Ontario Energy Board

Regulated Price Plan Working Group Meeting #5

October 28, 2004

NAVIGANT CONSULTING

Discussion Outline

- Assumptions, Considerations and Key Questions for Smart Metering
- Ontario Price History and TOU Considerations
- Impact and Allocation of the Global Adjustment
- Critical Peak Pricing
- Variance Recovery
- Applicability of "Conventional Meter" Strawman Elements

NAVIGANT CONSULTING

1

Moving to Smart Meters

- WG agreed to defer discussion of the RPP for smart meters until it had some resolution of the RPP for conventional meters
- This resolution is now more clearly defined
- This session address the issues and options for the RPP for smart meters (SM)

NAVIGANT CONSULTING

2

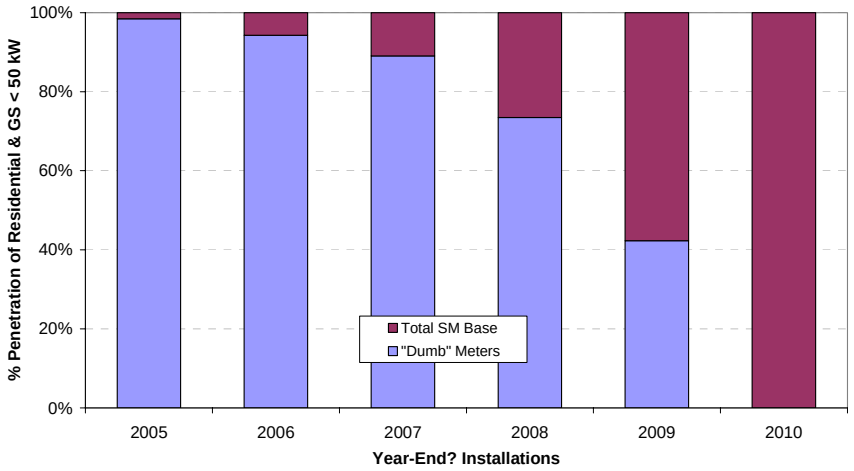
Assumptions for Smart Meters

- In developing the following discussion, we have assumed the following
  - SM deployment as outlined in *Smart Meter Update* (Attachment A to Oct 8 meeting notes)
    - Deployment likely to focus on larger customers first, but will likely cover some residential customers by second year of the RPP
  - SM deployment will be mandatory for selected customers
  - Customers will not be able to remain on the RPP for "conventional meters" after having an SM installed
  - SMs will be capable of measuring hourly consumption and will have bi-directional communication capability
  - Recovery of SM costs is outside scope of RPP WG
  - Customer education to "*encourage demand response*" is outside the RPP

NAVIGANT CONSULTING

3

Smart Meter Deployment Assumptions



NAVIGANT CONSULTING

4

Key Considerations: RPP for SMs

- In any given year, some RPP customers will be on SMs, others on conventional meters (CMs)
- It's not a different RPP, simply a different price plan within the broader RPP
- Spot price pass-through is available to all by opting out of the RPP
- As different groups of customers move to SMs, the Net System Load Shape (NSLS or total LDC load less interval metered load) may change
  - With good load profile information, the impact of any changes in the NSLS can be predicted and the RPP price for either the SM or CM customer group adjusted to mitigate variance
- In addition to the other RPP objectives we have been discussing for CMs, SMs also enable "*encouragement of demand management*"
  - How important is this objective relative to the others we have been focusing on to date (eg, cost reflectivity, stability, customer acceptance, low administrative costs)

NAVIGANT CONSULTING

5

Key Questions re: RPP for SMs

- What price structure (eg, Time-of-Use or TOU) for the RPP for SMs to take advantage of the additional capabilities of SMs
  - If TOU, how many periods, what hours?
  - Seasonality?
  - Critical Peak Pricing (CPP)?
  - Should the price in any period merely reflect underlying supply costs or should the prices or differences in prices between periods be "exaggerated" to elicit more customer response?
- Are variances in the RPP for SM recovered separately from variances in the RPP for CM?
- Can / should the other elements of the conventional meter RPP (eg, true-up frequency, recovery period, notice, etc.) apply to the RPP for SM or should they be different?

NAVIGANT CONSULTING

6

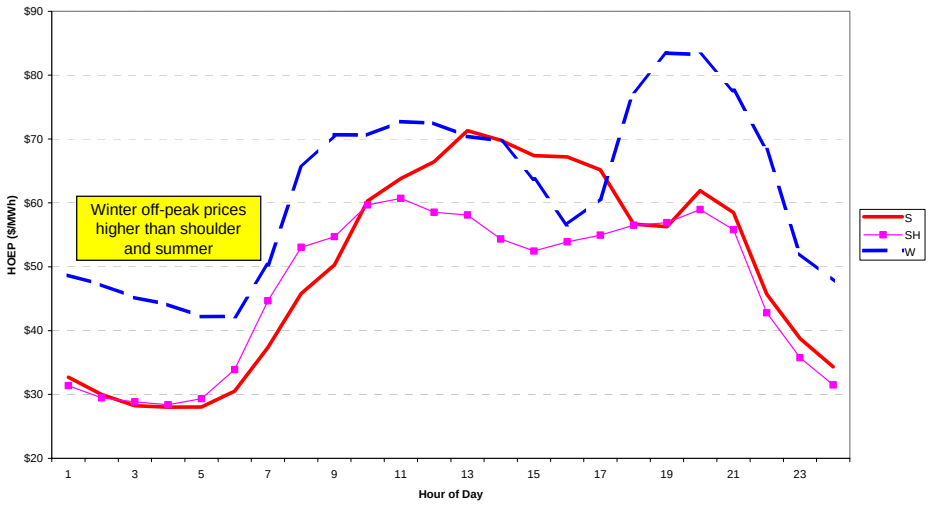
Ontario Price History

- Review history of hourly spot price in Ontario since market opening
- Review at seasonal pricing patterns and hourly pricing patterns
- Which periods should be considered "On-peak" and which "Off-peak"?
- Also explored a "Super-Peak" period within On-peak period, plus Critical Peak Pricing
- Infinite variations, but did not explore all (intent is to provide a flavour of the primary options available)

NAVIGANT CONSULTING

7

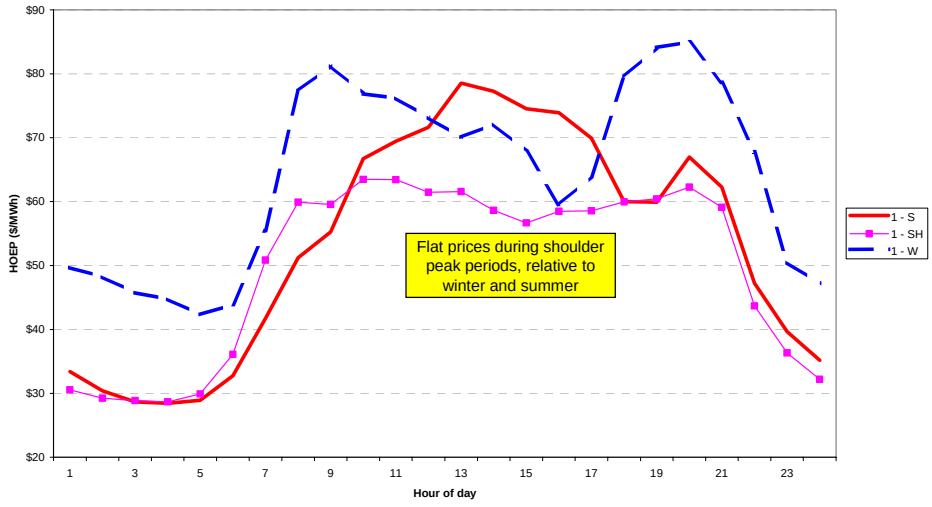
Ontario Hourly Prices by Season (all days)



NAVIGANT CONSULTING

8

Ontario Hourly Prices by Season (weekdays only)



NAVIGANT CONSULTING

9

TOU Considerations

- Traditional 7 am – 11 pm probably the best definition of "peak" periods
- Should the peak and off-peak prices vary by season
- Merits of "super-peak" period in winter and/or summer
  - Eg, noon – 6 pm summer and 6 pm – 10 pm winter

NAVIGANT CONSULTING

10

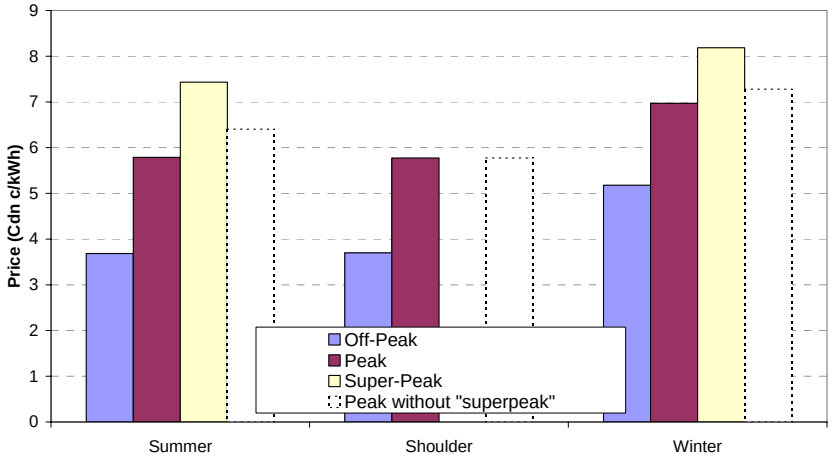
Prices by Period Since Market Opening

NAVIGANT CONSULTING

11

Prices by Period Since Market Opening (with "Super-Peak" Period)

- Summer super-peak period = noon – 6 pm
- Winter super-peak period = 6 pm to 10 pm



NAVIGANT CONSULTING

12

Impact of the Global Adjustment on TOU Price

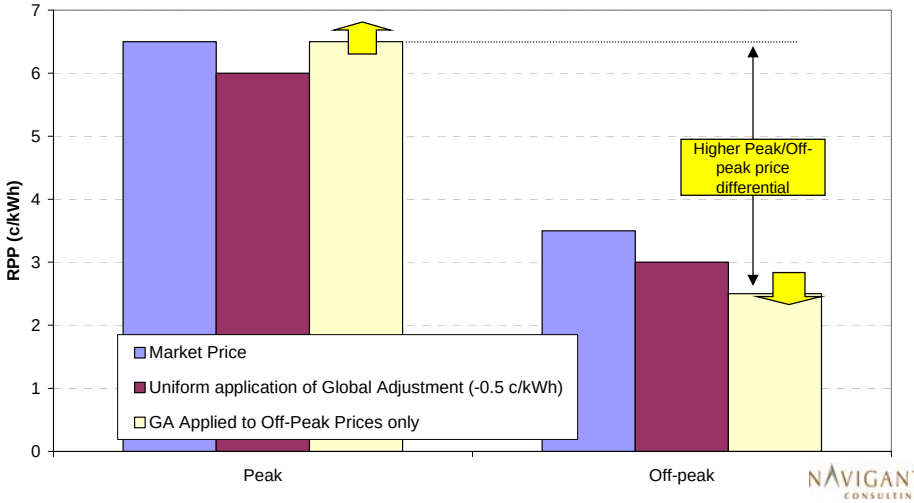
- Based on draft regulations, the Global Adjustment (GA) will be applied uniformly for all consumption in a month
  - Maintains peak / off-peak differential, but does not provide marginal price signal
- Key issues:
  - Although GA will be uniform within a given month, RPP for SM does not need to reflect GA uniformly in TOU prices
    - Could apply downward adjustments to off-peak prices, upward adjustments to on-peak prices
  - Although GA may vary by month, RPP for SM does not need to apply different GA for each month
    - Could average within a season or across the entire year

NAVIGANT CONSULTING

13

Illustrative Impact of Differing GA Allocation on TOU Rates

Illustration based on 6.5 c/kWh on-peak and 3.5 c/kWh off-peak price and –0.5 c/kWh Global Adjustment



14

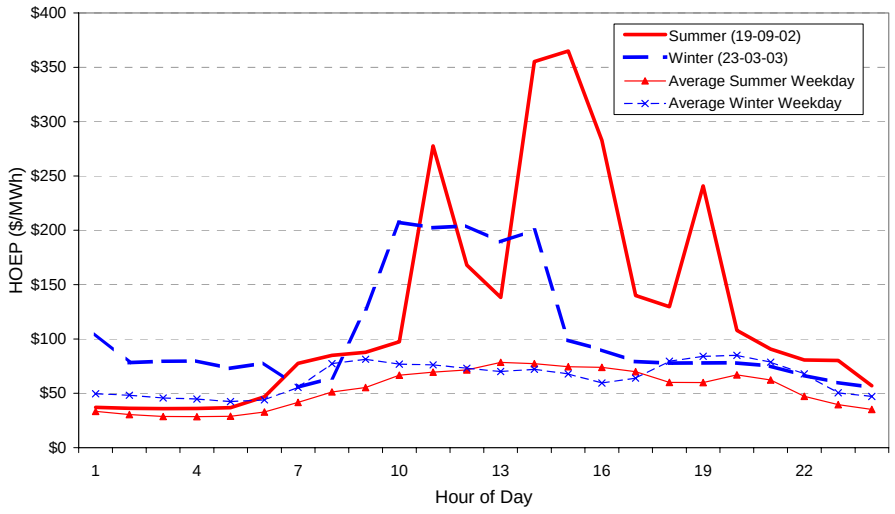
Critical Peak Pricing

- TOU price signals likely to be based on average expected prices over a given period
  - Do not reflect extreme weather / system prices, but rather "normal" weather and prices
- This price signal will encourage regular load shifting
  - benefits customers who load shift, but unlikely to have a significant impact on market prices (operating on relatively "flat" part of supply curve)
- TOU price signal will not encourage any incremental demand management on days with extreme prices when it would be most valuable
  - For example, if demand were 1% lower when prices were above $120/MWh in the first year since market opening, Navigant Consulting estimated that Ontario electricity prices would have been 2% lower, resulting in $170 M in reduced electricity costs for consumers* (operating on very steep part of supply curve). Numerous studies in other electricity market have yielded similar findings
  - Critical Peak Pricing (CPP) is an attempt to capture this benefit

* *Blueprint for Demand Response for Ontario*, Navigant Consulting, April 2003

15

Illustrative"Extreme" Price Days



NAVIGANT CONSULTING

16

Ontario "Extreme" Price Frequency

- Frequency of occurrence drops rapidly as "extreme" price threshold increases above 10 c/kWh
- Given limited time market has been open and weather patterns in that time, historical seasonal frequency may not be reflective of future frequency

Ontario Spot Price History Since Market Opening

	Winter (Dec-Mar)	*Shoulder*	*Summer (June-Sept)*	*% of hours*	*Average Price (c/kWh)*
Hours > 10 c/kWh	697	133	285	5.1%	12
Hours > 12.5 c/kWh	367	62	165	2.7%	15
Hours > 15 c/kWh	184	40	112	1.6%	18
Hours > 17.5 c/kWh	76	20	79	0.8%	22
Hours > 20 c/kWh	49	7	60	0.5%	26

NAVIGANT CONSULTING

17

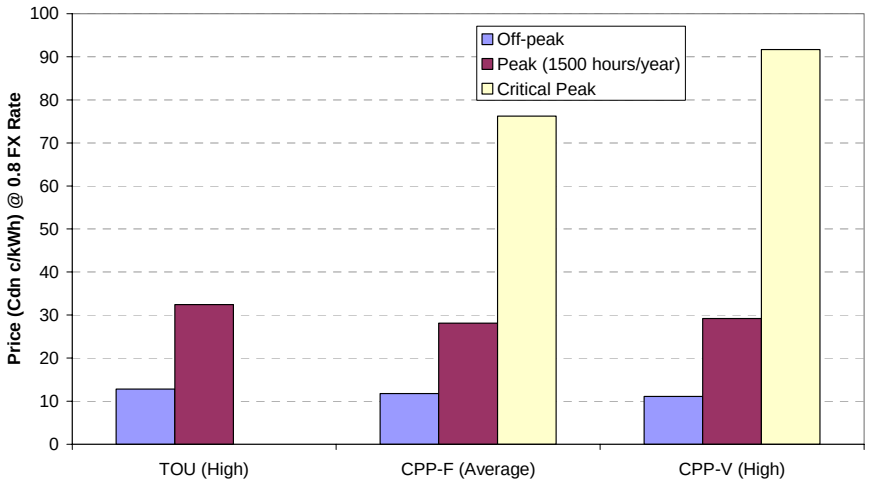
California Statewide Pricing Pilot

- Sophisticated pilot to determine impact of TOU and CPP prices to determine usage (kWh) and demand (kW) impacts from different time-differentiated rates, price elasticities and customer preference for dynamic and current rate forms
- Essentially three price schemes offered to customers
  - TOU with seasonal rates
  - CPP – Fixed (with day ahead notification) up to 15 times each year
  - CPP – Variable (with four hour notice) up to 75 hours each year offered to customers with smart thermostats
- Caveats
  - Price differentials between periods much higher than those likely to be implemented in Ontario
  - Participation was voluntary (some cohorts were difficult to fully subscribe)
  - Customer load profiles and equipment usage (eg, A/C) much different than Ontario
  - Based on these, results should be considered directional only

NAVIGANT CONSULTING

18

California Residential SPP Rates



NAVIGANT CONSULTING

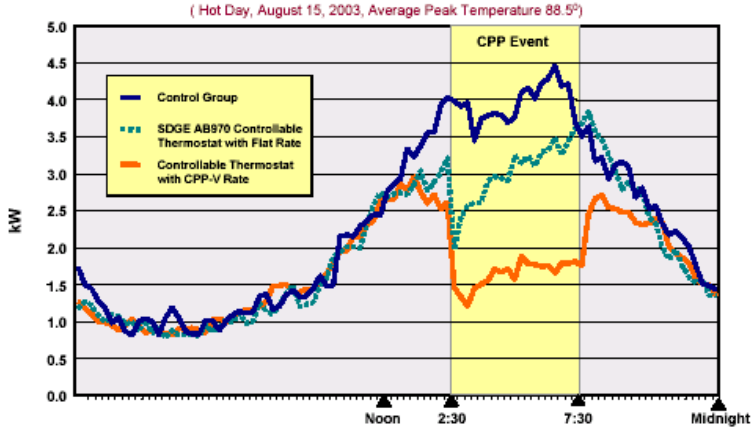
19

Experience with CPP-V Rate

RESIDENTIAL

Example Residential Customer CPP-V Response

(Hot Day, August 15, 2003, Average Peak Temperature 88.5º)



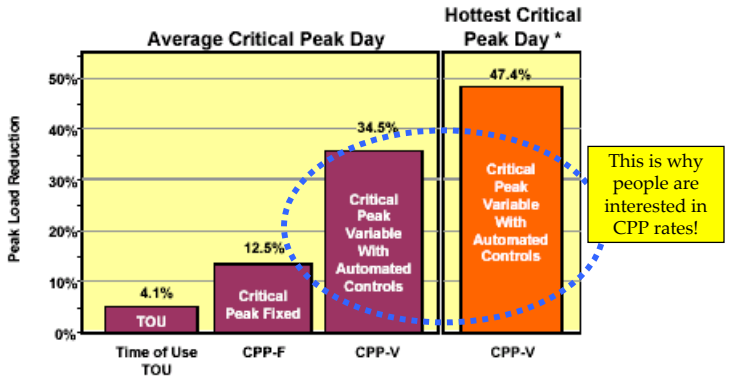
Source: Response of Residential Customers to Critical Peak Pricing and Time-of-Use Rates during the Summer of 2003, September 13, 2004, CEC Report.

Demand Reduction on Critical Peak Days

RESIDENTIAL

Actual Residential Critical Peak Impacts

By Rate Treatment



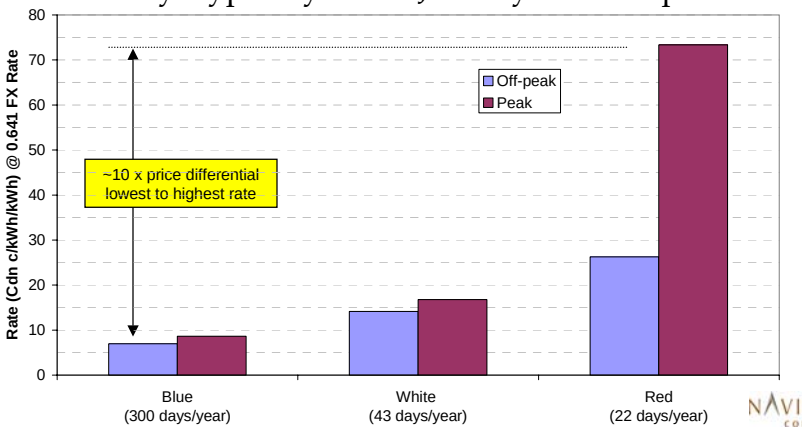
This is why people are interested in CPP rates!

Source: Statewide Pricing Pilot Summer 2003 Impact Analysis, Charles Rivers Associates, Table 1-3, 1-4, August 9, 2004.

* Hottest day impacts discussed on page 105.

EdF Tempo Rate

- Peak and off-peak prices for three different day types
- Day-type (and prices) posted day-ahead on EdF website
- "Red" days typically fall in January – March period



NAVIGANT CONSULTING

22

Role of Enabling Technologies in CPP

- California
  - Greatest demand response impact among CPP-V customers with "smart" thermostats
- EdF (from S. Adamson e:mail)
  - Signal box indicating day type can be plugged into any outlet
  - Energy management equipment that can respond to price signals
  - Equipment controls heating (almost all "red" days are in winter)
- These technologies help to automate and execute the customer preferences and price/comfort trade-offs

NAVIGANT CONSULTING

23

Critical Peak Pricing for Ontario

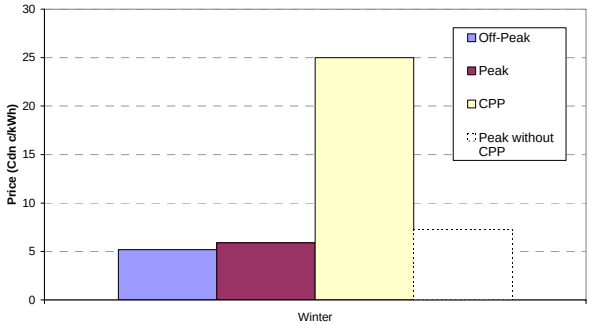
- Optional or mandatory?
  - Number of customers on EdF's tempo rate is substantially less than those on its TOU rate
- If so, when?
  - Is the market ready?
  - Optional now, mandatory later?
- Exaggerate prices or not?
  - Results achieved elsewhere are based on much higher critical peak prices and price differentials
- Notice period?
  - Need for Day-Ahead price signal or use three or four hour ahead pre-dispatch price?

NAVIGANT CONSULTING

24

Illustrative CPP Rate for Winter

- Based on $125/MWh HOEP "trigger" price, CPP would have applied 367 hours over two winters
  - A higher "trigger" would result in fewer CPP hours
  - Would likely base on pre-dispatch prices to provide notice to customers
- 25 c/kWh CPP rate is arbitrary, provides some "subsidy" to reduce peak rates at other time
- Fewer hours and less impact on rate for other peak hours for summer CPP



NAVIGANT CONSULTING

25

RPP for SM Variances

- Pool of customers for recovery of RPP for SM variances expected to increase over time; pool of customers for recovery of RPP for CM variance will decrease
- Variances in the RPP for SM can be tracked separately from variances in the RPP for CM
- Key decision is whether RPP for SM variances should be recovered separately from variances in the RPP for CM?

NAVIGANT CONSULTING

26

RPP for SM Variance Recovery

- If keep variance recovery separate by meter type
  - RPP for CM variances will be recovered from a "shrinking" pool, exacerbating the impact of any variances (becomes concentrated on remaining CM customers)
  - Conversely, increasing pool of SMs mitigates the impact of any RPP for SM true-ups (diluted as more SMs installed)
  - Options for handling migration to SMs
    - Track those customers with new SMs and charge them the RPP for CM true-up until the variance they are responsible for is cleared
    - Transfer the variance accounts from CM to SM on a pro-rata basis as SMs are installed
    - Charge customers an exit fee
- If treat RPP variance account as "one big pot" with uniform recovery, regardless of meter type
  - Don't need to worry about migration from CM to SM and changes in size of the recovery pool
  - Potential inequity if variances not reasonably uniform between CM and SM customers

NAVIGANT CONSULTING

27

Review of Key Questions

- What price structure (eg, Time-of-Use or TOU) for the RPP for SMs to take advantage of the additional capabilities of SMs
  - If TOU, how many periods, what hours?
  - Seasonality?
  - Critical Peak Pricing (CPP)?
  - Should the price in any period merely reflect underlying supply costs or should the prices or differences in prices between periods be "exaggerated" to elicit more customer response?
- Are variances in the RPP for SM recovered separately from variances in the RPP for CM?
- Can / should the other elements of the conventional meter RPP (eg, true-up frequency, recovery period, notice, etc.) apply to the RPP for SM or should they be different?

NAVIGANT CONSULTING

28