

# ACE 04

## General Information

Proposing entity name	AE
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	04
PJM Proposal ID	929
Project title	ACE 04
Project description	Upgrade Cardiff-Lewis #2, Lewis #1-Lewis #2, Cardiff-New Freedom, Peach Bottom-Conastone, Richmond-Waneeta, Peach Bottom-Furnace Run circuits, rebuild Cardiff substation, expand Orchard substation and build new 230 kV line from Cardiff to Orchard
Email	michael.donnelly@peco-energy.com
Project in-service date	06/2028
Tie-line impact	Yes
Interregional project	No
Is the proposer offering a binding cap on capital costs?	No
Additional benefits	See NJ BPU Data Collection Form and supporting documents for additional information about this proposal. The cost details and work schedule are provided in the NJ BPU Data Collection Form and supporting documents.

## Project Components

1. Upgrade Cardiff-Lewis #2 138 kV line
2. Upgrade Lewis #2 - Lewis #1 138 kV bus tie
3. Upgrade Cardiff-New Freedom 230 kV line

4. Upgrade Peach Bottom-Conastone 500 kV line
5. Upgrade Peach Bottom South substation
6. Upgrade Conastone substation
7. Upgrade Richmond substation
8. Upgrade Peach Bottom-Furnace Run 500 kV line
9. Rebuild Cardiff substation
10. Build 230 kV line from Cardiff to Orchard
11. Upgrade Peach Bottom North substation
12. Upgrade Orchard substation

### **Substation Upgrade Component**

Component title	Upgrade Cardiff-Lewis #2 138 kV line
Project description	Replace 1590 kcmil strand bus inside Lewis substation
Substation name	Lewis
Substation zone	AE
Substation upgrade scope	Replace 1590 kcmil strand bus inside Lewis substation

### **Transformer Information**

None	
New equipment description	New bundled 1590 kcmil strand bus to increase summer ratings to 377 MVA normal /478 MVA emergency
Substation assumptions	Adequate space exists within the substation.
Real-estate description	
Construction responsibility	ACE
Benefits/Comments	The cost details are provided in the NJ BPU Data Collection Form and supporting documents.

### **Component Cost Details - In Current Year \$**

Engineering & design	detailed cost
Permitting / routing / siting	detailed cost
ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00
Total component cost	\$100,000.00
Component cost (in-service year)	\$100,000.00

### **Substation Upgrade Component**

Component title	Upgrade Lewis #2 - Lewis #1 138 kV bus tie
Project description	Replace Lewis #2-Lewis #1 138 kV bus tie with 2000 A circuit breaker
Substation name	Lewis
Substation zone	AE
Substation upgrade scope	Replace Lewis #2-Lewis #1 138 kV bus tie with 2000 A circuit breaker

### **Transformer Information**

None	
New equipment description	2000 A circuit breaker; facility summer rating increases to 478 MVA normal / 478 MVA emergency
Substation assumptions	Adequate space exists within the substation.
Real-estate description	
Construction responsibility	ACE

Benefits/Comments

The cost details are provided in the NJ BPU Data Collection Form and supporting documents.

**Component Cost Details - In Current Year \$**

Engineering & design	detailed cost
Permitting / routing / siting	detailed cost
ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00
Total component cost	\$500,000.00
Component cost (in-service year)	\$500,000.00

**Substation Upgrade Component**

Component title	Upgrade Cardiff-New Freedom 230 kV line
Project description	Modify existing relay setting to increase relay limit
Substation name	Cardiff
Substation zone	AE
Substation upgrade scope	Modify existing relay setting to increase relay limit

**Transformer Information**

None	
New equipment description	No new equipment is needed.
Substation assumptions	Existing relay is able to be modified.

Real-estate description	
Construction responsibility	ACE
Benefits/Comments	The cost details are provided in the NJ BPU Data Collection Form and supporting documents.

**Component Cost Details - In Current Year \$**

Engineering & design	detailed cost
Permitting / routing / siting	detailed cost
ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00
Total component cost	\$300,000.00
Component cost (in-service year)	\$300,000.00

**Transmission Line Upgrade Component**

Component title	Upgrade Peach Bottom-Conastone 500 kV line
Project description	Reconductor Peach Bottom-Conastone 500 kV line
Impacted transmission line	Peach Bottom-Conastone 500 kV line
Point A	Peach Bottom
Point B	Conastone
Point C	
Terrain description	Relatively flat

### Existing Line Physical Characteristics

Operating voltage	500 kV
Conductor size and type	2-2493 kcmil 54/37 ACAR
Hardware plan description	New hardware will be used.
Tower line characteristics	The age of the line is 54 years. There are no known condition issues with the existing towers. The towers should be capable of accommodating the reconductor.

### Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	4962.000000	6126.000000
Winter (MVA)	5276.000000	6395.000000
Conductor size and type	1962 T-11 51/19 ACCR	
Shield wire size and type	2 9/16 19 9 Alumoweld	
Rebuild line length	16.4 miles (reconductor)	
Rebuild portion description	The entire length of the line (16.4 miles) will be reconducted. The existing towers will remain in place and be reused.	
Right of way	No new ROW will be needed.	
Construction responsibility	PECO	
Benefits/Comments	The cost details are provided in the NJ BPU Data Collection Form and supporting documents.	

### Component Cost Details - In Current Year \$

Engineering & design	detailed cost
Permitting / routing / siting	detailed cost

ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00
Total component cost	\$36,289,000.00
Component cost (in-service year)	\$36,289,000.00

### **Substation Upgrade Component**

Component title	Upgrade Peach Bottom South substation
Project description	Expand the existing 500 kV bus inside Peach Bottom South substation by adding a bus section with two new circuit breakers
Substation name	Peach Bottom South
Substation zone	PE
Substation upgrade scope	Expand the existing 500 kV bus inside Peach Bottom South substation by adding a bus section with two new circuit breakers

### **Transformer Information**

None	
New equipment description	bus section - 5in. schedule 80 6063 circuit breakers - 5000 A nominal rating
Substation assumptions	The existing substation footprint will need to be expanded on one side to accommodate the addition of the new bus section. Spare transformers located within the substation will need to be relocated.

Real-estate description	The existing substation fence would need to be expanded on one side. The land that would be needed for the expansion is owned by Exelon Generation. PECO has an easement for use of its existing substation on land owned by Exelon Generation. PECO and Exelon Generation, both divisions of Exelon Corporation, would need to amend the existing easement agreement to allow for the new substation footprint.
Construction responsibility	PECO
Benefits/Comments	The cost details are provided in the NJ BPU Data Collection Form and supporting documents.
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	detailed cost
Permitting / routing / siting	detailed cost
ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00
Total component cost	\$49,598,167.00
Component cost (in-service year)	\$49,598,167.00
<b>Substation Upgrade Component</b>	
Component title	Upgrade Conastone substation
Project description	Replace two 500 kV circuit breakers inside Conastone substation
Substation name	Conastone
Substation zone	BGE



Substation upgrade scope

Replace two 500 kV circuit breakers "B" and "C" inside Conastone substation with new 5000 A nominal rating circuit breakers

### **Transformer Information**

None

New equipment description

circuit breakers - 5000 A nominal rating

Substation assumptions

It is assumed that there is sufficient space within the substation to perform the upgrade.

Real-estate description

No new real estate should be needed.

Construction responsibility

BGE

Benefits/Comments

The cost details are provided in the NJ BPU Data Collection Form and supporting documents.

### **Component Cost Details - In Current Year \$**

Engineering & design

detailed cost

Permitting / routing / siting

detailed cost

ROW / land acquisition

detailed cost

Materials & equipment

detailed cost

Construction & commissioning

detailed cost

Construction management

detailed cost

Overheads & miscellaneous costs

detailed cost

Contingency

\$.00

Total component cost

\$2,078,000.00

Component cost (in-service year)

\$2,078,000.00

### **Substation Upgrade Component**

Component title

Upgrade Richmond substation

Project description	Install a Smart Wires device at Richmond substation in series with the 220-35 Richmond-Waneeta 230 kV line
Substation name	Richmond
Substation zone	PECO
Substation upgrade scope	Install a Smart Wires device at Richmond substation in series with the 220-35 Richmond-Waneeta 230 kV line

**Transformer Information**

None	
New equipment description	Smart Wires device - 0.003pu reactance at 230 kV on 100 MVA basis
Substation assumptions	The substation will need to be expanded on one side to accommodate installation of the Smart Wires device.
Real-estate description	The substation fence will need to be expanded. The additional land required to install the Smart Wires device is adjacent to the existing substation and is owned by PECO.
Construction responsibility	PECO
Benefits/Comments	The cost details are provided in the NJ BPU Data Collection Form and supporting documents.

**Component Cost Details - In Current Year \$**

Engineering & design	detailed cost
Permitting / routing / siting	detailed cost
ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00

Total component cost	\$4,700,000.00
Component cost (in-service year)	\$4,700,000.00

### Transmission Line Upgrade Component

Component title	Upgrade Peach Bottom-Furnace Run 500 kV line
Project description	Reconductor the Peach Bottom-Furnace Run 500 kV line
Impacted transmission line	Peach Bottom-Furnace Run 500 kV line
Point A	Peach Bottom
Point B	Furnace Run
Point C	
Terrain description	Relatively flat

### Existing Line Physical Characteristics

Operating voltage	500 kV
Conductor size and type	2-2493 kcmil 54/37 ACAR
Hardware plan description	New hardware will be used.
Tower line characteristics	The age of the line is 54 years. There are no known condition issues with the existing towers. The towers should be capable of accommodating the reconductor.

### Proposed Line Characteristics

	Designed	Operating
Voltage (kV)	500.000000	500.000000
	Normal ratings	Emergency ratings
Summer (MVA)	4962.000000	6126.000000
Winter (MVA)	5276.000000	6395.000000

Conductor size and type	1962 T-11 51/19 ACCR
Shield wire size and type	2 9/16 19 9 Alumoweld
Rebuild line length	10.2 miles (reconductor)
Rebuild portion description	The entire length of the line (10.2 miles) will be reconducted. The existing towers will remain in place and be reused.
Right of way	No new ROW will be needed.
Construction responsibility	PECO
Benefits/Comments	The cost details are provided in the NJ BPU Data Collection Form and supporting documents.

**Component Cost Details - In Current Year \$**

Engineering & design	detailed cost
Permitting / routing / siting	detailed cost
ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00
Total component cost	\$23,000,000.00
Component cost (in-service year)	\$23,000,000.00

**Substation Upgrade Component**

Component title	Rebuild Cardiff substation
Project description	Rebuild Cardiff substation to accommodate a breaker and a half bus design.

Substation name	Cardiff
Substation zone	AE
Substation upgrade scope	Rebuild Cardiff substation to accommodate a breaker and a half bus design. See NJ BPU Data Collection Form and supporting documents for additional information.

**Transformer Information**

None	
New equipment description	230 kV bus with 4000 A nominal rating circuit breakers with 3000 A nominal rating See NJ BPU Data Collection Form and supporting documents for additional information.
Substation assumptions	Substation will be rebuilt on ACE owned land. See NJ BPU Data Collection Form and supporting documents for additional information.
Real-estate description	Land acquisition is not required. See BPU Data Collection Form and supporting documents for additional information.
Construction responsibility	ACE
Benefits/Comments	See NJ BPU Data Collection Form and supporting documents for additional information about this component of the proposal. The real estate plan, substation drawings and cost details are provided in the NJ BPU Data Collection Form and supporting documents.

**Component Cost Details - In Current Year \$**

Engineering & design	detailed cost
Permitting / routing / siting	detailed cost
ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00

Total component cost	\$70,095,409.00
Component cost (in-service year)	\$70,095,409.00

**Greenfield Transmission Line Component**

Component title	Build 230 kV line from Cardiff to Orchard
Project description	Build a new 230 kV line from Cardiff to Orchard next to the existing line within the existing line ROW.
Point A	Cardiff
Point B	Orchard
Point C	

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	1508.000000	1754.000000
Winter (MVA)	1582.000000	1829.000000
Conductor size and type	2-954 kcmil ACSS/TW	
Nominal voltage	AC	
Nominal voltage	230 kV	
Line construction type	Overhead	
General route description	The route of the new line will parallel the existing Cardiff-Orchard 230 kV line.	
Terrain description	Relatively flat	
Right-of-way width by segment	Existing ROW will be used along side the existing transmission line. The new line will be 36.5 miles in length.	
Electrical transmission infrastructure crossings	No known crossings.	
Civil infrastructure/major waterway facility crossing plan	See NJ BPU Data Collection Form and attachments.	

Environmental impacts	See NJ BPU Data Collection Form and attachments.
Tower characteristics	New towers will be steel monopoles.
Construction responsibility	ACE
Benefits/Comments	See NJ BPU Data Collection Form and attachments for more information. Line impedances and charging in pu are 0.003373+j0.038525, b=0.146368

**Component Cost Details - In Current Year \$**

Engineering & design	detailed cost
Permitting / routing / siting	detailed cost
ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00
Total component cost	\$159,301,681.00
Component cost (in-service year)	\$159,301,681.00

**Substation Upgrade Component**

Component title	Upgrade Peach Bottom North substation
Project description	Replace two CTs inside Peach Bottom North substation
Substation name	Peach Bottom North
Substation zone	PECO
Substation upgrade scope	Replace two CTs inside Peach Bottom North substation

## Transformer Information

None

New equipment description current transformers with ratings that exceed the winter ratings of the present bus within Peach Bottom North substation, which are 3966 MVA normal and 4586 MVA emergency

Substation assumptions Adequate space exists within the substation

Real-estate description Expansion of the substation is not required

Construction responsibility PECO

Benefits/Comments

### Component Cost Details - In Current Year \$

Engineering & design detailed cost

Permitting / routing / siting detailed cost

ROW / land acquisition detailed cost

Materials & equipment detailed cost

Construction & commissioning detailed cost

Construction management detailed cost

Overheads & miscellaneous costs detailed cost

Contingency \$.00

Total component cost \$130,000.00

Component cost (in-service year) \$130,000.00

### Substation Upgrade Component

Component title Upgrade Orchard substation

Project description Upgrade Orchard substation by adding a 500-230 kV transformer, a line position for the new transmission line from Cardiff to Orchard, and voltage compensation equipment



Substation name	Orchard
Substation zone	ACE
Substation upgrade scope	Upgrade Orchard substation by adding a 500-230 kV transformer, a line position for the new transmission line from Cardiff to Orchard, and voltage compensation equipment
<b>Transformer Information</b>	
None	
New equipment description	3-450 MVA single phase 500-230 kV transformers
Substation assumptions	The existing substation needs to be expanded, but the land required for the expansion is owned by ACE.
Real-estate description	The existing substation fence needs to be moved to accommodate the expansion. The land needed for the expansion is owned by ACE.
Construction responsibility	ACE
Benefits/Comments	See NJ BPU Data Collection Form and attachments for more information.
<b>Component Cost Details - In Current Year \$</b>	
Engineering & design	detailed cost
Permitting / routing / siting	detailed cost
ROW / land acquisition	detailed cost
Materials & equipment	detailed cost
Construction & commissioning	detailed cost
Construction management	detailed cost
Overheads & miscellaneous costs	detailed cost
Contingency	\$.00
Total component cost	\$38,219,770.00
Component cost (in-service year)	\$38,219,770.00

## Congestion Drivers

None

## Existing Flowgates

FG #	From Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
28-GD-W15	214277	RICHMOND35	214012	WANEETA3	1	230	230	Gen Deliv (winter)	Included
35-GD-W16	214277	RICHMOND35	214012	WANEETA3	1	230/230	230/230	Gen Deliv (winter)	Included
35-GD-W5	200064	PCHBTM1S	200004	CNASTONE	1	500/500	230/232	Gen Deliv (winter)	Included
35-GD-W6	200064	PCHBTM1S	200004	CNASTONE	1	500/500	230/232	Gen Deliv (winter)	Included
28-GD-W4	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-W5	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-W110	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-W111	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-W112	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-W16	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-S2-W9	214277	RICHMOND35	214012	WANEETA3	1	230	230	Gen Deliv (winter)	Included
28-GD-S2-W9	200066	PCHBTM1N	270072	FUR RUN_500	1	500	230/225	Gen Deliv (winter)	Included
35-GD-S2-W1	200066	PCHBTM1N	270072	FUR RUN_500	1	500/500	230/225	Gen Deliv (winter)	Included
35-GD-S2-W1	214277	RICHMOND35	214012	WANEETA3	1	230/230	230/230	Gen Deliv (winter)	Included
35-GD-S2-W1	200064	PCHBTM1S	200004	CNASTONE	1	500/500	230/232	Gen Deliv (winter)	Included
35-GD-S2-W3	200064	PCHBTM1S	200004	CNASTONE	1	500/500	230/232	Gen Deliv (winter)	Included
35-GD-S2-W5	200064	PCHBTM1S	200004	CNASTONE	1	500/500	230/232	Gen Deliv (winter)	Included
28-GD-S2-S1	227900	CARDIFF C	219100	NEWFRDM	1	230	231/234	Gen Deliv (Summer)	Included
28-GD-S2-W1	227900	CARDIFF C	219100	NEWFRDM	1	230	231/234	Gen Deliv (winter)	Included
28-GD-S2-W1	227900	CARDIFF C	219100	NEWFRDM	1	230	231/234	Gen Deliv (winter)	Included
28-GD-S2-W1	227900	CARDIFF C	219100	NEWFRDM	1	230	231/234	Gen Deliv (winter)	Included
28-GD-S2-W1	227900	CARDIFF C	219100	NEWFRDM	1	230	231/234	Gen Deliv (winter)	Included
28-GD-S2-W3	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included

FG #	From Bus No.	From Bus Name	To Bus No.	To Bus Name	CKT	Voltage	TO Zone	Analysis type	Status
28-GD-S2-W32	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-S2-W12	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-S2-W22	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-S2-W32	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-S2-W32	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-S2-W92	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-S2-W32	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-S2-W32	200064	PCHBTM1S	200004	CNASTONE	1	500	232/230	Gen Deliv (winter)	Included
28-GD-S2-S132	27934	CARDIFF2	227945	LEWIS #2	1	138	234	Gen Deliv (Summer)	Included
28-GD-S2-S132	27945	LEWIS #2	227902	LEWIS #1	1	138	234	Gen Deliv (Summer)	Included
35-GD-S2-S82	27900	CARDIFF C	219100	NEWFRDM	1	230/230	234/231	Gen Deliv (Summer)	Included
35-GD-S2-W72	27900	CARDIFF C	219100	NEWFRDM	1	230/230	234/231	Gen Deliv (winter)	Included
35-GD-S2-W32	27900	CARDIFF C	219100	NEWFRDM	1	230/230	234/231	Gen Deliv (winter)	Included
35-GD-S2-W102	27900	CARDIFF C	219100	NEWFRDM	1	230/230	234/231	Gen Deliv (winter)	Included
35-GD-S2-W92	27900	CARDIFF C	219100	NEWFRDM	1	230/230	234/231	Gen Deliv (winter)	Included

## New Flowgates

None

## Financial Information

Capital spend start date 01/2023

Construction start date 01/2023

Project Duration (In Months) 65

## Additional Comments

None