference may not be equal.
  - This may or may not result in the failure of the Billing Validation Sum Check.
  - Failure of the Billing Validation Sum Check and subsequent VEE Post Processing Billing Estimation may not reconcile these differences.

# Meter Event Considerations

## Logical Meter Change



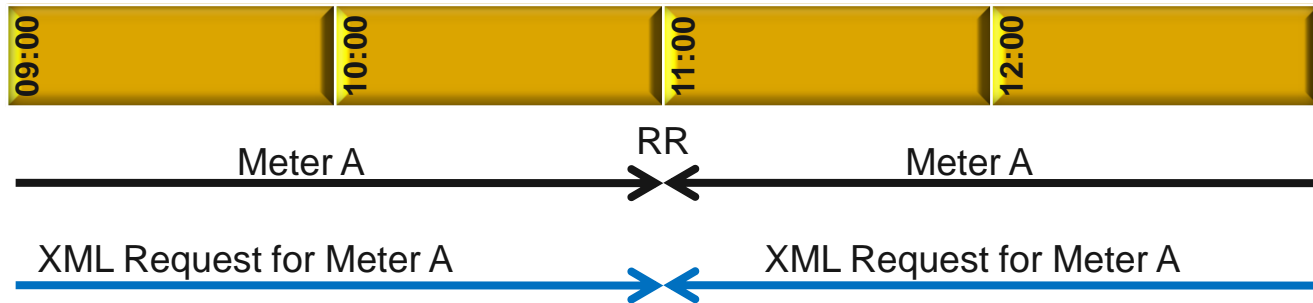
# Logical Meter Change

## Defined

A logical meter change is the business practice where the meter is not removed or installed and is defined as:

- Ending and starting the SDP to Meter Relationship for the same meter with same end date\_time and start date\_time.

# Logical Meter Change



## **Billing Considerations:**

- Do you want to receive separate XML Replies?
- The end register read and start register read for a logical meter change is the same reading at the same date\_time because there has been no physical meter change.
- If a register reading has not been transmitted at the date\_time of a logical meter change and the XML Requests are not segmented, the Billing Validation Sum Check will be skipped – Validation Code = “7”.
- If you segment the XML Requests for a logical meter change, the MDM/R will calculate the required register read, if it has not already been transmitted.

## **Synchronization Considerations:**

- A logical meter change must be at an interval boundary if it is your intent to segment the XML Request at the date\_time of a logical meter change.
- Note our rules require – a CT/PT Multiplier change must be submitted with a corresponding logical or actual meter change, when a change to the SDP CT/PT Multiplier parameter occurs.

## **Meter Read Data Considerations:**

- None

# Logical Meter Change

## Considerations

- For the MDM/R purposes, an LDC does not have to segment the XML Request to bill across a logical meter change.
  - If the XML Request is not segmented, the Billing Validation Sum Check algorithm will segment the sum check calculation
  - If the XML Request is not segmented a Billing Validation Sum Check Skipped exception (Validation Code = “7”) will occur if a register read has not been already transmitted at the date\_time of the logical meter change.
- A CT/PT Multiplier change must be accompanied by an actual or logical meter change:
  - This ensures that the correct CT/PT Multiplier is available for the Billing Validation Sum Check.
  - A logical meter change at an interval boundary intended to support segmentation of the XML Request will allow the calculation of a register read, if required.

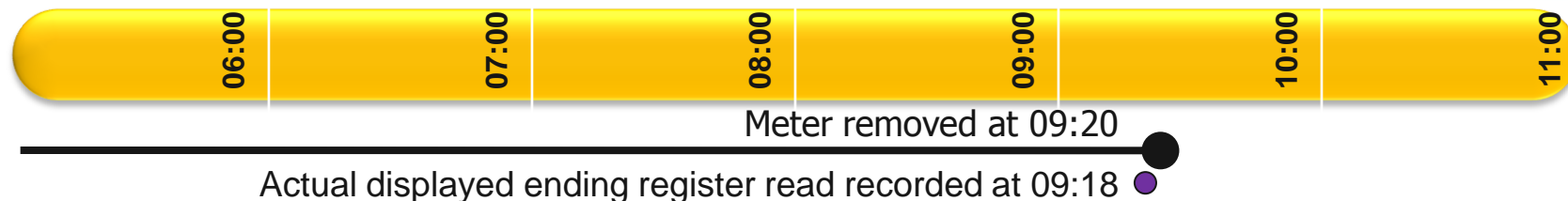
# Meter Event Considerations

Smart Meter Removal



# Smart Meter Removal

## Setting the Stage



### Billing Considerations

- Do you want to bill for all consumption to the end of the day where the meter was removed?
- Do you want to bill for all consumption including the consumption for the hour the meter was removed?
- Are you willing to bill to the end of the day prior to the day of the removal?
- In order to frame the data:
  - To midnight: The MDM/R needs the interval ending at Midnight and interval data for all hours of the day.
  - To XML Request <endTime>: The MDM/R needs the interval up to the XML Request <endTime>

### Synchronization Consideration

- The SDP to Meter Relationship end date\_time must allow for the transmission of meter read data up to and including the time of the day which you intend to bill.

### Meter Read Data Considerations

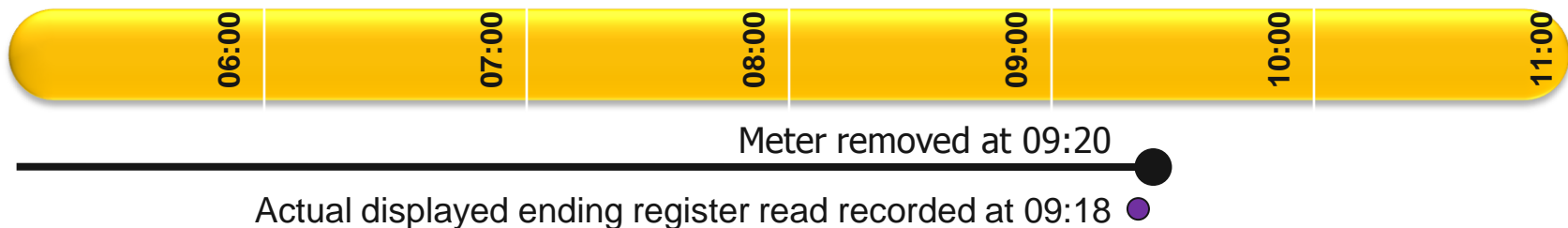
- Interval data must be provided after the date\_time of the last data transmission from the meter, if you intend to bill the final consumption recorded by the meter.
  - Any necessary estimations will not occur in real time.
  - ODEST can trigger interval data estimation at billing time, such estimates will be unscaled.
  - You can submit missing interval data to the time you intend to bill.
- You need to think about the date\_time that is submitted with the displayed ending register read collected from the meter.
- Note our rules require – The date\_time of the last register reading must be less than the end date\_time of the SDP to Meter Relationship.

# Smart Meter Removal

## One Billing Option

### Do you want to bill for all consumption to the end of the day where the meter was removed?

- The last meter data transmission was for the interval and register read at 06:00.
- The SDP to Meter Relationship was synchronized ending at 00:01 of the next day.
- XML Request is submitted with an <endTime> of 00:00 of the next day.
- The end register read that was recorded at 9:18 is submitted with a date\_time of 10:00.
- Zero value interval data is submitted to the MDM/R for the hours between 10:00 and Midnight sometime after the transmission of the interval data to 06:00.
  - This will cause the MDM/R to estimate the missing intervals between 06:00 and 10:00.



### Billing Results:

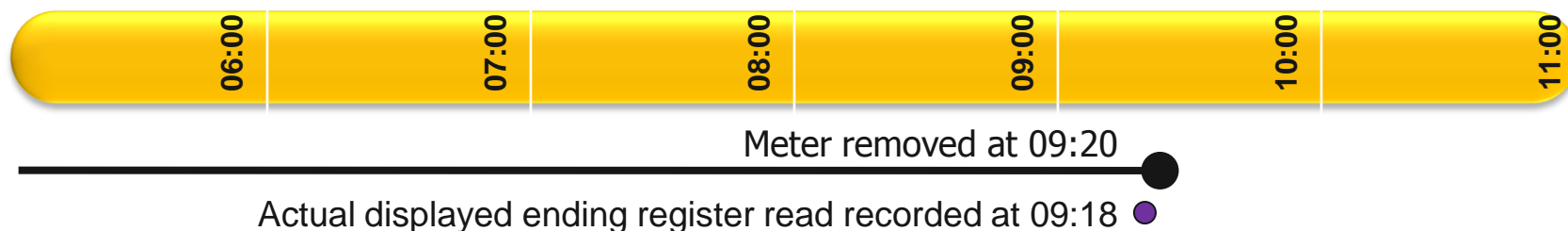
- The end register read collected at 9:18 and submitted at 10:00 is used to calculate the end register reading at 00:00 of the next day.
- VEE Post Processing in the mode of Retry Scaling will scale the estimates between 06:00 and 10:00.
- Consumption for the removed meter will be the sum of the interval data to the hour ending at 00:00 of the next day. This is expected to be equal to the register read difference to the end register reading.

# Smart Meter Removal

## Another Billing Option

**You want to bill for all consumption including the consumption for the hour the meter was removed.**

- The last meter data transmission was for the interval and register read at 06:00.
- The SDP to Meter Relationship was synchronized ending at 10:01
- XML Request is submitted with an <endTime> of 10:00.
- The end register read that was recorded at 9:18 is submitted with a date\_time of 10:00.
- The interval ending at 10:00 needs to be submitted (this can be a zero value interval).
  - This will cause the MDM/R to estimate the missing intervals between 06:00 and 10:00.



### Billing Results:

- The end register read collected at 9:18 and submitted at 10:00 is used as the end register reading for the billing period.
- Partial day framing will occur triggered by the 10:00 <endTime> of the XML Request.
- The partial day framed data between Midnight and 10:00 is not stored. It will only be provided as part of the billing quantity in the XML Reply.
- VEE Post Processing in the mode of Retry Scaling will scale the estimates between 06:00 and 10:00.
- Consumption for the removed meter will be the sum of the interval data to the hour ending 10:00. This is expected to be equal to the register read difference to the end register reading.

# VEE Post Processing Retry Scaling



# VEE Post Processor

## Retry Scaling Context

- Retry scaling is a persistent process operating after real-time data collection and estimation that will attempt to scale unscaled estimates.
  - First attempt occurs very early after real time data processing when unscaled estimates exist
  - Retry Scaling will be repeated a number of times based on a configurable schedule, when required
  - It will use register readings that have been transmitted to the MDM/R that may not have been available to real time estimation
- The Retry Scaling context looks for intervals that have failed scaling in the real-time estimation context.
- Unscaled intervals will be scaled using actual register reads:
  - Unscaled estimated intervals (Change Methods ESB and ESD) will be scaled between actual register reads
  - ADU scaled Class Load Profile estimated intervals (Change Method ESE) will be scaled between actual register reads
  - Estimated intervals with Change Method equal to ESG and ESZ will not be subject to Retry Scaling

# Changes to Reports



# Report BR01

## Billing Delivery Summary Report

- Report BR01 will now be divided into 3 sections:
  - Counts of “ReadsForBilling” requests initiated externally by the LDC or its authorized billing agent
  - Counts of “ReadsForBillingInformational” requests initiated externally by the LDC or its authorized billing agent
  - Counts of “ReadsForBillingInformational” requests initiated internally by Billing Data Change Monitor
- These changes are described in the Measurement Canada 2011 Solution requirements document

The change in the report specification will be available in the next version of the MDM/R Reports Technical Specifications

# Report BR04

## Billing Delivery Detail Report

- Report BR04 will have 3 new columns indicating if the billing quantity requests are:
  - “ReadsForBilling” or “ReadsForBillingInformational”
  - On-cycle or off-cycle
  - Generated internally (by EIP for billing data change monitor) or externally (by the LDC or its authorized billing agent)
- These changes are described in the Measurement Canada 2011 Solution requirements document

The change in report specification will be available in the next version of the MDM/R Reports Technical Specifications

# Other Reports

- **BR03: Rebilling Report**
  - This report will now report changes to register readings delivered for billing as provided for in the existing report specification
  - The precision of register readings, interval data, and usage data reported will be increased to 6 decimal places
  
- **BR05: Billing Validation Sum Check Failure Report**
  - The precision of the values reported will be increased to 6 decimal places

# Transition to the XML Billing Service Standard Interface



# Behind the Scenes

## FTS Authorizations

### IESO's Preparation for LDC-by-LDC interface switch:

- All Organizations currently authorized for Billing Quantity Request file types 5000 and Billing Quantity Response file types 6000, 6100 and 6200 will automatically be granted access for Billing Service Standard Interface – Request file type 5500 and Billing Service Standard Interface – Reply file type 6500

# Behind the Scenes

## Conversions and Ongoing Processes

IESO's preparation for LDC-by-LDC billing interface switch:

- We are converting all Data Delivery Service – DD Protocol Parameter Set values to “IESOFile” to support the continued use of the Custom BQI in each environment
- This can be seen by the LDC in the *EnergyIP* GUI

IESO's preparation for support of Meter ID in the Meter Asset for the purposes of returning Meter ID in the XML Billing Service Standard Reply

- The Meter ID field currently mapped to the Meter Asset (Meter\_CIS\_ID) will be written to the Meter Asset (X\_Universal\_Meter\_ID)
- This can be seen by the LDC in the *EnergyIP* GUI
- The Synchronization Staging Table Loader has been modified to load the Meter ID to both fields

# XML Interface - Transition Options

- Choose Custom BQI or the XML Billing Service Standard Interface, in the same environment, but not both
- Note 1: Any request loaded before you transition to the XML format will be returned in the Custom BQI format
- Note 2: Any request that is loaded after you have transitioned to the XML interface will be returned in the XML format
- Transition options are:
  - Ensure that there are no in-flight requests at the time of the transition by implementing three business days of quiet time
  - Switch to XML without a quiet time and anticipate that you will not process the Custom BQI Responses

You may use the IESO Custom BQR in *EnergyIP* R7.2:

- New measurement profile will export register reads that will be viewable in the MDM/R GUI. If register reads are not available or not able to be calculated, a no data response will result.
- Register reads **will not be** provided in the response.

# Release 7.2 Testing and Cutover Options

- Request the switch in Sandbox: Identify your transition option and specify the date for the switch using the method below. You need three business days advance notice.
  - Production LDC: Open a Service Now ticket
  - Pre-production LDC: Send an email to your R&E Project Manager
- What you do for cutover depends on your current state:
  - Production LDCs:
    - Test XML Billing Service Standard Interface in Sandbox and switch after R7.2 is in Production
  - LDCs who will enroll and cutover in R7.0:
    - Test custom billing interface in Sandbox and cutover to Production
    - Then test XML Billing Service Standard Interface in Sandbox and switch when R7.2 is in Production
  - LDCs who will enroll and cutover in R7.2:
    - SIT & QT will test the XML Billing Service Standard Interface only

# Are You Ready?

- Certification:
  - Provide evidence of successful testing of IESO-identified scenarios – SME will review and accept
  - Certification of Readiness is required for Production and pre-Production LDCs before you can transition to the new interface in Production
- After R7.2 is in Production any LDC that is certified can request the switch to the XML Billing Service Standard Interface using Service Now
- Any LDC that cuts over after R7.2 is in Production will be certified on the new interface as part of their normal cutover process

# Getting Help

- MDM/R Technical Interface Specifications version 3.3
  - TIS, Sample XML files, and the .xsd are available on our website
- VEE Standards for Ontario Smart Meters for testing – Version 4.t to be published soon
- Release 7.2 Transition Guide to be published soon
- SME Contact:
  - **When you're testing:** Registration and Enrolment Representative
  - When you're in Production: Production Operations

