

## Distribution Transformer Subcommittee Task force / Working Group Report

Document #: \_\_\_\_\_

Document Title: DOE Efficiency Task Force

Chair: Phil Hopkinson Vice-Chair David Brender

Secretary Gerard Winstanley Per Cent Complete \_\_\_\_\_

Current Draft Being Worked On: \_\_\_\_\_ Dated: \_\_\_\_\_

Meeting Date: March 25, 2019 Time: 9:30am

Attendance:	Members	<u>3</u>
	Guests	<u>106</u>
	<b>Total*</b>	<b><u>109</u></b>

\* For details of attendance, please refer to AMS system of the Transformers Committee

### Meeting Minutes / Significant Issues / Comments:

The minutes shall record the essential business of the Working Group, including the following items at a minimum:

1. Call to order and any Chair's remarks  
9:07am meeting was called to order
2. Quorum Verification  
Not a working group; Quorum is not necessary
3. Confirmation of the essential patent statement and responses  
Not a working group, no patents were discussed.
4. Approval of minutes of the previous meeting  
Minutes approved.
5. Approval of agenda for this meeting.  
Agenda was posted and followed for this meeting.
6. Technical topics

Dan Mulkey presented data provided by Liz Sullivan of Dominion Energy. This is the largest and most details data received so far. The 2018 data is predominately from Virginia with some from North Carolina and DC.

The Transformer breakdown was:

Single-phase Overhead	26176
Single-phase Pad-mount	25088
Three-phase Overhead	3090
Three-phase Pad-mount	6370
<b>Total</b>	<b>60724</b>

Dan Mulkey was able to analyze the data to provide breakdowns base on:

- Mixed use, residential only, commercial only

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- Name plate kVA size
- Customers per transformer (average, maximum, mode)

The Annual load factor is:

Average Annual Load/Peak Annual Load

This was analyzed for the same parameters to provide the mode and range (at half the mode).

Summary tables:

<b>Annual Load Factor</b>			
<b>RMS Average/ Peak Load</b>	<b>Mode</b>	<b>Numerical Average/ Peak Load</b>	<b>Mode</b>
Dominion 2018 All	0.288	Dominion 2018 All	0.258
Dominion 2018 Residential only	0.28	Dominion 2018 Residential only	0.26
Dominion 2018 Commercial only	0.35	Dominion 2018 Commercial only	0.37
Dominion 2018 Mixed use/comm	0.31	Dominion 2018 Mixed use/comm	0.29
Duke Energy LF	0.3	Duke Energy LF	0.2
		Toronto Hydro 2013 Residential	0.29
		PG&E 2006 Residential	0.39

<b>Peak Load kW Load/Nameplate kVA</b>	
	Mode
Toronto Hydro Residential only	0.9
Duke Energy	0.7
Dominion overall	0.46
Dominion Residential only	0.46
Dominion Commercial only	0.00
Dominion Mixed use	0.53

Lessons learned:

1. Add details on transformers in the transformer bank – e.g. is the 45 kVA 3-phase bank a single transformer or three 15kVA single phase transformers?
2. Ensure that the average load calculations sums the absolute value of the load
3. Ensure that daylight savings time change does not result in an artificial report of zero load.

Phil Hopkinson thanked the utilities who have contributed data; in particular Liz Sullivan for data set from Dominion Energy. He encouraged more utilities to provide data so that a national picture of transformer loads, highlighting geographic and regional differences, can be developed. He received indications of potential contributions from Ft Collins, Knoxville and Southern Company.

### 7. Future Work

Phil Hopkinson noted the work being undertaken by other IEEE groups on insulating materials and permitted temperature rise for transformers. He is considering the possibility of dual plating for transformers for A) 65° raise and B) Thermal class. He will develop this proposal and report at the next meeting

### 8. Next meeting--date and location

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No additional comments before adjournment. Next meeting is in Columbus, Ohio in Fall 2019.

Submitted by: Phil Hopkinson

Date: 3/26/2019