## **ATC Futures**

| AICFU                 |               | 1             | 1             |               | I                              |                         |                |          |            |      |                    |
|-----------------------|---------------|---------------|---------------|---------------|--------------------------------|-------------------------|----------------|----------|------------|------|--------------------|
|                       | Load          | Energy        | Load          | Energy        |                                |                         |                |          |            | c    | 70                 |
|                       | Growth        | Growth        | Growth        | Growth        |                                |                         | % Energy in    |          | Renewables |      |                    |
|                       | within        | within        | outside       | outside       | Generation                     |                         | ATC from       |          | inside/    |      |                    |
| Drivers               | ATC           | ATC           | ATC           | ATC           |                                | within ATC <sup>1</sup> |                |          | vables     |      | le WI <sup>2</sup> |
|                       | 2013,         | 2013,         | 2013,         | 2013,         | 2013                           | 2018                    | 2024           | 2013     | 2018,      | 2013 | 2018,<br>2024      |
| Bounds                | 2018,<br>2024 | 2018,<br>2024 | 2018,<br>2024 | 2018,<br>2024 |                                |                         |                |          | 2024       |      | 2024               |
| Dounds                | 2024          | 2024          | 2024          | 2024          | Small Can                      | acity Coal R            | atiraments     |          |            | Ins  | ide:               |
|                       |               |               |               |               | -                              |                         |                |          |            |      |                    |
| Lower                 | 0.5%          | 0.5%          | 0.5%          | 0.5%          | 270 MW                         | 880 MW                  | 880 MW         | 8%       | 10%        | 50%  | 50%<br>ut:         |
| Lower                 | 0.5 /0        | 0.5 /0        | 0.5 //        | 0.570         |                                | erator Addit            | ons:<br>No NED | 070      | 10 /0      | 50%  | ut:<br>50%         |
|                       |               |               |               |               | No NED <sup>9</sup>            | No NED                  |                |          |            |      |                    |
|                       |               |               |               |               | 1                              | acity Coal R            |                |          |            | 50%  | ide:               |
| NC 13                 | 1 501         | 1 501         | 1 501         | 1 501         | 130 MW                         | 440 MW                  | 440 MW         | 0.01     | 1501       |      | 35%<br>side:       |
| Mid <sup>3</sup>      | 1.5%          | 1.5%          | 1.5%          | 1.5%          |                                | erator Addit            |                | 8%       | 15%        | 50%  |                    |
|                       |               |               |               |               | NED <sup>9</sup>               | NED                     | NED            |          |            |      | 65%                |
|                       |               |               |               |               |                                | acity Coal R            |                |          |            |      | ide:               |
|                       | 2.00          | 2.00          | 2.00          | 2.00          | None                           | None                    | None           | 200      | 250        | 45%  | 25%                |
| Upper                 | 3.0%          | 3.0%          | 3.0%          | 3.0%          |                                | erator Addit            |                | 20%      | 25%        |      | side:              |
|                       |               |               |               |               | NED <sup>9</sup> ,             | NED, 500                | NED, 500       |          |            | 55%  | 75%                |
|                       |               |               |               |               | None                           | MW Coal                 | More Coal      |          |            |      |                    |
| 2013 Futu             | res Descr     | iptions       | 1             | 1             | ſ                              |                         |                |          |            | 1    |                    |
| Robust<br>Economy     |               |               |               |               |                                |                         |                |          |            | _    |                    |
|                       | 3.0%          | 3.0%          | 3.0%          | 3.0%          |                                | Upper                   |                | M        | lid        | M    | lid                |
| High re-<br>tirements | 1.50          | 1.50          | 1.50          | 1.50          |                                |                         |                |          |            |      |                    |
| High                  | 1.5%          | 1.5%          | 1.5%          | 1.5%          | Lower (with NED <sup>9</sup> ) |                         | Mid            |          | Mid        |      |                    |
| Environ.              | $1.2\%^{4}$   | 1.2  or  4    | $1.2\%^{4}$   | $1.2\%^{4}$   | I                              |                         | 10%            |          |            | e a  |                    |
| Slow                  | 1.2%          | $1.2 \%^4$    | 1.2%          | 1.2%          |                                | Lower                   |                | П        | 0%         | IV   | lid                |
| Growth                | 0.5%          | 0.5%          | 0.5%          | 0.5%          | Mid                            |                         | Lower          |          | La         | wer  |                    |
| DOE 20%               | 0.3%          | 0.3%          | 0.3%          | 0.3%          | Mild                           |                         | Lower          |          | LO         | wei  |                    |
| Wind                  | 2.0%          | 2.0%          | 2.0%          | 2.0%          | Lower                          |                         | Upper          |          | Upper      |      |                    |
| Fuel&Reg.             | 2.070         | 2.070         | 2.070         | 2.070         | Lower                          |                         | Opper          |          |            | per  |                    |
| Limitations           | 1.3%          | 1.3%          | 1.3%          | 1.3%          | Mid                            |                         | Mid            |          | М          | lid  |                    |
| 2018 Futu             |               |               | 110 /0        | 110 /0        |                                |                         |                |          |            |      |                    |
| Robust                |               | 1             |               |               |                                |                         |                |          |            |      |                    |
| Economy               | 3.0%          | 3.0%          | 3.0%          | 3.0%          | Upper                          |                         | М              | lid      | М          | lid  |                    |
| High re-              |               |               |               |               |                                |                         |                |          |            |      |                    |
| tirements             | 1.5%          | 1.5%          | 1.5%          | 1.5%          | Lower                          |                         | Mid            |          | Μ          | [id  |                    |
| High                  |               |               |               |               |                                |                         |                |          |            |      |                    |
| Environ.              | $1.0\%^{4}$   | $0.8\%^{4}$   | $1.1\%^{4}$   | $1.1\%^{4}$   | Lower                          |                         | 20%            |          | Up         | per  |                    |
| Slow                  |               |               |               |               |                                |                         |                |          |            |      |                    |
| Growth                | 0.5%          | 0.5%          | 0.5%          | 0.5%          |                                | Mid                     |                | Lo       | wer        | Lo   | wer                |
| DOE 20%<br>Wind       |               |               |               |               | _                              |                         |                |          |            |      |                    |
| Fuel&Reg.             | 2.0%          | 2.0%          | 2.0%          | 2.0%          | Lower                          |                         | Upper          |          | Upper      |      |                    |
| Limitations           | 1.207         | 1.207         | 1.207         | 1.207         |                                | Mid                     |                |          | C. A       |      | 6.4                |
| 2024 Futu             | 1.3%          | 1.3%          | 1.3%          | 1.3%          | l                              | Mid                     |                | N        | lid        | I    | lid                |
| 2024 Futu<br>Robust   | i es Deser    | ipuons        |               |               |                                |                         |                | -        |            |      |                    |
| Economy               | 3.0%          | 3.0%          | 3.0%          | 3.0%          |                                | Upper                   |                | N        | lid        | N    | lid                |
| High re-              | 5.0%          | 5.0%          | 5.0%          | 5.0%          |                                | Opper                   |                | IV       | uu         | IV   | uu                 |
| tirements             | 1.5%          | 1.5%          | 1.5%          | 1.5%          | Lower                          |                         | М              | lid      | M          | fid  |                    |
| High                  | 1.3 /0        | 1.5 /0        | 1.5 /0        | 1.5 /0        | LOWEI                          |                         | 101            |          | Mid        |      |                    |
| Environ.              | $1.0\%^{4}$   | $0.8\%^4$     | $1.1\%^{4}$   | $1.1\%^{4}$   | Lower                          |                         | 20             | )%       | Upper      |      |                    |
| Slow                  | 1.0 /0        | 0.070         | 1.1 /0        | 1.1 /0        | Lower                          |                         | 2(             | 20% Uppe |            |      |                    |
| Growth                | 0.5%          | 0.5%          | 0.5%          | 0.5%          | Mid                            |                         | Lower          |          | Lo         | wer  |                    |
| DOE 20%               |               | 0.0 /0        | 2.2 /0        | 2.2 / 2       |                                |                         |                |          |            |      |                    |
| Wind                  | 2.0%          | 2.0%          | 2.0%          | 2.0%          | Lower                          |                         | Up             | per      | Un         | per  |                    |
| Fuel&Reg.             |               |               |               |               |                                |                         |                |          |            |      |                    |
| Limitations           | 1.3%          | 1.3%          | 1.3%          | 1.3%          |                                | Mid                     |                | М        | lid        | Μ    | lid                |

## ATC Futures (cont.)

| AICIU                    | tul es (cont.)    |                         |                                    |                          |
|--------------------------|-------------------|-------------------------|------------------------------------|--------------------------|
|                          | Natural Gas price | Coal Price Forecast for | Environmental                      | Generation Portfolios    |
| Drivers                  | forecast          | New Units <sup>5</sup>  | Regulations <sup>6</sup>           | outside ATC <sup>7</sup> |
|                          | 2013,             | 2013,                   | 2013,                              | 2013                     |
|                          | 2018,             | 2018,                   | 2018,                              | 2018,                    |
| Bounds                   | 2024              | 2024                    | 2024                               | 2024                     |
| _                        |                   |                         | \$0/ton for CO <sub>2</sub> , 0%   |                          |
| Lower                    | -40%              | -10%                    | Higher Mercury Costs               | N/A                      |
|                          | NYMEX             | MISO MAIN               | $25/ton for CO_2,$                 |                          |
|                          | For 5 Years       | \$2.00/MMBTU            | 25% Higher Mercury                 |                          |
| Mid                      | Followed by EIA   | Delivered in 2010 &     | Costs                              | N/A                      |
|                          | Escalation Rate   | 2%/yr. (\$2.34 in       |                                    |                          |
|                          |                   | 2018, \$2.59 in 2024)   | <u> </u>                           |                          |
|                          | 50%               | 200                     | \$44/ton for CO <sub>2</sub> , 25% | 37/4                     |
| Upper                    | 50%               | 20%                     | Higher Mercury Costs               | N/A                      |
|                          | s Descriptions    |                         |                                    |                          |
| Robust                   |                   |                         |                                    |                          |
| Economy                  | Mid-Upper +25%    | Upper                   | Mid                                | Reference                |
| High re-                 |                   |                         |                                    | D.C.                     |
| tirements                | Mid-Low -20%      | Mid                     | Mid                                | Reference                |
| High                     |                   | T                       | TT                                 |                          |
| Environ.                 | Upper             | Lower                   | Upper                              | Environmental            |
| Slow                     |                   |                         | Ŧ                                  | D.C.                     |
| Growth                   | Lower             | Mid                     | Low                                | Reference                |
| DOE 20%                  | 161               | Ŧ                       |                                    |                          |
| Wind                     | Mid               | Lower                   | Mid                                | 20% Wind                 |
| Fuel&Reg.<br>Limitations | N. 1 11           | 16.1                    | 16.1                               |                          |
|                          | Mid-Upper +25%    | Mid                     | Mid                                | Reg. Limitation          |
|                          | s Descriptions    |                         |                                    |                          |
| Robust                   | Mid Umman + 2507  | Unnon                   | Mid                                | Reference                |
| Economy                  | Mid-Upper +25%    | Upper                   | Mid                                | Reference                |
| High re-                 | Mid-Low -20%      | Mid                     | Mid                                | Reference                |
| tirements                | MID-LOW -20%      | IVIIU                   | Mild                               | Reference                |
| High<br>Environ.         | Unnor             | Lower                   | Unnor                              | Environmental            |
| Slow                     | Upper             | Lower                   | Upper                              | Environmentai            |
| Growth                   | Lower             | Mid                     | Low                                | Reference                |
| DOE 20%                  | Lower             | Ivilu                   | LOW                                | Kelefellee               |
| Wind                     | Mid               | Lower                   | Mid                                | 20% Wind                 |
| Fuel&Reg.                | Ivita             | Lower                   | Wild                               | 20% Wind                 |
| Limitations              | Mid-Upper +25%    | Mid                     | Mid                                | Reg. Limitation          |
| 2024 Future              | s Descriptions    | Iviiu                   | 1011d                              | rteg. Elilitation        |
| Robust                   | 5 Descriptions    |                         |                                    |                          |
| Economy                  | Mid-Upper +25%    | Upper                   | Mid                                | Reference                |
| High re-                 |                   | - rp**                  |                                    |                          |
| tirements                | Mid-Low -20%      | Mid                     | Mid                                | Reference                |
| High                     |                   |                         |                                    |                          |
| Environ.                 | Upper             | Lower                   | Upper                              | Environmental            |
| Slow                     | 11                |                         |                                    |                          |
| Growth                   | Lower             | Mid                     | Low                                | Reference                |
| DOE 20%                  |                   |                         |                                    |                          |
| Wind                     | Mid               | Lower                   | Mid                                | 20% Wind                 |
| Fuel&Reg.                |                   | İ.                      |                                    |                          |
| Limitations              | Mid-Upper +25%    | Mid                     | Mid                                | Reg. Limitation          |
|                          |                   |                         |                                    |                          |

Notes:

1) All scenarios include Weston 4 and Elm Road 1 and 2 for a total of about 1,850 MWs. The amount and type of generation additions in ATC's Futures start with MISO's expansion plans and are adjusted based on the load forecast specified in each ATC Future.

| Model Year | Reference   | 20% Wind    | Environmental | Regulatory <sup>a</sup> |
|------------|-------------|-------------|---------------|-------------------------|
| 2013       | 600 MW CT   | 600 MW CT   |               | 600 MW CT               |
| 2018       | 600 MW Coal | 600 MW Coal |               | 1,200 MW CT             |
| 2024       | 600 MW Coal | 600 MW Coal | 1,200 Nuclear | 1,200 MW Coal           |

## MISO MTEP09 Generator Additions Within ATC for Each MISO Future:

<sup>a</sup> 5 year delay on new Coal and Combustion Turbines (CTs) & Combined Cycle (CC) near loads.

- 3) Mid load growth was based primarily on ATC's normalized peak growth rate over the past 5 years.
- 4) A lower load growth percentage was selected for the High Environmental future due to increased Demand Side Management and Energy Efficiency, not because of low economic growth. Conservation programs are assumed to impact the rate of energy growth inside ATC somewhat more than the peak demand growth in 2018 and 2024.
- 5) Most existing coal-fired generators have unit specific forecasts from Ventyx (formerly NewEnergy Associates).
- 6) CAIR and CAMR regulations are assumed to be met in the mandated timeframes. This column means that the  $CO_2$  tax affects the dispatch of the generators. The  $CO_2$  tax can also affect the generation expansion plans. The starting point for the MISO expansion plan used in each ATC Future is specified in the next column.
- 7) The Reference, Environmental, 20% Wind and Regulatory Limitation refer to separate MISO MTEP09 Expansion plans.
- 8) CAPX Group 1 is assumed in place for 2018 and 2024 for all Futures. Also, all Futures include approved transmission upgrades from MTEP for 2013, 2018 & 2024.
- 9) NED is Alliant Energy's proposed 280 MW Nelson Dewey power plant.

<sup>2)</sup> Approach: Determine the number of MWh that could be produced from planned renewables in WI, all other comes from outside.