U.S. DEPARTMENT OF ENERGY
CHP Technical Assistance Partnerships
NORTHWEST

New Features in 2014:
Using the Scenarios Feature

RELCOST FINANCIAL

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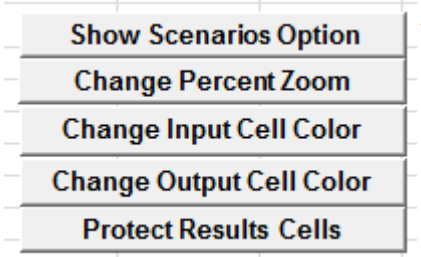
RELCOST Scenarios

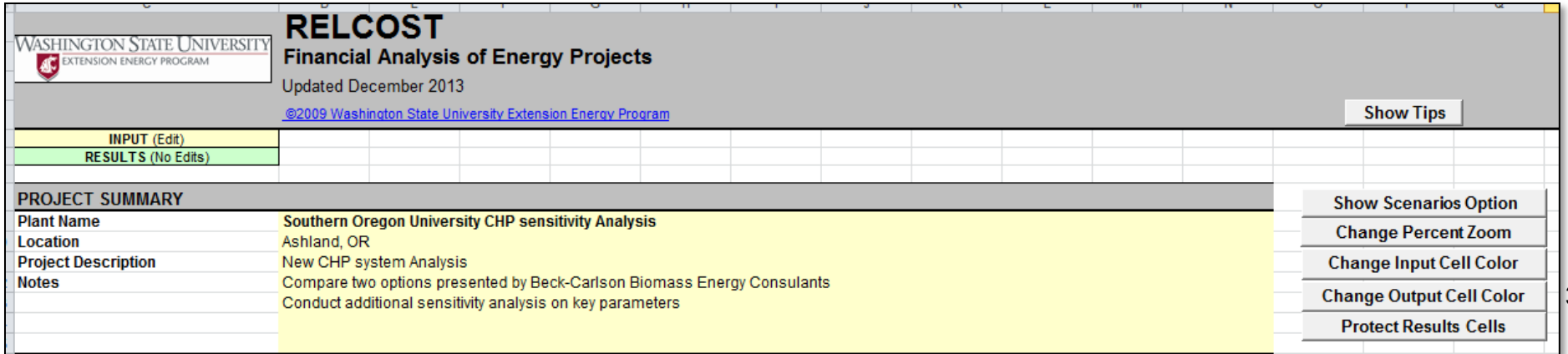
- **Up to 10 scenarios can be defined using RelCost's new Scenarios Option**
  - **Input data on the "Scenarios" tab**
  - **Drop down menus on other sheets allow you to easily switch between the scenarios you have defined**

Scenarios Feature

- **Click on "Show Scenarios Option" on the General tab**
  - **Opens Scenarios tab**
  - **Shows Scenario sections on input sheets**



Scenarios button



On Scenario Tab

- **First, enter scenario descriptions and assign them "numbers"**
  - **Any code will work in place of number**

SCENARIO DESCRIPTIONS: Describe scenarios and assign numbers for running them from the WhatIf tab.

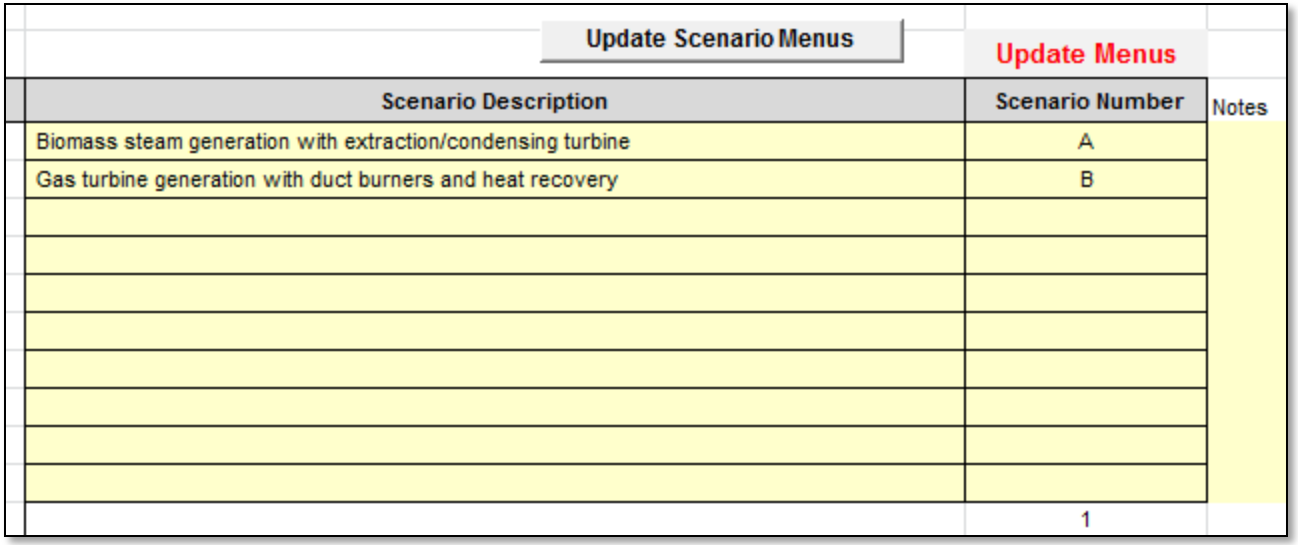
Update Scenario Menus

	Scenario Description	Scenario Number	Notes
1	Biomass steam generation with extraction/condensing turbine	1	
2	Gas turbine generation with duct burners and heat recovery	2	

1	Biomass steam generation with extraction/condensing turbine	1

Scenario Tab

- If you change the number, you will be prompted to update the menu so they reflect your new codes



Update Scenario Menus

Update Menus

Scenario Description	Scenario Number	Notes
Biomass steam generation with extraction/condensing turbine	A	
Gas turbine generation with duct burners and heat recovery	B	
	1	

Defining Scenarios

- **Next, there are a number of fields for you to enter data for each scenario**
  - **Heading indicates what input tab the data will appear on**

Data in this field will appear on the Capital Expenditures tab

2	CAPITAL EXPENDITURES: Enter parameters for each scenario. Use top row for headings. Create references to paramenters on Capit						
3		Scenario Description	Total Installed Cost	Replacing Older Boilers at Central Plant, 10 year intervals(2017)			
4	1	Biomass steam generation with extraction/condensing turbine	$ 12,185,000	$ 700,000			
5	2	Gas turbine generation with duct burners and heat recovery	$ 8,539,000	$ 700,000			
6							
7							
8							
9							
0							
1							
2							
3							
4	1	Biomass steam generation with extraction/condensing turbine	$ 12,185,000	$ 700,000	-	$	

...but only the values in green
... and the headings

Defining Scenarios

- **Values in green are for the selected scenario**
  - **Total Installed Cost of $12M appears on CapEx sheet when scenario 1 is selected**

	CAPITAL EXPENDITURES: Enter parameters for each scenario. Use top row for headings. Create references to paramenters on Capit					
	Scenario Description	Total Installed Cost	Replacing Older Boilers at Central Plant, 10 year intervals(2017)			
1	Biomass steam generation with extraction/condensing turbine	$ 12,185,000	$ 700,000			
2	Gas turbine generation with duct burners and heat recovery	$ 8,539,000	$ 700,000			
1	**Biomass steam generation with extraction/condensing turbine**	**$ 12,185,000**	**$ 700,000**	-	**$**	

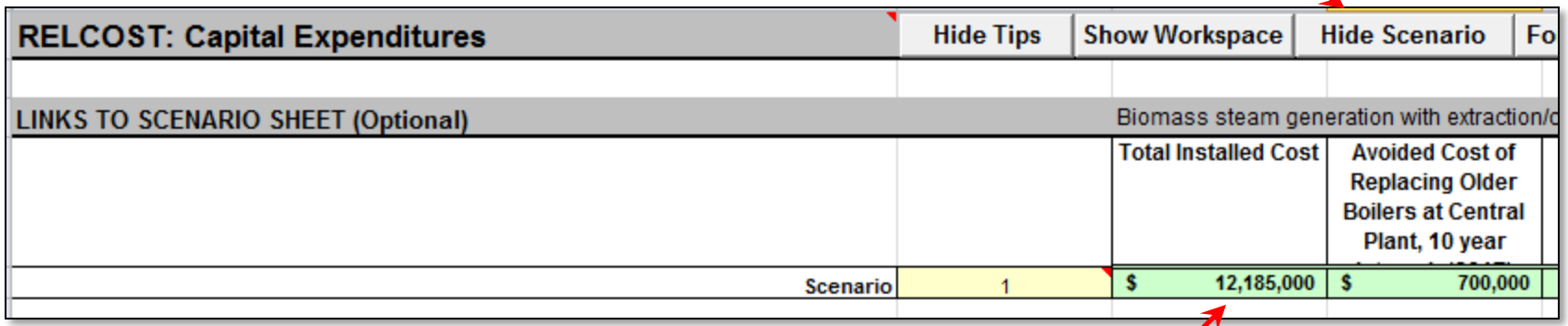
Selected scenario

Values in green corresponds to the scenario selected on drop down menus

Scenario Sections on Input Sheets

- **Here's how the references appear on input tabs**
  - **Headings and selected scenario appear**

If you don't see the scenario section, click "Show Scenario"



RELCOST: Capital Expenditures	Hide Tips	Show Workspace	Hide Scenario	Fo
LINKS TO SCENARIO SHEET (Optional)			Biomass steam generation with extraction/c	
		Total Installed Cost	Avoided Cost of Replacing Older Boilers at Central Plant, 10 year	
Scenario	1	$ 12,185,000	$ 700,000	

The $12M referenced from Scenario tab in Scenario 1

Back to Fields on Scenario Tab...

- **First row of field is for headings**
  - **You define whatever headings you want**
  - **Can be whatever data may be convenient to have on both the Scenario tab and input tabs**
- **Each row below the heading defines a scenario**

2	CAPITAL EXPENDITURES: Enter parameters for each scenario. Use top row for headings. Create references to paramenters on Capit						
3		Scenario Description	Total Installed Cost	Replacing Older Boilers at Central Plant, 10 year intervals(2017)			
4	1	Biomass steam generation with extraction/condensing turbine	$ 12,185,000	$ 700,000			
5	2	Gas turbine generation with duct burners and heat recovery	$ 8,539,000	$ 700,000			
6							
7							
8							
9							
0							
1							
2							
3							
4	1	Biomass steam generation with extraction/condensing turbine	$ 12,185,000	$ 700,000	-	$	

Fields on Scenario Tab

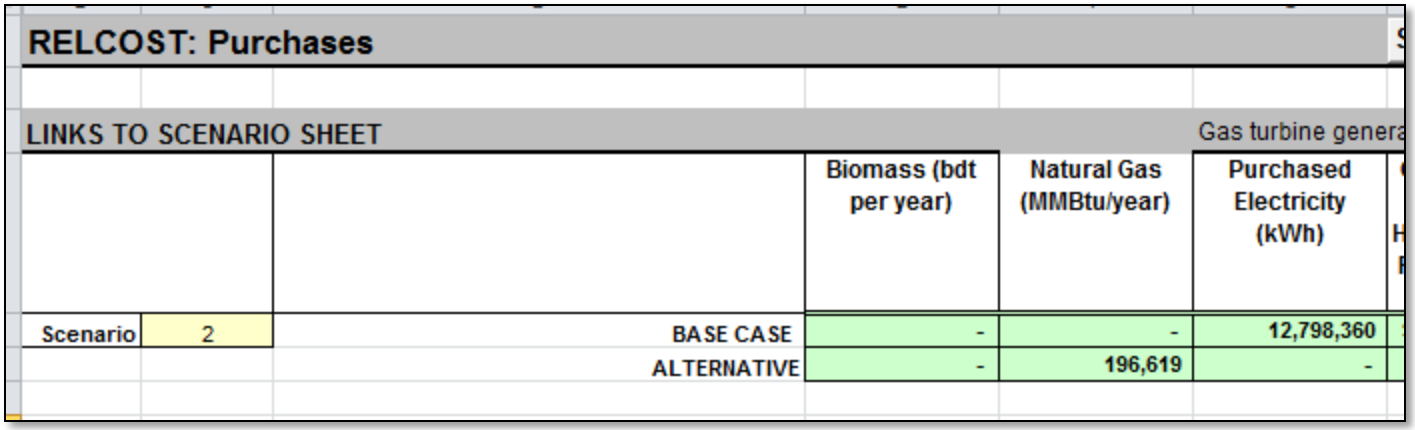
- **Some fields also have a line for a base case**

Base case is 2nd row

PURCHASES: Enter parameters for each scenario. Use top row for headings and second row for the base case. Create references			
Scenario Description	Biomass (bdt per year)	Natural Gas (MMBtu/year)	Purchased Electricity (kWh)
BASE CASE			12,798,360
Biomass steam generation with extraction/condensing turbine	21,320	3,325	
Gas turbine generation with duct burners and heat recovery	-	196,619	
Gas turbine generation with duct burners and heat recovery	-	196,619	-

Input Tab with a Base Case

- On these input tabs, the headings, the base case and the selected scenario all appear



RELCOST: Purchases

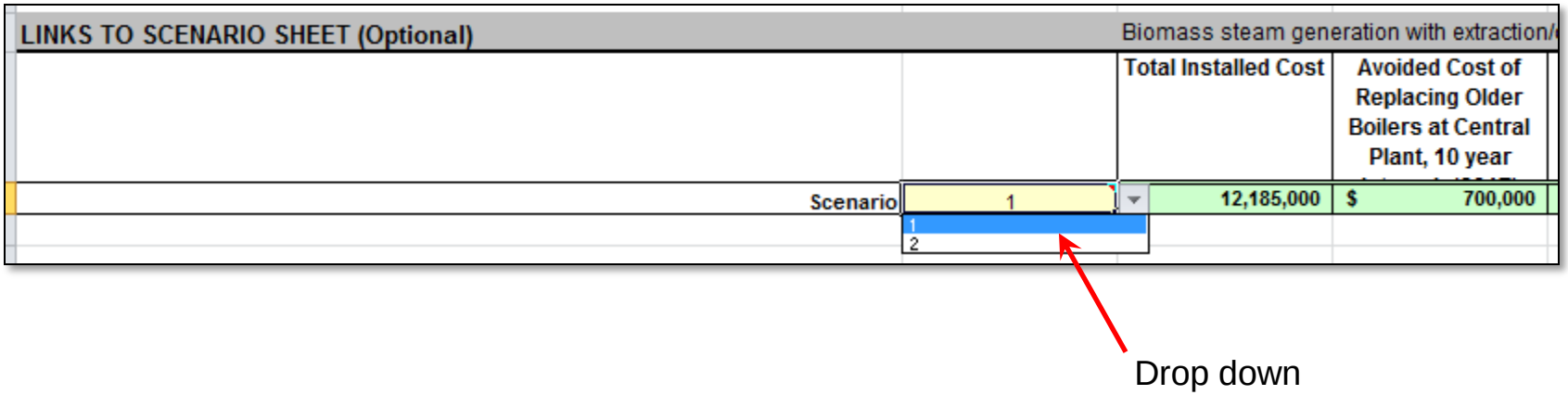
LINKS TO SCENARIO SHEET

Gas turbine genera

			Biomass (bdt per year)	Natural Gas (MMBtu/year)	Purchased Electricity (kWh)
Scenario	2	BASE CASE	-	-	12,798,360
		ALTERNATIVE	-	196,619	-

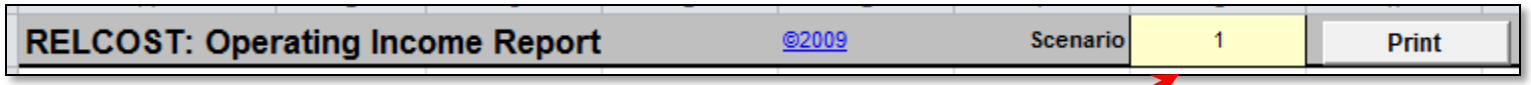
Scenario Drop-Down Menus

- **Menus on WhatIf tab, input tabs, and reports tabs**
- **On Input sheets...**
  - **Located in Scenario sections near top of sheet**



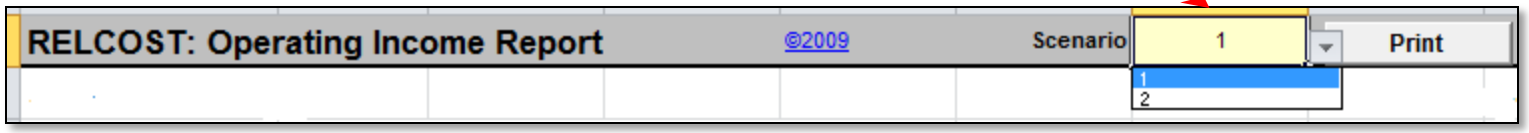
Scenarios Drop Down Menus

- **Available on WhatIf tab, input tabs, and reports tabs**
- **On reports and proformas...**



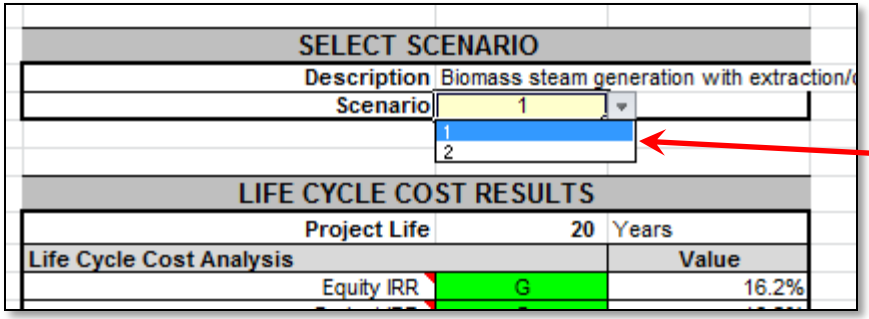
Located at top

When open...



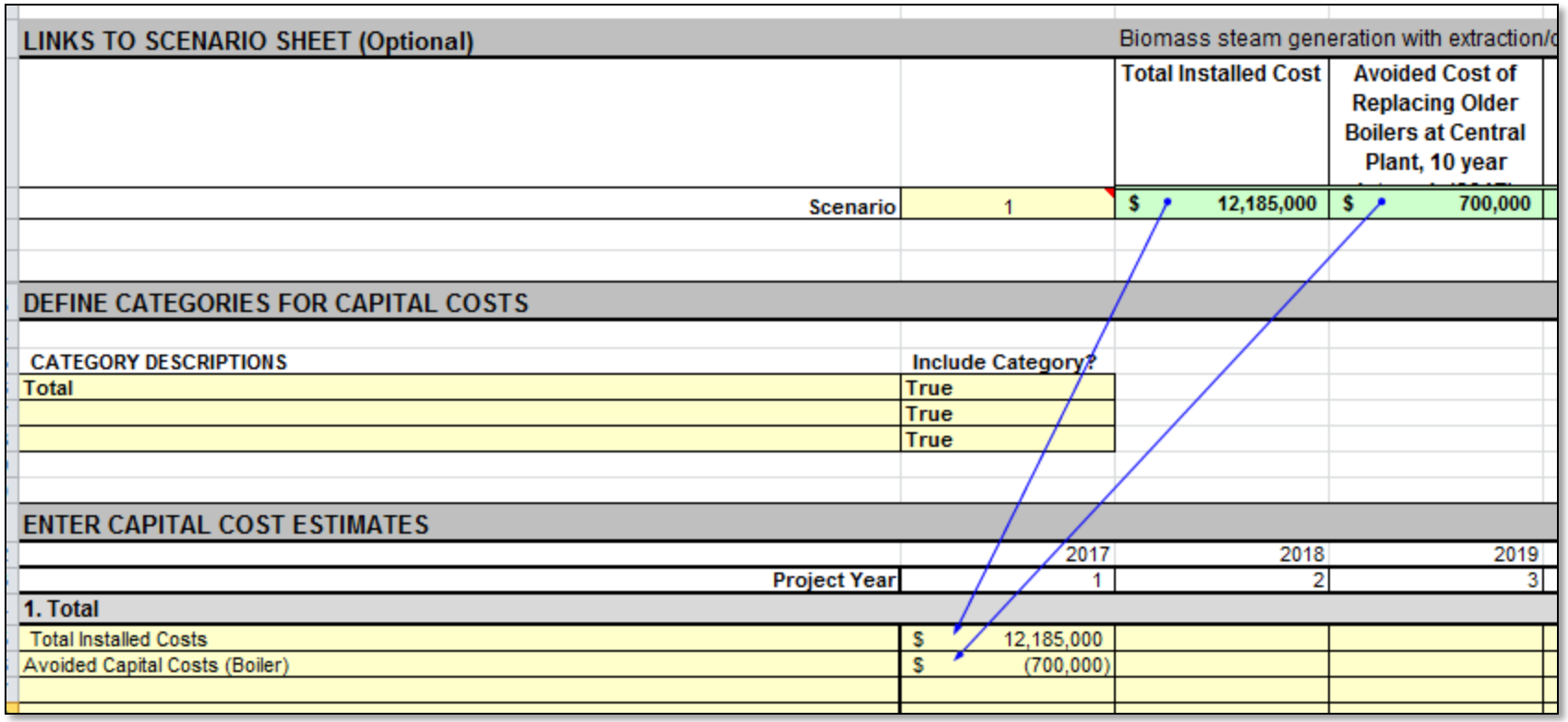
Scenarios Drop Down Menus

- **On WhatIf tab...**
  - **Located above LCCA results**



Using the Scenario Section

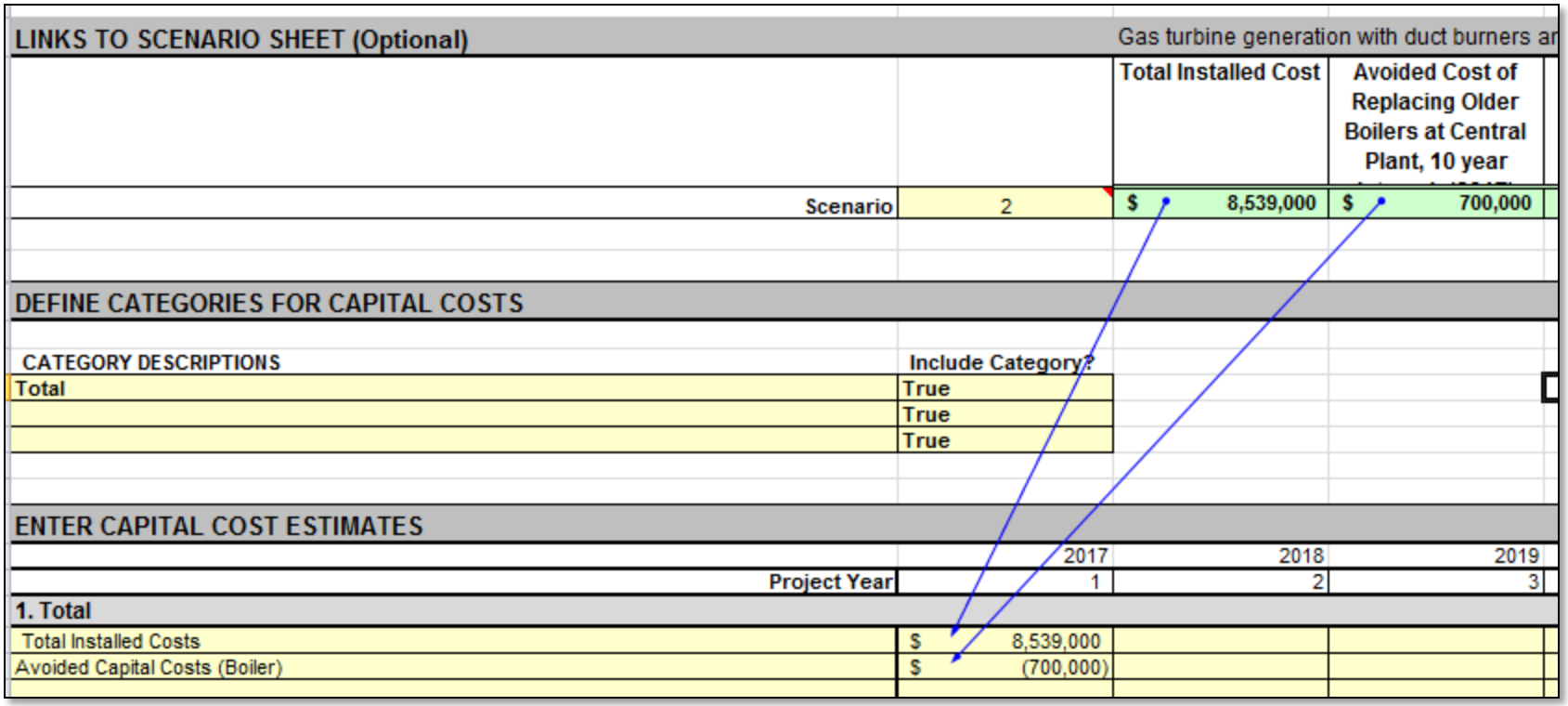
- None of this works unless you reference the Scenario section in your inputs



LINKS TO SCENARIO SHEET (Optional)		Biomass steam generation with extraction/c	
		Total Installed Cost	Avoided Cost of Replacing Older Boilers at Central Plant, 10 year
Scenario	1	$ 12,185,000	$ 700,000
DEFINE CATEGORIES FOR CAPITAL COSTS			
CATEGORY DESCRIPTIONS	Include Category?		
Total	True		
	True		
	True		
ENTER CAPITAL COST ESTIMATES			
	2017	2018	2019
Project Year	1	2	3
1. Total			
Total Installed Costs	$ 12,185,000		
Avoided Capital Costs (Boiler)	$ (700,000)		

Using the Scenario Section

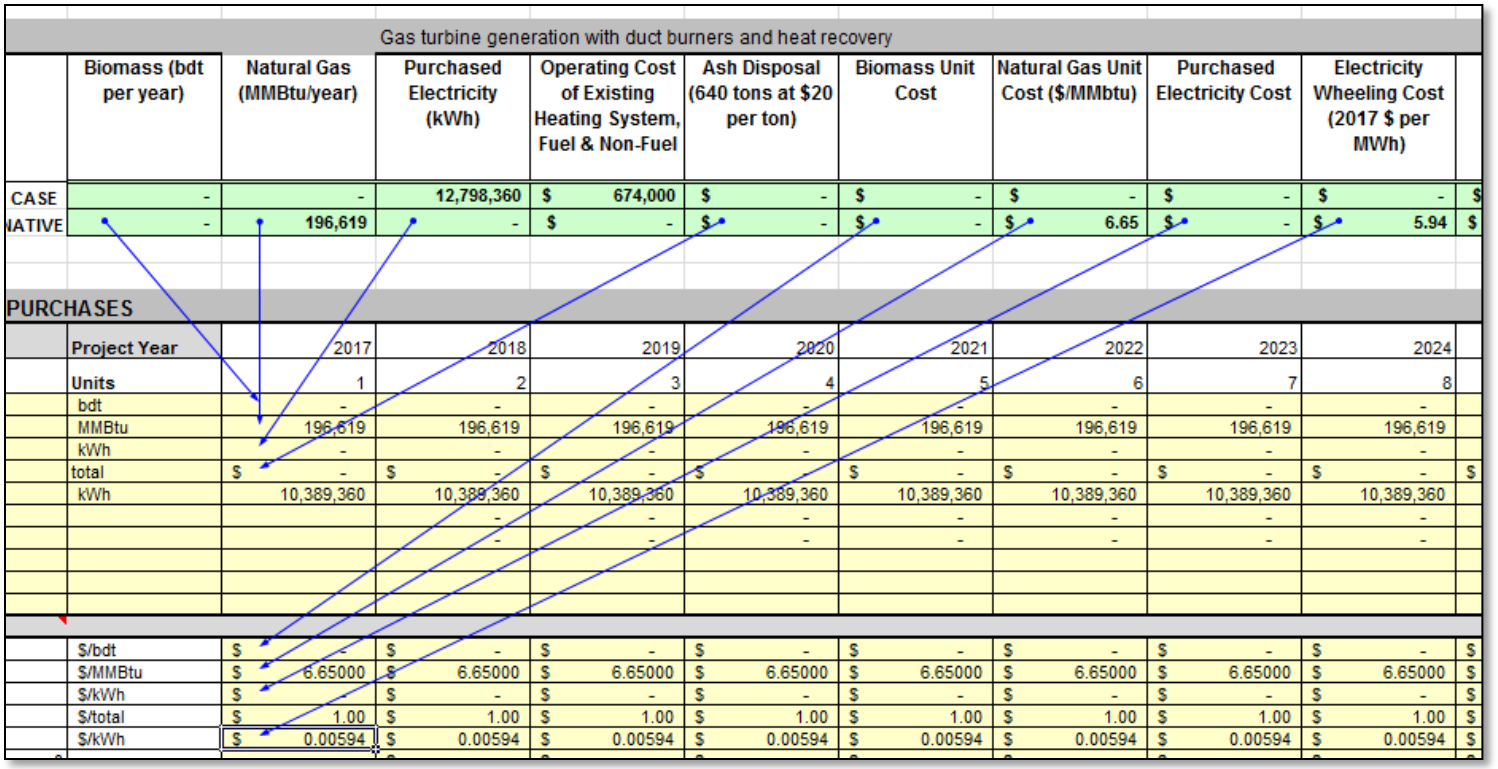
- **When you select another scenario on the drop down, input values change**
  - **Remember menus are located throughout the sheet**
  - **Selecting scenario on any sheet changes scenario data throughout**



LINKS TO SCENARIO SHEET (Optional)		Gas turbine generation with duct burners ar	
		Total Installed Cost	Avoided Cost of Replacing Older Boilers at Central Plant, 10 year
Scenario	2	$ 8,539,000	$ 700,000
DEFINE CATEGORIES FOR CAPITAL COSTS			
CATEGORY DESCRIPTIONS	Include Category?		
Total	True		
	True		
	True		
ENTER CAPITAL COST ESTIMATES			
	2017	2018	2019
Project Year	1	2	3
1. Total			
Total Installed Costs	$ 8,539,000		
Avoided Capital Costs (Boiler)	$ (700,000)		

References to Scenarios Sections

- It's worth emphasizing that any value you want to change, must be referenced into your inputs



Gas turbine generation with duct burners and heat recovery

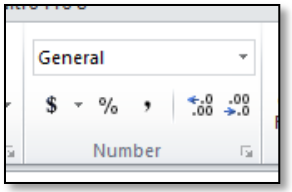
	Biomass (bdt per year)	Natural Gas (MMBtu/year)	Purchased Electricity (kWh)	Operating Cost of Existing Heating System, Fuel & Non-Fuel	Ash Disposal (640 tons at $20 per ton)	Biomass Unit Cost	Natural Gas Unit Cost ($/MMbtu)	Purchased Electricity Cost	Electricity Wheeling Cost (2017 $ per MWh)	
CASE	-	-	12,798,360	$ 674,000	$ -	$ -	$ -	$ -	$ -	$
NATIVE	-	196,619	-	$ -	$ -	$ -	$ 6.65	$ -	$ 5.94	$

PURCHASES

	Project Year	2017	2018	2019	2020	2021	2022	2023	2024	
	Units	1	2	3	4	5	6	7	8	
	bdt	-	-	-	-	-	-	-	-	
	MMBtu	196,619	196,619	196,619	196,619	196,619	196,619	196,619	196,619	
	kWh	-	-	-	-	-	-	-	-	
	total	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$
	kWh	10,389,360	10,389,360	10,389,360	10,389,360	10,389,360	10,389,360	10,389,360	10,389,360	
			-	-	-	-	-	-	-	
			-	-	-	-	-	-	-	
	$/bdt	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$
	$/MMBtu	$ 6.65000	$ 6.65000	$ 6.65000	$ 6.65000	$ 6.65000	$ 6.65000	$ 6.65000	$ 6.65000	$
	$/kWh	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$
	$/total	$ 1.00	$ 1.00	$ 1.00	$ 1.00	$ 1.00	$ 1.00	$ 1.00	$ 1.00	$
	$/kWh	$ 0.00594	$ 0.00594	$ 0.00594	$ 0.00594	$ 0.00594	$ 0.00594	$ 0.00594	$ 0.00594	$

Formatting Scenario Data

- As you enter data on the scenarios field, format the numbers as always in Excel



SALES & SAVINGS -- PRODUCTION INCENTIVES			
Scenario Description	Estimated Maximum Electrical Production (kWh per year)	Weighted Average Electricity Sales Price (2017 $ per MWh)	Electricity Wheeling Cost (2017 $ per MWh)
BASE CASE			
Biomass steam generation with extraction/condensing turbine	15,700,000	$ 61.10	$ 5.94
Gas turbine generation with duct burners and heat recovery	10,389,360	$ 61.10	$ 5.94

- The use Format Scenario button...

Gas turbine generation with duct burners and heat recove			
	Estimated Maximum Electrical Production (kWh	Weighted Average Electricity Sales Price (2017 $	Electricity Wheeling Cost (2017 $ per MWh)
BASE CASE			
ALTERNATIVE	10,389,360	$ 61.10	$ 5.94

Use “Format Scenario” button to copy your number formats from Scenario sheet to Input sheets

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Questions ?

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Download blank spreadsheet, examples, and User's Manual at
http://www.northwestchptap.org/ResourcesSoftwareLinks/Software.aspx