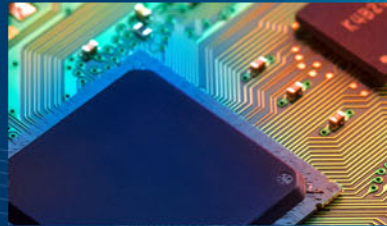


Energy Management Best Practices

Phil Rausch - HSC

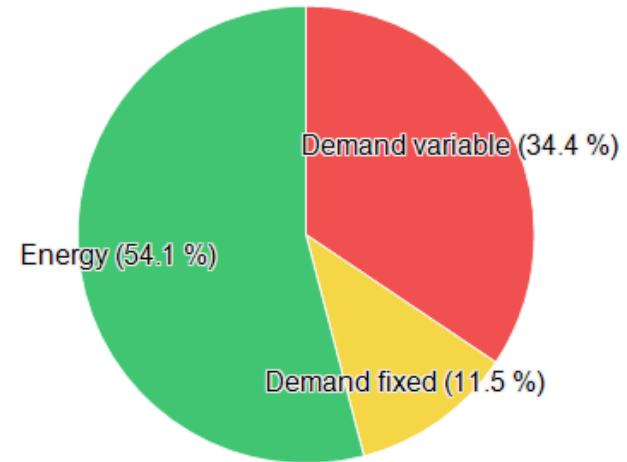


Who knows what their energy bill looks like?

Electric Charges

- On-Peak Billing Demand kW
- Trans. On-Peak Billing Demand
- Interruptible Capacity Credit
- On-Peak Energy
- Off-Peak Energy
- PSCR
- System Access
- Max Demand kW
- Energy Efficiency
- Power Plant Securitization
- Power Factor Credit
- Low-Income Assist Fund

Monthly Billing Determinants



Yearly Billing Determinant
 “On-bill Financing”

Agenda

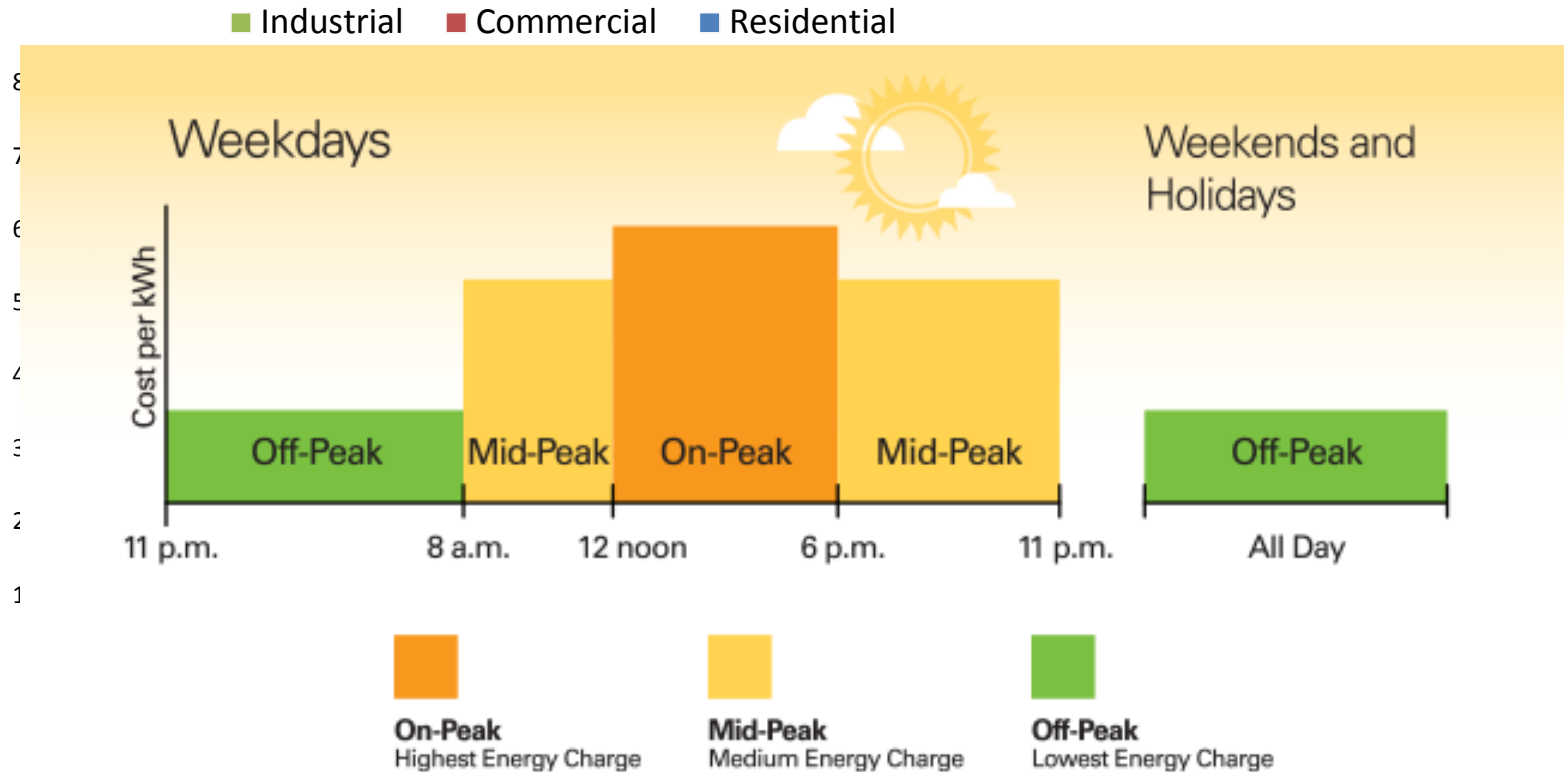
- Terms and Understanding
- Billing Determinants and Framework
- On-Peak/Off-Peak Load Management
- Demand Response
- Interruptible Power Supply
- Energy Efficiency Program
- On-site Power Generation
- Regulatory Intervention

Consumers Energy – CVL1

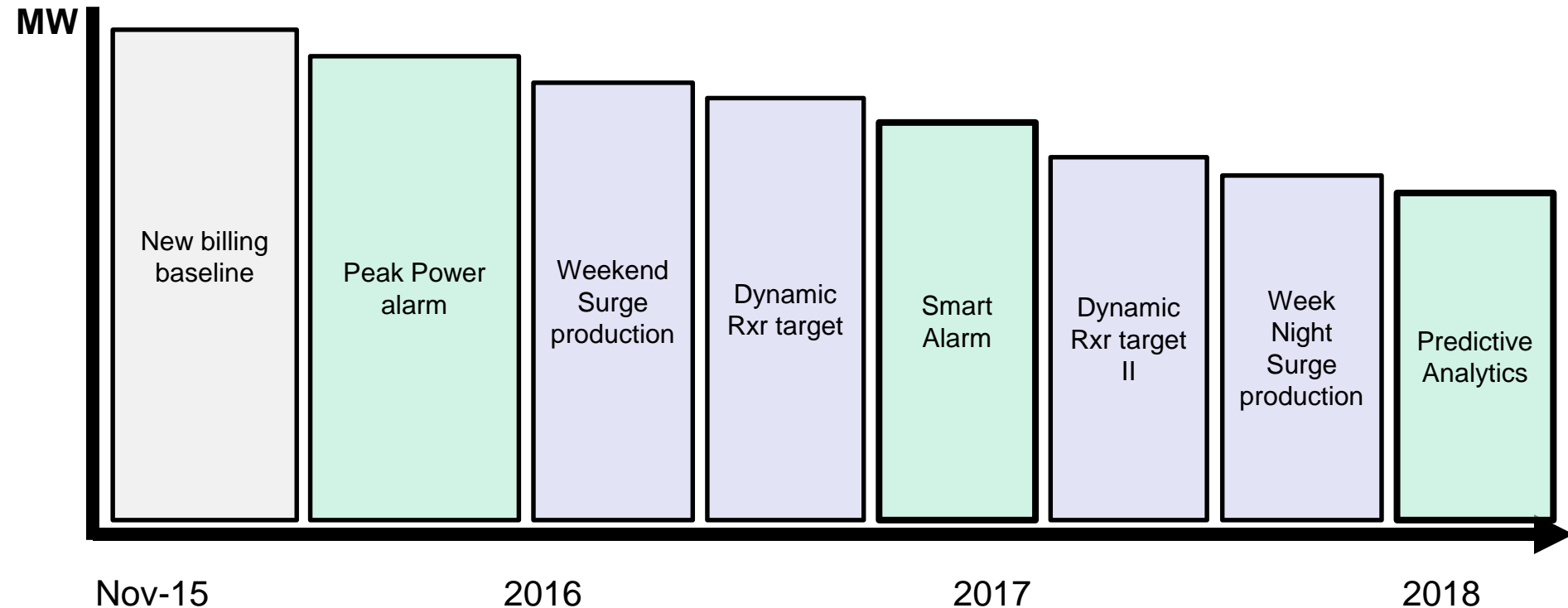
		Units	Capacity	Non-Capacity	Total
Demand	Jun-Sep	\$/kW On-Peak*	10.52	7.86	18.38
	Oct-May		9.52	7.86	17.38
Transmission	Jun-Sep	\$/kW On-Peak	1.86	-	1.86
	Oct-May		1.86	-	1.86
Energy	Jun-Sep	\$/kWh On-Peak	-	.046189	.046189
	Jun-Sep	\$/kWh Off-Peak*	-	.030316	.030316
	Oct-May	\$/kWh On-Peak	-	.036253	.036253
	Oct-May	\$/kWh Off-Peak	-	.032217	.032217
Delivery		\$/kW Max Demand*	0.96	-	0.96
Substation Ownership Credit		\$/kW Max Demand	(0.38)	-	(0.38)

Time of use rates

Contribution to Peak by Class (MW)



A Long and Steady Journey



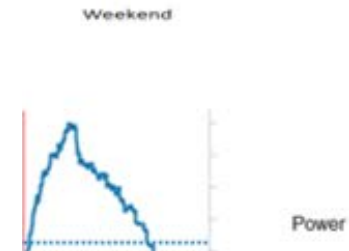
Strategies that optimize on-peak electrical use, scheduling or controlling number of rxrs online

Strategies that utilize production assets off-peak to lower the burden of on-peak production

Dynamic Control of Production Assets

Optimal Scheduling of Continuous Plants with Energy

Constraints



Pedro M. Castro,^{*,†,‡}

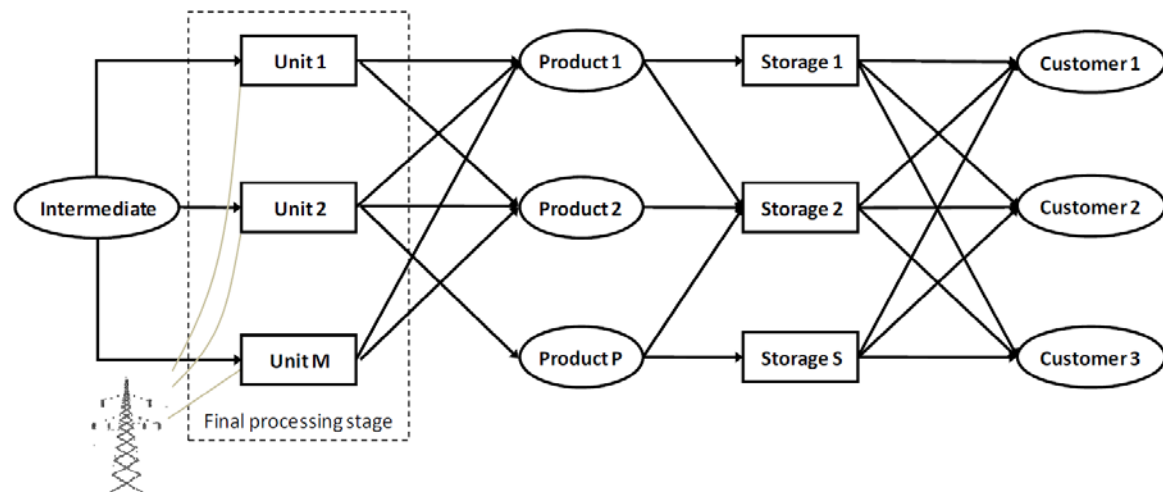
[†] Unidade de Modelação e Optimizaçã

Geolog

[‡] ABB Corporate Research Ce

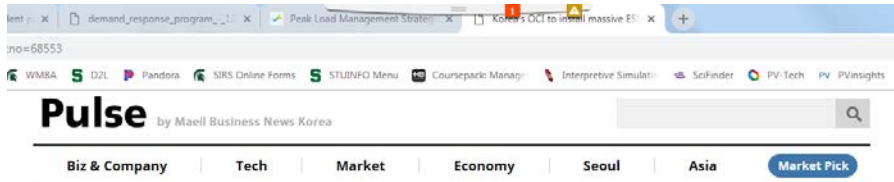
4/30/2017 12:00:00 AM

5/7/2



Shift 12% of 'On-Peak' manufacturing each week from weekday to weekend and weeknight hours!

High Capital Demand Management



Home > Biz&Company

Korea's OCI to install massive ESS in production site in cost-saving action

2018.01.30 14:09:47 | 2018.01.30 15:41:45



South Korea's chemical and green energy company OCI Co. said on Tuesday it will



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Load Management and Curtailment

Program	Emergency Demand Response	Economic Demand Response	Interruptible Load
Program Period	June 1 – Sept. 30, non-holiday weekdays		MISO Planning Year
Program Hours	11 a.m. – 7 p.m.		Anytime
Event Duration	4 hours		Min 4 hours
Expected Dispatch	Infrequent	More Frequent	Infrequent
Max Dispatches	<= 5 events	<= 10 events	No Max
Advanced Notice	30 min – 12 hr	Day Ahead	30 min
Payment	\$25/kw	\$0.30/kWh	\$6.33/kw-month
Penalty			Severe

Energy Efficiency Rebate Program

“...comprehensive suite of energy efficiency programs created to assist commercial and industrial businesses increase their energy optimization, lower their energy usage and lower their cost of operation” – CE Program

Prescriptive Incentives

- Lighting/Electrical
- Mechanical
- Kitchen/Refrigeration
- Building Envelope
- Paid on quantity, size or efficiency
- Qualified retrofit or replacement
- Cannot exceed 75 percent of the project cost

Custom Incentives

- less common/more complex energy saving for retrofit and replacement
- first-year savings (kWh or Mcf)
- Process improvements
- Process exhaust heat recovery
- Constant volume to variable volume water
- Variable-speed or Frequency
- Upgrade refrigeration compressor
- VFDs on hydraulic equipment

Energy Efficiency Caps and Limits

Payback period is calculated with the following equation:

$$\text{Simple Payback Period} = \frac{\text{Measure Cost}}{(\text{Annual kWh Saved} \times \text{Electricity Rate}) + (\text{Annual Mcf Saved} \times \text{Natural Gas Rate})}$$

Prescriptive Incentives

75 percent of the total project cost

Custom Incentives

50 percent of the total project cost

Electric Customer Incentive Limit

\$2,000,000 across all facilities per customer

Natural Gas Customers Incentive Limit

\$1,000,000 across all facilities per customer

Final Thoughts on Best Practices

- Participate in the regulatory process
 - Customers and utilities can have common goals
 - Influence the process
 - Intervene when necessary
 - Collaborate with other industrial partners (ABATE)

Summary

- Terms and Understanding
- Billing Determinants and Framework
- On-Peak/Off-Peak Load Management
- Demand Response
- Interruptible Power Supply
- Energy Efficiency Program
- Regulatory Intervention

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