

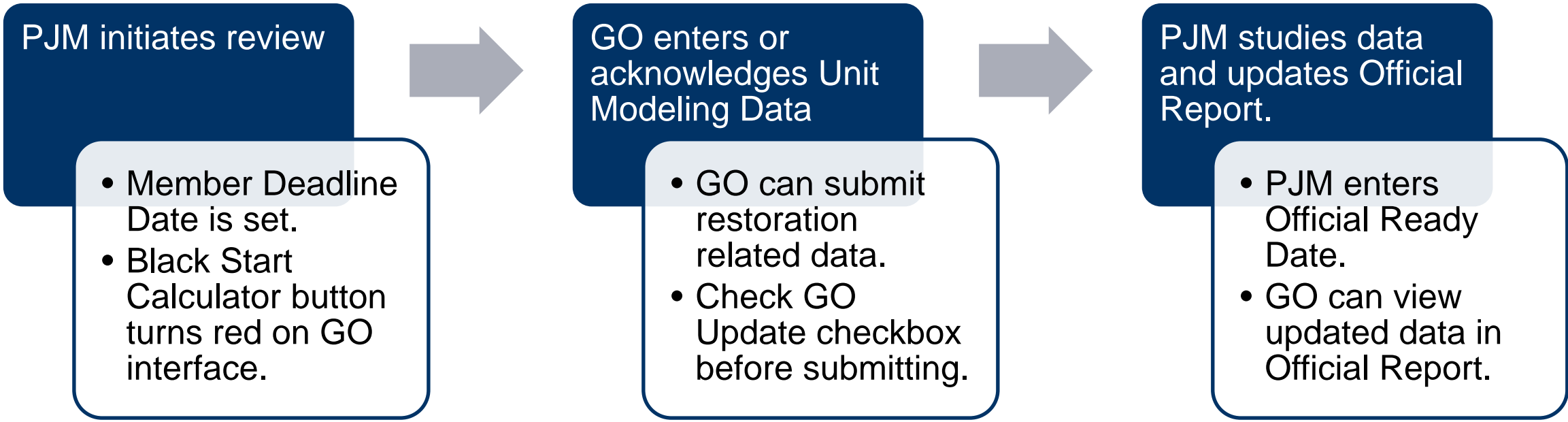


PJM eDART Black Start Calculator

January 31st, 2018

PJM eDART User Group Meeting

- Enhance visibility/awareness of current and future Black Start and Critical Loads
- Enhance tracking and completion of required items prior to new units coming in service or retiring or terminating Black Start service.
- Minimize rework by using the same baseline data across PJM/GO/TO.
- Reduce reliance on email as documentation between PJM/GO/TO.



PJM TEST
Production

- Feedback
- My eDART
- Upload
- Download
- Gen. Tickets
- Trans. Tickets
- Instantaneous Reserve Check
- Minimum Gen. Report
- PJM Status Report
- NERC Data
- Facility Data
- Online Help
- Logout



Generator Tickets Main Menu

Summer Peak Period Maintenance Margin Season
Start: 06/11/2018 End: 09/07/2018

Current Maintenance Margin
Western-Southern 0

[Create New Ticket](#)
[Opportunity Window](#)
[View/Revise Ticket](#)

	MW	Volt. Reg.	MVAR	Governor	MVAR Test	PSS
Submitted Tickets	1	0	0	0	0	0
Revised Tickets	0	0	0	0	0	0
Current Tickets	9	0	0	0	0	0
Approved Tickets	125	0	0	0	0	0
Future Tickets	125	0	0	0	0	0
Approved No Start	0	0	0	0	0	0
Active Beyond End	0	0	0	0	0	0
Recalled Tickets	0					
Forced Tickets						
Tickets History						

[Owners Report](#)
[Maint. Margin Log](#)
[D-Curve Report](#)

[Blackstart Test Upload](#)
[Blackstart Test Download](#)
[Blackstart Calculator](#)

[GO Survey](#)

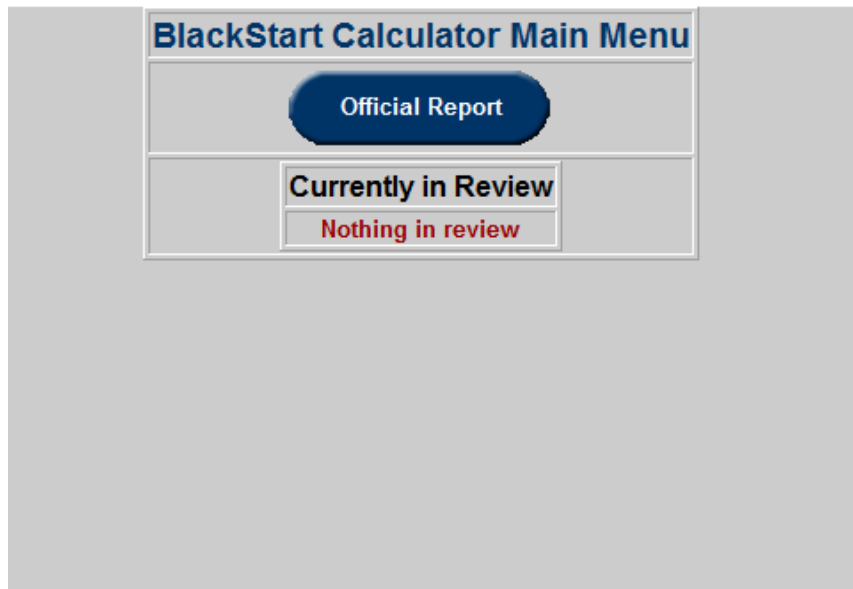
Reactive Result Tickets

[Create Reactive Result Ticket](#)
[View Reactive Result Tickets](#)
[Company Unit Report](#)

Status	Total
Saved	
PJM Review	
GO Data Required	
GO Review	
GO No Response	
New Default D-Curve Under Review	
Awaiting Test Letter	
Test Letter Issued	3
MOD-025 only, no PJM Letter	



No Action Required



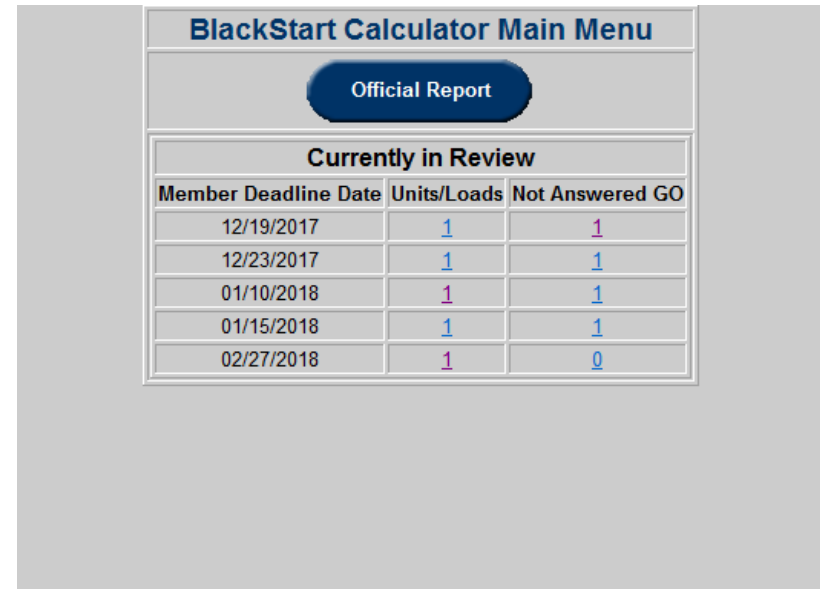
BlackStart Calculator Main Menu

[Official Report](#)

Currently in Review

Nothing in review

Action Required



BlackStart Calculator Main Menu

[Official Report](#)

Currently in Review

Member	Deadline Date	Units/Loads	Not Answered GO
	12/19/2017	1	1
	12/23/2017	1	1
	01/10/2018	1	1
	01/15/2018	1	1
	02/27/2018	1	0

Generator Tickets Main Menu

Summer Peak Period Maintenance Margin Season
Start: 06/11/2018 End: 09/07/2018

Current Maintenance Margin	
Mid-Atlantic	N/A
Western-Southern	N/A

[Create New Ticket](#)
[Opportunity Window](#)
[View/Revise Ticket](#)

	MW	Volt. Reg.	MVAR	Governor	MVAR Test	PSS
Submitted Tickets	0	0	0	0	0	0
Revised Tickets	1	0	0	0	0	0
Current Tickets	12	0	0	0	0	0
Approved Tickets	1	0	0	0	0	0
Future Tickets	0	0	0	0	0	0
Approved No Start	1	0	0	0	0	0
Active Beyond End	12	0	0	0	0	0
Recalled Tickets	0					
Forced Tickets						
Tickets History						

[Owners Report](#)
[Maint. Margin Log](#)
[D-Curve Report](#)

[Blackstart Test Upload](#)
[Blackstart Test Download](#)
[Blackstart Calculator](#)

[GO Survey](#)

BlackStart Calculator Main Menu

[Official Report](#)

Currently in Review

Member Deadline Date	Units/Loads	Not Answered GO
02/14/2018	6	2

Select Unit Modelling Data to enter data.

BlackStart Review

Member Deadline: 02/14/2018

GO Company: Gen Company

Record Status: GO not Answered
GO Answered

Display: Unit Detailed Data Unit Modeling Data

[Apply Filter](#)
[Help](#)
[Main Menu](#)

Member Deadline	GO Company	Name	Unit Type	TO Zone	Record Type	Record Status
02/14/2018	Gen Company	UNIT ABC	Nuclear	PJM	Unit	GO not Answered
02/14/2018	Gen Company	UNIT DEF	Gas	PJM	Unit	GO not Answered

[Submit Form](#)
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[CSV Export](#)
[Main Menu](#)

Entry fields pre-populated where possible

“GO Update” checkbox **MUST** be checked in order to submit/acknowledge data

BlackStart Review

Member Deadline:

GO Company:

Record Status:

Display: Unit Detailed Data Unit Modeling Data

Member Deadline	GO Company	Name	Unit Type	TO Zone	Record Type	Record Status	Unit will black start solely on primary or secondary fuel	Total Start-Up (MWs)	Total Start-Up (MVAR)	Unit MIN Stable Load (MWs)	Required time to reach MIN stable load (Minutes)	Largest Motor (MWs)	Largest Motor Power Factor	Largest Motor Transformer Z%	Largest Motor Transformer R%	Largest Motor Transformer X%	Largest Motor Transformer High Side Voltage (kV)	Largest Motor Transformer Low Side Voltage (kV)	Largest Motor Transformer Base (MVA)	2nd Largest Motor (MWs)	2nd Largest Motor Power Factor	3rd Largest Motor (MWs)	3rd Largest Motor Power Factor	Nuclear Unit One-Line	GO Update
02/14/2018	Gen Company	UNIT ABC	Nuclear	PJM	Unit	GO not Answered	No on Prim. and Yes on Sec. ▾	10.2					0.27											Download Upload	<input type="checkbox"/>
02/14/2018	Gen Company	UNIT DEF	Gas	PJM	Unit	GO not Answered	▾	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>	<input type="text" value="4"/>	<input type="text" value="5"/>	<input type="text" value="6"/>	<input type="text" value="7"/>	<input type="text" value="8"/>	<input type="text" value="9"/>	<input type="text" value="10"/>	<input type="text" value="11"/>	<input type="text" value="12"/>	<input type="text" value="13"/>	<input type="text" value="14"/>	<input type="text" value="15"/>	<input type="text" value="16"/>		<input type="checkbox"/>

Export data to CSV file

One-Line Upload/Download for Nuclear Units only

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
1	Member Deadline	GO Comp ID	Name	Unit Type	TO Zone	Record T	Record St	PJM Defa	Official F	Unit wil	Total Star	Total Sta	Unit MIN	Requirec	Largest N	Largest N	Largest N	Largest N	Largest N	Largest N	Largest N	Largest N	Largest N	2nd Large	2nd Large	3rd Large	3rd Largest M	Motor Power	Factor	
2	2/14/2018	Gen Comp	7080	UNIT ABC	Nuclear	PJM	Unit	GO not Ar	No on Prim.	And Yes	No on Pri	10.2				0.27														
3	2/14/2018	Gen Comp	1295	UNIT DEF	Gen	PJM	Unit	GO not Ar	No		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
4																														
5																														
6																														

All extra selected Unit Modelling Data columns are exported into .csv file



GO Black Start Calculator – Official Report Default View

BlackStart Official Report

TO Zone: **PJM** Restoration Zone: **PJM** GO Company: **Gen Company** Restoration Type: **Black Start
Critical Load (Nuclear)
Non-Critical Load** From Date: **01/23/2018** To Date: **01/24/2018**

Display: Unit Detailed Data Unit Modeling Data

[Apply Filter](#) [Help](#) [Main Menu](#)

GO Company	Name	Unit Type	TO Zone	Record Type	Total Start-Up (MWs)	Total Start-Up (MVAR)	Restoration Type
Gen Company	UNIT ABC	Nuclear	PJM	Unit			Critical Load
Gen Company	UNIT DEF	Nuclear	PJM	Unit	10.0	50	Critical Load
Gen Company	UNIT GHI	Nuclear	PJM	Unit	100	50	Critical Load
Gen Company	UNIT JKL	Hydro	PJM	Unit			Black Start
Gen Company	UNIT MNO	Bio Mass	PJM	Unit			
Gen Company	UNIT PQR	Nuclear	PJM	Unit			Critical Load

[Apply Filter](#) [Help](#) [CSV Export](#) [Main Menu](#)



GO Black Start Calculator – Official Report Default View

	A	B	C	D	E	F	G	H	I
1	GO Company	Name	Unit Type	TO Zone	Record Type	Total Start-Up (MWs)	Total Start-Up (MVAR)	Restoration Type	
2	Gen Company	UNIT ABC	Nuclear	PJM	Unit			Critical Load	
3	Gen Company	UNIT DEF	Nuclear	PJM	Unit	10	50	Critical Load	
4	Gen Company	UNIT GHI	Nuclear	PJM	Unit	100	50	Critical Load	
5	Gen Company	UNIT JKL	Hydro	PJM	Unit			Black Start	
6	Gen Company	UNIT MNO	Bio Mass	PJM	Unit				
7	Gen Company	UNIT PQR	Nuclear	PJM	Unit			Critical Load	

Note: For all “CSV Export” functions, only displayed data will be exported to .csv file



GO Black Start Calculator – Official Report

Unit Detailed Data View

BlackStart Official Report

TO Zone: Restoration Zone: GO Company: Restoration Type: From Date: To Date:

Display: Unit Detailed Data Unit Modeling Data

[Apply Filter](#) [Help](#) [Main Menu](#)

GO Company	Name	Unit Type	TO Zone	Record Type	Total Start-Up (MWs)	Total Start-Up (MVAR)	Restoration Type	ICAP	Unit Effective Date	Unit Terminate Date	Prim. Fuel	Sec. Fuel	Hot Start Time (Hours)	Cold Start Time (Hours)	Ramp Rate (MWs/Minute)
Gen Company	UNIT ABC	Nuclear	PJM	Unit			Critical Load	900	07/01/2000		Tires				
Gen Company	UNIT DEF	Nuclear	PJM	Unit	10.0	50	Critical Load	1000	03/06/2007		Synthesis Gas from Petroleum Code	DualFuel:Natural Gas + Other Gases			
Gen Company	UNIT GHI	Nuclear	PJM	Unit	100	50	Critical Load	1000	03/06/2007		Synthesis Gas from Petroleum Code	DualFuel:Natural Gas + Other Gases			
Gen Company	UNIT JKL	Hydro	PJM	Unit			Black Start	140	12/12/2017		Unknown				
Gen Company	UNIT MNO	Bio Mass	PJM	Unit				100	12/07/2017		Unknown				
Gen Company	UNIT PQR	Nuclear	PJM	Unit			Critical Load	500	10/17/2013		Unknown				

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GO Black Start Calculator – Official Report

Unit Detailed Data View

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	GO Company	Name	Unit Type	TO Zone	Record Ty	Total Start	Total Star	Restoratic	ICAP	Unit Effective Date	Unit Term	Prim. Fue	Sec. Fuel	Hot Start	Cold Start	Ramp Rate (MWs/Min)	
2	Gen Company	UNIT ABC	Nuclear	PJM	Unit			Critical Lo	900	7/1/2000		Tires					
3	Gen Company	UNIT DEF	Nuclear	PJM	Unit	10	50	Critical Lo	1000	3/6/2007		Synthesis	DualFuel:Natural Gas + Other Gases				
4	Gen Company	UNIT GHI	Nuclear	PJM	Unit	100	50	Critical Lo	1000	3/6/2007		Synthesis	DualFuel:Natural Gas + Other Gases				
5	Gen Company	UNIT JKL	Hydro	PJM	Unit			Black Start	140	12/12/2017		Unknown					
6	Gen Company	UNIT MNC	Bio Mass	PJM	Unit				100	12/7/2017		Unknown					
7	Gen Company	UNIT PQR	Nuclear	PJM	Unit			Critical Lo	500	10/17/2013		Unknown					



GO Black Start Calculator – Official Report Unit Modeling Data View

Black Start Official Report

TO Zone: Restoration Zone: GO Company: Restoration Type: From Date: To Date:

Display: Unit Detailed Data **Unit Modeling Data**

[Apply Filter](#) [Help](#) [Main Menu](#)

GO Company	Name	Unit Type	TO Zone	Record Type	Total Start-Up (MWs)	Total Start-Up (MVAR)	Restoration Type	Unit will black start solely on primary or secondary fuel	Unit MIN Stable Load (MWs)	Required time to reach MIN stable load (Minutes)	Largest Motor (MWs)	Largest Motor Power Factor	Largest Motor Transformer %	Largest Motor Transformer R%	Largest Motor Transformer X%	Largest Motor Transformer High Side Voltage (kV)	Largest Motor Transformer Low Side Voltage (kV)	Largest Motor Transformer Base (MVA)	2nd Largest Motor (MWs)	2nd Largest Motor Power Factor	3rd Largest Motor (MWs)	3rd Largest Motor Power Factor	Nuclear Unit One-Line
Gen Company	UNT ABC	Nuclear	PJM	Unit			Critical Load																
Gen Company	UNT DEF	Nuclear	PJM	Unit	100	50	Critical Load																Download
Gen Company	UNT GH	Nuclear	PJM	Unit	100	50	Critical Load																
Gen Company	UNT IJL	Hydro	PJM	Unit			Black Start																
Gen Company	UNT MNO	Bio Mass	PJM	Unit																			
Gen Company	UNT PQR	Nuclear	PJM	Unit			Critical Load																

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GO Black Start Calculator – Official Report Unit Modeling Data View

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	GO Company	Name	Unit Type	TO Zone	Record Type	Total Start-Up (MWs)	Total Start-Up (MVAR)	Restorati	Unit will	Unit MIN	Required	Largest N	Largest N	Largest N	Largest N	Largest N	Largest N	Largest N	Largest N	2nd Large	2nd Large	3rd Large	3rd Largest	Motor Power	Power Factor
2	Gen Company	UNIT ABC	Nuclear	PJM	Unit				Critical Load																
3	Gen Company	UNIT DEF	Nuclear	PJM	Unit	10		50	Critical Load																
4	Gen Company	UNIT GHI	Nuclear	PJM	Unit	100		50	Critical Load																
5	Gen Company	UNIT JKL	Hydro	PJM	Unit				Black Start																
6	Gen Company	UNIT MNO	Bio Mass	PJM	Unit																				
7	Gen Company	UNIT PQR	Nuclear	PJM	Unit				Critical Load																

PJM initiates review

- Member Deadline Date is set.
- Black Start Calculator button turns red on TO interface.



TO can indicate that an SOS exception will be requested

- TO can also remove previously indicated SOS exception requests.
- Check TO Update checkbox before submitting.



TO communicates with PJM for SOS exception requests.

- PJM enters Official Ready Date.
- TO can view updated data in Official Report

PJM TEST
Production

- Feedback
- My eDART
- Upload
- Download
- Trans. Tickets
- Network Model
- Black Start
- TERM
- Reactive Reserve
- New Reactive Reserve
- Instantaneous Reserve Check
- Minimum Gen. Report
- PJM Status Report
- NERC Data
- Restoration Data
- Facility Data
- Online Help
- Logout



Black Start Main Menu

Restoration Plans

- Approved Restoration Plans
- Restoration Plans Notif. Request
- Pending Restoration Plans
- Restoration Plans Report

BlackStart Calculator

- Blackstart Calculator



No Action Required

BlackStart Calculator Main Menu						
Official Report						
Critical Load vs. Blackstart Balance						
Restoration Zone	BlackStart Unit Count	BlackStart MW	Critical Load Count	Critical Load Actual MW	Critical Load Req. MW	Balance MW
Zone A	3	100	10	30	33	67
Currently in Review						
Nothing in review						

Action Required

BlackStart Calculator Main Menu						
Official Report						
Critical Load vs. Blackstart Balance						
Restoration Zone	BlackStart Unit Count	BlackStart MW	Critical Load Count	Critical Load Actual MW	Critical Load Req. MW	Balance MW
Zone A	3	100	10	30	33	67
Currently in Review						
		Member Deadline Date	Units/Loads	Not Answered TO		
		12/19/2017	1	1		
		01/18/2018	1	1		
		02/14/2018	1	1		

Unit Warning

BlackStart Calculator Main Menu						
Official Report						
Critical Load vs. Blackstart Balance						
Restoration Zone	BlackStart Unit Count	BlackStart MW	Critical Load Count	Critical Load Actual MW	Critical Load Req. MW	Balance MW
Zone A	1	100	10	30	33	67

Currently in Review

Nothing in review

Balance Warning

BlackStart Calculator Main Menu						
Official Report						
Critical Load vs. Blackstart Balance						
Restoration Zone	BlackStart Unit Count	BlackStart MW	Critical Load Count	Critical Load Actual MW	Critical Load Req. MW	Balance MW
Zone A	3	30	10	30	33	-3

Currently in Review

Nothing in review

Black Start Main Menu

Restoration Plans

- Approved Restoration Plans
- Restoration Plans Notif. Request
- Pending Restoration Plans
- Restoration Plans Report

Black Start Calculator

Blackstart Calculator

BlackStart Calculator Main Menu

Official Report

Critical Load vs. Blackstart Balance

Restoration Zone	BlackStart Unit Count	BlackStart MW	Critical Load Count	Critical Load Actual MW	Critical Load Req. MW	Balance MW
Zone A	3	100	10	30	33	67

Currently in Review

Member	Deadline Date	Units/Loads	Not Answered TO
	12/19/2017	1	1
	01/18/2018	1	1
	02/14/2018	1	1

BlackStart Review

Member Deadline: 12/19/2017, 01/18/2018, 02/14/2018
 TO Zone: PJM
 Restoration Zone: PJM
 GO Company: Gen Company
 TO Company: Trans Company
 Restoration Type: Black Start, Critical Load (EGC), Critical Load (Nuclear)
 Record Status: TO not Answered

[Apply Filter](#) [Help](#) [Main Menu](#)

Member Deadline	GO Company	Name	Unit Type	TO Zone	Record Type	Current / Future	Restoration Type	Restoration Zone	TO Company	Effective Date	Terminate Date	Record Status	SOS Exception	TO Update	PJM Approval
02/14/2018	Gen Company	UNIT 001	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	04/04/2007		TO not Answered	<input type="checkbox"/>	<input type="checkbox"/>	
02/14/2018	Gen Company	UNIT 002	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	04/04/2007		TO not Answered	<input type="checkbox"/>	<input type="checkbox"/>	
02/14/2018	Gen Company	UNIT 003	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	01/01/2000		TO not Answered	<input type="checkbox"/>	<input type="checkbox"/>	
02/14/2018	Gen Company	UNIT 004	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	01/01/2000		TO not Answered	<input type="checkbox"/>	<input type="checkbox"/>	
02/14/2018	Gen Company	UNIT 005	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	01/01/2000		TO not Answered	<input type="checkbox"/>	<input type="checkbox"/>	
02/14/2018	Gen Company	UNIT 006	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	01/01/2000		TO not Answered	<input type="checkbox"/>	<input type="checkbox"/>	
02/14/2018	Gen Company	UNIT 007			Load	Current	Critical Load (EGC)	PJM	Trans Company	08/29/2017		TO not Answered	<input type="checkbox"/>	<input type="checkbox"/>	

[Submit Form](#) [Help](#) [CSV Export](#) [Main Menu](#)

Check SOS Exception checkbox to indicate an exception request will be made through the SOS-T

“TO Update” checkbox **MUST** be checked in order to submit data



TO Black Start Calculator – Black Start Review

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Member Deadline	GO Company	Name	Unit Type	TO Zone	Record Ty	Restoratic	Restoration Type	Restoration Zone	TO Company	Restoration Effective Date	Restoration Terminate Date	Restoration SOS Exception		
2	2/14/2018	Gen Company	UNIT 001	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	4/4/2007		No		
3	2/14/2018	Gen Company	UNIT 002	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	4/4/2007		No		
4	2/14/2018	Gen Company	UNIT 003	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	1/1/2000		Yes		
5	2/14/2018	Gen Company	UNIT 004	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	1/1/2000		No		
6	2/14/2018	Gen Company	UNIT 005	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	1/1/2000		No		
7	2/14/2018	Gen Company	UNIT 006	Nuclear	PJM	Unit	Current	Critical Load (Nuclear)	PJM	Trans Company	1/1/2000		No		
8	2/14/2018	Gen Company	UNIT 007		PJM	Load	Current	Critical Load (EGC)	PJM	Trans Company	8/29/2017		No		



TO Black Start Calculator – Official Report

BlackStart Official Report

TO Zone: PJM1
PJM2
 Restoration Zone: PJM1
PJM2
PJM3
 GO Company: Gen Company 1
Gen Company 2
Gen Company 3
 TO Company: Trans Company A
Trans Company B
Trans Company C
 Restoration Type: Black Start
Critical Load (EGC)
 From Date: 01/23/2018
 To Date: 01/24/2018

Critical Load vs. Blackstart Balance						
Restoration Zone	BlackStart Unit Count	BlackStart MW	Critical Load Count	Critical Load Actual MW	Critical Load Req. MW	Balance MW
PJM2	2	300	1	10	11	289

Apply Filter Help Main Menu

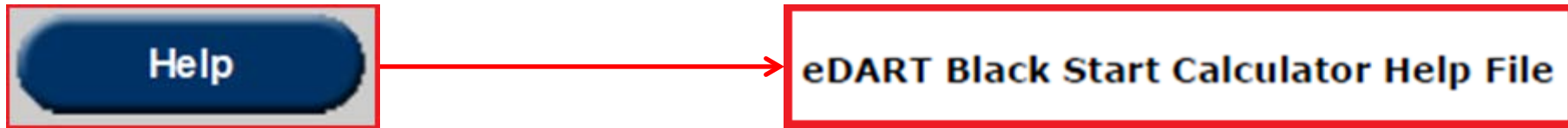
GO Company	Name	Unit Type	TO Zone	Record Type	Total Start-Up (MWs)	Total Start-Up (MVAR)	Current / Future	Restoration Type	Restoration Zone	TO Company	Allocated Restoration MW	Effective Date	Terminate Date
Gen Company 1	UNIT ABC	Combustion Turbine	PJM1	Unit			Current	Black Start	PJM1	Trans Company A	200	11/01/2017	
							Current	Black Start	PJM2	Trans Company B	150	12/01/2017	
Gen Company 2	UNIT 123	Hydro	PJM2	Unit			Current	Black Start	PJM2	Trans Company B	150	12/12/2017	
Gen Company 3	UNIT 001			Load	10	5	Current	Critical Load (EGC)	PJM2	Trans Company B	10	08/29/2017	
							Future	Critical Load (EGC)	PJM3	Trans Company C	10	03/18/2018	

Apply Filter Help CSV Export Main Menu



TO Black Start Calculator – Official Report

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	GO Company	Name	Unit Type	TO Zone	Record Ty	Total Start	Total Star	Restoratic	Restoratic	Restoratic	TO Company	Allocated	Restoration Effective Date	Restoration Terminate Date		
2	Gen Company 1	UNIT ABC	Combusti	PJM1	Unit			Current	Black Star	PJM1	Trans Company A	200	11/1/2017			
3	Gen Company 1	UNIT ABC	Combusti	PJM1	Unit			Current	Black Star	PJM2	Trans Company B	150	12/1/2017			
4	Gen Company 2	UNIT 123	Hydro	PJM2	Unit			Current	Black Star	PJM2	Trans Company B	150	12/12/2017			
5	Gen Company 2	UNIT 001			Load	10	5	Current	Critical Lo	PJM2	Trans Company B	10	8/29/2017			
6	Gen Company 3	UNIT 001			Load	10	5	Future	Critical Lo	PJM3	Trans Company C	10	3/18/2018			



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