



Report on:

ERCOT PNNL Contract 401882: *Start Date 3/19/2018*

Development of an Integrated Transmission and Distribution Test System to Evaluate Transactive Energy Systems

ISU Project Team:

PI Leigh Tesfatsion & Co-PI Zhaoyu Wang

Grad Research Assistant: Swathi Battula

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ERCOT Contract: Presentation Outline

- ❑ Original Task/Milestone Schedule: M1-M3
- ❑ Updated Task/Milestone Schedule: M1-M3
- ❑ Latest AMES V5.0 Work for ERCOT Test Cases (i.e., for M3.2)
 - Modified AMES V5.0 to incorporate FNCSActive flag
 - Modified AMES V5.0 to allow user to input Non-dispatchable generation
 - Updated to-do checklist for AMES V 5.0 constraint implementations
 - Pending Tasks

Original Task & Milestone Schedule

Milestone	Date Due	Original Description
M1	May 31, 2018	5-zone model of the old ERCOT system, posted to a web repository.
M2	Sep 30, 2018	Nodal model of the new ERCOT system, posted to a web repository.
M3	Sep 30, 2018	Submitted conference or journal paper on this work.

Updated Task & Milestone Schedule

Milestone	Date Due	Date Delivered	Fuller Descriptions of Actual Work
M1* DONE	May 31, 2018	June 5, 2018	Development of 8-Bus ERCOT model (with nodal locational marginal pricing); grid/load/gen data posted at PNNL repository
M2.1 DONE	Sept 30, 2018	August 1, 2018	Basic 8-Bus ERCOT Test System, implemented via AMES V3.1, posted at https://github.com/ITDProject/ERCOTTestSystem
M2.2 DONE	Sept 30, 2018	August 24, 2018	8-Bus ERCOT Test System (with wind power), implemented via AMES V3.2, posted at https://github.com/ITDProject/ERCOTTestSystem
M3.1 DONE	Sept 30, 2018	August 31, 2018	200-Bus ERCOT Test System (with wind power), implemented via AMES V3.2, posted at https://github.com/ITDProject/ERCOTTestSystem/tree/master/ERCOT_Test_Systems/The_200Bus_ERCOT_Test_System
M3.2**	July 31, 2019		200-Bus ERCOT Test System (with wind power), implemented via AMES V5.0, to be posted at PNNL/ISU repositories.
M3.3**	July 31, 2019		Paper to be submitted that focuses on the development of the ERCOT Test Systems

- * **M1 Modification (Ok'd by PNNL):** For M1 we have skipped the modeling of the old (zonal) ERCOT system and instead directly worked to develop an 8-bus model of the new (nodal) ERCOT system.
- ** **M3 Modification:** Contract extension through July 31, 2019 received from PNNL on March 4, 2019, for completion of task M3

Latest Work on AMES V5.0

- ❑ Modified AMES V5.0 to enable FNCSActive flag
 - Users need to set FNCSActive flag to 'True' if they want AMES to run with FNCS
 - Users need to set FNCSActive flag to 'false' if they want AMES to run without FNCS

- ❑ Modified AMES V5.0 to enable NDG (Non dispatchable generation) data input
 - User needs to input NDG data using the following name tags
 - #NDGDataStart
 - #NDGDataEnd

Answer to Qiuhua's Query

❑ How 'execute' method in 'WPMarket' is called?

➤ AMESMarket.java extends 'SimModelImpl'. 'SimModelImpl' is an abstract base class which implements 'SimModel'. SimModelImpl allows modeling of a simulation to be controlled by a user through GUI, e.g. user can start, pause and stop simulation through a GUI.

➤ 'WPMarket' class extends 'BasicAction' class which is an abstract base class.

The execute method of this class object will be executed continuously until the simulator is stopped when the class object is added to a 'Schedule'.

Note: Check line #858 of AMESMarket.java to see how WPMarket class object is added to 'Schedule'.

➤ Summary: With the use of above Java classes, 'execute' method of 'WPMarket' is run continuously until a stop code is activated.

ECA Model Notes (EMN) Implementation	Equation No in EMN	Implemented in AMES V5.0?	Validated?	Remarks
Objective Function	(16)	Yes	Partial	
Power Flow Constraints	(33)-(34)	Yes	No	
Power Balance Constraints	(35)	Yes	No	
Slack Variable Constraints	(36)-(37)	Yes	-	
Generator Capacity Constraints	(38)-(40)	Yes	Partial	
Generator Ramping Constraints	(41)-(43)	Yes	No	
Generator minimum-up time constraints	(44)-(46)	Yes	Yes	
Generator minimum-down time constraints	(47)-(49)	Yes	Yes	
Generator hot-start constraints	(50)-(52)	Yes	No	
Generator start-up cost constraints	(53)	Yes	Yes	
Generator shut-down cost constraints	(54)	Yes	Yes	
System-wide down/up reserve requirement constraints	(65)-(66)	Yes	No	
Zonal down/up reserve requirement constraints	(67)-(68)	Yes	No	
Voltage angle specifications	(69)-(70)	Yes	Yes	
Total Production Cost Approximation Constraints	(71)-(80)	Yes	Partial	

Note: Above model equations are implemented in python files located at AMES-V5.0\psst\psst\model.
constraints.py has the modeling of objective function and constraints

Pending Tasks

☐ Coding Market Settlement Aspects in AMES V5.0

☐ Code Validation

☐ Cleaning up of AMES

☐ ERCOT Journal Paper