

**Southwest Power Pool, Inc.
Model Development Working Group
OGE Office, Leadership Square Building
Oklahoma City, Oklahoma
June 7: 8:00 A.M. – 5:00 P.M.
June 8: 8:00 A.M. – 12:00 P.M.**

• M I N U T E S •

Agenda Item 1 - Administrative

The meeting was called to order at 8:07 a.m. The following MDWG members were in attendance:

Nate Morris, Chair – Empire District Electric Company
Derek Brown, Vice Chair – Westar Energy
Dustin Betz – Nebraska Public Power District
Joe Fultz – Grand River Dam Authority
Holli Krizek – Western Area Power Administration
Reené Miranda – Southwestern Public Service
Scott Rainbolt – American Electric Power
Scott Schichtl – Arkansas Electric Cooperative Company
Jason Shook – GDS Associates
Liam Stringham – Sunflower Electric Power Corporation
Brian Wilson – Kansas City Power & Light
Anthony Cook, Secretary – Southwest Power Pool

The following guests were also in attendance:

Jason Bentz – American Electric Power
Mark Reinart – Golden Spread Electric Cooperative
Chris Colson – Western Area Power Administration
Alex Mucha – Oklahoma Municipal Power Authority
Bruce Doll, Armin Sehic – Municipal Energy Agency of Nebraska
Aravind Chellappa – Southwestern Public Service
Jerad Ethridge – Oklahoma Gas & Electric
David Gustad – Tri-State Generation and Transmission
Wayne Haidle – Basin Electric Power Cooperative
Gimod Olapurayil – ITC Great Plains
Dona Parks, Patrick McPhail – Grand River Dam Authority
John Weber – Missouri River Energy
Daniel Benedict – City of Independence, Missouri
Alan Burbach – Lincoln Electric System
Jeremy Harris – Westar Energy
Jerry Bradshaw - City Utilities of Springfield
Thomas Mayhan – Omaha Public Power District
Eddie Watson, John Mills, Jonathon Hayes, Scott Jordan, Mitch Jackson, Moe Shahriar
– Southwest Power Pool

Proxies

John Boshears gave his proxy to Jerry Bradshaw and Derek Brown gave his proxy to Jeremy Harris on day 2.

Charter Update

Anthony Cook stated that the TWG, MOPC, CHC, and BOD approved the MDWG Charter changes to add two additional members. He asked the group if they wanted to solicit applications to fill the additional two positions or leave the group with twelve members. The group decided to solicit applications for the two positions.

AI: SPP Staff to solicit applications for two open positions.

Meeting Agenda

The group was asked if anyone had any issues or needed more time to review the posted materials. There were no concerns from anyone for this meeting.

The agenda was reviewed by the group. There were a few changes made which were itemizing the Contact List into Staff Contacts and Modeling Contacts, added SPP Data Coordination Workbook, moved Review of MOD-016 to be item 7, and added 2016 Dynamic Build Update. Jason Shook motioned to approve the agenda with changes; Joe Fultz seconded the motion. The motion passed unopposed.

(Attachment 1 - MDWG Meeting Agenda 20160607.docx)

Meeting Minutes

The September 15, 2015, March 14, 2016, and April 18, 2016 minutes were open for review. Jason Shook motioned to approve all sets of minutes. Derek Brown seconded the motion. The motion passed unopposed.

(Attachment 2 - MDWG Minutes September 15, 2015.docx,

Attachment 3 - MDWG Minutes March 14, 2016.doc,

Attachment 4 - Finalization of Short Circuit Cases Email Vote 20160418.doc)

Review of Action Items

The action item list was reviewed starting with the most recent action items. The more notable items were #121 for Staff to see if an email had been sent from Nathan or Reené, #122 for Staff to add language to the MDWG Procedure Manual that Members will provide outage lists so that facilities are not placed in-service in the Max-fault short circuit case, #128 for Staff to discuss with Doug Bowman how windfarms should be modeled in short circuit analysis, and #130 for Nate Morris to request TPLTF for recommendation.

(Attachment 5 - SPP MDWG Action Items 20160607.xls)

Agenda Item 2 – 2017 Series MDWG Model Build:

Anthony stated that the 2017 Series would be utilizing PSS/E 33.5 at a minimum in order to utilize the enhancement of the WMOD capability. The group decided to utilize version 33.7.

The case list was presented to the group for discussion. After discussion on the number of models and the need for each one, it was decided that the 2018SH model would not be needed. Reené Miranda motioned to remove the 2018SH model from the powerflow and dynamics case list. Scott Schichtl seconded the motion. There was further discussion to treat the powerflow and dynamic case lists separately; so Reené motioned to edit the original motion to only be for the powerflow case list. Scott Schichtl seconded the motion. The motioned passed unopposed. There was further discussion to add a 2018S model to the short circuit case list. After further

discussion over the dynamics and short circuit case lists, Derek Brown motioned to remove the 2018SH from the dynamics list and add 2018S to the short circuit list. Brian Wilson seconded the motion. The motion passed unopposed.

(Attachment 6 - 2017 Series MDWG Model Selection.xlsx)

Anthony presented three options for the powerflow, short circuit, and dynamics schedule. Nate addressed the group of the perpetual lateness of the models each year. The discussion was tabled until day two to allow for everyone to review the options further before making a decision. Upon the start of day two, Nate asked for a straw poll to see which option the majority was in favor of. The results were in favor of option 1. Further discussion was tabled until after Chris Colson presented on Model Balancing. Upon resuming discussion, Nate asked everyone their preference for the Model Update Meeting dates. The majority wanted to move it to be October 18-20, 2016. Also, it was decided to lock loads down in Pass 3, and to hold conference calls each pass during the member review period for status updates. Based on the Model Balancing discussion the group decided to add an effort to coordinate Company Workbooks during the month of July. Liam motioned to approve the schedule with adding July Company Workbook coordination time frame, conference call during each pass, and moving the Model Update Meeting to October 18-20, 2016. Holli Krizek seconded the motion. The motion passed unopposed. Anthony will send out the schedule to Nate and Derek with changes for verification before posting as final.

AI: Mitch and Anthony make schedule changes and send to Nate and Derek for approval before posting.

Anthony then discussed the SPP Staff Contact list and the changes to the modeling group. He stated that Scott Jordan and Brandon Hentschel will no longer be working for Modeling so the list will be updated once their replacements have been identified.

Anthony asked the group to provide updates to the Modeling Contacts list for individual companies.

AI: Staff to send out request for Modeling Contact list updates.

AI: Members provide Modeling Contact list updates per request.

Scott Jordan presented on the Lean Accountability document that was created by SPP Staff and Member representation. He discussed the enhancements that were made to the previous effort by Staff in 2014. Due to the changes to the structure of the schedule for the 2017 Series, Staff will have to make revisions to the Accountability document and bring it back to the group.

AI: Staff to revise Accountability document based on schedule structure updates.

Chris Colson gave a presentation on model balancing. The premise is for each company to coordinate transactions and balance their individual load, generation, transactions, and losses at the beginning of the model building schedule and then make minor tweaks throughout the modeling process. **(Attachment 7 - MDWG Presentation June 2016.pptx)**

Nate Morris asked individuals for other ideas to create efficiencies. These ideas were: Prioritize and focus on Pass 1 & 2, Balance Pass 1, Impose penalties for late participants, Get topology updates earlier, Identify when entities receive load updates and hold them accountable for that time period, Build in stages per element or data type, Finalize the models per the schedule regardless of remaining issues, Build models rapidly, Require any changes submitted

after deadline to be reviewed and accepted by the MDWG, Allow only a certain number of changes to be submitted during later passes, Shift away from MOD, Require docucheck issues corrected sooner, Use language in data request to lean on MOD-032 and Tariff, Report on who submitted profiles for each pass, notify legacy BA when profile data is submitted by LSE, Provide data throughout the “off season”, LSE/GO entities submit data earlier than host BA, Verify transactions early, Balance models, Survey entities for reason for lateness, Create a data repository for data not contained in models, Create modeling areas for each entity, and Locking loads and interchange early.

Nate also asked for examples of known issues. These were: Unfamiliarity with MOD, Late submissions, SPP/MISO system representation getting overwritten, Staffing, and Unfamiliar with overall process.

AI: Members send Nate Morris entities they have had trouble with or reasons for why you have been late before.

The group decided to adopt the practice for the 2017 Series powerflow model build and asked for a conference call the week of June 27th to discuss the Company Workbook format and process.

AI: Staff schedule conference call for week of June 27th to discuss Company Workbook format and process.

Anthony stated that MOD will be in version 8.1.0.1 and using PSS/E version 33. He stated that he received some feedback from the UMZ companies as to what data should be in the MOD base case. He is currently working to consolidate the data and work with SPP IT to complete the MOD update. He stated that he was trying to get it completed by July 1.

Anthony stated that there were not any plans to hold MOD training this year; however, if there was a need then Staff could schedule a training session.

Anthony stated that Staff would be sending out Data Coordination Workbooks this year requesting who will be submitting data for whom. This is in an effort to establish who will be submitting data directly to SPP instead of working through the legacy BA to ensure all data entities are actively participating per MOD-032.

Agenda Item 3 – Procedure Manual:

This item was table for a future meeting.

Agenda Item 4 – Modeling Practices Update:

Anthony stated that the members should be utilizing the PSS/E functionality to define scalable loads in the models. This will create efficiencies and accuracy within the various assessments that are performed each year.

Anthony stated that there has been an effort for correctly modeling windfarms with GSUs and utilizing the PSS/E functionality of identifying windfarms (WMOD) and use of power factor correctly. However, the effort needs to be completed and get all windfarms modeled correctly in order to create efficiencies and accuracy.

Anthony stated that there have been recent situations where SPP was notified of generation retirements with very little lead time. He stated that the MDWG adopted a generation retirement

practice for the models; however, these particular units were not modeled per the practice. He asked the group if the practice needs to be revisited. The group stated that they believed the practice was fine; however, decided to ask the TWG for recommendations about a modeling practice for retiring units.

AI: Nate Morris to ask the TWG for recommendation about a modeling practice for retiring units.

Anthony stated that an effort was needed to map generators to the auxiliary load(s) since in some situations the auxiliary load is not on the same bus as the generator. Others expressed a need for consistency in auxiliary load id. The group asked staff to survey the load ids being used and establish possible load ids for auxiliary loads.

AI: Staff to survey the load ids being used and establish possible load ids for auxiliary loads.

The group decided to table the discussion on the DLTF update for a future meeting.

Anthony stated that the MOD Project Matrix needs to be updated. There are a few types/statuses that are no longer being used and need to be removed. Also, in an effort to create further efficiencies with MOD projects, Staff is requesting member feedback for potential updates to define new types and statuses.

AI: Members to provide Staff with potential MOD Project type and status updates.

AI: Staff to remove type/status that is not used.

Agenda Item 5 – Model Element Review Update:

Anthony asked the group to consider yearly selecting an element to audit for data accuracy. He stated that NERC has started performing data checks on the models and are looking for erroneous data. He asked the group to give is some thought and would add it to a future meeting for further discussion.

Scott Jordan gave an overview of the NERC case metrics reports.

Agenda Item 6 – Planning vs. Operations Models:

This item was tabled for a future meeting.

Agenda Item 7 – Review of MOD-016 and other Standards:

This item was in executive session. Jonathan Hayes discussed the spot checks that the SPP Compliance department performed this year. He spoke on MOD-016 for demand data, net energy for load, and controllable DSM for modeling. The group also discussed the collection of data for TPL-007 and the delay of the effective date of the standard.

AI: Jonathan to follow up with ITP and Markets to see the need of information for MOD-016.

AI: Jonathan to find out consideration comments as to whether DSM is “all activity” or “manual operation” to interrupt load.

AI: Staff to send out request of data information based on consideration comments outcome.

AI: Members to determine percent of DSM for individual systems for summer and submit to Anthony.

Agenda Item 8 – Machine Capability Curve Data Files:

Derek Brown discussed the functionality with PSS/E to read in capability curve data and adjust Qmax and Qmin values based on dispatch. He stated that this would be beneficially for the accuracy of the models. He gave an example of windfarms typically being dispatched at lower output in the cases and the Qmax and Qmin set accordingly and then special wind studies are performed to ramp up the wind and the VAr limits are not adjusted. This can cause voltage issues that are not legitimate.

Agenda Item 9 – Miscellaneous:

Anthony stated that the ITP models will continue to be built using the block dispatch and not the ECDI files. He stated that due to staffing changes, efficiencies within the dynamic model build will be looked into at a later time. Scott Jordan gave an update for the 2016 Dynamic model build. He stated that the build was slightly behind schedule; however, he planned to post full cases by end of June and reduced cases the week after.

Agenda Item 10 – Administrative Items:

Summary of Action Items

- **SPP Staff to solicit applications for two open positions.**
- **Mitch and Anthony make schedule changes and send to Nate and Derek for approval before posting.**
- **Staff to send out request for Modeling Contact list updates.**
- **Members provide Modeling Contact list updates per request.**
- **Members send Nate Morris entities they have had trouble with or reasons for why you have been late before.**
- **Staff schedule conference call for week of June 27th to discuss Company Workbook format and process.**
- **Nate Morris to ask the TWG for recommendation about a modeling practice for retiring units.**
- **Staff to survey the load ids being used and establish possible load ids for auxiliary loads.**
- **Members to provide Staff with potential MOD Project type and status updates.**
- **Staff to remove type/status that is not used.**
- **Jonathan to follow up with ITP and Markets to see the need of information for MOD-016.**
- **Jonathan to find out consideration comments as to whether DSM is “all activity” or “manual operation” to interrupt load.**
- **Staff to send out request of data information based on consideration comments outcome.**
- **Members to determine percent of DSM for individual systems for summer and submit to Anthony.**

Future Meetings

- **Conference Call week of June 27**
- **Face to Face October 18**

Adjourn Meeting

With no further business to discuss, Nate asked for a motion to adjourn. Scott Schichtl motioned to adjourn the meeting, Reené Miranda seconded the motion. The motion passed unopposed. The meeting adjourned at 12:08 p.m.



Respectfully submitted,
Anthony Cook
SPP Staff Secretary



Southwest Power Pool, Inc.
MODEL DEVELOPMENT WORKING GROUP

June 7-8, 2016

OGE Offices, Leadership Square Building – 14th Floor, NW Conference
211 North Robinson, North Tower, Oklahoma City, Oklahoma 73102

• A G E N D A •

June 7: 8:00 a.m. – 5:00 p.m.

- 1. Administrative Items Nate Morris
 - a. Call to Order
 - b. Introductions
 - c. Proxies
 - d. Charter Update
 - i. Open positions
 - e. Agenda Review (Action Item)
 - i. Meeting Materials
 - f. Previous Meeting Minutes (Action Item)
 - i. September 15, 2015 Face to Face
 - ii. March 14, 2016 Conference Call
 - iii. April 18, 2016 Email Vote
 - g. Review of Action Items

- 2. 2017 Series MDWG Model Build All
 - a. PSS/E Version 33
 - b. Case List
 - c. Schedule
 - d. Powerflow Efficiency
 - i. Contact List Updates
 - 1. Staff Contacts
 - 2. Modeling Contacts
 - ii. Lean: Accountability Scott Jordan
 - iii. Model Balancing Chris Colson/Holli Krizek
 - e. MOD Upgrade Status
 - f. MOD Training
 - g. SPP Data Coordination Workbook

- 3. Procedure Manual All
 - a. Review Updates and Comments

- 4. Modeling Practices Update All
 - a. Scalable Loads
 - b. Generator Modeling

Relationship-Based • Member-Driven • Independence Through Diversity

Evolutionary vs. Revolutionary • Reliability & Economics Inseparable

- i. GSUs
 - ii. Wind Machine Mode and Power factor
 - c. Generation Retirements
 - d. Data Submittal Workbook
 - i. Generator Data: Aux Load Bus Mapping
 - e. Dynamic Load Task force (DLTF) Update Derek Brown
 - f. MOD Project Matrix
- 5. Model Element Review Update Anthony Cook/Scott Jordan
 - a. Select Element for Yearly Review
 - b. MMWG Metric Updates
- 6. Planning vs. Operations Models John Boshears
 - a. Voltage Issues
- 7. Review of MOD-016 and other Standards..... Jonathan Hayes
- 8. Machine Capability Curve Data Files Derek Brown
- 9. Miscellaneous
 - a. ECDI vs. Block Dispatch for ITPNT
 - b. Dynamic Schedule Efficiency
 - c. 2016 Dynamic Build Update
- 10. Administrative Items Nate Morris
 - a. Summary of Action Items
 - b. Future Meeting
 - c. Adjourn



**Southwest Power Pool, Inc.
Model Development Working Group
September 15, 2015
SPP Corporate Office
Little Rock, Arkansas
8:00A.M. – 12:00 P.M.**

• M I N U T E S •

Agenda Item 1 - Administrative

The meeting was called to order at 8:52 a.m. The following Model Development Working Group (MDWG) members were in attendance:

Nate Morris, Chair – Empire District Electric Company
Dustin Betz – Nebraska Public Power District
John Boshears - City Utilities of Springfield
Derek Brown – Westar Energy
Joe Fultz – Grand River Dam Authority
Holli Krizek – Western Area Power Administration
Reené Miranda – Southwestern Public Service
Scott Schichtl – Arkansas Electric Cooperative Company
Jason Shook – GDS Associates
Liam Stringham – Sunflower Electric Power Corporation
Brian Wilson – Kansas City Power & Light

SPP Staff in attendance included Anthony Cook (Secretary), Zack Bearden, Brandon Hentschel, Scott Jordan, Mike Hughes, Derek Wingfield, and John Mills.

The following guests were also in attendance:

Jeff Crites – Empire District Electric Company
Aravind Chellappa – Southwestern Public Service
Jerry Bradshaw, Kevin Foflygen - City Utilities of Springfield
Gimod Olapurayil – ITC Great Plains
Mark Reinart – Golden Spread Electric Cooperative
Jerad Ethridge, Sing Tay, Alex Lanphere – Oklahoma Gas & Electric
Bruce Doll – Municipal Energy Agency of Nebraska
David Spargo, Thomas Mayhan – Omaha Public Power District
Dave Sargent, Mark Robinson – Southwestern Power Administration
John Payne – Kansas Electric Power Cooperative, Inc.
John Turner – Kansas City Board of Public Utilities
Alex Mucha – Oklahoma Municipal Power Authority
Jeremy Harris, James Remley – Westar Energy
Wayne Haidle – Basin Electric Power Cooperative
Tyler Baxter – CornBelt Power Cooperative
John Knofczynski – East River Electric Power Cooperative
Adam Mummert

There were no proxies for this meeting.

Group Membership Update

Anthony Cook stated that the TWG approved the MDWG Charter changes to add 2 additional members; however, it must go to MOPC, CGC, and BOD for approval. Nate Morris stated that once the charter was approved, applications would be accepted through January 2016.

Meeting Agenda

The group was asked if anyone had any issues or needed more time to review the posted materials. There were no concerns from anyone for this meeting.

The agenda was reviewed by the group. There were two additions made by Staff which were an SPP.org update, and Lean Activity Area Contacts. Brian Wilson motioned to approve the agenda with changes; Jason Shook seconded the motion. The motion passed unopposed. **(Attachment 1 - MDWG Meeting Agenda 20150915.docx)**

Meeting Minutes

The June 26, 2015 minutes were open for review. Jason Shook motioned to approve the minutes. John Boshears seconded the motion. The motion passed unopposed. **(Attachment 2 - MDWG Minutes June 26, 2015.doc)**

Agenda Item 2 – SPP.org Update:

Derek Wingfield gave a brief presentation of the new SPP.org website. He stated that all are encouraged to create a profile prior to the deadline to make sure individuals don't miss out on any working group announcements. **(Attachment 3 - SPP.org Sneak Peek.pptx)**

Agenda Item 3 – 2016 Series Model Building Activities:

For the MDWG Powerflow models, Anthony Cook reminded everyone that post processing topology idevs submitted after the finalization of the models and idevs submitted during the ITPNT process do not get re-ran for inclusion in the next series model build. It is the responsibility of the individual submitters to create MOD projects for inclusion in future model builds.

Anthony discussed the MMWG approved model list for the 2016 series build. He stated that there are now two models that won't align with any of the models that are being built for the 2016 MDWG effort. He stated that the two models are 2018 Light Load and 2021 Summer Shoulder. He also stated that the issue is the need for load and generation profiles and not topology since the MDWG is building 2018 Spring and 2021 Summer models. A suggestion was made to apply the 2017 Light Load profiles to the 2018 Spring topology to create the 2018 Light Load model. Members will submit profile idevs and transaction updates to run on the 2021 Summer model to create the 2021 Summer Shoulder model. The request will be sent out after the MDWG Powerflow models are finalized.

(Attachment 4&6 - 2016 Series Model Selection_Update.xlsx)

AI: SPP Staff request 2021 Summer Shoulder profile idevs and transactions after the 2016 Series MDWG Powerflow models are finalized.

AI: Members submit 2021 Summer Shoulder profiles and transactions upon request. Scott Jordan discussed the status of the Policy & Accountability project of the Modeling LEAN initiative. He stated that SPP Staff has been developing a document with the aid of four of the

MDWG members who participated in the SPP Modeling LEAN initiative. The document is currently under review by the four members.

John Mills discussed the status of the Area Contact project of the Modeling Lean initiative. He stated that the four members suggested in the Lean workshop that a specific contact at SPP be assigned to an area and presented the assignments document. This would allow for the work to be spread amongst the modeling staff and allow for members to get to know others within the modeling group. He stated that this effort is to streamline the process and help staff understand the individual systems better. The breakout also includes all LSEs within the planning area. This document will be effective as of the posting. (**Attachment 5 - Area Contacts.xlsx**)

For the MDWG Dynamic models, Anthony stated that NPPD requested adding 2017 Spring to the list of dynamic models to be built for the 2016 Series. Dustin Betz stated that it shouldn't be burdensome since a 2017 Light Load case is being built. SPP Staff doesn't have any issues with adding the model. Hearing no other discussion, Dustin Betz motioned to add the 2017 Spring to the list of Dynamic models for the 2016 Series. Derek Brown seconded the motion. The motion passed unopposed.

(**Attachment 4&6 - 2016 Series Model Selection_Update.xlsx**)

AI: Staff to add 2017 Spring model to the list of 2016 Series Dynamic models.

Anthony gave an overview of the status of the model building schedule and the importance for data submissions to be provided during the MDWG build and not waiting until the ITPNT build.

For the ITPNT Powerflow models, Nate discussed TWG requesting information on how to model DC ties. Reené discussed the history of modeling generators for the DC ties and now modeling the tie explicitly. Zack stated that in Scenario 0 (S0) of the ITPNT, the ties are modeled as in the MDWG. However, in Scenario 5 (S5) the practice has been to bias the direction per historical flows. During the ITPNT build, WAPA/Basin requested to bias their DC ties with a flow of east to west in S5 which is in the opposite direction than historical flow. This prompted a review into the DC tie modeling methodology for future ITPNT model builds. Nate asked SPP Staff to provide a spreadsheet of the DC ties in order to send out for data gathering purposes by the members.

AI: SPP Staff to create a list of DC tie owners/submitters within SPP and gather contact information external to SPP. Post by Friday, September 18, 2015.

AI: Request information of desired modeling practice for DC tie flows from members and request response due by October 1, 2015.

Anthony raised discussion on whether the ITPNT models will be dispatched using a block dispatch or with ECDI files in future builds. Reené stated that he ran a check between the two sets provided and prefer the block dispatch over the ECDI. Derek stated that he saw very little difference between the two dispatches. He stated that ECDI makes more sense for annual updates, but the files would have to be reviewed for accuracy. John Boshears stated that he didn't see a difference in the two dispatches for his system. Zack explained the differences between the block and ECDI dispatches. He also stated that very few members submitted updates to the block dispatch for their system. He stated that SPP doesn't have a recommendation since different issues could arise depending on the dispatch and this needs to be a decision made by the members. John Mills stated that we are in an economic environment and should be planning with by an economic dispatch. John Boshears added that issues are being seen in Operations that are not being caught in the planning models. Wayne Haidle

asked how ECDI handles must run units. Zack answered that priorities can be set in the files for RMR units. Reené asked if SPP would withdraw NTCs if issues go away the next year since the market dispatch changed year to year, season to season. Anthony stated that NTCs can be re-evaluated by SPP and its members currently; however, NTCs are baked into the models from the beginning of the next model build cycle. Nate asked SPP Staff to supply data (dispatch, models, ACCC, docucheck, etc.) to the members for review and contact information for the economic data. He stated that the members are to review the data October – December and provide feedback. He wants to have a call in January to discuss the review and potentially make a decision in February.

AI: SPP Staff to supply data (dispatch, models, ACCC, docucheck, etc.) to the members for review and contact information for the economic data.

AI: Members review the data October – December and provide feedback.

Anthony discussed that MOD is still being worked on to get upgraded. He stated that any entity not in MOD can submit idev files for corrections until they are incorporated into the new MOD system.

Agenda Item 4 – Manual Discussion:

This topic has been tabled.

Agenda Item 5 – Administrative Items:

Summary of Action Items

- **SPP Staff request 2021 Summer Shoulder profile idevs and transactions after the 2016 Series MDWG Powerflow models are finalized.**
- **Members submit 2021 Summer Shoulder profiles and transactions upon request.**
- **Staff to add 2017 Spring model to the list of 2016 Series Dynamic models.**
- **SPP Staff to create a list of DC tie owners/submitters within SPP and gather contact information external to SPP. Post by Friday, September 18, 2015.**
- **Request information of desired modeling practice for DC tie flows from members and request response due by October 1, 2015.**
- **SPP Staff to supply data (dispatch, models, ACCC, docucheck, etc.) to the members for review and contact information for the economic data.**
- **Members review the data October – December and provide feedback.**

Future Meetings

- Conference Call October
- Conference Call January
- Conference Call December

Adjourn Meeting

With no further business to discuss, Nate asked for a motion to adjourn. Scott Schichtl motioned to adjourn the meeting, Reené Miranda seconded the motion. The motion passed unopposed. The meeting adjourned at 12:18 p.m.

Respectfully submitted,
Anthony Cook
SPP Staff Secretary



**Southwest Power Pool, Inc.
Model Development Working Group
March 14, 2016
Conference Call
2:00 P.M. – 4:00 P.M.**

• M I N U T E S •

Agenda Item 1 - Administrative

The meeting was called to order at 2:11 p.m. The following Model Development Working Group (MDWG) members were in attendance:

Nate Morris, Chair – Empire District Electric Company
John Boshears - City Utilities of Springfield
Derek Brown – Westar Energy
Joe Fultz – Grand River Dam Authority
Scott Schichtl – Arkansas Electric Cooperative Company
Jason Shook – GDS Associates
Liam Stringham – Sunflower Electric Power Corporation
Brian Wilson – Kansas City Power & Light
Dustin Betz – Nebraska Public Power District
Scott Rainbolt – American Electric Power

SPP Staff in attendance included Anthony Cook (Secretary), Scott Jordan, John Mills, Zack Bearden, Brandon Hentschel, Moe Shahriar, and Mike Hughes (RE Staff).

The following guests were also in attendance:

Jason Bentz – American Electric Power
Aravind Chellappa, Clarence Campbell – Southwestern Public Service
Gimod Olapurayil– ITC Great Plains
Bruce Doll, Armin Sehic – Municipal Energy Agency of Nebraska
John Turner – Kansas City Board of Public Utilities
Alan Burbach – Lincoln Electric System
Andrew Berg – Minnkota Power Cooperative
Chris Colson – Western Area Power Administration
Dona Parks, Patrick McPhail – Grand River Dam Authority
Jerad Ethridge – Oklahoma Gas & Electric
Jeremy Severson, Wayne Haidle– Basin Electric Power Cooperative
John Weber– Missouri River Energy Services
James Vermillion– Associated Electric Cooperative
Christopher Hund – Midwest Energy
Rey Rodriguez – Western Farmers Electric Cooperative
Jeff Crites – Empire District Electric Company
Tyler Baxter – Corn Belt
John Knofczynski – East River Electric Power Cooperative
Jim McAvoy – Oklahoma Municipal Power Authority

Aravind Chellappa for Reen  Miranda
Chris Colson for Holli Krizek

Meeting Agenda

The group was asked if anyone had any issues or needed more time to review the posted materials. There were no concerns from anyone for this meeting.

The agenda was reviewed by the group. Jason Shook motioned to approve the agenda; Brian Wilson seconded the motion. The motion passed unopposed.

(Attachment 1 - MDWG Meeting Agenda 20160314.docx)

Agenda Item 2 – 2016 Series Model Building Activities:

Anthon Cook gave an overview of the current docucheck report for the MDWG Powerflow models. Nate Morris requested the group to finalize the powerflow series. Liam Stringham motioned to finalize the 2016 Series MDWG Powerflow models based on the Pass 5 set. Scott Schichtl seconded the motion. The motion passed unopposed.

Nate then reviewed the draft report card and area contact sheet. Anthony stated that the SPP Modeling Staff has a new employee and introduced Moe Shahriar. Nate stated that there will be further discussion on the powerflow model build at the next face to face meeting and asked the MDWG members to each come with a couple of ideas on how to improve build.

AI: Update Area Contact sheet to include Moe Shahriar for SPP Staff contact and include LSE companies.

AI: MDWG Members each come to the next face to face meeting with two ideas on how to improve the model build.

Brandon Hentschel discussed the MDWG Short Circuit models and asked the group how long they wanted for submitting corrections. The group decided that members should have corrections submitted by March 25, 2016. SPP Staff will then re-evaluate any remaining issues.

AI: Members submit corrections for the Short Circuit models by March 25, 2016.

Scott Jordan gave a status update on the MDWG Dynamic models. He stated that staff is reviewing the member submitted data. He also introduced Moe Shahriar as a new staff member helping with the dynamic build.

Zack Bearden gave a status update on the ITPNT Powerflow models. He discussed the NTC review inquiry that was previously sent out to verify discrepancies. He also stated that an ACCC non-converged file will be sent out with each pass as well.

Anthony updated the group that MOD will be upgraded to the PSSE version 33.7 format in the next few months.

Agenda Item 3 – Administrative Items:

Summary of Action Items

- **Update Area Contact sheet to include Moe Shahriar for SPP Staff contact and include LSE companies.**

- **MDWG Members each come to the next face to face meeting with two ideas on how to improve the model build.**
- **Members submit corrections for the Short Circuit models by March 25, 2016.**

Future Meetings

- Face-to-Face June (TBD)

Adjourn Meeting

With no further business to discuss, Nate asked for a motion to adjourn. Jason Shook motioned to adjourn the meeting, Scott Rainbolt seconded the motion. The motion passed unopposed. The meeting adjourned at 4:09 p.m.

Respectfully submitted,
Anthony Cook
SPP Staff Secretary



**Southwest Power Pool
MODEL DEVELOPMENT WORKING GROUP
April 18, 2016
Email Vote**

• MINUTES •

The 2016 Series MDWG Short Circuit Pass 4 Cases were posted for finalization on April 5, 2016 requesting comments by April 8, 2016. SPP received some minor updates during the comment period and were summarized to the group. Derek Brown solicited for a motion and second to approve the models with the submitted updates included on April 11, 2016. Jason Shook motioned to approve the Pass 4 2016 MDWG Short Circuit models with the updates provided by WERE, MIDW, OMPA, and LEPA included as the final short circuit models. Joe Fultz seconded the motion. Derek then requested the group cast their votes. There were 11 votes casted to approve the models as final.

The models were approved to be finalized and SPP staff sent an e-mail on April 20, 2016 to the members to let them know the short circuit cases and supplemental data were posted.

Respectfully submitted,

Anthony Cook
SPP Staff Secretary

	Action Item	Responsible Parties	Date Originated	Date Updated	Progress
42	Review the new MOD standards approved by FERC and how they will apply to the MDWG and SPP planning modeling	SPP Staff	3/1/2010	5/19/2014	In Progress
50	Reformat the MDWG procedure manual and add hyperlinks for referenced documents	Anthony Cook	8/6/2010	10/23/2014	In Progress
57	Determine the standards for stability load data	Scott Jordan	8/6/2010	5/21/2014	In Progress
72	Staff to provide background information on reasons for choosing 20 MVA for machines and aggregate plant capacity for Uniform Generation Modeling when modeling auxiliary load	Staff	11/8/2011	5/8/2012	In Progress
76	Look for ways to shorten the Dynanamic Build.	Scott Jordan	2/8/2012	5/21/2014	In Progress
84	RTO/RE staff and MDWG to address data reporting requirements and enforceability for independently owned generation and transmission assets.	MDWG/Staff	8/29/2012	11/13/2012	Complete



Further review with the new NERC MOD s

Currently working on updates from the MM 14, September 17, October 23 meetings.

Scott to give update of TSTF discussion at
This has been pushed back to the MITF fo

Internal Build? When could that take effect
personel are working on it.

TWG action item: Who is responsible, Wh
compliance.

2017 Series Model Selection

		MDWG		
Year	Season	Power Flow Model	Dynamic Model	Short Circuit Model
2017	Spring	X		
2017	Summer	X		X
2017	Summer Shoulder	X		
2017	Fall	X		
2017	Winter	X		
2018	Light Load	X	X	
2018	Spring	X	X	
2018	Summer	X	X	X
2018	Summer Shoulder	X	X	
2018	Fall	X		
2018	Winter	X	X	
2019	Light Load	X		
2019	Spring	X		
2019	Summer	X	X	
2019	Winter	X		
2022	Light Load	X	X	
2022	Summer	X	X	X
2022	Summer Shoulder	X		
2022	Winter	X	X	
2027	Summer	X	X	
2027	Winter	X	X	

MDWG: Model Development Working Group

ERAG MMWG: Eastern Interconnection Reliability Assessment Group I

X = MMWG

*MMWG 2017 Series is based off of 2016 Series rolled up by 1 year

A Better Way to Balance?

For the SPP MDWG

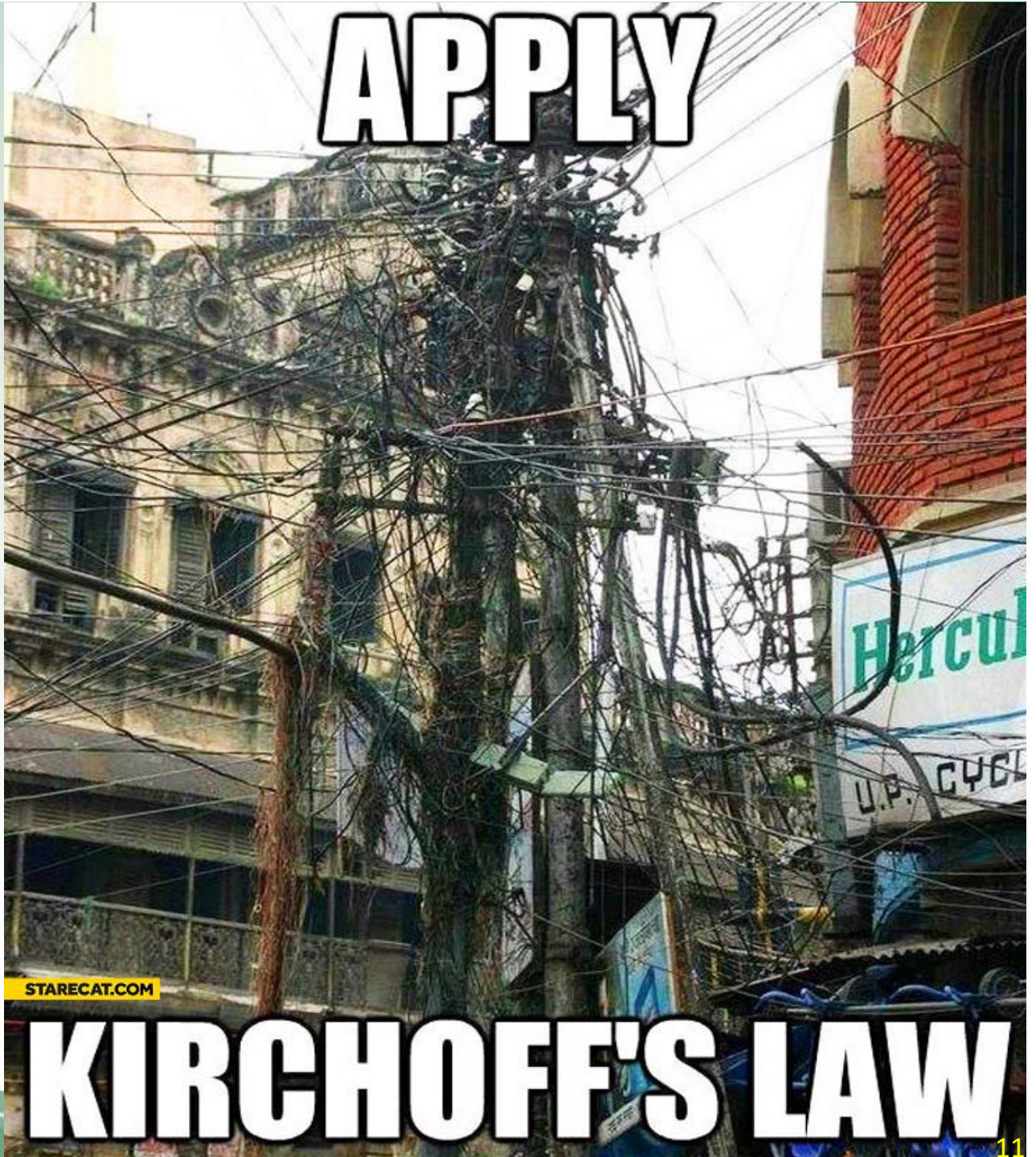
07 June 2016



Topics

- Why are we talking about balancing?
- What are some of the issues we see?
- Why does timing matter?
- Solutions, not just problems!
- Have we convinced you?

APPLY



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KIRCHOFF'S LAW

Why balancing? Why now?

- Zone 19 (Upper Missouri Zone) transitioned to SPP MDWG model-building process in 2016.
 - Continues to participate in MRO 2016 build, but will likely cease in 2017.
- UMZ is a multi-Transmission Owner & Generation Owner zone.
- UMZ partners experienced significant balancing issues during 2016 model build.

Root causes:

- Unfamiliarity with dissimilarities in model building procedures/approach.
- Different centralized coordination methods.
- **Balancing happens at end of model build, rather than up front.**

Potential Room for Improvement

- UMZ partners have the luxury of having seen an alternative balancing approach.
- Currently, the SPP MDWG process:
 - Must wait for **solved** models to verify slack machine status for balancing checks.
 - This process delay causes subsequent delays in the overall model building process.
 - The transaction process is cumbersome and **relies too heavily upon SPP-PC involvement.**

OK UMZ, get off your high horse

We are proposing to balance the SPP MDWG models...

...from the start,
with Company Workbooks!



What is a Company Workbook?

- Simple spreadsheet with multiple tabs.
- Individual tables for:
 - Generation
 - Loads
 - Losses
 - Transactions
 - Totals (summary) tab

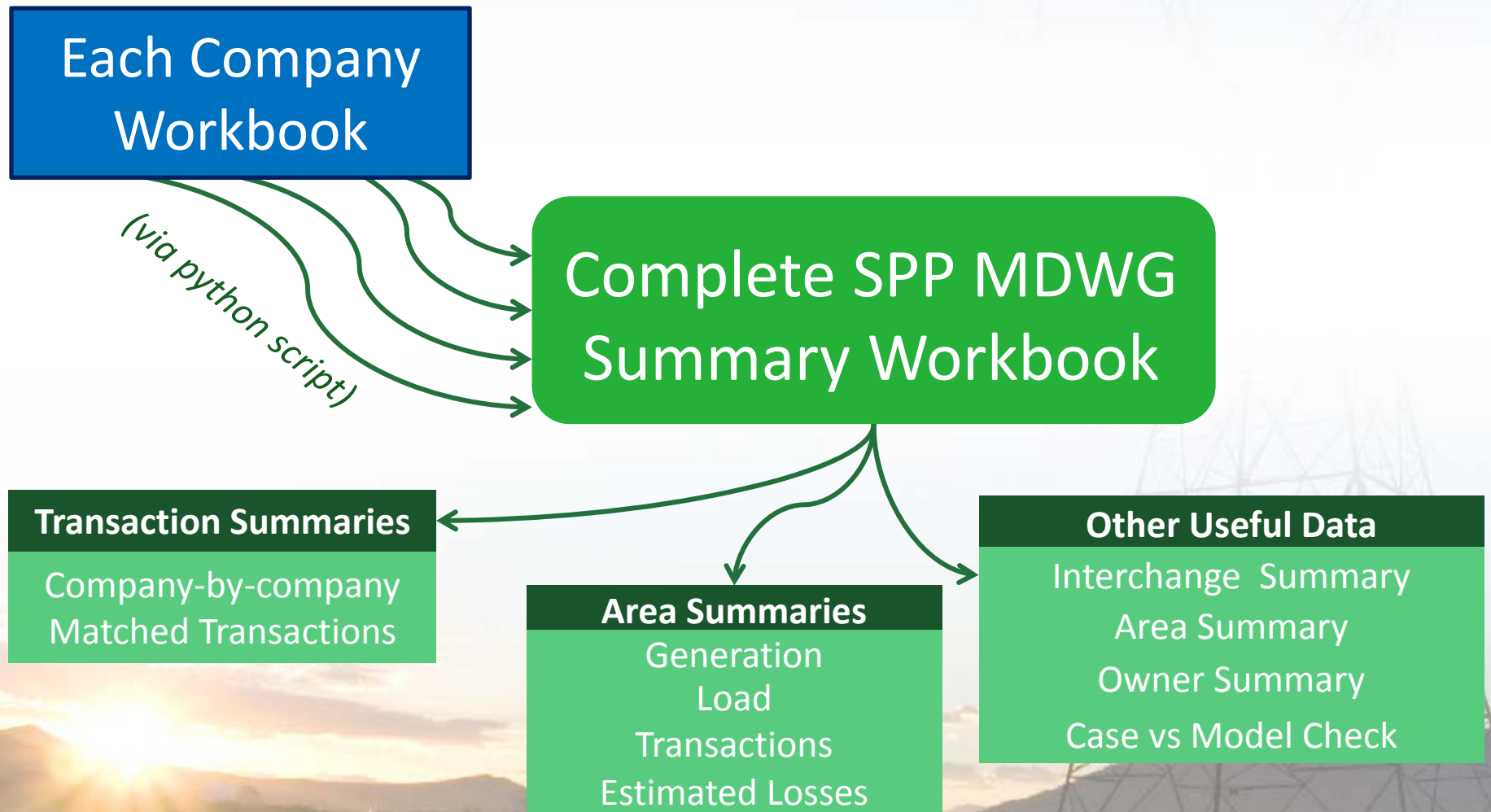
- **All tables must sum to Zero!**

Just like the accountants want


$$e^{i\pi} + 1 = 0$$

What happens next?

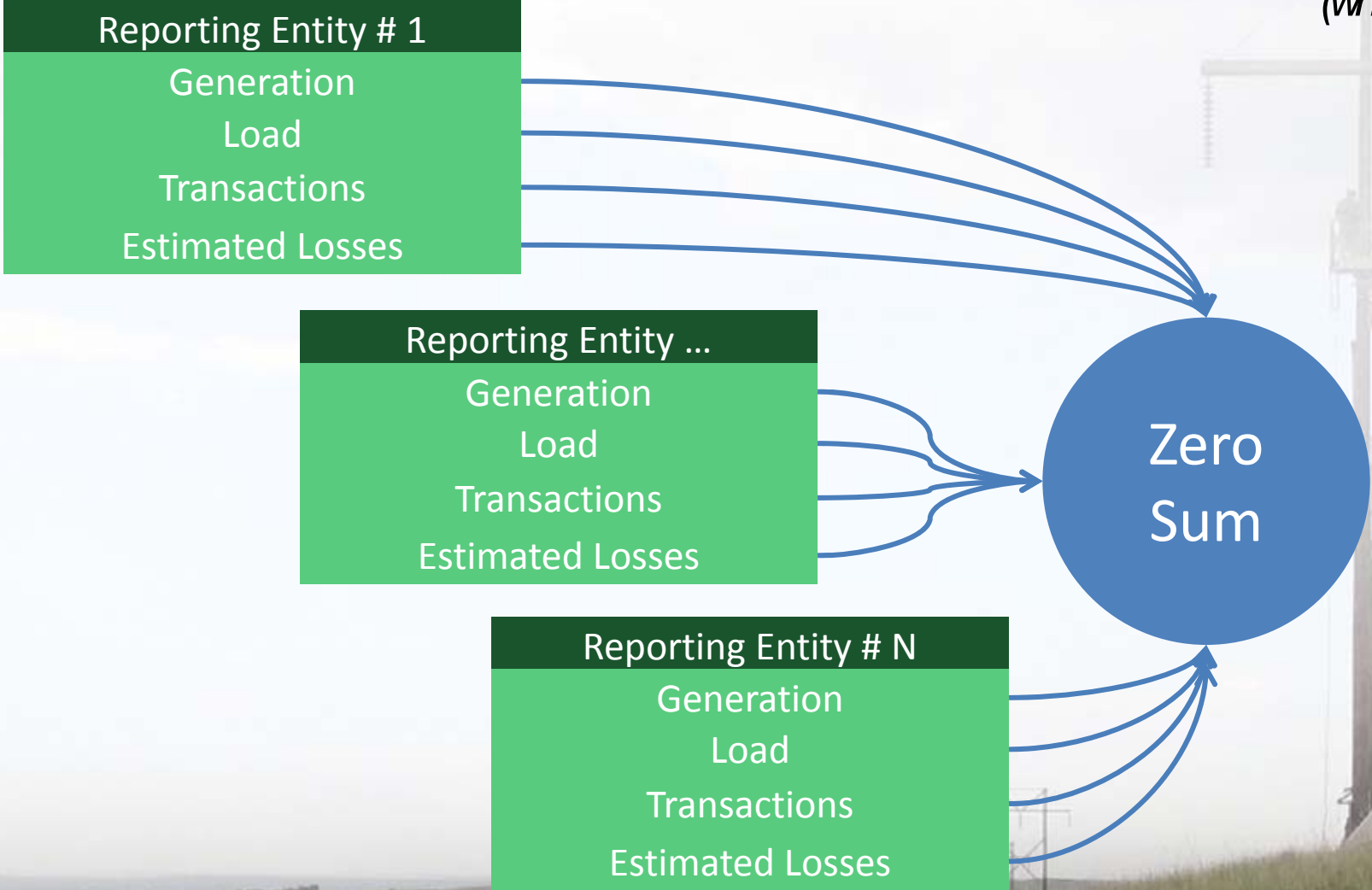
- Company Workbooks feed Complete Summary Workbook



Overall Effect

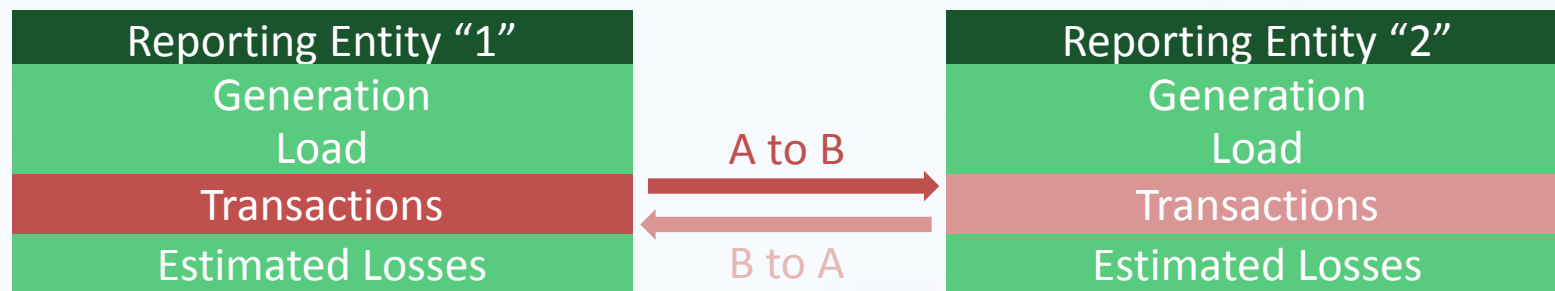
- Within a Marketing Area, legacy Balancing Area, host Area

(whatever)



Transaction Accounting

- Equal and opposite transactions.
- Must be coordinated
(e.g. sender item without a receiver item = non-zero sum)
- Consistent with establishing DNI for model areas.
- Great visibility!



Selling Points

- Load/Gen/Transaction discrepancies are visible before models are solved.
- Small delays in “getting to convergence”, but large time savings by accounting upfront.
- Transaction process simplified: only working with your own company’s data.
- SPP Summary Workbook populated from Company Workbooks via simple Python script.
- Balancing transparent for all!
- Puppies and chocolate for all!

Have
we
convinced
you?





What
questions
do
you
have?

Fin

Upfront balancing. ◀

Only slight change to existing process. ◀

Cleaner accountability. ◀

Improved process. ◀

