Utility Rate Structures and the Impact on Energy Efficiency and Renewable Projects

Hosted by:

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Agenda

• Rate calculations
• Review a mock energy efficiency and renewable energy project with three different utilities with differing tariffs
• Summary
Energy Efficiency Calculations

- Rates: most common are energy only rates, or a demand rate (kVa or kW)

- Demand Rate
  - Can’t use the average cost per kWh for calculations
  - Must use the actual billing determinants
  - Demand, energy, on-peak, off-peak, ratchet charges, contract demand charges, power factor requirements, etc.

- Include any add-on charges like franchise fees, fuel charges, DSM charges, etc.
Energy Efficiency Savings Calculations

• Sample project saves 500 kW and 1.87 million kWh
• Equipment operates 12 hours a day, 6 days a week
• R9 – energy only, $0.131 / kWh
• R24 – time of use demand
  – On-Peak and Off-Peak Energy and Demand periods
  – Summer, 1 – 9 PM, Mon-Fri, excluding holidays
  – Non-Summer, 6 AM – noon, & 5 – 9 PM
  – Shoulder months
Energy Efficiency Savings Calculations

• Rate 24 tariff
  – Summer Demand, On-Peak $18.85, Off-Peak $5.68
  – Non-Summer Demand, On-P $13.21, Off-P $5.68
  – Summer Energy, On-P $0.0883, Off-P $0.0490
  – Non-Summer Energy, On-P $0.0638, Off-P $0.0490

• Savings
  – Demand $90,500
  – Energy $105,800
  – Average Cost / kWh = $0.105 / kWh
  – Customers actual average cost / kWh is $0.081
Mock EE and RE Project

- Large Military Base
  - 25 MW Peak Load, Summer Peaking
  - 150,000,000 kWh per Year
  - UESC Project will save 8,000,000 kWh per year
  - Project reduces demand 1,333 MW
  - Project Includes a 1 MW PV system

- UESC Project Cost is $10 M
SCE&G Power Analysis

- Rate 24, time-of-use kW demand rate
- 25 MW Peak Load, Summer Peaking
  - Annual Demand Cost = $4.0 M
- 150,000,000 kWh per Year
  - Annual Power Cost = $8.64 M, Average Cost $0.0576
- Project Savings
  - 8,000,000 * (Avg Rate of $0.0576/kWh) = $460,800
  - 1,333 + 1,000 (Maybe) * (Demand Charge $15.09/kW) = $241,400
- PV Cost Offset
  - 1000 kW * 16% * 8760 hours * average rate ($0.0576) = $80,730
  - Incentive = $0
- UESC Project Cost is $10 M
SCE&G Savings Analysis

- Demand Cost = $4.0 M
- Power Cost = $8.64 M
- Project Savings = $782,930
  - kW Savings + kWh Savings + PV Offset
- Payback $10 M / Savings
  - Aggregated Project = 12.8 years
- Actual savings are dependent on actual time-of-day operating results
FPL Power Analysis

- Rate Structure: GSLDT-3 (TOU Transmission > 2,000 kW)
- 25 MW Peak Load, Summer Peaking
  - Annual Demand Cost = $3.06 M
- 150,000,000 kWh per Year
  - Annual Power Cost = $6.22 M Average Cost $0.0414
- Project Savings
  - 8,000,000 * (Avg Rate of $0.0414/kWh) = $331,200
  - 1,333 * (Demand Charge of $11.78/kW) = $188,433
- PV Cost Offset
  - 1000 kW * 20% * 8760 * average rate ($0.0414) = $72,533
  - Incentive = $0
- UESC Project Cost is $10 M

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FPL Savings Analysis

- Demand Cost = $3.06 M
- Power Cost = $6.22 M
- Project Savings = $592,166
  - kW Savings + kWh Savings + PV Offset
- Payback $10 M / savings
  - Aggregated Project = 16.9 Years
- Blended rate overstates savings and would incorrectly reduce the payback by 3 years.
SCE Power Analysis

• Rate Structure: TOU-8 Sub Trans (>50kV)
• 25 MW Peak Load, Summer Peaking
  – Annual Demand Cost = $3.76 M
• 150,000,000 kWh per Year
  – Annual Power Cost = $12.73 M (Total Bill is $16.5 M using an Average Cost of $0.11/kWh)
• Project Savings
  – 8,000,000 * (Avg Rate of $0.0848) = $680,000
  – 1,333 * (Demand Charge) = $214,000
• PV Cost Offset
  – 1000 kW * 25% * 8760 * Rate = $241,000
  – Incentive =
• UESC Project Cost is $10 M
SCE Savings Analysis

• Demand Cost = $3.76 M
• Power Cost = $12.73 M
• Project Savings = $1.13 M
  – kW Savings + kWh Savings + PV Offset
• Payback
  – EE Measures = 7.2 Years
  – PV System = 14.9 Years
  – Aggregated Project = 8.8 Years
• Final Comments
Summary

• It’s critical to talk with your service provider when first thinking about a project, not after it starts.
• Use the actual Rate to perform calculations, not an average cost.
• EE and self generation projects can alter the billing structure and negatively effect the cost to the facility.
Summary

• Contract demand, ratchet clause, departing load charge, supplemental tariff, interconnection costs, etc., must be considered in the calculations

• Are utilities willing to alter the contract?

• What if the project doesn’t perform the way it was intended?
Questions

• Gene Beck
  – Florida Power and Light
  – Gene.Beck@FPL.com

• Phil Consiglio
  – Southern California Edison
  – Phillip.Consiglio@sce.com

• Bill Eisele
  – SC Electric & Gas
  – BEisele@scana.com