



Introduction to  
**Collector System Templates**

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## Background

- RARF will be replaced by RIOO-RS portal
- Currently no web interface for collector system data
  - Collector system data will still be submitted via an Excel upload
  - Good News! Excel Template now has built in data checking
  - Format similar to current RARF

# Home Sheet

- Enter basic info about resource

HOME PAGE	COLLECTOR SYSTEM FORM			
<b>1.</b> Enter ResourceSite Code and Unit Names exactly as registered.	<input type="text" value="&lt;Enter Site Code&gt;"/>	Note: You cannot leave the default name as "UNIT.1", etc. You must change to match your registered name. If your resource is new, pick another name such as "UNIT.1A", etc.		
	<b>NAME of UNIT RESOURCE--&gt;</b>	UNIT.1	UNIT.2	UNIT.3
<b>2.</b> Enter basic descriptions.	Enter Model Name (e.g. GE2.7, etc)-->			
	Enter number of turbines / inverters-->			
	Enter total MW this Resource-->			
<b>(Auto-Populated GenCode)</b>	SITE_UNIT.1	SITE_UNIT.2	SITE_UNIT.3	

- Buttons to check data

<input type="button" value="Validate!"/>	
Topology Check (# Turbines each Node)	Validation Error Messages
	(Click Validate! button.)

# Cable and Segments Sheets

- Identical to RARF forms

[<- Return to Home page](#) **CABLE DATA**

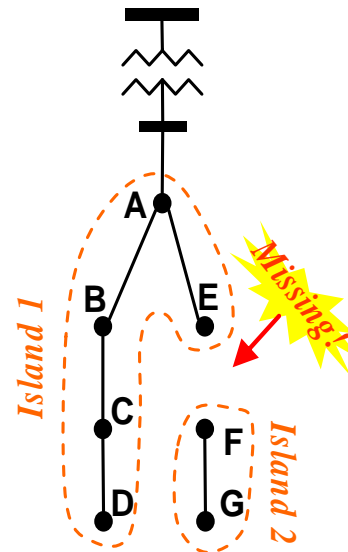
GENERATOR DETAILS	COLLECTION SYSTEM DETAILED MODEL		POSITIVE SEQUENCE DATA			ZERO SEQUENCE	
Resource Name	Cable Type	Voltage Level kV	R/kft	X/kft	Charging Bc/kft	RO/kft	XC
(Resource Name is Optional Here)	(Name Must Be Unique)	kV	(p.u. on 100 MVA base)	(p.u. on 100 MVA base)	(p.u. on 100 MVA base)	(p.u. on 100 MVA base)	(p.u. on 100 MVA base)

[<- Return to Home page](#) **SEGMENT DATA**

GENERATOR DETAILS	Cable Type	RENEWABLE SEGMENT DETAILS					
Resource Name (Unit Code/Mnemonic)	Cable Type	From Node	To Node	Circuit Number	Voltage Level	Cable Segment Length	Number of Turbines/Inverters On Cable Segment
List	List	alpha/numeric	alpha/numeric	pha/nume	kV	in kft	Integer

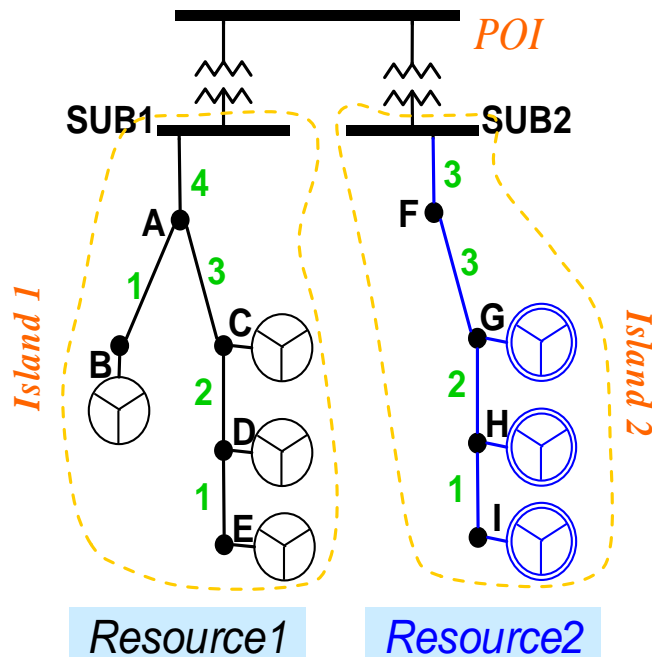
# Validations

- Several Validations are performed:
  - Island Checks: Are any segments missing?
  - Data consistency:
    - Are cable types correctly defined?
    - Are turbines/inverters numbered correctly?
  - “Loop Backs”: Is the layout radial in nature or are there parallel paths caused by mistakes in the connectivity?



**Island Check:**  
Segment E-F is missing, incorrectly causing a second island.

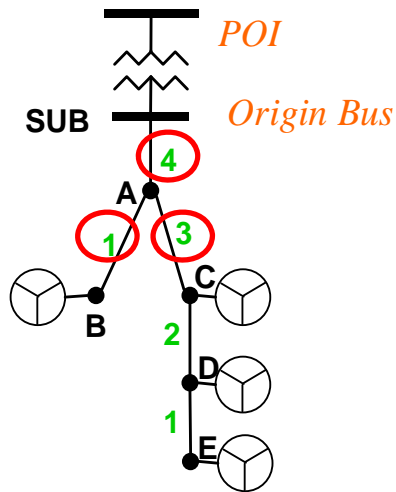
# Island Checking



- This site with two independent 34.5 kV SUB buses will appear to have two islands.
  - Because transformers are not entered into the Segments sheet, there will be two groups of collector segments that are not connected to each other. “Island 1” and “Island 2”.
- However, if the validation step reports three islands, then you know a mistake was made
  - A segment is probably missing

# Turbine Segment Numbering

- Segments are numbered to indicate the number of turbines/inverters they support.



Cable	FROM	TO	CKT	# Turb
XLR	SUB	A	101	4
XLR	A	B	102	1
XLR	A	C	103	3
XLR	C	D	104	2
XLR	D	E	105	1

- The segments leaving the SUB node should indicate the total number of turbines / inverters in the farm. Here, there are 4.

# Turbine Segment Numbering

- Most wind farms have only one turbine per node.
  - Can't put two turbines in the same spot!
- Below, the Validation step has found a node with 7 turbines.

The screenshot shows a software interface for validating turbine segment numbering. At the top left is a grey button labeled "Validate!". Below it are two panels. The left panel, titled "Topology Check (# Turbines each Node)", displays a list of nodes and their associated turbine counts. The right panel, titled "Validation Error Messages", contains a warning message.

```
// == Node Data: (Name,#Turbines) ==  
// ---- Island 1 with Resources [SITEA_UNIT1,  
SITEA_UNIT2]  
SUB,0          JB-A1,0  
B01,1          C01,1  
D01,1          JB-E1,0  
F01,0          JB-G1,0  
B07,1          F07,7  
H01,1          J01,1  
K01,1          A01,1  
M02,1          B02,1  
JB-C1,0        JB-D1,0  
F01,1          F02,1
```

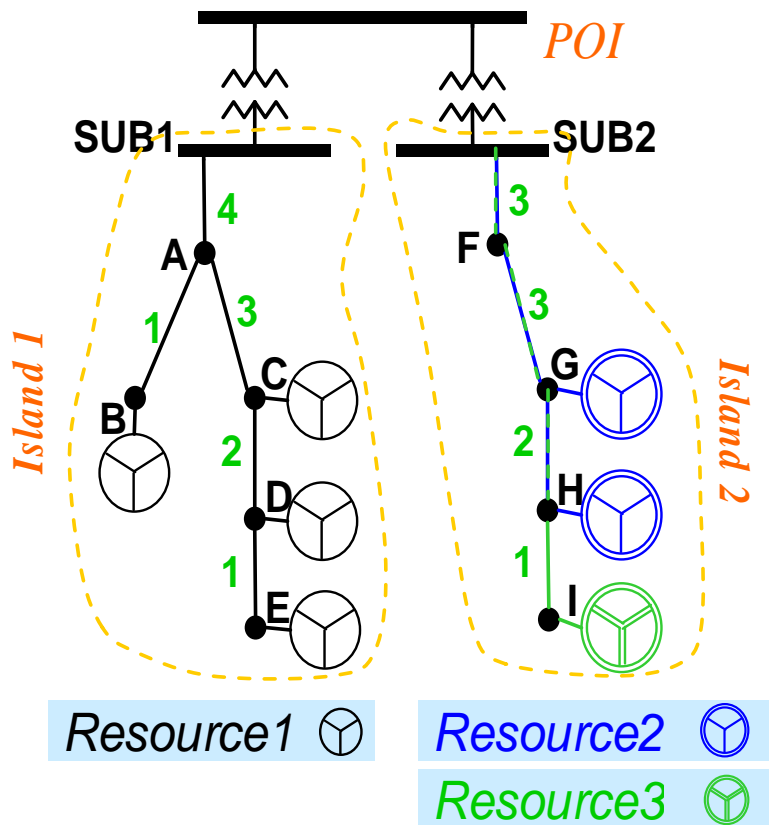
Island 1 appears to contain 86 turbines according to column H in the Segments v [SITEA\_UNIT1,SITEA\_UNIT2] has/have 76 turbines according to Row 7.  
Please check the numbers in Row 7 of the Home page and check the numbering  
Warning: Inconsistent turbine numbering in Island 1. The branch(es) leaving the indicate they are feeding 70 turbines. However, 86 turbines were discovered wh Please check Column H of the Segments worksheet for consistency. Also check expected and you do not have additional islands because you are missing a segr

- This could be caused by a segment that is mis-numbered missing.
  - The error is probably near Node F07.



# Sites with Mixed Turbines

- New form can accommodate mixed sites.

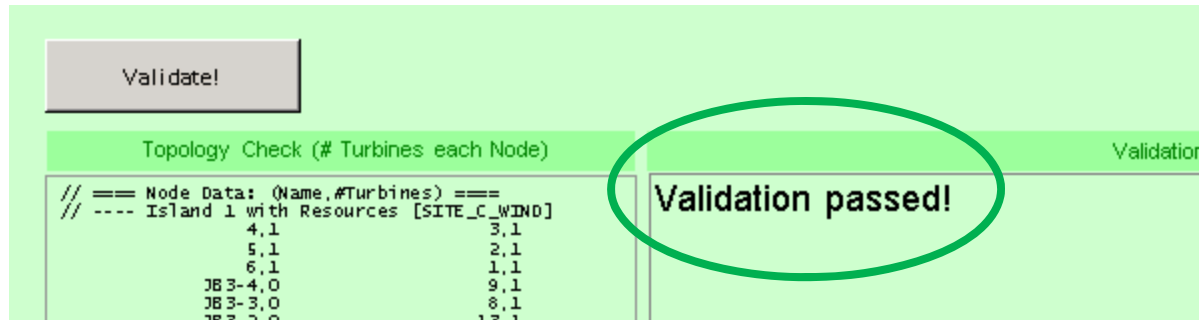


See Help sheet for details.

Resource	Cable	FROM	TO	CKT	# Turb
Resource1	XLR	SUB1	A	101	4
Resource1	XLR	A	B	102	1
Resource1	XLR	A	C	103	3
Resource1	XLR	C	D	104	2
Resource1	XLR	D	E	105	1
(Mixed)	XLR	SUB2	F	201	3
(Mixed)	XLR	F	G	202	3
(Mixed)	XLR	G	H	203	2
(Mixed)	XLR	H	I	204	1

# Validation

- Here's what you want to see before submitting to ERCOT:



```
Validate!
```

Topology Check (# Turbines each Node)	Validation
// === Node Data: (Name, #Turbines) ===	
// --- Island 1 with Resources [SITE_C_WIND]	
4,1	3,1
5,1	2,1
6,1	1,1
JB 3-4,0	9,1
JB 3-3,0	8,1
1R 3-2,0	13,1

- Some warning messages may be okay for your particular system
  - For example, some solar farms have more than one inverter per Node.
  - There may be rare situations where a collector system actually does loop-back upon itself and is not a truly radial system.
  - Exercise judgment.
- Also providing ERCOT a good RAW file that solves out-of-the-box will help us greatly.