

ATTACHMENT

California Solar Initiative (CSI) Performance Data Provider (PDP) Workshop report

Prepared by Energy Division
June 25, 2008



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Overview

This workshop report fulfills the requirements of Decision 08-01-030 to file a workshop report on the PDP Workshops held pursuant to the decision. Within 30 days of this report's publication, the CSI Program Administrators (PAs) are required to file CSI Program Handbook changes to conform the CSI Program Handbook to the final PDP Protocols.

Introduction

On January 31, 2008, California Public Utilities Commission (Commission) issued Decision (D.) 08-01-030 that modified the performance monitoring and reporting rules of the California Solar Initiative (CSI) to remove the "independence" requirement. This requirement had previously mandated that all providers of performance monitoring and reporting services (PMRS) be unaffiliated with all CSI incentive recipients, solar installers, or solar manufacturers. When the Commission removed the "independence" requirement for PMRS providers, it acknowledged the importance of putting in place rules to ensure the integrity of data provided to the CSI Program Administrators for the purpose of paying Performance Based Incentives (PBI). The decision replaced the "independence" requirement with a protocol-based approach to data validation, referred to in the Decision as the Performance Data Provider (PDP) protocol.

While the Commission adopted the protocol-based approach to data validation, the Commission also recognized that a public input process was needed to develop the requirements that underpin the protocol. The Commission had earlier released a draft PDP protocol for public review and comment as part of a 9/04/07 Administrative Law Judge Ruling. The Commission ordered Energy Division to convene public workshops to discuss possible improvements and refinements to the requirements in the PDP protocol document that was released to the public as part of the 9/04/07 Ruling. In D. 08-01-030, the Commission also identified seven specific issue areas within the PDP protocols that needed refinement. They are the following:

- Data format, reporting and retention
- Data security and confidentiality
- Data and payment validation
- Measurement and evaluation
- Technical and customer support
- PDP performance exemptions
- PDP non-performance and appeal process

Workshop Report

Energy Division convened a public workshop on the topic of performance data provider requirements on February 25, 2008 at the CPUC. The workshop agenda covered an

overview of the D.08-01-030, the seven PDP issue areas covered in the Decision, the interim PBI reporting and payment process, and an in-depth discussion of the PDP performance exemptions, and PDP non-performance and appeal process. In attendance at the workshop were representatives from the three CSI PAs, current providers of PMRS, meter manufacturers, solar installers and integrators, and meter service providers.

During the morning session of the workshop, key topics and the process for developing the PDP were discussed. Discussion in the afternoon session covered specifically how PDP performance exemptions and PDP non-performance and appeals process would be handled. The afternoon session also included a brief discussion of data security and confidentiality requirements. Workshop participants discussed the draft PDP document and came to consensus on a set of proposed modifications relating to PDP performance exemptions and PDP non-performance and appeals process. Workshop attendees also briefly discussed data security and confidentiality requirements. A sub-set of the workshop attendees volunteered to participate in a data security and confidentiality working group that was tasked with putting together a proposal to be presented at a subsequent meeting. Below is an overview of the changes and in attachment 2 is a copy of the draft PDP document that was circulated to workshop attendees.

- In the 'Technical and Customer Support' section on page 3 of the draft PDP requirements, the original draft document stated that PDPs had to respond to Program Administrators within 24 hours when an error occurred. The proposed change modified this to allow PDP to respond within two days. (Attachment 1, PDP Requirements)
- In the 'PDP Non-Performance' section on p.4 and 5 of the draft PDP requirements, the workshop participants suggested slight modifications and additions to the set of activities that result in penalties, suspension of activity, or revocation of PDP approval. (Attachment 1, PDP Requirements)

After this first PDP workshop, five PMRS providers jointly submitted comments to the draft PDP document. The suggested changes largely reflect the modifications agreed to in the workshop, but they also include several additional suggested modifications (Attachment 2).

On February 26, 2008, a second meeting was held where to discuss the PDP protocols. At this meeting of the CSI Metering Sub-committee, discussion of the PDP requirements focused on data formatting. In the draft PDP protocols that were circulated with the Commission's 9/04/07 Ruling, the CSI PAs had selected the ANSI X.12 Electronic Data Interchange 867 protocol (EDI 867) as their data format of choice for PBI reporting. At this meeting, the CSI PAs brought in GXS, a consultant to PG&E, to provide an overview of the ANSI X.12 EDI 867 protocol. GXS provided an in-depth presentation of the EDI 867 protocol that included comparisons with other data formats (Attachment 3). The CSI PAs, GXS and attendees representing the PMRS and metering community discussed the pros and cons of the EDI 867 protocol. By the conclusion of the meeting, the group had come to a consensus that the ANSI X.12 EDI 867 be the data format of choice for PDP reporting of PBI data.

After the February 26, 2008 meeting, the data security and confidentiality working group, led by Southern California Edison, convened a number of conference calls. Their

proposal for data security and confidentiality was submitted and discussed at the third PDP workshop.

On May 19th 2008, a third meeting was held to discuss the PDP requirements. This meeting centered on a discussion of the data validation protocols that had been proposed in the 9/04/07 draft PDP Requirements and a brief discussion of the data security and confidentiality proposal. The security and confidentiality proposal to mandate that data be transferred via secure FTP was presented, and no one dissented. Next was a discussion of the data validation protocols. In the draft PDP, there were ten validation requirements:

- Time Check of Meter Reading Device/System
- Meter Identification Check
- Time Check of Meter
- Pulse Overflow Check
- Test Mode Check
- Sum Check
- Spike Check
- High/Low Data Check
- Daytime Only Solar Production Check
- Zero or Negative Solar Production During Daylight Hours Check

These data validations were originally Direct Access Program requirements, and based upon the data collection and data reasonability requirements included in the Direct Access Program's California Meter Data Management (MDM) Validation, Estimation and Editing (VEE) Standards. The CSI PAs brought in Entegrity, an IT consultant to PG&E, to discuss their evaluation (Attachment 4) of the proposed data validation protocols using sample solar data to determine which data validation requirements were applicable to production data, as opposed to the consumption data, which was the purpose of data validation in the Direct Access program. Entegrity tested the eight validation tests that were deemed applicable to the CSI Program, and added two additional tests to account for solar production. Below are the tests that Entegrity proposed for inclusion in the PDP data validation requirements:

Data Collection Validation

- Time check of meter reading device/system
- Meter identification check
- Time check of meter
- Pulse Overflow check
- Test Mode check
- Sum check

Data Reasonability Validation

- High-Low Usage check
- Monthly Average Efficiency per Lumen of Radiation
- Gap and Overlap checks
- Spike and Dip checks

After Entegrity's presentation, the metering subcommittee discussed each of the proposed data validation requirements. Below is a review of the discussion:

Data Collection Validation

- Time check of reading system – this is a valid measure for data logging or IDR revenue metering
- Meter ID check – only works to confirm the equipment being polled. Therefore, to confirm the meter ID, the system must directly poll the meter, not a data logger.
- Time check of meter system – meter may not need clock if polling communication is less than 15 minutes and is time stamped. Not relevant for data logging systems receiving pulse inputs from the meter.
- Pulse overflow – not relevant because pulse caps do not mean higher incentive. The program should not be worried about pulse overflow.
- Test Mode – only relevant for IDR revenue meters, not data loggers.
- Sum Check – comparison of cumulative kWh count with interval data. Only relevant to revenue grade IDR meters consistently reading at least every 15 minutes.

Data reasonability validation:

- Boundary Test – is highly dependent on the expected performance; high boundary tests are directly related to PBI payments and relevant to primarily the PA. CCSE noted that the PAs intend to monitor the performance of the system relative to the expected performance and high anomalies will be investigated.
- Monthly Average Efficiency per Lumen – This criterion may be more useful during the M&E evaluation, but does not correlate to a PDP requirement.
- Gap and Overlap – Workshop examined whether editing gaps by linear interpolation will be allowed. Additionally, there was an in depth discussion of whether payments should be based on interval data, cumulative data reads, or some combination. The workshop did not come to consensus on the best method. Tracking only the cumulative data would result in reduced data validation requirements. Finally, the workshop debated whether real-time data would be accepted as interval data or if the PAs should allow only IDR meters recording at 15-min intervals and storing the data locally until it is uploaded remotely to the internet.

One of the main discussion points was related to inconsistent validation metrics that depend on metering equipment hardware. One example is the fact that pulse overflow checks are only relevant for systems using a pulse output to a data logger. Another is that meter ID checks are only relevant for systems where there is no data logger. These inconsistencies speak to the larger question of the definition of a metering system and the definition of interval data. At the meeting, various parties debated the merits of setting standards that allow for a range of different metering configurations, but no consensus could be had. And the central question remains whether meters that do not include on-board memory capable of logging 15-minute interval data recording (IDR) are eligible to serve as PBI meters within the CSI Program. The argument in favor of these meters is that they can be coupled with data loggers that have 15-minute IDR capacity to assure accuracy, while also being less expensive than meters with integrated 15-minute IDR. The argument against these combination metering systems is that they are less accurate and more prone to fault and tampering.

At the end of this meeting, the CSI PAs and attendees agreed that all the arguments for and against the data validation protocols had been presented and discussed. With no

clear consensus to be had, the CSI PAs determined that they would make the final decision regarding the data validation protocols and submit it as part of the PDP protocols Advice Letter that is mandated in D.08-01-030.

Next Steps

Over the course of the three workshops, each of the seven PDP issue areas outlined in D.08-01-030 was discussed. Of these seven issue areas, Energy Division, the CSI PAs and workshop attendees were able to come to consensus on every issue except 'Data and payment validation'.

The CSI PAs are hereby ordered to submit an Advice Letter within the next 30 days that conforms to the spirit of the consensus requirements for:

- Data format, reporting and retention
- Data security and confidentiality
- Measurement and evaluation
- Technical and customer support
- PDP performance exemptions
- PDP non-performance and appeal process

The CSI PAs should address the question of data validation requirements, and to the extent possible take into consideration all concerns raised by PMRS providers when finalizing the Advice Letter proposal concerning data and payment validation protocols.

APPENDIX 1

INSTRUCTIONS FOR QUALIFYING AS A PERFORMANCE DATA PROVIDER (PDP) FOR THE CALIFORNIA SOLAR INITIATIVE PROGRAM

REVISED MARCH 4, 2008

BACKGROUND AND REQUIREMENTS

Utility customers participating in the California Solar Initiative (CSI) program are required to install performance meters to determine the actual output of their generation equipment. For customers enrolled under the CSI Performance Based Incentive (PBI) program, data from these meters will be used to calculate their monthly incentive payment. This data may be read and communicated to the Program Administrator (PA)¹ by a third-party Performance Data Provider (PDP). Customers may also elect to contract this service through their local utility company. This document provides information and instructions for non-utility providers wishing to qualify to provide PDP services.

The following are the PDP's primary responsibilities:

- Manage meter reading/data retrieval schedule
- Read and retrieve performance meter data
- Troubleshoot and resolve communications issues
- Calculate monthly production of solar generating system for incentive payment
- Validate performance data prior to providing to the PA using the approved validation rules outlined in this document
- Format data using EDI 867 or other approved protocol
- Manage data on PDP server
- Make server accessible to Program Administrators to download data on a consistent and reliable schedule or post data on appropriate Program Administrator server on a consistent and reliable schedule, per individual Program Administrator requirements.
- Make historical performance data available to Program Administrators as requested
- Provide technical support to Program Administrators as well as customer support
- Store data in accordance with program requirements
- Communicate meter/device information and changes to the Program Administrator (i.e., installation date, equipment type, equipment changes, service history, etc.)
- Ensure confidentiality of customer information and performance data
- Provide disaster recovery and data backup services as requested by respective Program Administrator
- Possess technical expertise and capability

¹ PG&E and SCE are the Program Administrators for the California Solar Initiative program for customers in their respective service territories. The California Center for Sustainable Energy is the Program Administrator for the SDG&E service territory.

PDP TASK REQUIREMENTS

Data Format

Data must conform to the specific program requirements (for CSI requirements, see Section 12 of the CSI Handbook). The PBI Data Report must include 15-minute interval and monthly cumulative production data. All PBI Data Reports must be formatted using the ANSI X.12 Electronic Data Interchange 867 protocol (EDI 867) unless otherwise specified. Sample EDI 867 Implementation Guides and Tutorials are available from CSI Program Administrators.

Data Reporting, Security and Confidentiality

It is the PDP's responsibility to ensure timely, consistent and accurate reporting of performance data. Data must be located in a secure facility, on a secured server and have firewall and equivalent protection. The PDP must protect the confidentiality of the customer information and performance data in accordance with all program guidelines (for CSI requirements, see Section 12 of the CSI Handbook). The server must be accessible to the Program Administrator for downloading the performance data for incentive payment and/or reporting purposes, or the data must be posted on an appropriate Program Administrator server, depending on the specific Program Administrator requirements. **The Program Administrator is not responsible for, and will not pay any customer incentives based on missing, estimated or invalid performance data.**

Data Validation

The PDP must validate all data prior to posting it to the Program Administrator for determining the incentive payment. The following data validation rules shall apply²:

- Time Check of Meter Reading Device/System
- Meter Identification Check
- Time Check of Meter
- Pulse Overflow Check
- Test Mode Check
- Sum Check
- Spike Check³
- High/Low Data Check³
- Daytime Only Solar Production Check³
- Zero or Negative Solar Production During Daylight Hours Check³

Descriptions of these validation rules are included in Attachment A.

Payment Validation and Measurement and Evaluation Program

² All of these rules, except the Daytime Only Solar Production Check and the Zero or Negative Solar Production During Daylight Hours Check, are described in the Direct Access Standards for Metering and Meter Data (DASMMD) in California (R.94-04-031 & I.94-04-032), published March 1, 1999.

³ The Program Administrators, working with the CSI Metering Subcommittee, will develop specific solar production data validation and editing rules for each of these validations. These rules are not required to be performed under the Interim PBI Data Transfer Rules.

The Program Administrator will perform validations on all incentive payments prior to issuing payments to customers participating in this program. The validations will compare actual monthly incentive payments with expected payments based on design specifications and expected performance data submitted with the customers' approved applications. If payments fall outside expected ranges for the month, the incentive payment will be withheld until the Program Administrator determines to its satisfaction the reason for the discrepancy.

The PDP will work with the customer to resolve any discrepancies identified by the Program Administrator, which may include testing and/or recalibrating the meter/devices if deemed necessary. The PDP must provide a copy of the meter testing certificate to the Program Administrator if requested. The Program Administrators are not responsible for the costs associated with investigating and resolving any such discrepancies (i.e. testing, meter replacement hardware, installation labor). However, if the Program Administrator requests an investigation which finds that the metering system is accurate, the Program Administrator will pay all reasonable and necessary costs for the investigation.

The Program Administrator will also perform random audits of PDP data to ensure accuracy and compliance with the requirements outlined in this document, or as part of the CSI Measurement and Evaluation Program in accordance with Section 7 of the CSI handbook. Any PDP found to be in violation of any of these requirements will be subject to the penalties outlined later in this document. The Program Administrator, via the servicing local utility or its designated contractor may, at its discretion, inspect and test the performance meter or install separate metering in order to check meter accuracy, verify system performance, or confirm the veracity of monitoring and reporting services.

Any additional metering installed by or at the request of the Program Administrator will be paid for by the Program Administrator. However, in the event metering is installed during the course of an audit or investigation initiated by the Program Administrator where cheating or tampering is suspected and confirmed, the System Owner will be charged for these costs.

Data Retention

Interval and cumulative monthly data must be retained in accordance with appropriate program requirements (see Section 12 of the CSI Handbook for CSI program requirements). The PDP must be prepared to post historical interval data at the Program Administrator's request. The PDP is also responsible for providing backup and disaster recovery services for 100% of the data up to the date of the final PBI payments.

Technical and Customer Support

The PDP must provide a technical support number to the Program Administrator for use during normal business hours (8am to 5pm Pacific time, Monday through Friday, except holidays) to help resolve any data availability, format or corruption issues, communication problems, server access problems, or other technical issues. Within those normal business hours, the PDP must respond to Program Administrator requests within **two business days** with a status report and plan for correcting the issues. The PDP must also provide a customer support number to respond to customer inquiries within **two business days** from the initial customer contact. **Program Administrators will have the discretion to set deadlines for the resolution of data transfer**

problems/issues.

PDP Performance Exemptions

The PDP is responsible for meeting the above noted program requirements and for consistently posting performance data in accordance with the Program Administrator's scheduling and data posting requirements. At its discretion, the Program Administrator may grant reasonable allowances for occasional issues or technical problems, as well as for large catastrophic events such as earthquakes.

In the event of such catastrophic event resulting in an energy production interruption; OR in the event of metering or communications equipment failure where the production data is irretrievable by the PDP at no fault of the customer AND it can be determined that the customer's generating equipment was still operating and interconnected with the utility grid, the Program Administrator may extend the PBI incentive payment period beyond the established timeframes otherwise specified by the incentive program Handbook. The PBI incentive payment extension period will be equivalent to the same period the system energy production data is unavailable. In situations where a communications issue results in missing data but the data is retrieved at a later date, the Program Administrator will accept the retrieved data and process payment for the recovered data with the next payment period and no extensions of the PBI incentive payment period will be necessary.

PDP Non-Performance

The Program Administrator will not issue incentive payments to customers based on estimated data from the PDP, nor will the Program Administrator estimate incentive payments under any circumstances. It is the PDP's responsibility to ensure timely (+ 5 days after the end of the specified reporting period) and accurate posting of validated performance data so customer incentive payments can be made.

The following conditions may result in penalties, suspension of activity, or revocation of PDP approval from the Program Administrator:

- Data not posted by specified date (10% of accounts serviced by PDP over a one-month period are late).
- **No data received for incentive period** (per customer: no data posted 2 times consecutively OR 3 times in 6 months; and/or per PDP: no data posted for 10% of accounts serviced by PDP).
- Server availability/ access problems (server unavailable or inaccessible more than 2 consecutive business days, and/or 3 or more times in 6 months) [Note: This condition only applies when the Program Administrator retrieves data from the PDP server.]
- Data not validated in accordance with program requirements over the course of the CSI Program. (1 time)
- Estimated data posted instead of actual data. (1 time)
- Meter change information not reported **within 30 days of the meter change**. (3 times within 6 months)
- **If an audit or investigation shows a discrepancy of +/- 5% between the PDP reported data and raw Program Administrator validated production data for a full report period. This**

discrepancy will trigger an audit schedule set by the Program Administrator for the PDP.

The PDP will be given reasonable opportunity to correct problems identified by the Program Administrator. The Program Administrator will work with the PDP to correct any such problems and avoid unnecessary delays in issuing incentive payments to customers, to the extent feasible. However, if the PDP fails to resolve any issues to the Program Administrator's satisfaction within 60 days which result in delays in incentive payments to customers, the following penalties may apply:

- If the problem is with a single or less than 20% of customer accounts served by the PDP, the Program Administrator will suspend PDP activity with just those affected customers. The affected customers will be notified that the PDP has been unable to resolve the specified issue within an acceptable timeframe and they will be given a 30 day grace period to select and engage with another PDP. The original PDP will be required to transfer all historical data to the newly selected PDP. No incentive payments will be made until the customer provides a contract or similar document proving they are engaged with another PDP, but the customer's incentive payment period will be extended beyond the established period allowed under the applicable program rules to compensate for this interruption in payments. If the customer fails to engage with and provide proof that they have contracted with a new PDP within the allowable grace period, the time between the grace period expiration date and the date the Program Administrator receive such proof will be deducted from the established payment period.
- If the problem is of a more serious nature as determined by the Program Administrator and continues over 60 days, or it affects more than 20% of customers served by the PDP, the PDP's approval will be revoked and all customers will be notified that they must select another PDP. As above, no incentive payments will be made until the customer selects another PDP, but the customers' incentive payment period will be extended beyond the established payment period. The PDP will be eligible to reapply after six months upon demonstrating that they have successfully resolved all problems to the Program Administrator's satisfaction.
- If an audit or investigation shows a discrepancy between the PDP reported data and data obtained by the Program Administrator for a specific customer that is greater than +/-5%, the PDP will be responsible for reimbursing the customer or Program Administrator for any such difference if it is determined that the difference is due to PDP error. The PDP will also be put on an audit schedule by the Program Administrator. If a subsequent audit uncovers a discrepancy with the same customer due to PDP error, the PDP will be assessed a 10% penalty in addition to the difference in reads. If a third audit uncovers any discrepancy due to PDP error, the PDP's approval will be revoked and the customer given an opportunity to select another PDP as described above. Audits may be conducted as stated in the CSI Handbook Section 3.4.3.

Criteria for a PDP Appeals Process

- **Venue for PDP to protest/appeal decisions from Program Administrator**
 - **Appeal to the CSI Working Group for consideration**

APPLICATION PROCESS

Application & Documentation

The PDP applicant completes the attached “Application for PDP Services” and provides all documentation in the attached checklist. Note that the PDP applicant must submit separate applications to and successfully complete the data transfer test described later in this document for each utility or Program Administrator.

In PG&E’s service territory, the PDP applicant forwards the completed application and required documentation to:

Mail to: Program Manger, California Solar Initiative
Pacific Gas & Electric Co.
P.O. Box 770000
San Francisco, CA 94177-0001

For questions, contact: Program Manager, California Solar Initiative
Phone: (415) 973-3480
Fax: (415) 973-2510
Email: SolarPBI@pge.com
Web: www.pge.com/csi

In SCE’s service territory, the PDP applicant forwards the completed application and required documentation to:

Mail to: Program Manager, California Solar Initiative
Southern California Edison
6042A Irwindale Ave
Irwindale, CA 91702

For questions, contact: Program Manager, California Solar Initiative
Phone: (800) 799-4177
Fax: (626) 633-3402
Email: pbi@sce.com
Web: www.sce.com/rebatesandsavings/CaliforniaSolarInitiative/

In San Diego Gas & Electric’s service territory, the PDP applicant forwards the completed application and required documentation to:

Mail to: California Center for Sustainable Energy
Attn: CSI Program Manager
8690 Balboa Avenue Suite 100
San Diego, CA 92123

For questions, contact: California Solar Initiative Program Manager

Phone: (858) 244-1177
Fax: (858) 244-1178
Email: csi@energycenter.org
Web: www.energycenter.org

The Program Administrator will review the submitted documentation, determine if the PDP applicant meets the program requirements and notify the PDP applicant via email. The Program Administrator will review the application and respond to the PDP applicant within 10 business days.

Data Transfer Test

Once the Program Administrator has reviewed and accepted the potential PDP's application, they will contact the PDP applicant to schedule a data transfer test.

The PDP applicant is responsible for downloading the Program Administrator's EDI 867 Implementation Guide and Tutorials from its website. The PDP applicant will create the EDI 867 Phase 1 test file and email it as an attachment to the Program Administrator. The Program Administrator will check the test file to ensure it complies with the guidelines and notify the PDP applicant within 5 business days.

The PDP applicant will then place production-ready Phase 2 test files on their server. The Program Administrator will process the test file to verify compliance with the EDI 867 guidelines and notify the PDP applicant within two weeks of the test results. Once the PDP is notified it has passed the Phase 2 test, the PDP is considered qualified. The PDP and the Program Administrator will agree on a date to move into production. If the PDP applicant fails the Phase 2 test, they will be given 2 weeks to resolve any technical or data format issues. If the PDP applicant fails the test a third time, they will not be allowed to reapply for a period of six months.

APPLICATION FOR PDP SERVICES

This application and the attached documents are to be used by Applicants when applying for Performance Data Provider (PDP) acceptance. Use this application and attached checklist to indicate what information you have included with your application and to ensure that you have all the required documentation.

The PDP will receive an acknowledgement that the PA has received your application, as well as any necessary requests for additional information, within ten business days of the receipt of this application. The PDP will also receive information on the data transfer test with sample data, contact names and procedures.

By signing this agreement, the applicant agrees to keep all customer information confidential regarding the data transmitted to it by the Program Administrator in the testing process.

PDP APPLICANT NAME: _____

CONTACT PERSON: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

PHONE: (____) _____ FAX: (____) _____ EMAIL: _____

Please provide the following information for connectivity purposes (if required):

COMPLETE URL ADDRESS: _____ USER CODE: _____

PASSWORD: _____

TECHNICAL SUPPORT CONTACT INFORMATION:

PHONE: (____) _____ EMAIL: _____ WEB: _____

CUSTOMER SUPPORT CONTACT INFORMATION:

PHONE: (____) _____ EMAIL: _____ WEB: _____

SIGNATURE: _____ TITLE: _____

(Signature must be someone with legal authority at the PDP) DATE: _____

PDP Authorization Checklist

Use this checklist to ensure that you include all required documentation in your PDP Qualification Package. Attach copies of relevant documents.

Background

- Company background (years in business, size, number of employees, general description, executive team, etc.)
- Meter data reading and reporting experience and capabilities, capacity, technology overview, IT capabilities, etc.

Procedures

- Meter reading and data retrieval procedures
- Data communication (frequency, scalability, types, troubleshooting, etc.)
- Process for retrieving missed reads
- Data validation procedures
- Technical Support (hours of operations, staff levels, procedures, etc.)
- Customer Support (hours of operations, staff levels, etc.)
- Meter servicing, testing, calibration and troubleshooting procedures (note if this service will be performed by the PDP or outsourced, and if outsourced, what procedures will be required of the contractor(s)).

ITS Systems and Processes

- Data posting (data translation, formatting, firewall access, etc.)
- Data retention plan
- Backup and recovery plans
- Hardware and software scalability plans
- Data confidentiality and security procedures

ATTACHMENT A

Proposed CSI Data Validation Rules

Check	Purpose
Time Check of Meter Reading Device/system	Check for time drift of meter reading device/system outside standard
Meter ID Check	Check for the following: <ul style="list-style-type: none">• Meter ID reported correctly• Meter has not been changed out• Data is being reported for correct meter
Time Check of Meter	Check for time drift of meter clock outside standard
Pulse Overflow Check	Check for the following: <ul style="list-style-type: none">• Improper scaling factor in meter• Improperly sized transformer• Hardware problem
Test Mode Check	Check that data collected when meter was in test mode represents test production rather than actual production
Sum Check	Check for the following in combination meter/recorder installations: <ul style="list-style-type: none">• Crossed channels between meter & recorder• Pulse relay problems Check for the following in all installations: <ul style="list-style-type: none">• Invalid PT & CT ratios• Invalid meter constants
Spike Check	Check for the following: <ul style="list-style-type: none">• Transmission error

	<ul style="list-style-type: none"> • Spike resulting from meter test
High/Low Data Check	<p>Check for the following:</p> <ul style="list-style-type: none"> • Dropped phases • Inaccurate meter constants • Energy diversion • Fast/slow meters <p>Also check for erratic pulse input to recorder in combination meter/recorder installations</p>
Daytime Only Solar Production Check	Check to ensure solar production occurs only during expected daylight hours
Zero or Negative Solar Production During Daylight Hours Check	Check to ensure that there is production during expected daylight hours and that there is no consumption recorded during these hours

APPENDIX 2

TO: Nicolas Chaset via email
PDP Service list via email

RE: PDP Requirements Draft of March 4, 2008

DATE: March 17th, 2008

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As requested on March 4 please find attached the collective comments, concerns, and suggestions of the listed PMRS Providers with respect to the PDP Requirements Draft circulated on March 4, 2008 for comments.

Attachment A of this document contains a list of specific comments and concerns related to the changes made and not made to the previous working draft discussed on December 12th.

Attachment B of this document contains a list of general comments and concerns related to a number of critical issues that have been discussed previously by the PDP working group but for which changes have not yet been reflected in the PDP Requirements Draft.

While it is of course our intent to provide a set of comprehensive comments on the current draft of the PDP proposal, due to the challenges inherent in doing so as well as the on-going nature of this drafting process, the inputs contained within document should not be considered final or complete.

Sincerely,

Draker SolarDesign - Bruce McGeoch
Energy Recommerce - Ronnie Pettersson
Fat Spaniel Technologies - David Kopans
Glunetworks - Mark Mah
Powernab - Shannon Koffman

ATTACHMENT A

Attachment A of this document contains a list of specific comments and concerns related to the changes made and not made to the previous working draft discussed on December 12th and circulated on March 4th for comment. Attachment A only contains the pages of the March 4th document that contain comments (3 pages). Note that the blue colored text represents the changes made to the previous working draft discussed on December 12th

PMRS Providers comments and text changes appear in green or in the comment balloons appearing in the right margin.

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is suspected and confirmed, the System Owner will be charged for these costs.

Data Retention

Interval and cumulative monthly data must be retained in accordance with appropriate program requirements (see Section ~~1244~~ of the CSI Handbook for CSI program requirements). The PDP must be prepared to post historical interval data at the Program Administrator's request. The PDP is also responsible for providing backup and disaster recovery services for 100% of the data up to the date of the final PBI payments.

Technical and Customer Support

The PDP must provide a technical support number to the Program Administrator for use during normal business hours (8am to 5pm Pacific time, Monday through Friday, except holidays) to help resolve any data availability, format or corruption issues, communication problems, server access problems, or other technical issues. Within those normal business hours, the PDP must respond to Program Administrator requests within ~~two 24 hours (during normal PDP business days/hours)~~ with a status report and plan for correcting the issues. The PDP must also provide a customer support number to respond to customer inquiries within ~~two 24 hours (during normal PDP business days/hours)~~ from the initial customer contact. Program Administrators will have the discretion to set reasonable deadlines for the resolution of data transfer problems/issues.

Comment [MSOffice1]: It is important to insert the word "reasonable" unless specific deadlines are noted in this document.

PDP Performance Exemptions

The PDP is responsible for meeting the above noted program requirements and for consistently posting performance data in accordance with the Program Administrator's scheduling and data posting requirements. At its discretion, the Program Administrator may grant reasonable allowances for occasional issues or technical problems, as well as for large catastrophic events such as earthquakes.

In the event of such catastrophic event resulting in an energy production interruption; OR in the event of metering or communications equipment failure where the production data is irretrievable by the PDP at no fault of the customer AND it can be determined that the customer's generating equipment was still operating and interconnected with the utility grid, the Program Administrator may extend the PBI incentive payment period beyond the established timeframes otherwise specified by the incentive program Handbook. The PBI incentive payment extension period will be equivalent to the same period the system energy production data is unavailable. In situations where a communications issue results in missing data but the data is retrieved at a later date, the Program Administrator will accept the retrieved data and process payment for the recovered data with the next payment period and no extensions of the PBI incentive payment period will be necessary.

PDP Non-Performance

The Program Administrator will not issue incentive payments to customers based on estimated data from the PDP, nor will the Program Administrator estimate incentive payments under any circumstances. It is the PDP's responsibility to ensure timely ~~(+/- 5 days~~ after the end of the specified reporting period) and accurate posting of validated performance data so customer incentive payments can be made.

The following conditions may result in penalties, suspension of activity, or revocation of PDP approval from the Program Administrator:

- Data not posted by specified date (10% of accounts serviced by PDP over a one-month period are late).
- ~~NoMissing~~ data received for incentive period (per customer: no data posted 2 times consecutively OR 3 times in 6 months; and/or per PDP: no data posted for 10% of accounts serviced by PDP).
- Server availability/ access problems (server unavailable or inaccessible more than 2 consecutive business days, and/or 3 or more times in 6 months) [Note: This condition only applies when the Program Administrator retrieves data from the PDP server.]
- Data not validated in accordance with program requirements over the course of the CSI Program. (1 time~~(3 times)~~)
- Estimated data posted instead of actual data, (1 time)
- Meter change information not reported within 30 days of the meter change. (3 times within 6 months)
- If an audit or investigation shows a discrepancy of +/- 5% between the PDP reported data and raw Program Administrator validated production data for a full report period. This discrepancy will trigger an audit schedule set by the Program Administrator for the PDP.

Comment [njm2]: Because explicit data validation requirements have yet to be developed it is inappropriate at this time to set the number of failures after which penalties are assessed.

The PDP will be given reasonable opportunity to correct problems identified by the Program Administrator and communicated to the PDP. The Program Administrator will work with the PDP to correct any such problems and avoid unnecessary delays in issuing incentive payments to customers, to the extent feasible. However, if the PDP fails to resolve any issues to the Program Administrator's satisfaction within 60 days which result in delays in incentive payments to customers, the following penalties may apply (note however that if a problem has a resolution plan in place it does not count as an infringement that will result in a penalty):

Comment [njm3]: The modifications to this section are based on notes from the meeting.

- If the problem is with a single or less than 20% ~~percentage~~ of customer accounts served by the PDP, the Program Administrator will suspend PDP activity with just those affected customers. The affected customers will be notified that the PDP has been unable to resolve the specified issue within an acceptable timeframe and they will be given a 30 day grace period to select and engage with another PDP. The original PDP will be required to transfer all historical data to the newly selected PDP. No incentive payments will be made until the customer provides a contract or similar document proving they are engaged with another PDP, but the customer's incentive payment period will be extended beyond the established period allowed under the applicable program rules to compensate for this interruption in payments. If the customer fails to engage with and provide proof that they have contracted with a new PDP within the allowable grace period, the time between the grace period expiration date and the date the Program Administrator receive such proof will be deducted from the established payment period.
- If the problem is of a more serious nature as determined by the Program Administrator and continues over 60 days, or it affects more than 20% of customers served by the PDP, the PDP's approval will be revoked and all customers will be notified that they must select another PDP. As above, no incentive payments will be made until the customer

selects another PDP, but the customers' incentive payment period will be extended beyond the established payment period. The PDP will be eligible to reapply after six months upon demonstrating that they have successfully resolved all problems to the Program Administrator's satisfaction.

- If an audit or investigation shows a discrepancy between the PDP reported data and data obtained by the Program Administrator for a specific customer that is greater than +/-5%, the PDP will be responsible for reimbursing the customer or Program Administrator for any such difference if it is determined that the difference is due to PDP error. [The PDP will also be put on an audit schedule by the Program Administrator.](#) If a subsequent audit uncovers a discrepancy with the same customer due to PDP error, the PDP will be assessed a 10% penalty in addition to the difference in reads. If a third audit uncovers any discrepancy due to PDP error, the PDP's approval will be revoked and the customer given an opportunity to select another PDP as described above. Audits may be conducted as stated in the CSI Handbook Section 3.4.3.

Criteria for a PDP Appeals Process

- [Venue for PDP to protest/appeal decisions from Program Administrator](#)
 - [Appeal to the CSI Working Group for consideration](#)

APPLICATION PROCESS

Application & Documentation

The PDP applicant completes the attached "Application for PDP Services" and provides all documentation in the attached checklist. Note that the PDP applicant must submit separate applications to and successfully complete the data transfer test described later in this document for each utility or Program Administrator.

Comment [MSOffice4]: It may be most appropriate to include appropriately modified text here from the last paragraph of section 2.9.1 of the CSI HANDBOOK

Section 2.9.1 text (unmodified) is as follows:

If an Installer or Applicant disputes the failed inspection or disqualification, he or she may appeal in writing within 30 days of notification of the failed inspection via US certified mail to the Program Administrator. A panel of all of the Program Administrators and a representative from the Energy Division of the California Public Utilities Commission will review the appeal. Written appeals should substantiate any reasons he or she believes warrant reconsideration of the failure or disqualification. The appealing party may request an audience with the panel. The panel may also request additional information to substantiate the written appeal. The final decision will be provided to the Applicant or Installer within 60 days of receipt of the written appeal and the appeal decision of the panel shall be final.

ATTACHMENT B

Attachment B of this document contains a list of general comments and concerns related to a number of critical issues that have been discussed previously by the PDP working group but for which changes have not yet been reflected in the PDP Requirements Draft circulated on March 4th for comment.



Data Transfer Test

As noted during the December 12th meeting the current draft of the PDP proposal lacks a clearly defined success metric as it applies to the Data Transfer Test. A clearly defined definition of success needs to be added to the PDP proposal.

Likewise, as noted during the December 12th meeting the “3 strikes and out” clause associated with the Data Transfer Test is unduly punitive. The PMRS providers understand the need to minimize the impact and cost of PDP Data Transfer Testing on the PAs and endorse the replacement of the “3 strikes and out” clause with a mutually agreed upon fixed payment structure due the PAs for each test conducted by the PAs subsequent to the third test. The PMRS Providers believe this modification will properly encourage prospective PDPs to devote the needed engineering resources to complete the Data Transfer Test in a timely fashion, limit the burden on the PAs, and result in the highest number of approved PDPs in the shortest time-period possible.

Clarification of Meter Related Responsibilities

As noted during the December 12th meeting the current draft of the PDP proposal at times appears to require PDPs to be responsible for the installation, testing, calibration, recalibration, and or maintenance of kWh meters. As a data provider, assigning such responsibilities to PDPs is inappropriate. As such, the PDP proposal should be modified so that it is clear that the responsibilities of a PDP begin with the retrieval of PBI data from a kWh meter and that PDPs are not held responsible for issues related to meter installation, testing, calibration, recalibration, and or maintenance.

Clarification of Communication Responsibilities

In a similar vein to the Meter Related Responsibilities, it is important to note that while PDPs should be responsible for identifying and resolving some communication issues this should not be a primary responsibility of a PDP as it pertains to some of the communication links associated with transmitting PBI data. Specifically, communication links from a CSI recipient’s site to a PDP are frequently owned, maintained and managed by the CSI recipient, not by the PDP. As such, troubleshooting and resolving communication issues should not be a PDP’s responsibility and the PDP Proposal should be modified accordingly to strike this requirement.

Clarification of Data Handling Requirements

As noted during the December 12th meeting the current draft of the PDP proposal contains broad statements with respect to a PDP’s responsibilities for on-request data requests as well as backup and disaster recovery requirements. These requirements need to be clarified and should reflect the specific responsibilities of PDPs as they pertain to PBI data. As such it should be noted that the data must be retained in its raw form to enable auditing, that data should be maintained for some reasonable period of time following the date of the final PBI payment (requirement currently ends on date of the last PBI payment), and that PDP providers need not post historical data on demand.

Financial Liability for Improper Payments

As discussed during the December 12th meeting changes and clarifications are needed with respect to a PDP's financial liabilities related to improper PBI payments (overpayments or underpayments).

In a 60 month program there is ample time for PBI recipients and PAs to adjust future payments so as to correct any manner of incorrect prior period payments. Accordingly, there is no logical reason for a PDP to reimburse either PAs or the PBI recipients for incorrect prior period payments other than as a punitive measure. Other penalties are far fairer and more appropriate in ensuring accurate PDP reporting – and the draft already contains such penalties. Specifically, as currently drafted, including the offending PDP on an audit schedule (first strike), assessing a 10% penalty of the overpayment (second strike), and revoking PDP status (third strike) are all appropriate penalties with respect to overpayment errors caused by a PDP. The last two of these penalties are however inappropriate with respect to underpayment errors caused by a PDP. In this case the CSI program should allow the free market to intercede. For after all, a PDP client holds the biggest penalty of all – the right to fire and replace their PDP at any time and for any reason. And, while a PDP's customer might take issue with a PDP who has underreported, many other attributes about the offending PDP's service may exist that would cause the PBI recipient to desire to continue to retain the PDP even in light of an underreporting error. Accordingly, in the case of underreporting, the PAs should not have the power to move the hand of the free market by assessing penalties or revoking PDP status.

Use of "PDP Authorization Checklist" Data

During the December 12th meeting the Program Administrators agreed to modify the PDP proposal's Application form such that written assurances would be provided to applicants indicating that the application information from a prospective PDP would be maintained by the Program Administrators on a confidential basis. The PMRS Providers very much appreciated the PAs expression at that time and look forward to reviewing the next draft of the PDP requirements document that incorporates this language.

APPENDIX 3



GXS

CSI PDP Reporting

Discussion on Formats and Delivery Protocols

February 26, 2008

GXS Overview

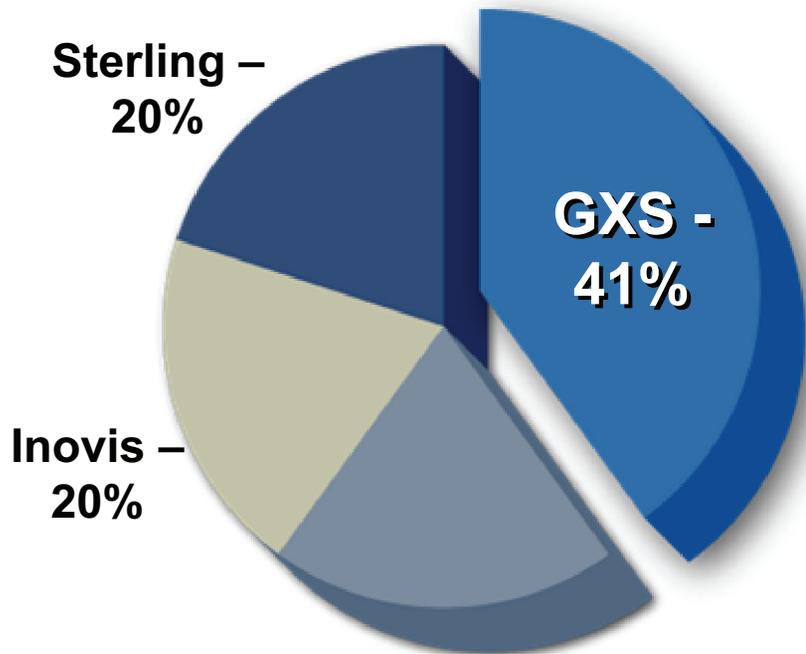


- **Strong History - 35+ Years of Experience**
- **World's Largest B2B Integration Services Provider**
- **Global - 40% of Business in Europe & Asia**
- **75% of Fortune 500**
- **40,000 Small to Medium Businesses**

GXS accelerates the reliable exchange of information between organizations worldwide. By serving large and small customers jointly and distinctly, we streamline cross-enterprise business processes.

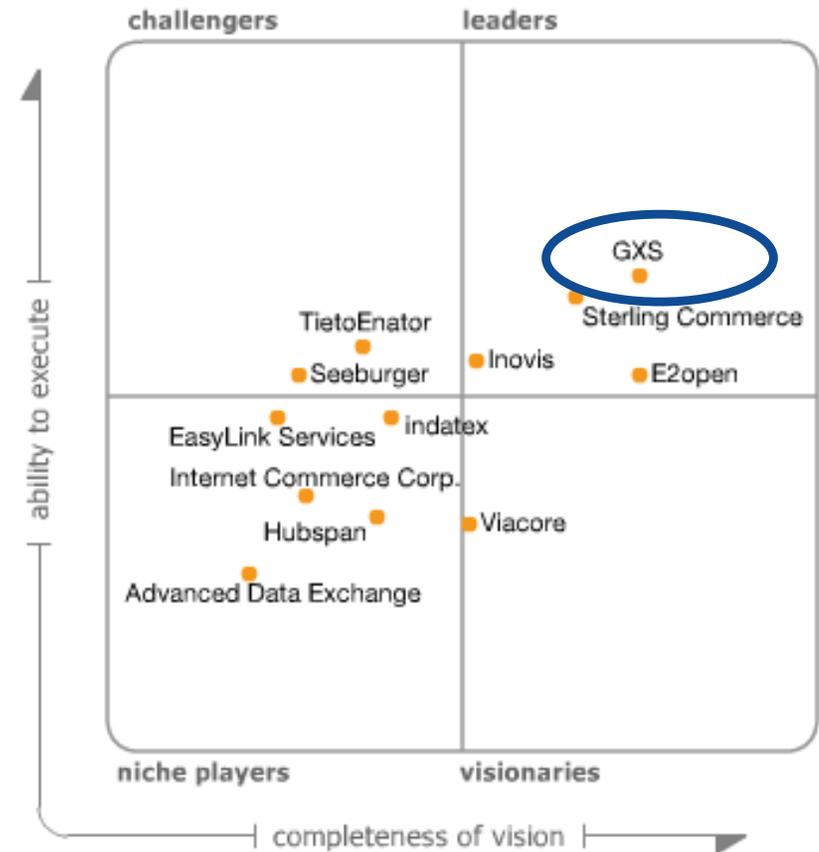
The Leading Integration Service Provider

Electronic Document Exchange Revenues



Over 100 Local Telecom Providers and VANs – 19%

Source: GXS – Based upon Estimated Electronic Document Exchange Revenues

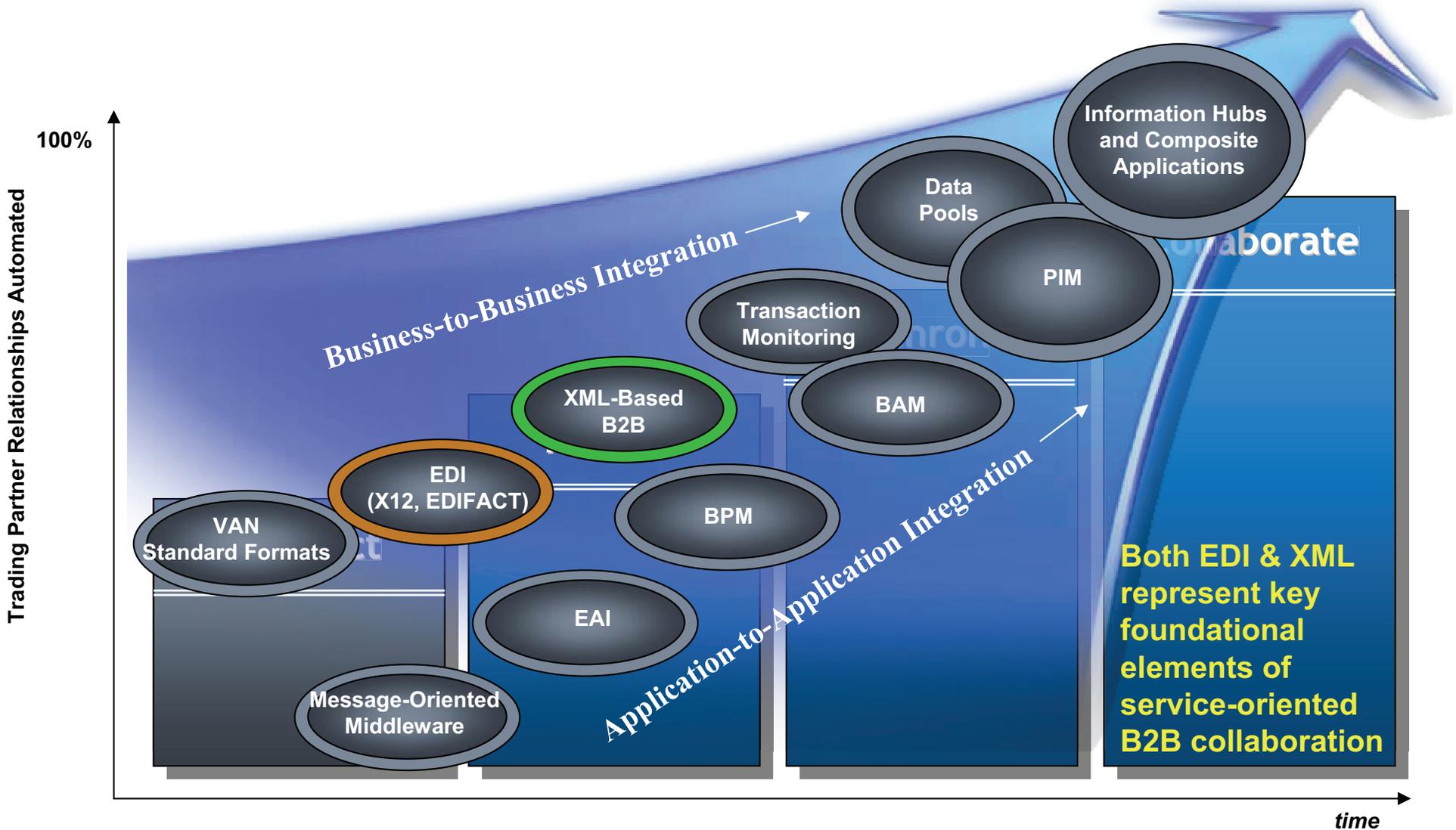


GXS is a recognized leader in the Gartner Group's Magic Quadrant

Source: Magic Quadrant for Integration Service Providers, 1Q06; Gartner Research Note G00124247, January 19, 2006

B2B e-Commerce Trends

Technology Evolution towards Integration Convergence



XML Growing Enabler Of Electronic Exchange

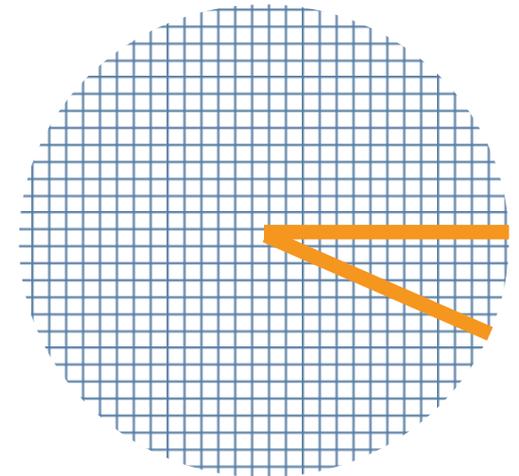
Must embrace and foster new collaboration standards



- XML transaction volumes grew 160% in 2003

- But from a small base
- At the end of 2003, XML represented 5% of overall B2B data flow

Source: Yankee Group



Why is adoption still limited?

XML: The Promise & Reality

Elusive hype surrounding XML

EDI is a well-established technology for automating document interchange between computer applications.

XML is an emerging standard designed to simplify Web-based e-commerce transactions between computer applications.

True

EDI enables highly secure document exchanges.

XML documents typically need to be encrypted to maintain security levels.

Encryption is only part of the solution to securing B to B Transactions, regardless of the format

EDI documents are typically in a compressed, machine-only readable form.

XML is an open human-readable, text format.

True

EDI documents are typically sent via private value-added networks (VANs).

XML documents are typically sent via the Internet - i.e. a relatively low-cost public network.

Today, EDI Documents are sent directly between trading partners via the internet, and EDI VANS carry and process XML Documents

EDI traditionally requires customized mapping of each new trading partners document format.

XML is designed to require one customized mapping per industry grouping, so most companies will be able to work to one format and use XML.

Both Statements are false – the mapping effort in either case is dependent on the degree of standardization in the industry and the relationship between the Trading Partners

XML: The Promise & Reality

Elusive hype surrounding XML

EDI typically requires dedicated servers that cost from US\$10,000 and up.

XML requires a reliable PC with an Internet connection.

Both EDI and XML can be processed on a reliable PC with an Internet Connection,

EDI can involve high on-going transaction based costs keeping up the connection to the EDI network and keeping the servers up and running.

XML in Internet-based has low ongoing flat-rate costs using existing Internet connections and relatively low-cost Web Servers.

The relative cost of communications methodologies is independent of transaction format

EDI-based transactions account for the bulk of value of goods and services exchanged electronically.

XML processes relatively low transaction values.

True, because of XML's low adoption in B to B Electronic Commerce

EDI is estimated to be limited to 300,000 companies worldwide and about 20% of their suppliers because of operational costs and complexity.

XML appears to have no upper limit in terms of numbers of users.

From a B to B Perspective, Number of connections is not as important as the number of connections.

EDI was traditionally built from the ground up in semi-isolation without being able to share resources with other programs.

XML is being developed in a world of shared software development populated by many low-cost tools and open source projects.

Lack of robust, globally adaptable standards for applying XML to B to B Electronic Commerce has hindered adoption

Leading Analysts Concur...

XML will not replace EDI in the foreseeable future



“Through the end of the decade, **ebXML will not replace electronic data interchange (EDI)** as the primary method by which organizations exchange electronic documents with their partners...”

“Despite some recent wins, Electronic Business XML (ebXML), a B2B communications framework, **will continue its struggle for adoption** through year-end 2010.”



“**80% of business transactions still use EDI**, indicating that EDI continues to be the **dominant standard**... XML hype might have generated more headlines and hoopla in the last year, but EDI is still the **dependable workhorse for business transactions**.”



“The core technology may be nearing its silver anniversary, but **EDI remains a critical element** of many medium-sized and large companies’ supply chains. The volume of commerce conducted over EDI will reach \$1.99 trillion in 2003 and **will grow** to \$2.68 trillion in 2007.”



“The use of EDI standards and VAN-based document transport **continues to expand** and will be **the mainstay of commercial B2B activity** for the foreseeable future.”

“**On-going penetration of EDI into small to midsize organizations** will continue to be the primary source of growth in the volume of EDI transactions.”

“Expect a **5% to 10% annual increase in the total number of EDI transactions** during the next five years.”



“There is a widely **mistaken perception that XML will replace EDI**, the primary way companies exchange information today... XML adoption will grow in tandem with EDI and the transaction **volume on both networks will rapidly increase**.”

“XML Volumes Increase Dramatically, but **EDI Dominates Networked Supply Chain**”



EDI Remains Critical To B2B Collaboration

Penetration is high across many sectors

Industry	\$ Value of US-Based EDI Transactions by Year				
	2001 (billions)	2002 (billions)	2003 (billions)	2004 (billions)	2005 (billions)
Chemicals	\$60	\$60	\$63	\$65	\$68
Consumer Goods	\$289	\$291	\$302	\$314	\$327
Electronics	\$86	\$87	\$90	\$94	\$98
Food and Beverage Processing	\$379	\$381	\$396	\$412	\$428
Health Care	\$347	\$349	\$432	\$477	\$527
Manufacturing	\$661	\$665	\$690	\$718	\$747
Metals and Natural Resources	\$414	\$417	\$433	\$450	\$468
Pharmaceuticals and Medical	\$171	\$172	\$179	\$186	\$194
Retail and Distribution	\$360	\$363	\$376	\$392	\$407
Transportation	\$299	\$301	\$312	\$325	\$338
Utilities	\$161	\$162	\$168	\$175	\$182
	\$3,227	\$3,250	\$3,443	\$3,608	\$3,783
Annual growth estimates*	1.10%	0.07%	3.80%	4.00%	4.00%

EDI FACTS:

Supports over 1/3
of US GDP

Between 12-15
million transactions
per day...
and growing

Source: Forrester / Giga

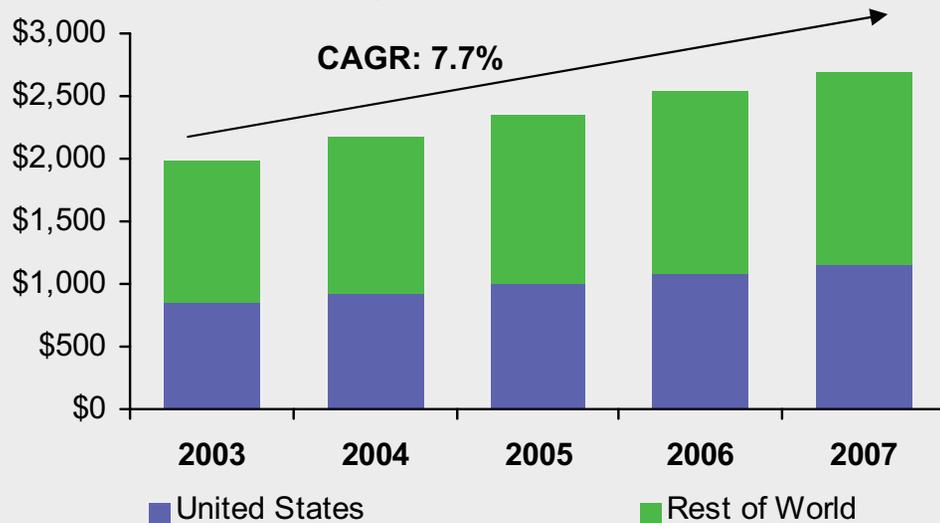
EDI Growth Driven by Companies of All Sizes

Misconception: EDI is for large companies only

Worldwide EDI Purchasing by Region

Source: IDC.

\$ in Billions



2003 to 2005 EDI Transaction Value Growth

Source: Forrester.

- Manufacturing ▲ Up 25% due to SMB Growth
- Healthcare ▲ Up 35% due to SMB Growth/HIPAA
- Food and Beverage ▲ Up 10% due to SMB growth
- Retail & Distribution ▲ Up 30% due to int'l procurement/imports
- Transportation ▲ Up 25% due to SMB growth
- Financial Services ▲ Up 10% due to SMB growth
- Consumer Goods ▲ Up 10% due to SMB growth
- Pharmaceuticals ▲ Up 10% due to SMB growth
- Utilities ▲ Up 50% for scheduling transmissions
- Electronics ● Down 15% due to RosettaNet PIPs
- Chemical ● Down 5% due to CIDX

**EDI Growth in Global Business
Partner Enablement**



**EDI Growth in Small-and-Medium
Business Partner Enablement**



Why Is EDI So Valuable?

EDI is the mainstay of B2B for several key reasons...

	EDI	XML
Proven robust, reliable (proven SLAs)	✓	△
Standard data formats (forms), no manual intervention	✓	△
Standards-based security	✓	△
Standards-based data transformation	✓	△
Cost effective	✓	△
Scalable (upward and downward)	✓	△
Established TP management protocols	✓	△
Efficient file size, minimal network traffic / infrastructure	✓	△

XML is an evolution in B2Bi, not revolution...
'Rip & replace' rarely cost effective

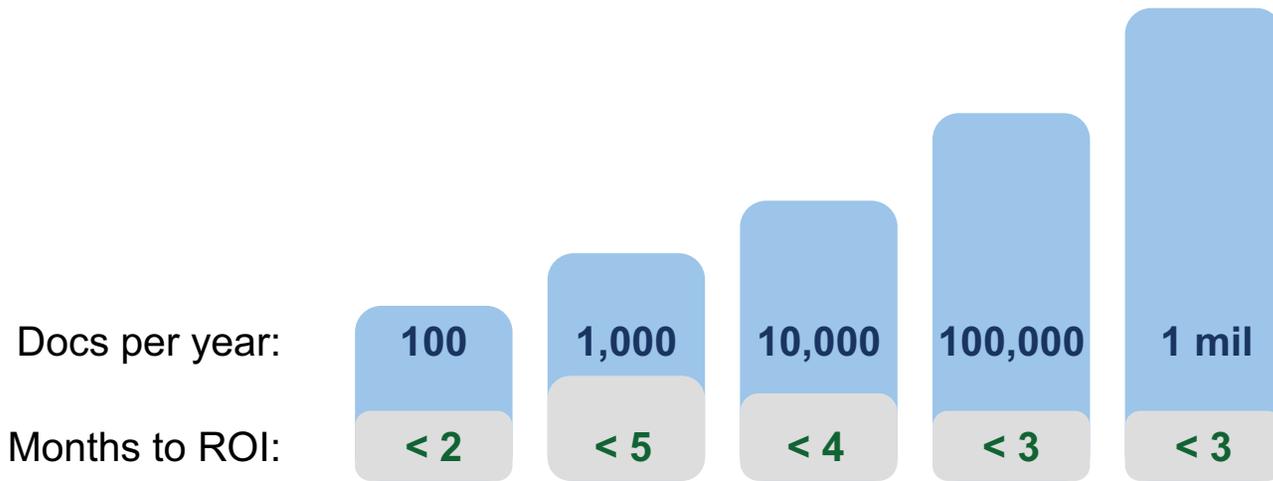
EDI is proven & reliable...
Bottom line: EDI works!

EDI is Cost Effective

Misconception: EDI is too expensive; XML is 'free'



EDI delivers measurable & fast ROI



Source: Forrester

Gartner

Significant cost associated with setting up, maintaining, managing, and scaling XML-based document exchange

Table 1
Estimated WSN Deployment Costs

Trading-Community Size	Small	Medium	Large
No. of Trading Partners	1-50	50-250	250-1,000
Initial Hardware + Software Cost	\$50,000-100,000	\$100,000-200,000	\$200,000-500,000
Full-Time Equivalents (FTEs)	1-3	3-5	5-10
Minimum FTE Cost	\$75,000	\$225,000	\$375,000
Total Minimum Initial Hub Cost	\$125,000	\$325,000	\$575,000

Source: Gartner Research (May 2003)

Where does XML Fit?

- Data exchange between internal applications
- Data Exchange between Service Providers and their customers
- Data Exchange between small communities of specific and unique information

Establishing an XML Document Standard

Steps to Establishing a Community Standard

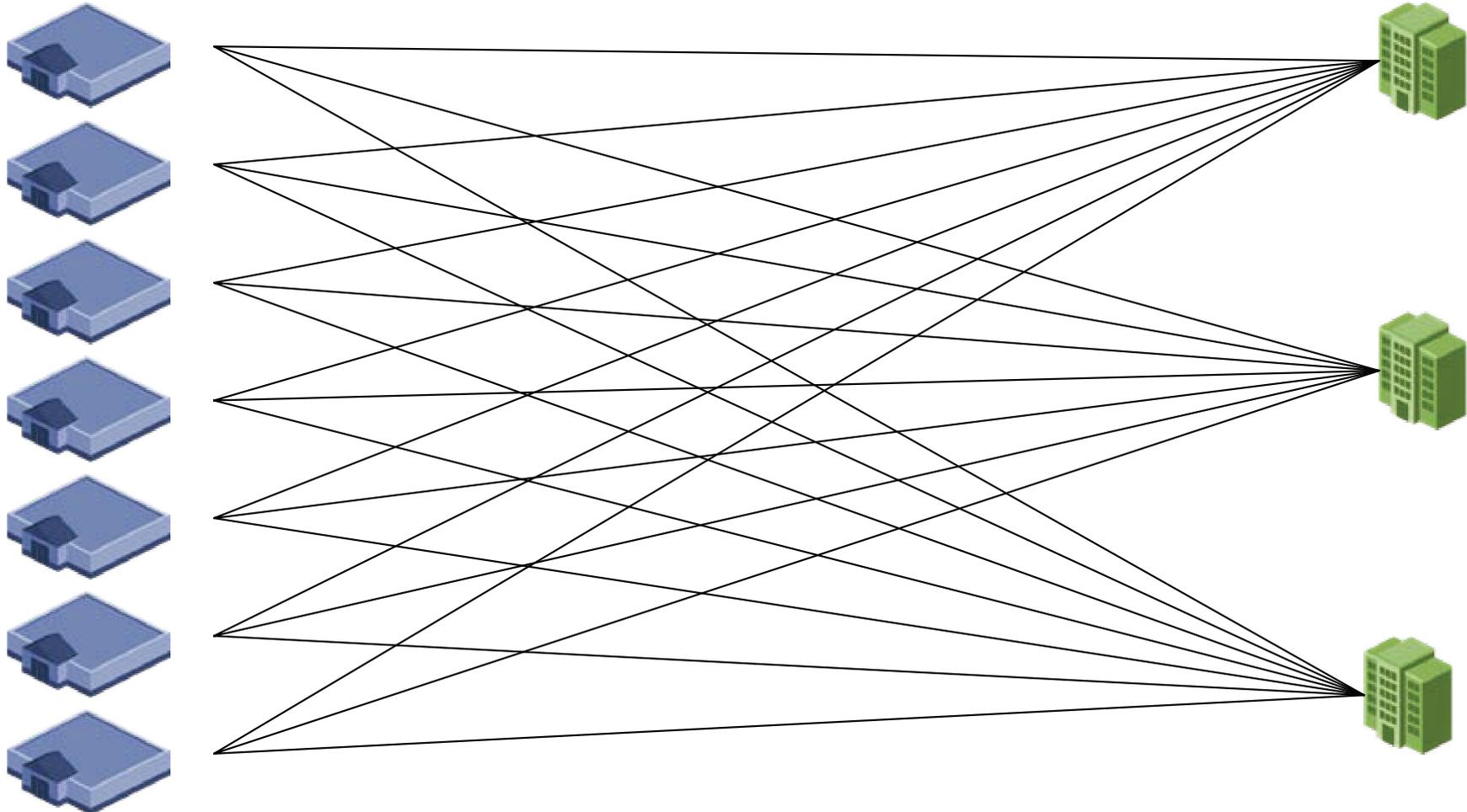
1. Agree on Document Types to be exchanged
2. Agree on required Data Elements and their relationships
3. Identify and define any data variations that may be required
4. Establish a methodology for identifying the Document types to be exchanged
5. Establish Document Verification Rules
6. Establish Standards for message receipt and acknowledgement and bad message notification
7. Plan and prioritize the automated interfaces to in-house systems

Establishing an Electronic Commerce Standard

A Comprehensive Electronic Commerce Standard must address:

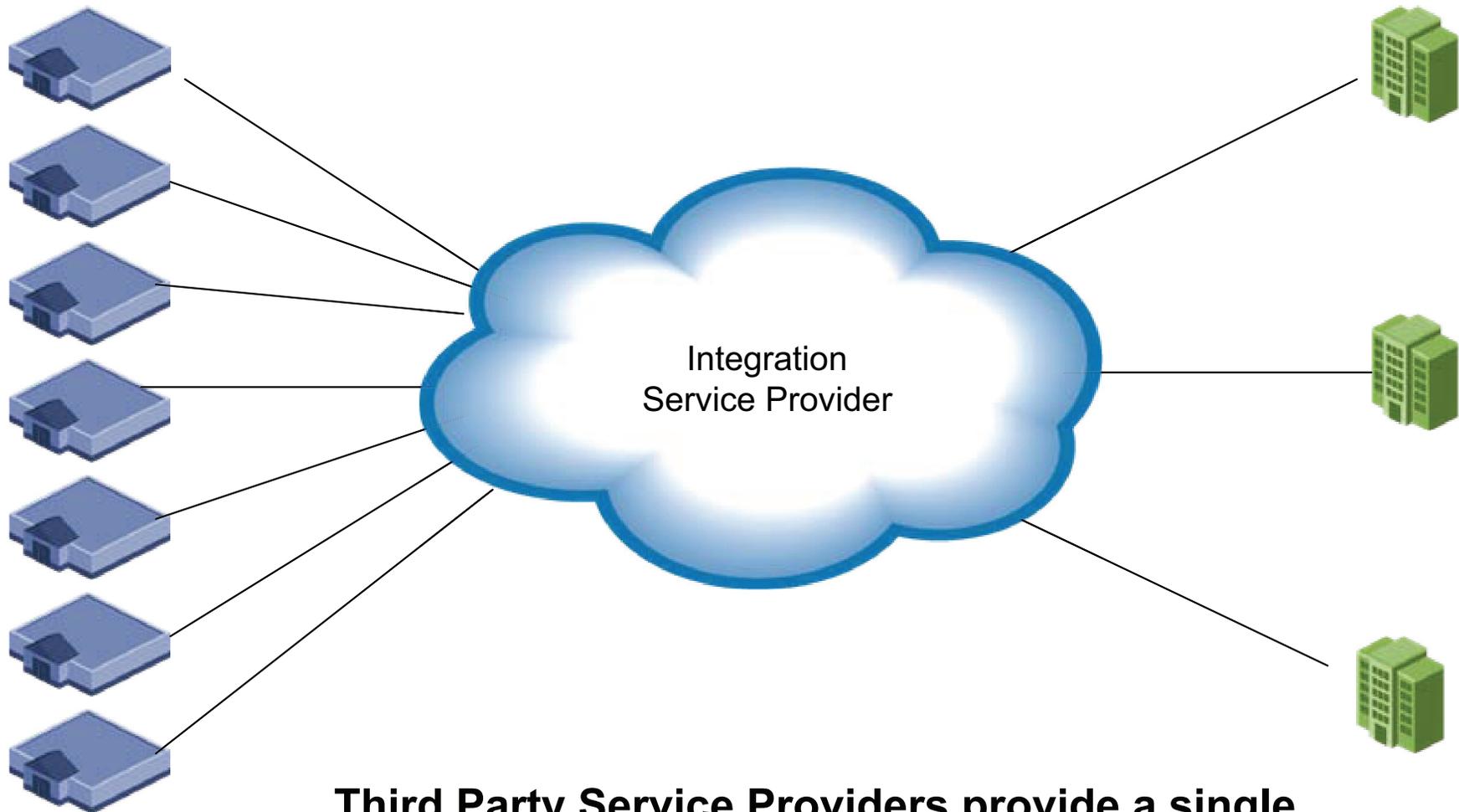
- Privacy
 - Protection of data content from unauthorized access
- Authentication
 - Assurance that the sender is who he claims to be
- Integrity
 - Assurance that the data received was not modified in transit
- Non-Repudiation
 - Proof that both the sender and receiver participated in the transaction

Managing Trading Partner Connectivity



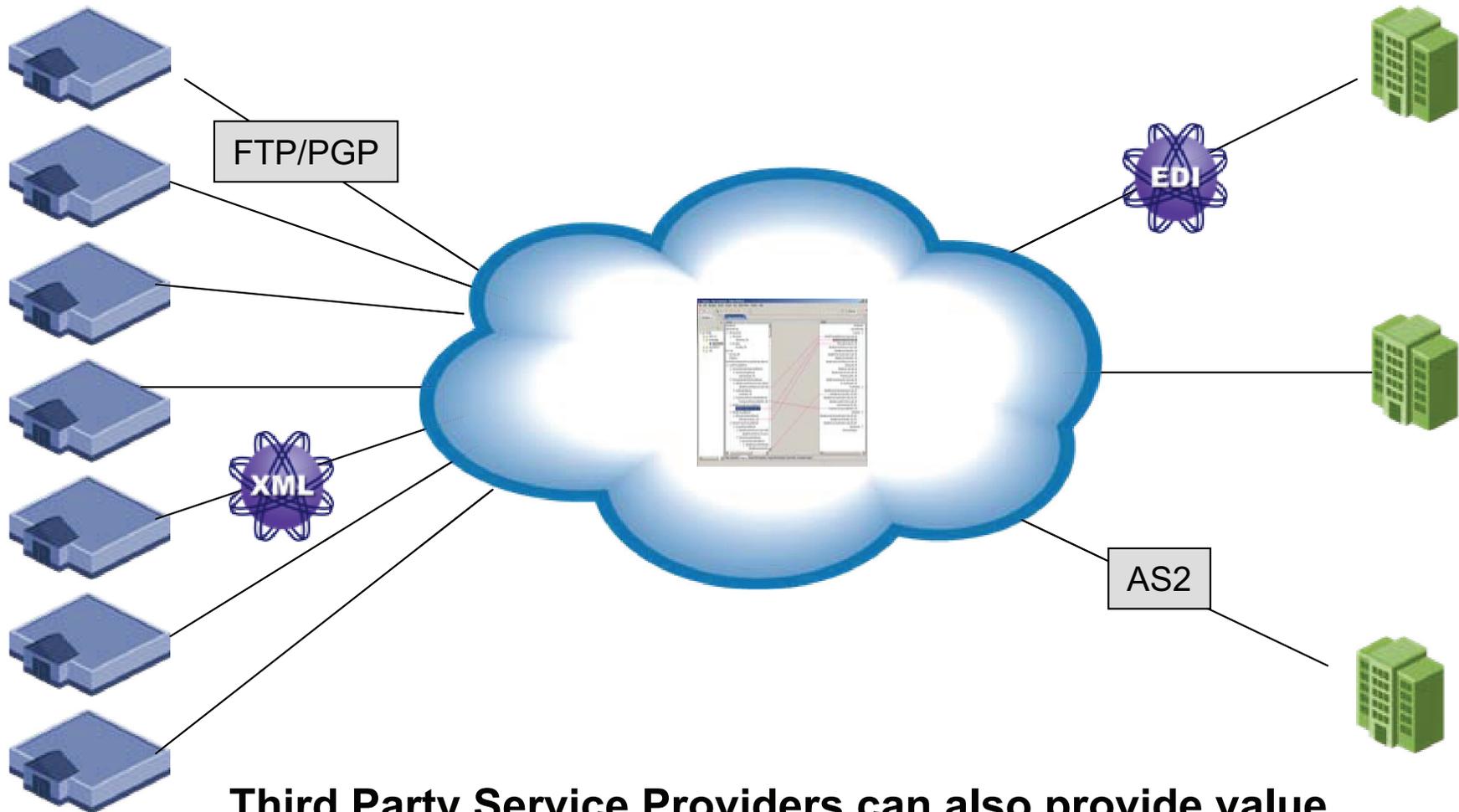
“Point to Point” Connections increase management complexity of credentials, communications protocols, schedules, exceptions, etc.

Leveraging VAN Services



Third Party Service Providers provide a single point of connection to reach all trading partners

Outsourced B to B E-Commerce



Third Party Service Providers can also provide value added services such as translation and protocol mediation

Scope of the CSI PDP Program

	PDP	PA
Number of Trading Partners	3	18
Estimated Monthly Data for EDI*	525KC's	3,150KC's
Estimated Monthly Data for XML*	2,625KC	15,750KC's

*Assumes 5 meters/PDP

Summary: Sample Comparative Costs

	XML/ Internet	Traditional EDI	Outsourced
Translation Software and Infrastructure	\$50,000	\$50,000	
Map Specification, Testing and Deployment	\$100,000	\$50,000	\$25,000
Communicatoins Software	\$10,000	\$10,000	
Annual Recurring Costs			
Personnel	\$250,000	\$200,000	\$100,000
Software Maintenance	\$12,000	\$12,000	
Annual EDI VAN Charges		\$3,000	\$90,000
Total Three Year Costs	\$946,000	\$755,000	\$595,000

APPENDIX 4

PG&E CSI Meter Validation



**VALIDATION AND EDITING OPTIONS FOR
SOLAR GENERATION METER DATA**

**ENTEGRITY LLC
DAVID HILL
SHANEEN HARRIS**

Agenda



- 9:00 Introduction and Goals
- 9:15 California MDM VEE Standards
- 9:30 Available Data and Site Characteristics
- 10:00 Solar Generation Reasonability Checks
- 11:00 Solar Estimation Techniques

Project Goals



- Evaluate sample solar data for data anomalies
- Propose and test validation and editing techniques
- Evaluate feasibility of implementation of best methods

California MDM VEE Standards



Data Collection Validation

- Time check of meter reading device/system
- Meter identification check
- Time check of meter
- Pulse Overflow check
- Test Mode check
- Sum check

Data Reasonability Validation

- Spike check
- kVARh check
- High-Low Usage check

Available Data and Site Characteristics

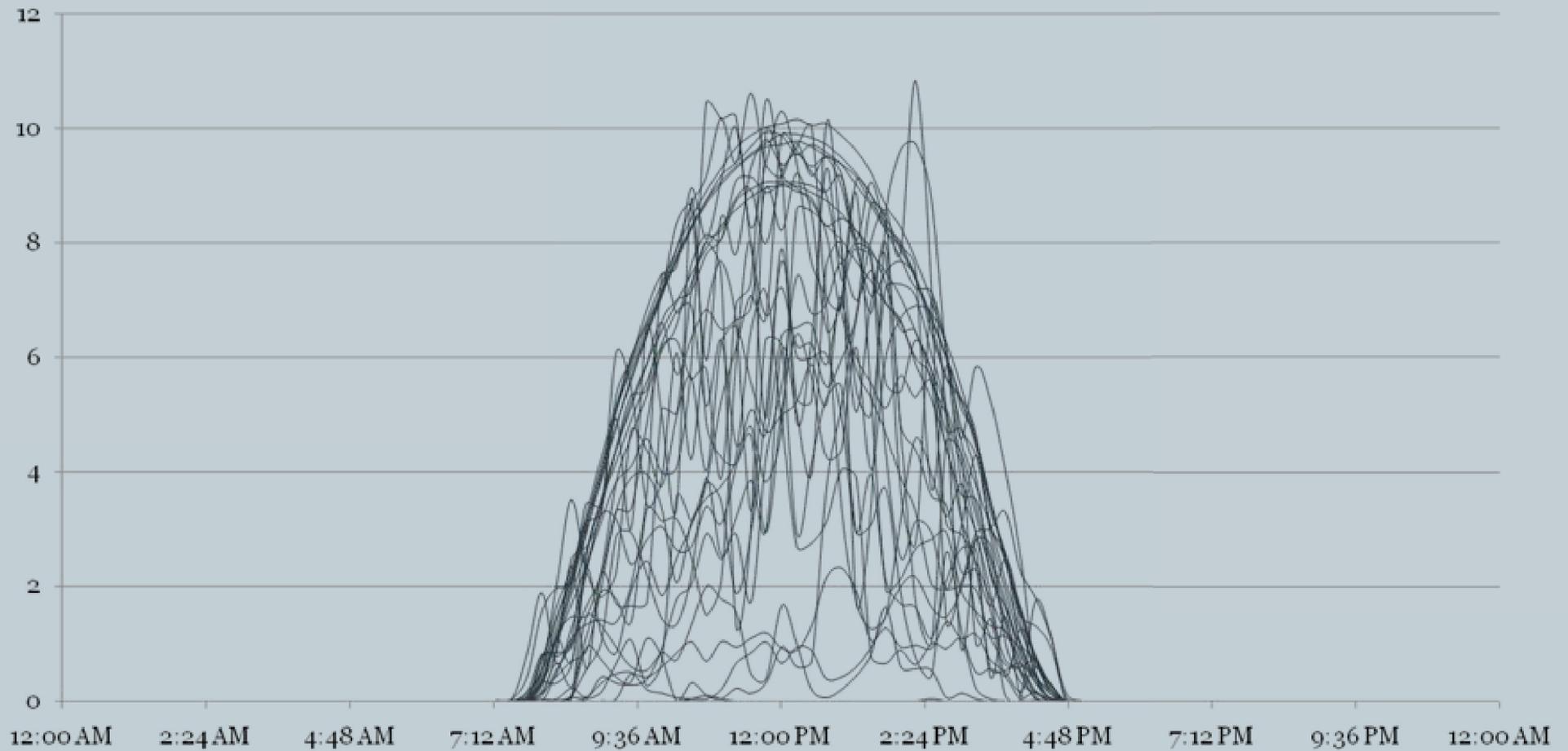


- **Installation Characteristics**
 - Total Solar Generation Capacity
 - Installation type and location
- **Metering Characteristics**
- **Geographic Information**
 - Zip group
- **Solar Radiation by Geographic Location**
 - Zip group or other characteristic that can be derived from available site information

Sample Site January



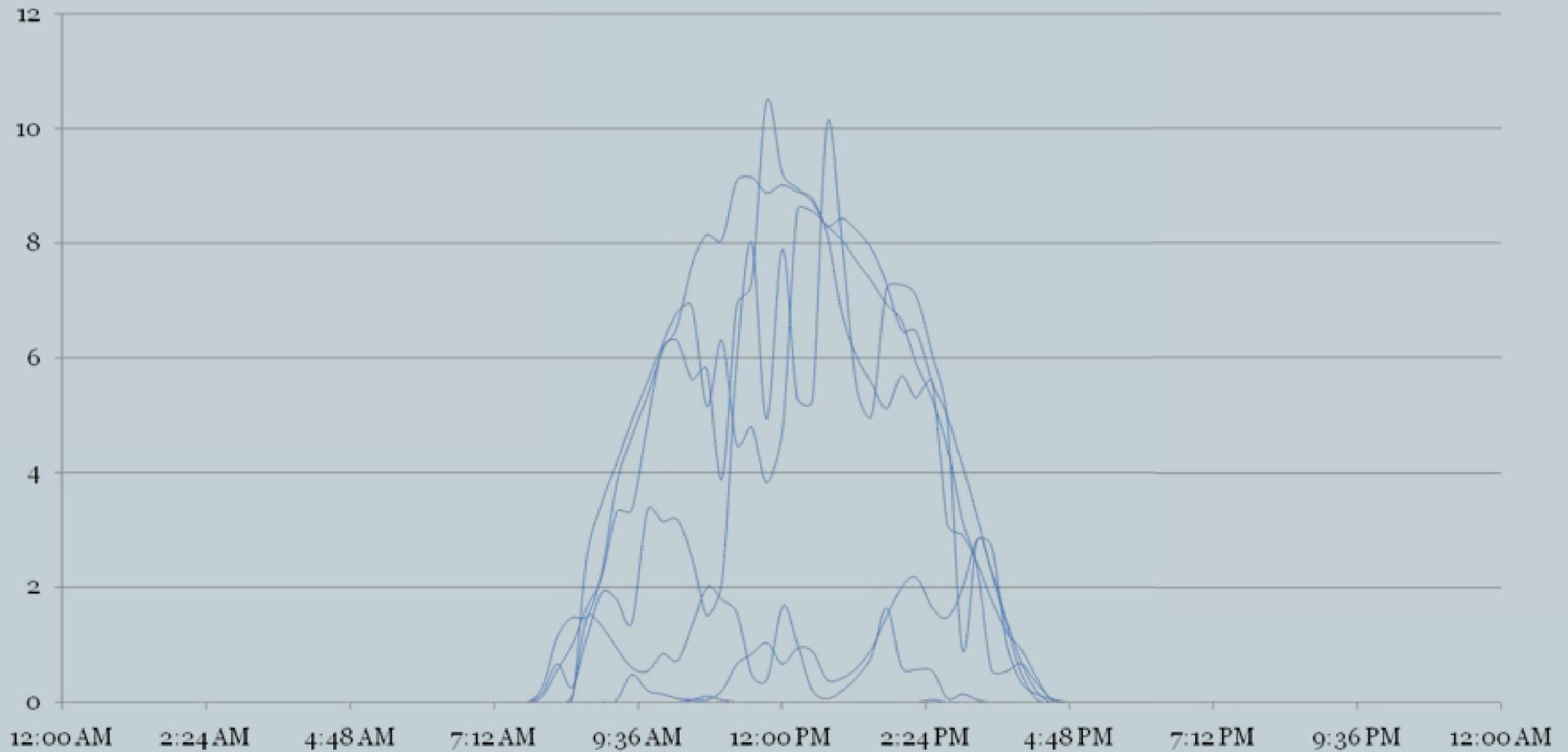
January Days



Sample Site January Week 1



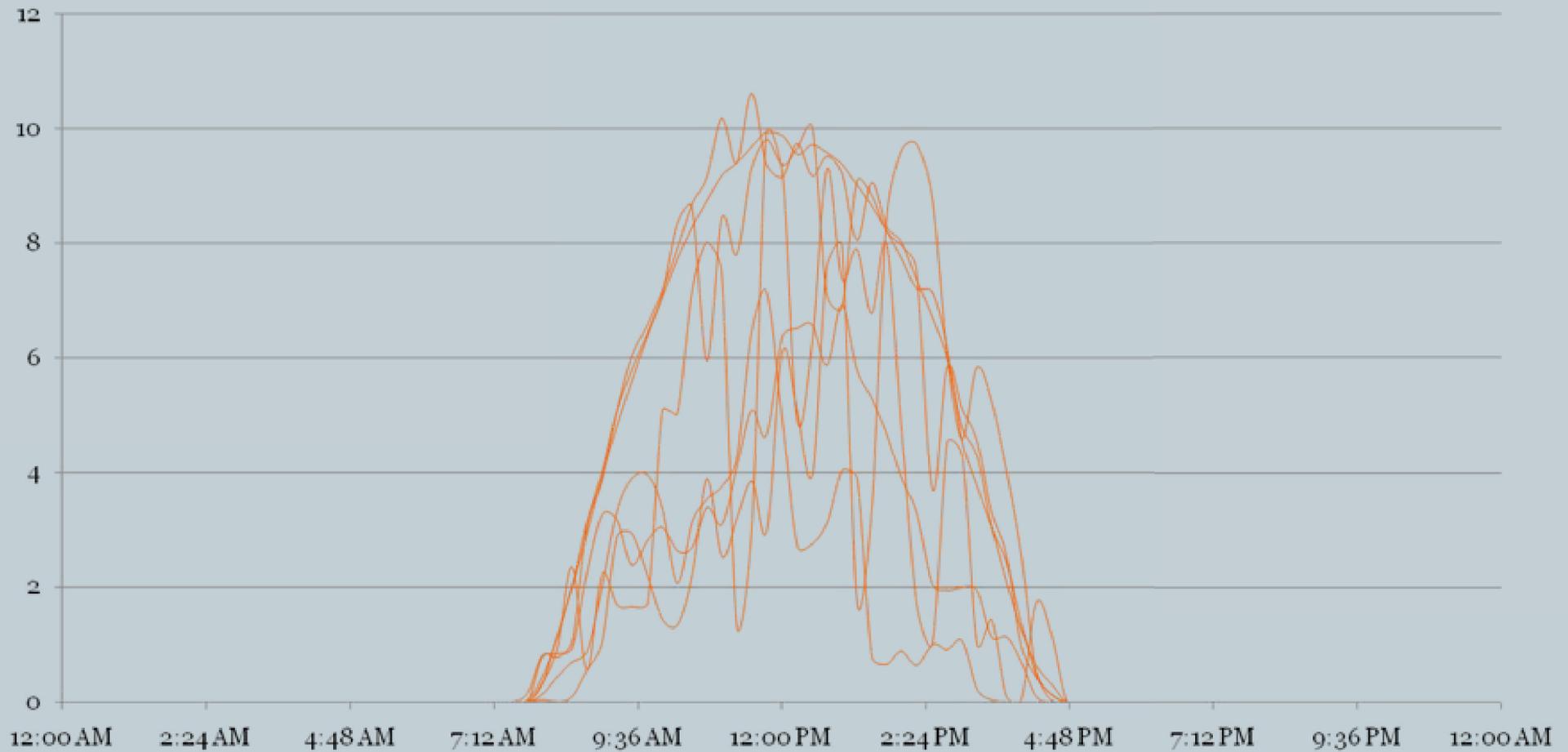
January 1 - 7



Sample Site January Week 3



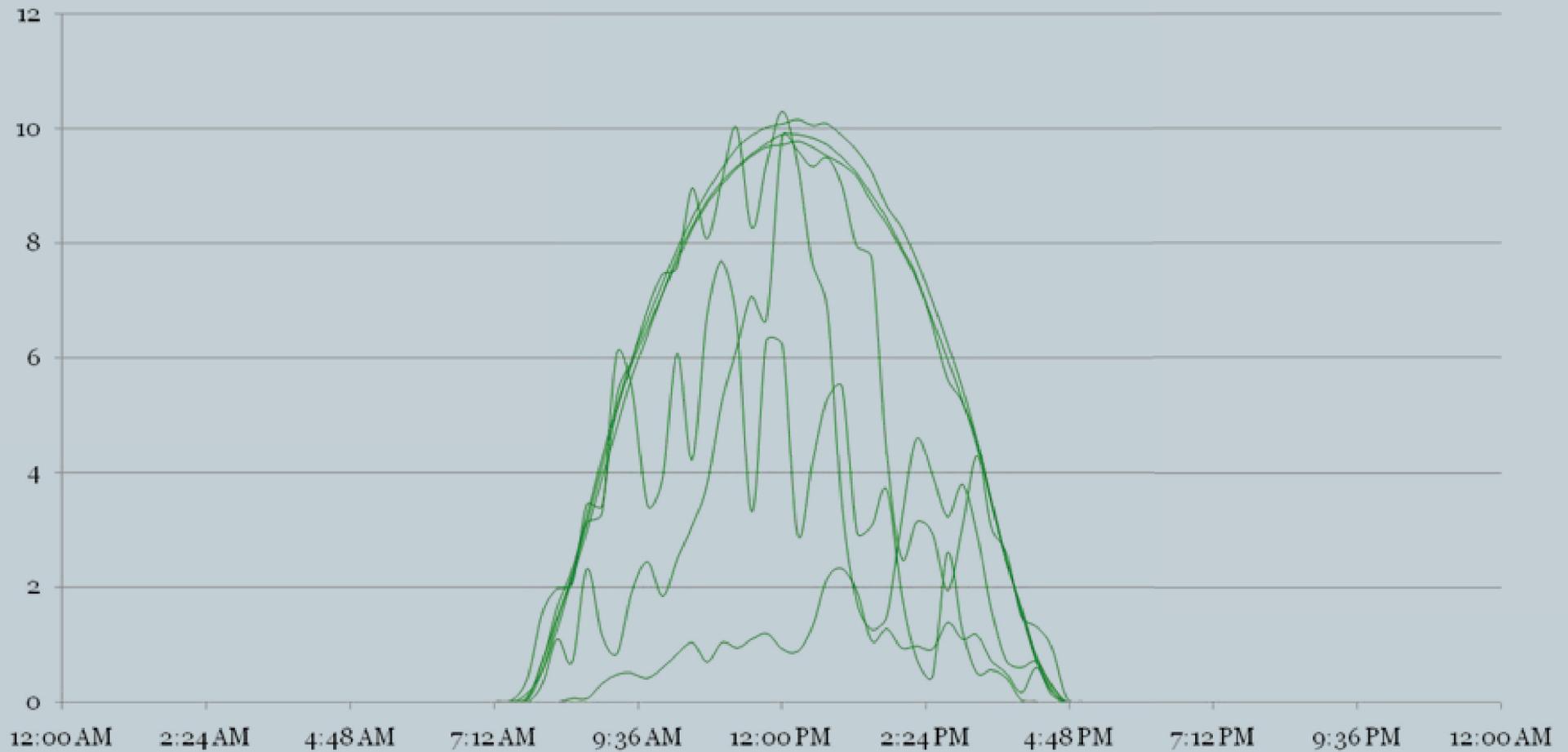
January 15 - 21



Sample Site January Week 4



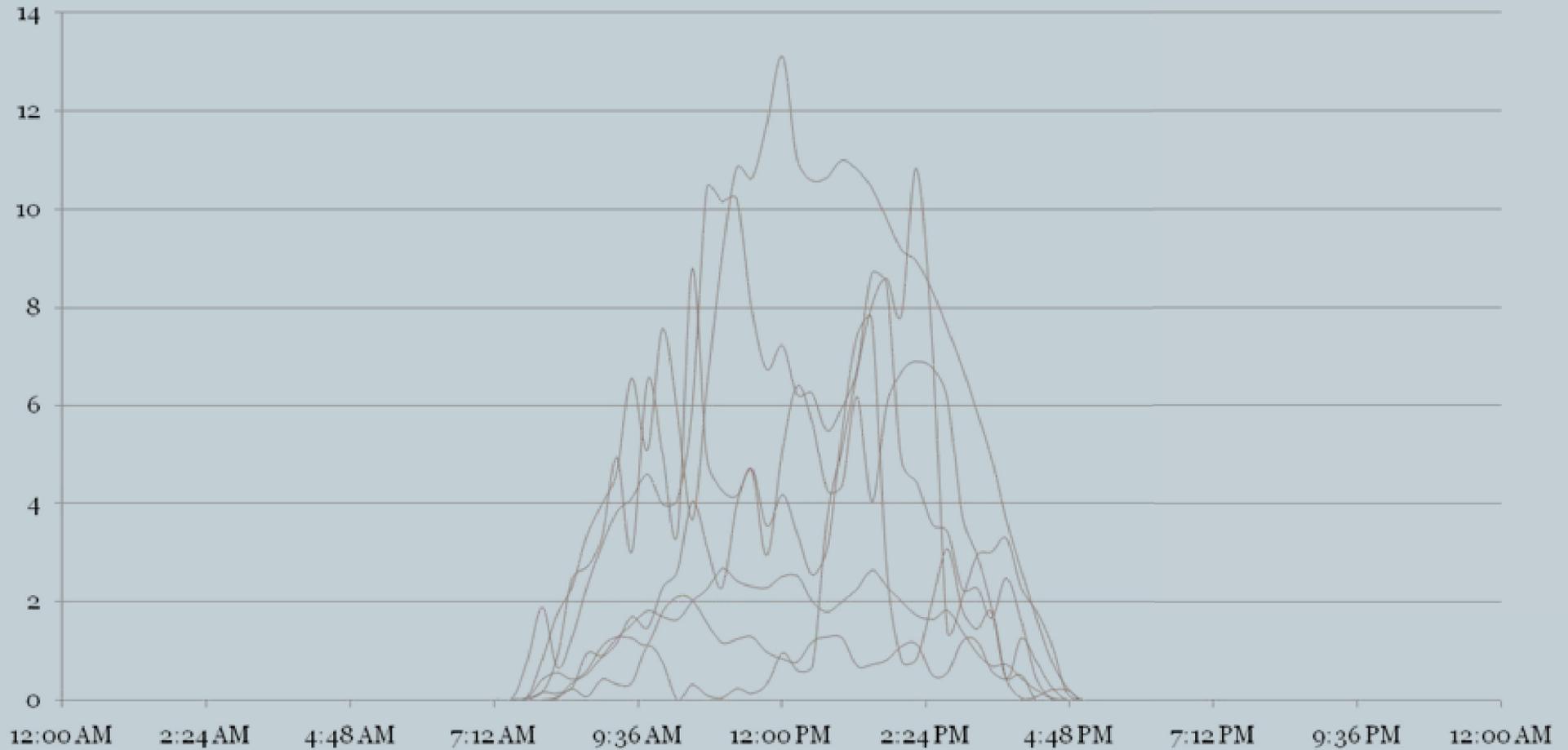
January 22 - 28



Sample Site January Week 5



January 29 - February 4



Solar Generation VEE Proposal



Data Collection Validation

- Time check of meter reading device/system
- Meter identification check
- Time check of meter
- Pulse Overflow check
- Test Mode check
- Sum check

Data Reasonability Validation

- High-Low Usage check
- Monthly Average Efficiency per Lumen of Radiation
- Gap and Overlap checks
- Spike and Dip checks

Solar Reasonability Validations



- **High-Low Test**
 - Well-defined maximums and minimums
 - Performed daily rather than monthly as with consumption data
 - May supercede the need for a spike test
- **Spike and Dip Tests**
 - Due to the nature of solar data, may create numerous false positives without an effective floor for spikes
 - Intent of check may be reasonably accomplished with High-Low check
 - Dip test not part of MDM VEE, but would generate numerous false positives in solar data

Solar Reasonability Validations



- **Gap and Overlap Tests**
 - Not directly listed but commonly performed on consumption data
 - Should continue with potentially alternate estimations
- **Monthly Average Efficiency per Lumen of Radiation**
 - Designed to determine efficiency of implementation over time
 - May aid in determination of soiling and other problems
 - Can be used to compare like implementations for outliers
 - Concept can be leveraged for estimation

Solar Estimation Techniques



- **Interpolation**

- Standard interpolation cannot account for fluctuations during estimation period
 - ✦ With consumption sites, that can't be determined from available data
 - ✦ With solar generation sites, it is possible to estimate more effectively using solar radiation data

- **Like-Day Plug**

- Same Day Previous Week methodologies won't account for different solar conditions
- Proxy Day method can be used to select a similar solar radiation day for historical plugging

Solar Estimation Techniques



- **Site Efficiency Estimation**
 - Using average efficiency for the intervals before and after the estimation period and the available solar radiation data may provide an accurate estimate without requiring complex site engineering data
 - Method should be evaluated with hourly solar radiation data and actual metered generation to determine the feasibility of the methodology

Discussion



(END OF ATTACHMENT)