

AMI / AMR Solutions

Presentation for AMI/AMR Projects

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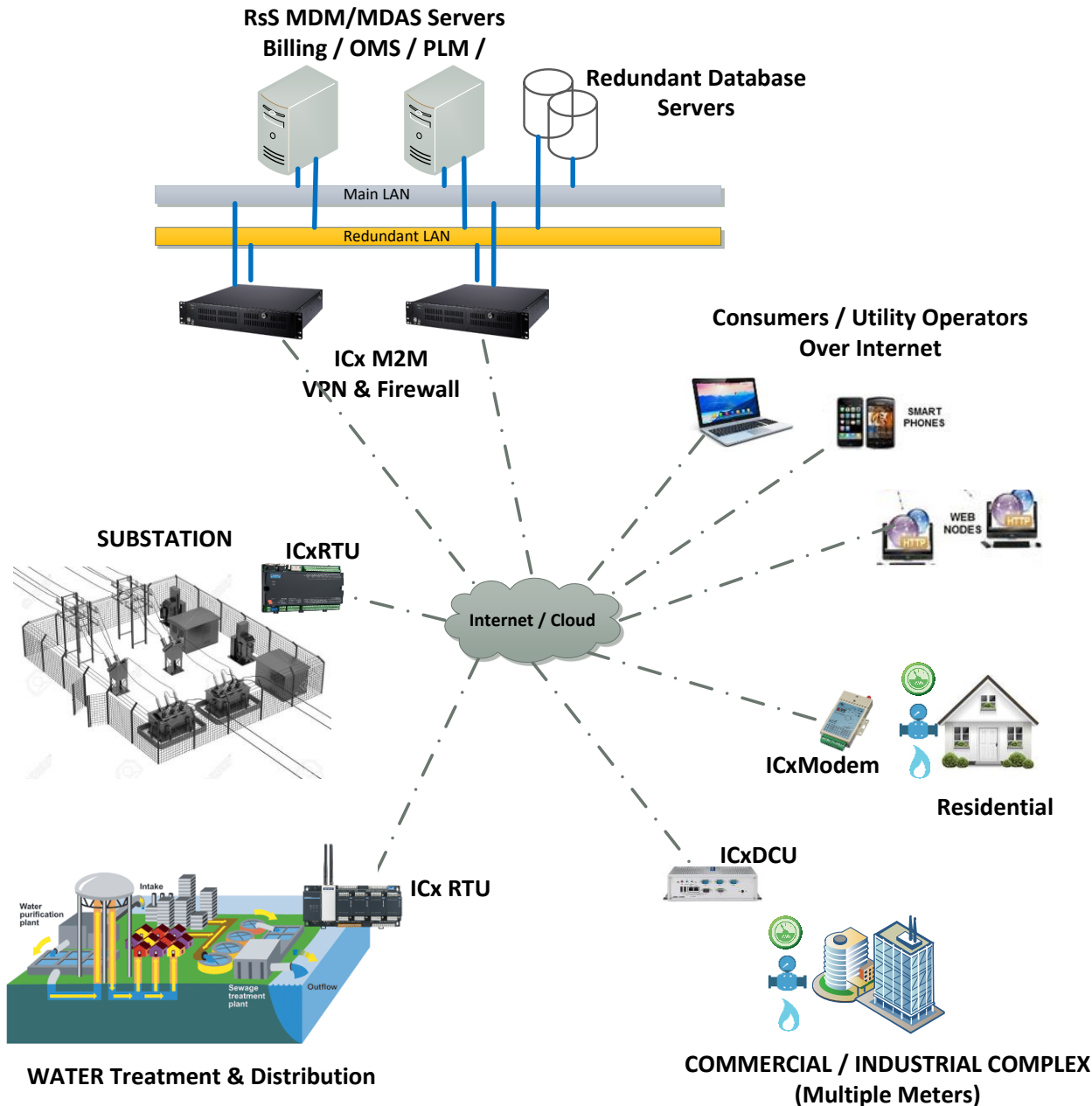
AMR / AMI: Advantages

- Business Model
 - Allows Utility / Consumer to adapt to different business needs / requirements
 - Total consumption based pricing
 - Time-of-use pricing
 - Critical peak pricing
 - Real-time pricing
- Demand / Asset Management
 - Usage Forecasting & Operations
 - Need based Pricing / bidding
 - Peak / Off Peak / Mid Peak / Multiple Demand Management Techniques
 - Maximum Demand Management / Enforcement
- Customer / User Experience
 - Monthly / Instantaneous bill
 - Detailed report
 - Cloud based Web Display
 - Mobile APPs

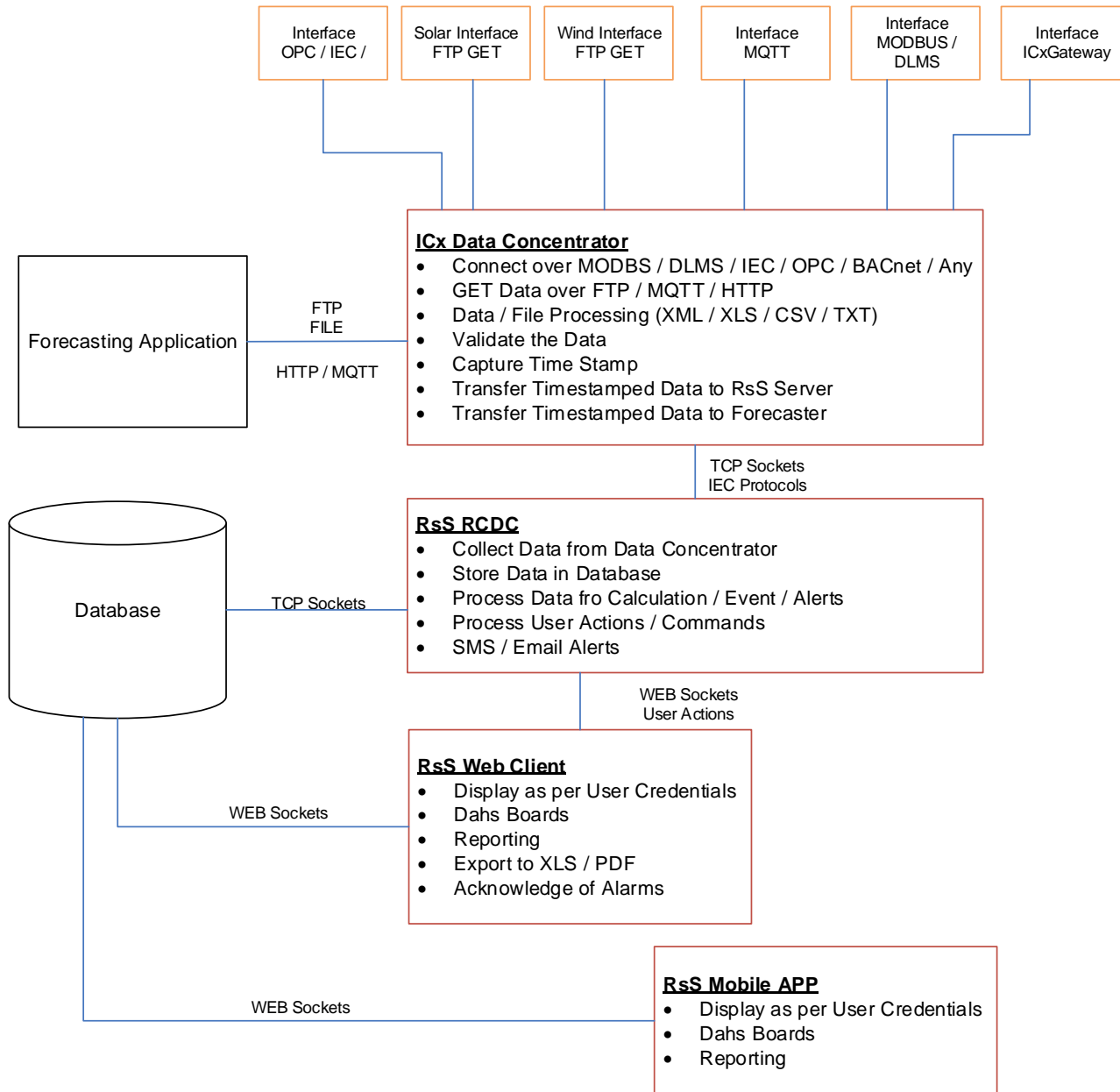
AMR / AMI: Advantages

- Energy / Asset Management
 - Remotely / Time defined Turn off Assets
 - Shift Assets off peak
 - Sensors based on Demand based Asset usage
- Downtime Reduction
 - Automatic Detection
 - Automated Verification of Restoration
 - Fault / Restoration Reporting to Utility / Consumer
- Target Utilities / Industry
 - Electricity Utilities
 - Water Utilities
 - Gas Utilities
 - Street Lighting
 - Distributed Asset Management

AMI / AMR MAP



AMI / AMR Architecture



ICxModem: Remote Communication Solution

- Based on Hongdian Technology with Cloud Management Platform
- GPRS Modem with RS 232 / 485 and LAN Interface
- Modem with inbuilt M2M interfacing abilities
- Auto Internet Connection Management / Handling
- Transparent mode secure encrypted data transfer using VNP technologies



ICxDCE: Data Concentrator / Gateway

- Data Concentrator / Gateway Solution
- Industry Standard Protocols Supported
- Various WAN technologies
- Selection based required Serial / Lan ports

- ICx1122

- Serial Ports 4
- LAN ports 1



- ICx3360

- Serial Ports 6
- LAN ports 3



- ICx4671

- Serial Ports 16
- LAN ports 10



- ICx Firmware based on Windows and Advantech Platform

ICxM2M / Headend

- Allows secure communication between metering points and RsS MDM platform
- Support for IP based networks (LAN / GPRS / 3G / 4G)
- VPN
 - PPTP
 - L2TP
 - IPSec
- Data Encryption
- Built-in Firewall
- Multiple Scaling Options
 - ICxM2M Lite: for < 100 Devices
 - ICxM2M Pro: for < 3000 Devices
 - ICxM2M Enterprise: for < 100000 Devices
 - ICxM2M Cloud: for < 1 Million Devices
- ICx Firmware based on Windows and Linux Platform



ICxRTU: Controllers with I/Os

- Remote Terminal Units
- Key Installation
 - Substations
 - Utility Operating Assets
- Supported Substation Protocols
- Supported WAN technologies
- Various Communication Options
 - LAN
 - Serial
 - FO
 - Wireless (GPRS / WiFi)
- Multiple IO and Expansion Options
 - ICx1911
 - ICx5560
 - ICxAPAX
- Multiple Serial Ports & LAN Ports
- ICx Firmware based on Windows and Advantech Platform



RsS MDAS / MDM

- Key Features
 - Web Based and Client Server Architecture
 - Allows easy customization for Meter Data Interfacing
 - Dashboard, Custom MIS Reports (us as user defined Billing Reports), Trending, Event / Alarm Management and Realtime SLD Display
 - Based on latest Microsoft .NET / HTML 5 Technologies
- Smart Grid Enabler
 - Designed for 2 Way Meter Communication
 - Provide accurate Metering Data in required time frame is key requirement for any Smart Grid Project
 - Provides industry standard communication interface for Smart Grid tools
 - ICx products supports interfacing to Sensors allowing distributed data collection for Smart Grid Tools

RsS MDAS: Key Features

- Meter Data Acquisition
 - Manage data from multiple sources in one location
 - Provision to collect and manage meter data from Various Head Ends / M2M / Meters
 - Remote capturing of meter data from system & select consumer meters
 - Automate validation, editing, and estimation (VEE) of data
 - Consolidated interface
 - Raw Data
 - Validated meter data
 - Synchronize data acquired by different sources over different time intervals.
 - Connect with upto 1 Million Nodes (working on scaling upto 10 Million Nodes)

RsS MDAS: Modules

- Reporting
 - Meter Values
 - Meter Faults
 - Meter Connection Status
 - Calculated / Raw Data
 - Time based/Event Based
- Billing
 - Total Consumption
 - Prepaid Metering
 - Multiple Tariffs
 - ToD Tariffs
 - ToU /Extended ToU Tariffs
 - Load Specific Tariff (Commercial / Industrial / Institutional / Rural / etc)

RsS MDAS: Modules

- Outage Module
 - Outage Detection
 - Outage Reporting
 - Restoration Detection
- Customer Care
 - Billing
 - Meter Usage Patterns
 - Customer Performance
 - Load / Demand Estimation
 - Maximum Demand Alerts

RsS MDM: Modules

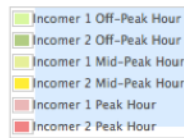
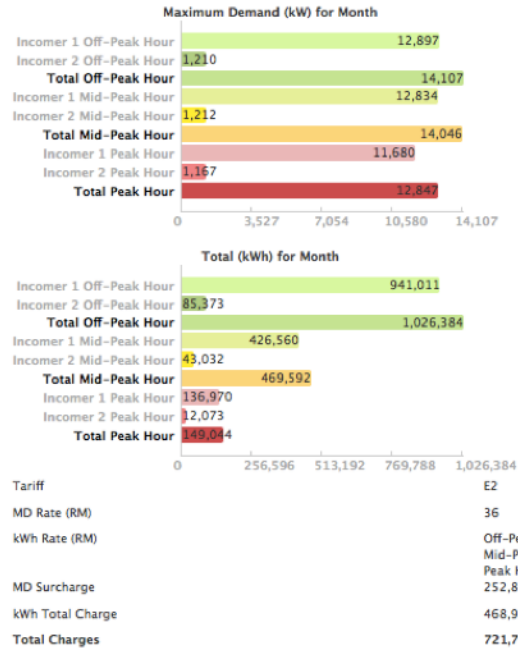
- Load Management
 - Peak Load Management
 - Estimation
 - Remote Load Shedding
- Power Module
 - Power Factor Analysis
 - Voltage Dip Analysis
 - Frequency Fluctuation Analysis
 - Load Balancing Analysis
- Water Module
 - Billing
 - Remote operation of Water Supply / Tank Management
 - Water Quality Monitoring
 - Leakage Detection

RsS MDM: Modules

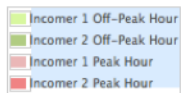
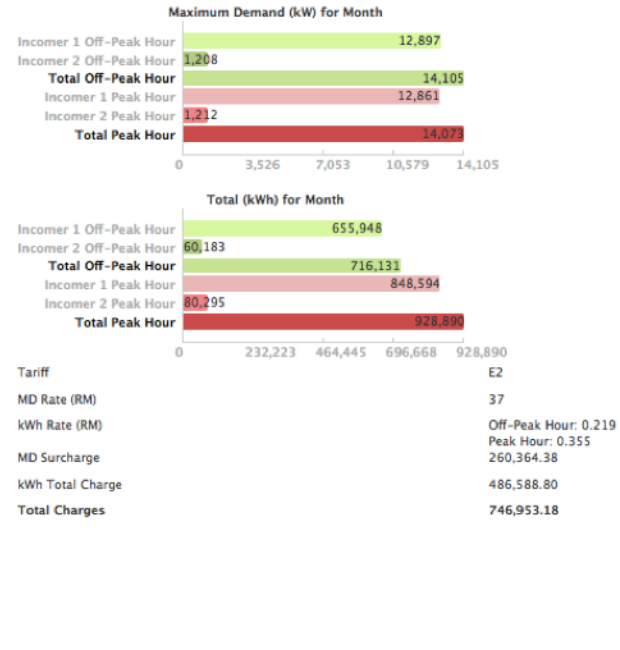
- Utility Performance
 - Theft Analysis
 - Leakage Analysis
 - Losses (transmission / over flow) Analysis
 - Downtime Analysis
- Utility Metrics
 - Load Forecasting
 - Load Growth Estimation
 - Seasonal Effects
 - Downtime Impacts
 - Customer Management
 - Demand Violation
 - Usage Violation
 - Tamper Counters
 - Power Factor / Quality / Dry Run Wastage Analysis

RsS MDM: Utility Metrix Modules

ETOU Tariff Usage



TOU Tariff Usage



RsS MDAS / MDM: Sample Views

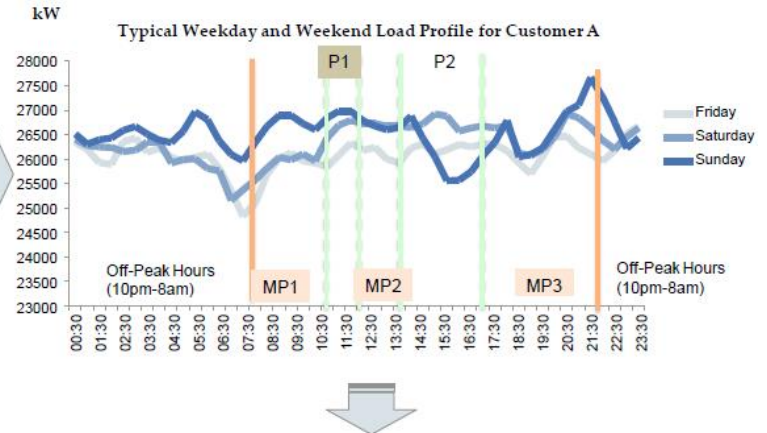
Time Zone	Maximum Demand (kW)	Energy (kWh)
Peak	28,885	3,229,030
Mid Peak	28,986	8,057,414
Off-peak	28,584	7,978,602

Time Zone	MDRate(RW/kW)	Energy(sen/kWh)	MD Charge (RM)	Energy Charge (RM)
Peak	38.30	39.00		1,259,322
Mid Peak	35.00	31.00	1,014,510	2,497,798
Off-peak	NA	20.20		1,611,678
TOTAL BILL				RM6,383,308

Time Zone	MD Rate (RM/kW)	Energy (sen/kWh)	MD Charge (RM)	Energy Charge (RM)
Peak				
Mid Peak	35.50	33.70	1,029,003	3,803,532
Off-peak	NA	20.20		1,611,678
TOTAL BILL				RM6,444,212

Tariff Category	MD RATES (RM/kW)			ENERGY RATES (RM/kWh)				
	TOU	ETOU		TOU		ETOU		
	PEAK	PEAK	MID - PEAK	PEAK	OFF - PEAK	PEAK	MID - PEAK	OFF - PEAK
Commercial C1	RM 30.30	RM 34.00	RM 28.80	RM 0.365	RM 0.365	RM 0.584	RM 0.357	RM 0.281
Commercial C2	RM 45.10	RM 48.40	RM 42.60	RM 0.365	RM 0.224	RM 0.636	RM 0.339	RM 0.224
Industrial D	-	RM 42.10	RM 37.20	RM 0.441	RM 0.441	RM 0.484	RM 0.327	RM 0.249
Industrial Ds	-			RM 0.427	RM 0.427			
Industrial E1	RM 29.60	RM 35.50	RM 29.60	RM 0.337	RM 0.337	RM 0.566	RM 0.333	RM 0.225
Industrial E1s	RM 23.70			RM 0.336	RM 0.336			
Industrial E2	RM 37.00	RM 40.00	RM 36.00	RM 0.355	RM 0.219	RM 0.592	RM 0.332	RM 0.219
Industrial E2s	RM 32.90			RM 0.336	RM 0.191			
Industrial E3	RM 35.50	RM 38.30	RM 35.00	RM 0.337	RM 0.202	RM 0.576	RM 0.327	RM 0.202
Industrial E3s	RM 29.00			RM 0.317	RM 0.175			

Time	Hour	kW
Off-Peak	00:30	26,343
	01:00	26,197
	01:30	25,928
	02:00	25,888
	02:30	26,357
	03:00	26,430
	03:30	26,146
	04:00	26,234
	04:30	26,040
	05:00	25,958
	05:30	26,034
	06:00	26,107
	06:30	25,809
	07:00	25,353
	07:30	24,837
	08:00	25,103
Mid Peak	08:30	25,705
	09:00	26,019
	09:30	26,127
	10:00	25,963
	10:30	25,915
	11:00	25,855
Peak	11:30	26,088
	12:00	26,331
Mid Peak	12:30	26,182
	13:00	26,236
	13:30	26,006
	14:00	25,919
Peak	14:30	26,226
	15:00	26,309
	15:30	26,117
	16:00	26,194
	16:30	26,298
	17:00	26,245
Mid Peak	17:30	26,306
	18:00	26,304
	18:30	26,167
	19:00	25,921
	19:30	25,707
	20:00	26,059
	20:30	26,470
	21:00	26,473
	21:30	26,228
	22:00	26,103
	22:30	25,957
	23:00	26,179
	23:30	26,532
	24:00	26,663

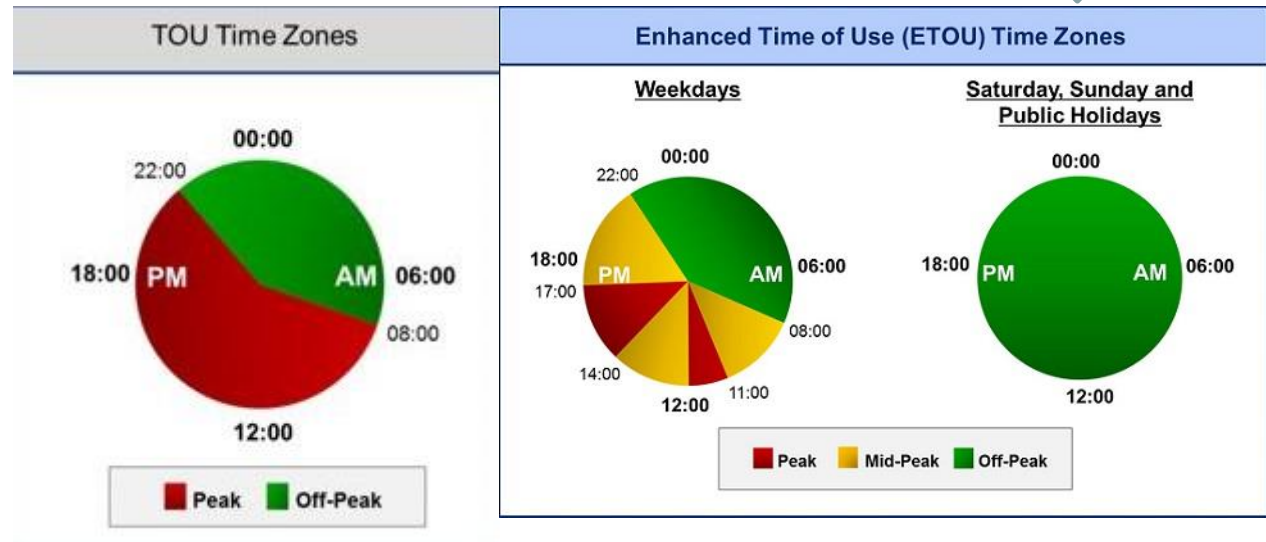


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Peak	28,885	3,229,030
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RsS MDAS / MDM: Sample Views

TOU Time Zones		Enhanced Time of Use Time Zones	
Time Zone	Hours	Time Zone	Hours
Peak	08:00 – 22:00 hours	Mid-Peak	08:00 – 11:00 hours
Off-peak	22:00 – 08:00 hours	Peak	11:00 – 12:00 hours
		Mid-Peak	12:00 – 14:00 hours
		Peak	14:00 – 17:00 hours
		Mid-Peak	17:00 – 22:00 hours
		Off-Peak	22:00 – 08:00 hours

Off Peak Rate
and No
Maximum
Demand



Communication Protocols Support

- Metering / Grid Interface Protocols Supported
 - IEC 60870-5-101 Master/Slave
 - IEC 60870-5-103 Master/Slave
 - IEC 60870-5-104 Master/Slave
 - IEC 61850 Client/Server
 - DNP3 Serial Master/Slave
 - DNP3 Network Master/Slave
 - MODBUS RTU Serial Master/Slave
 - MODBUS TCP Master/Slave
 - Ethernet / IP
 - Profibus DP Master/Slave
 - BACnet Master / Slave
 - OPC Client / Server
 - DLMS

WAN Technologies Supported

- HTTP / SOAP
- JSON
- Thrift
- FTP
- MQTT
- Web Sockets
- ADO.NET