Real-Time Pricing – What is the Right Price Signal?

Harvard Electricity Policy Group
Sixty-Fifth Plenary Session
December 1-2, 2011
Dallas TX

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Promoting Efficient Pricing is a Full Time Job

Efficient Pricing Crusade
Electric Pricing (and Brain) Scrabble
Integrating DR into Wholesale Electricity Markets

Net Welfare: Flat versus Market Pricing with Inelastic Demand
Net Welfare: Flat versus Market Pricing with Elastic Demand – at High LMPs

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<th>Price/Cost</th>
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- Consumer Surplus
- Producer Surplus
- Deadweight Losses

Market Settlement

Usage P = MC

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Net Welfare: Flat versus Market Pricing with Elastic Demand – At Low LMPs
Retail Rates Alternatives Modeled

Proposed 3-Part TOU

|       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Wkdy  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Wknd  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

Proposed CPP

|       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Wkdy  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Wkdy  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Wknd  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

Proposed VPP

|       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Wkdy  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Wknd  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
Participant Savings (NE)

Status Quo Year
High Year
Extreme Year

$0
$10
$20
$30
$40
$50
$60
$70
$80

3-Part TOU
CPP
VPP
RTP

$M
Average Coincident Monthly Peak Load Reductions (NE)
Maximum Non-Coincident Peak Load Reductions (NE)
All Consumers Electricity Bill Savings (NE)
Net Welfare Resource Savings (NE)

Status Quo Year
High Year
Extreme Year

$,000

$M

$5.0
$2.0
$1.0
$0.0

3-Part TOU_{CPP}  VPP  RTP

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CLP Implemented VPP – Participant Savings

Coincidence of Peak Loads and High Prices

Participant Savings

3-Part TOU  VPP  RTP

$0.00  $0.20  $0.40  $0.60  $0.80  $1.00  $1.20  $1.40  $1.60  $1.80

$ Millions

Extreme Year
High Year
Status Quo Year

CT Monthly Peak Load (n=31)  System Monthly Peak Load (n=31)

Hours over $250/MWh (n=34)
CLP Implemented VPP – Resource Savings
Discussion

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