

*Seeing the Vision
&
Capturing the Value
of
"Smart" Metering*
*Technical & Economic Implications
of
Energy Policy Act of 2005
Section 1252*

November 2006
Plexus Research, Inc

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Utility Applications
CUSTOMER APPLICATIONS

- ◆ AMR
- ◆ Energy use/rate information
- ◆ Load control / load management
- ◆ Meter tamper detection
- ◆ Outage reporting
- ◆ Remote connect / disconnect
- ◆ Value-added services
- ◆ Energy management
- ◆ Power quality (PQ) monitoring

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Utility Applications – UTILITY INTERNAL APPLICATIONS

- ◆ SCADA
- ◆ Capacitor control
- ◆ Power outage / notification
- ◆ Transformer load management
- ◆ Outage reporting and diagnostics
- ◆ Demand prediction
- ◆ Voltage/VAR control
- ◆ Equipment monitoring
- ◆ Substation monitoring
- ◆ Customer communications
- ◆ Phase loss detection
- ◆ Displace microwave and copper



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AMI Benefit Tree

Quantifiable

New Revenue

One Time & Short Term

Capital Reductions


Reduced Expenses

Avoided Losses

Intangible

Customer Service Benefits

Strategic Benefits




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AMI Benefit Tree -- **Quantifiable**

Reduced Expenses

- Customer Service
 - Shorter Bill Inquiries
 - Faster Inquiry Resolution
 - Customer Site Visits
- Billing
 - Reduced Manual Processing
 - Fewer Estimated Bills
 - Fewer Pre-bill Audits
- Distribution Operations
 - Capacitor Control
 - Outage Restoration

- Metering & Reading
 - On-Cycle Reads
 - Off-Cycle Reads
 - Meter Reader Safety, Liability
 - Meter Reader Training
 - Reduced Meter Testing
 - Direct Access Settlement
 - Load Research Metering




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AMI Benefit Tree -- Quantifiable

Avoided Losses

- Reduced Non-Billable Consumption
 - Tamper Deterred
 - Unoccupied Premises
- Electric System Optimization
 - End of Line Voltage
 - Feeder Load Balancing
 - Power Factor Losses




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AMI Benefit Tree -- Intangible

Customer Service Benefits

- Diverse Customer Services
- New Rates Possible
- Increased Responsiveness to Customer
- Less Intrusive to Customer
- Power Quality Monitoring




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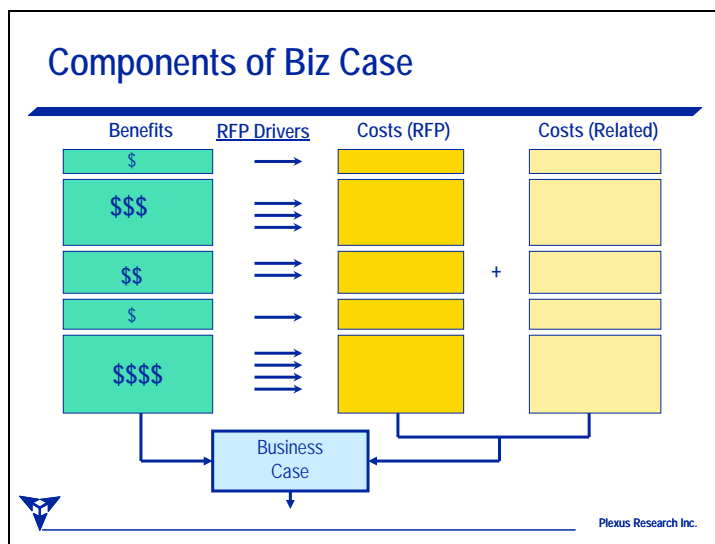
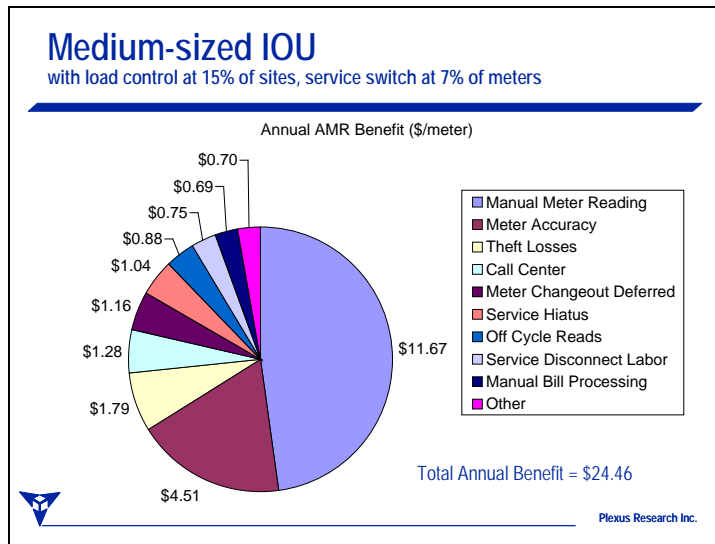
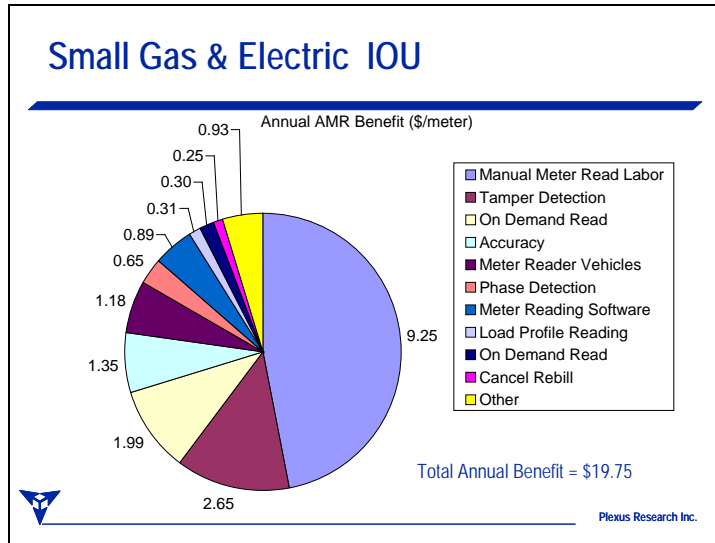
AMI Benefit Tree -- Intangible

Strategic Benefits

- Distribution Automation
- Monitor/Manage Distributed Generation
- Greater Approved Return
- Improved Costs & Pricing Basis
- Improved Load Forecasting & System Planning
- Improved System Reliability
- Market Segmentation & Targeting
- Improved Public/Regulatory Relations
- Improved Customer Satisfaction



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How benefits can be established ...

- ◆ **By internal historical data**
 - Meter reader labor reduction
- ◆ **By others' example**
 - Other utilities get this benefit
- ◆ **By management edict**
 - Because management said we must
- ◆ **By persuasion**
 - Because in-house departments enthusiastically "buy-in."
 - Example: distribution benefits



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Sample Benefit Assessment: High Bill Test

Meter Shop Hi Bill Test

Field Metering is budgeting 850 man-hours for 2005 for Meter Technicians to do High-Bill tests when customers question their bills. Some of these can be attributed to estimated reads, miss reads, owner read errors and actual meter reader errors. We expect that with AMR these types of errors will decrease dramatically. We have no data to support our estimate of a 75% reduction, although we think this is a very conservative number. No reduction in equipment or shop time is assumed because these tests are done on-site, using standard equipment that is used for other field operations. No shop time is incurred. Even if a recalibration is necessary, this operation is also done in the field. Consequently, there will be no reduction in equipment, calibration or shop time costs, as a result of the decreased test requests. Any basic AMR system will provide this benefit – no special features are required.

Amount of benefit (cost) estimated on this estimate sheet:	Annual	1-Time	Non AMR
	\$33,833		

AMR VALUE ESTIMATE	Amounts	Result
1 Current annual manhours for high bill meter tests	850	
2 Savings achievable w/ AMR	75%	
3 Manhour savings (1 x 2)	638	
4 2005 hourly direct labor rate for Meter Technician	\$31.00	
5 Direct labor savings (3 x 4)	\$19,763	
6 Employee benefit factor for Meter Technician	1.60	
7 Savings in loaded labor costs (5 x 6)		\$31,620
8 Indirect surcharge for Meter Technician	70%	
9 % of Meter Tech indirect surcharge applicable to cost/savings	10%	
10 Savings in indirect costs (7 x 8 x 9)		\$2,213
11 Total savings w/100% AMR (7 + 8)		\$33,833
12 Fraction of all meters equipped with AMR	100%	
13 Savings with Displayed AMR system (11 x 12)		\$33,833



Sample Benefit Assessment: Reduced Bill Inquiries

Residential Call Center Bill Inquires

An AMR system will result in shorter bill inquiry calls due to more accurate reads and better statistics on customer energy usage. This estimate assumes no reduction in call volume, however a reduction in call duration for 50% of the calls is projected. The average call lasts 6 min. (from call typing reports), with an actual problem discussion time of 3 minutes per call. The rest of the call is getting the customer's personal info, accessing their file, etc. Of that 3 minutes, a 1 min (33%) reduction is assumed. To achieve this benefit, the system must have an on-demand read feature w/response time of less than 30 seconds.

Amount of benefit (cost) estimated on this estimate sheet:	Annual	1-Time	Non AMR
	\$109,794		

AMR VALUE ESTIMATE	Amounts	Result
1 Annual number of calls to Customer Call Center	900,000	
2 Percent of calls that are bill related	35%	
3 Annual bill-related calls (1 x 2)	315,000	
4 Estimated % of calls that will benefit from AMR (less time)	50%	
4a Fraction of all meters equipped with AMR	100%	
5 Number of calls that will benefit from AMR (3 x 4 x 4a)	157,500	
6 Estimated time reduction per call, in minutes	1.0	
7 Annual labor hours reduction (5 x 6 ÷ 60 mins/hr)	2,625	
8 2005 hourly direct labor rate for Call Center Specialist	\$22.50	
9 Annual direct labor saving due to shorter bill inquiries (7 x 8)	\$59,063	
10 Employee benefit factor for Call Center Specialist	1.7	
11 Annual fully loaded labor benefit (9 x 10)		\$100,406
12 Indirect surcharge for Call Center Specialist	85%	
13 % of Call Center Spec. indirect surcharge applicable to cost/savings	11%	
14 Savings in indirect costs (11 x 12 x 13)		\$9,388
15 Total annual labor savings due to shorter bill inquiries (11 + 14)		\$109,794



Special Biz Case Considerations ...

Meter Strategy

Depreciation of existing meters –
How it matters and how to deal with it.

Meter technology – Electronic versus induction meters. Pros and cons. Many issues.

New meters or retrofit – Or some of both.

Installation challenges – Last look at the customer premises – for a while. Procedures & incentives.

Realistic data requirements – The implications of over-specification and under-specification.



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Special Biz Case Considerations ...

Personnel

Work force planning, impacts on meter readers and others

– Realistic phase-out levels, and importance of strategy

IT staffing & skills

– Are you prepared for the initial and subsequent effects on IT. Roles. New hardware and software.

In-house clients

– Need to deliver what you promised. May displace other other mission-critical technology. Ex: Outage capabilities



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Conclusions

◆ EPA Act sec 1252 defines a standard that requires AMI

◆ Some utilities already conform (w/ or w/o AMI).

◆ Making a valid AMI decision requires a detailed business case.

- Complicated but doable – takes 6 to 9 mo's.
- Solid industry experience is available.

◆ Many utilities will find a compelling AMI biz case on basic operating benefits alone.

- Demand response is icing on their biz cake.



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