



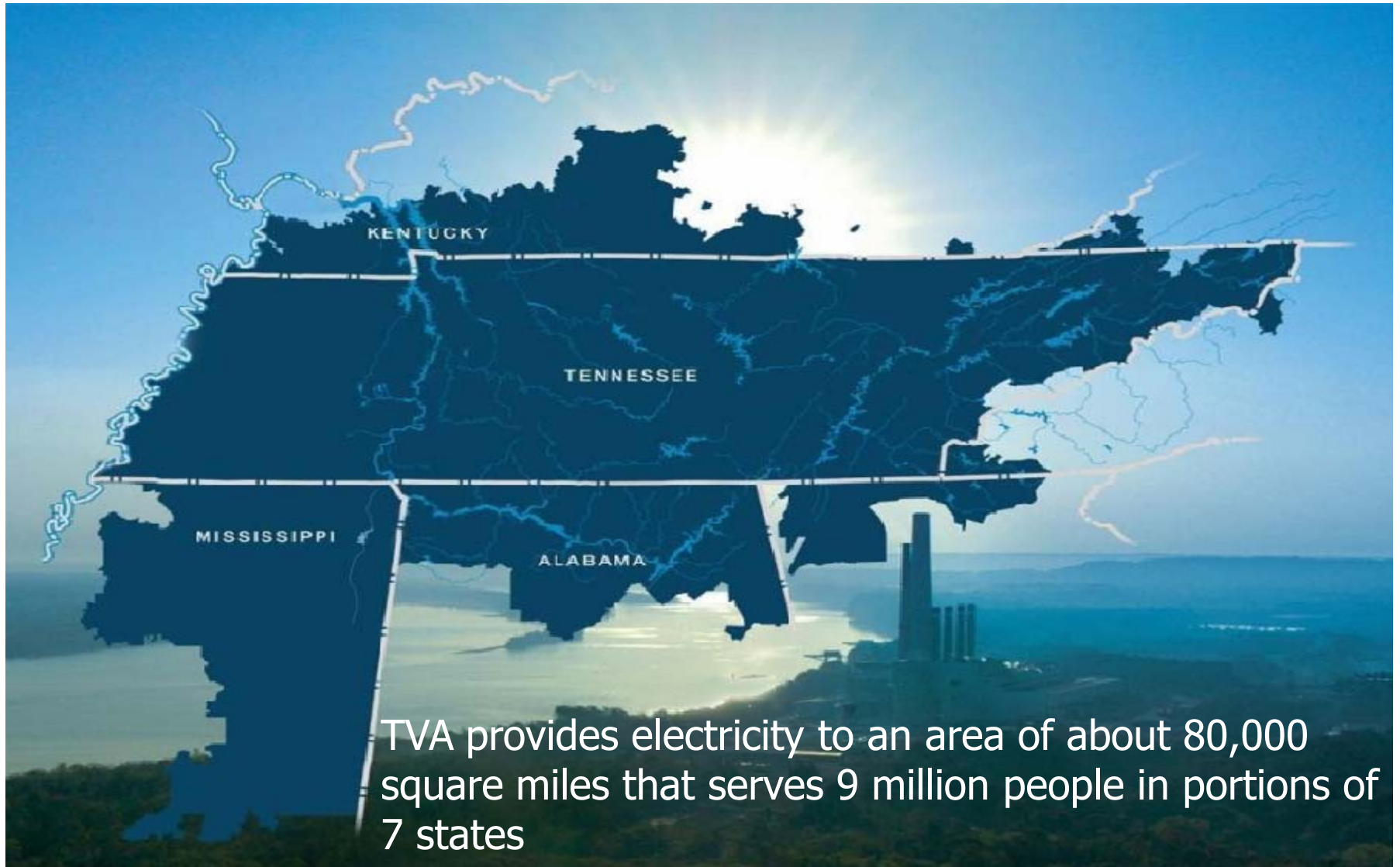
# Distributed Generation & Renewable Energy

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Matt Brown  
TVA Renewables



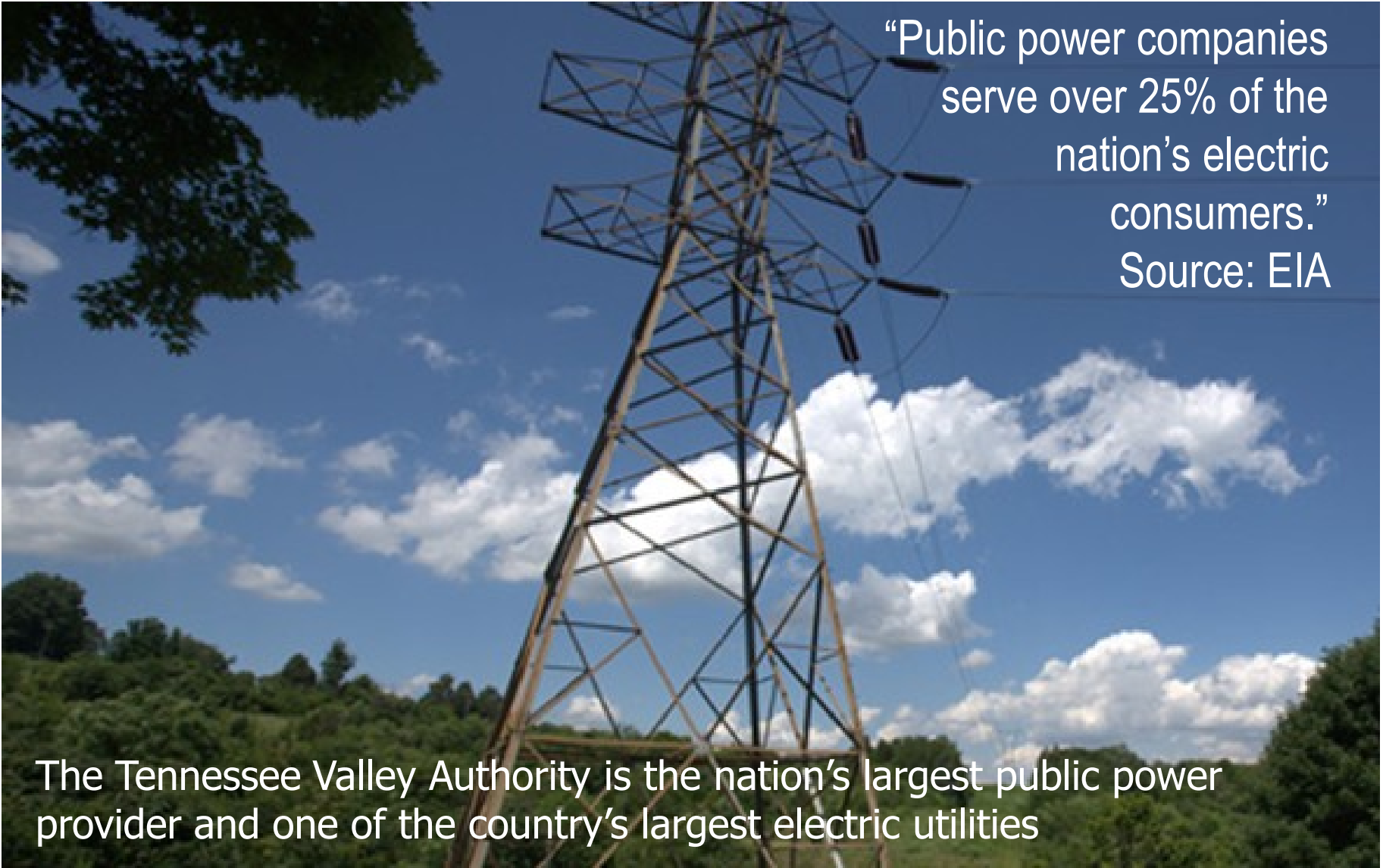
# About TVA



TVA provides electricity to an area of about 80,000 square miles that serves 9 million people in portions of 7 states



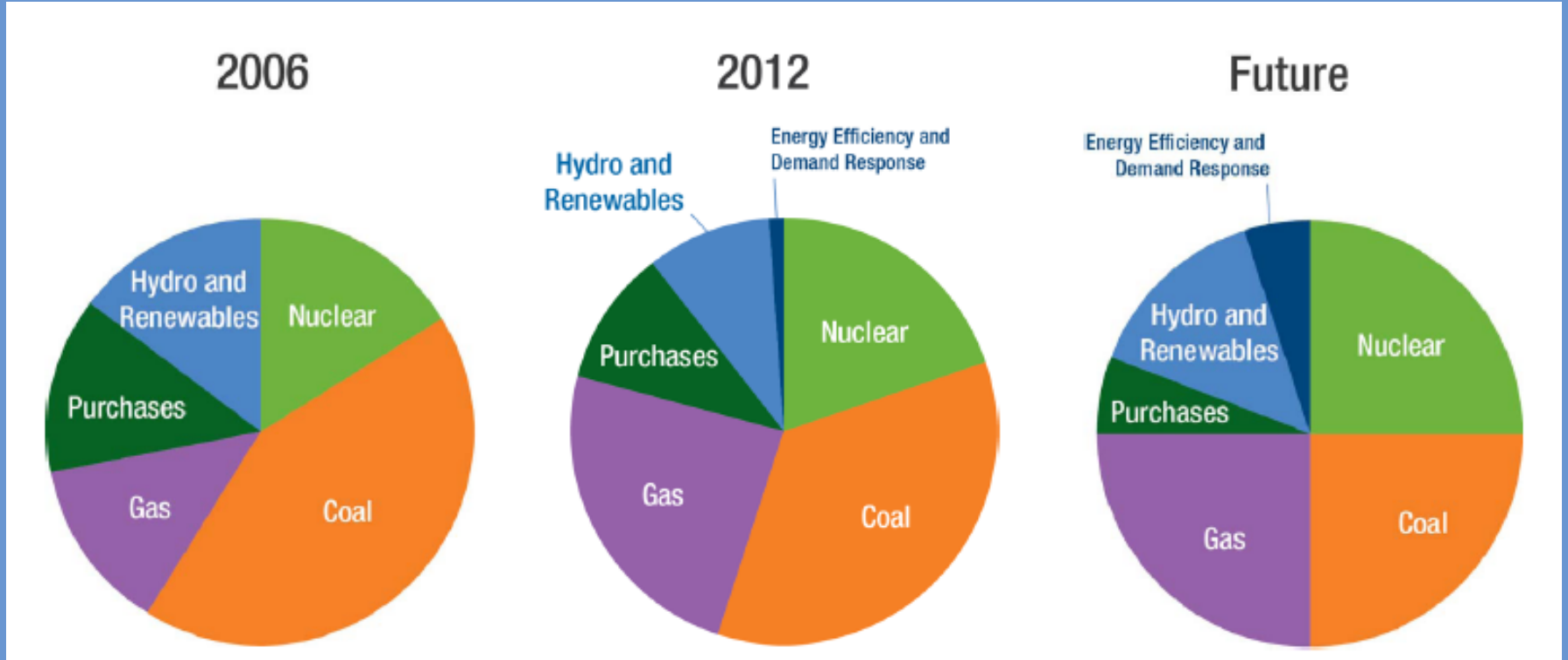
## Public Power and TVA



“Public power companies serve over 25% of the nation’s electric consumers.”  
Source: EIA

The Tennessee Valley Authority is the nation’s largest public power provider and one of the country’s largest electric utilities

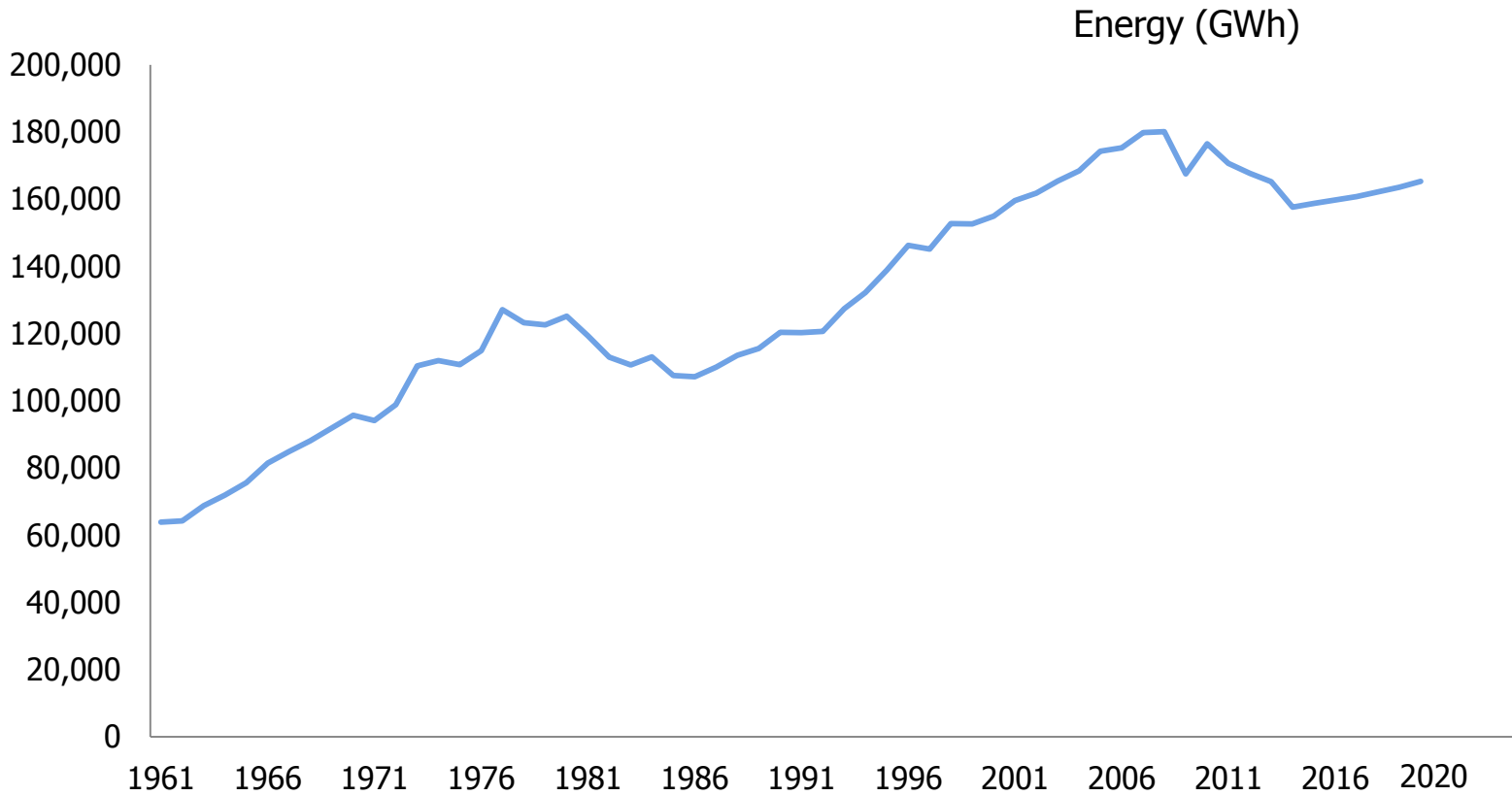
# TVA Building A Balanced Portfolio



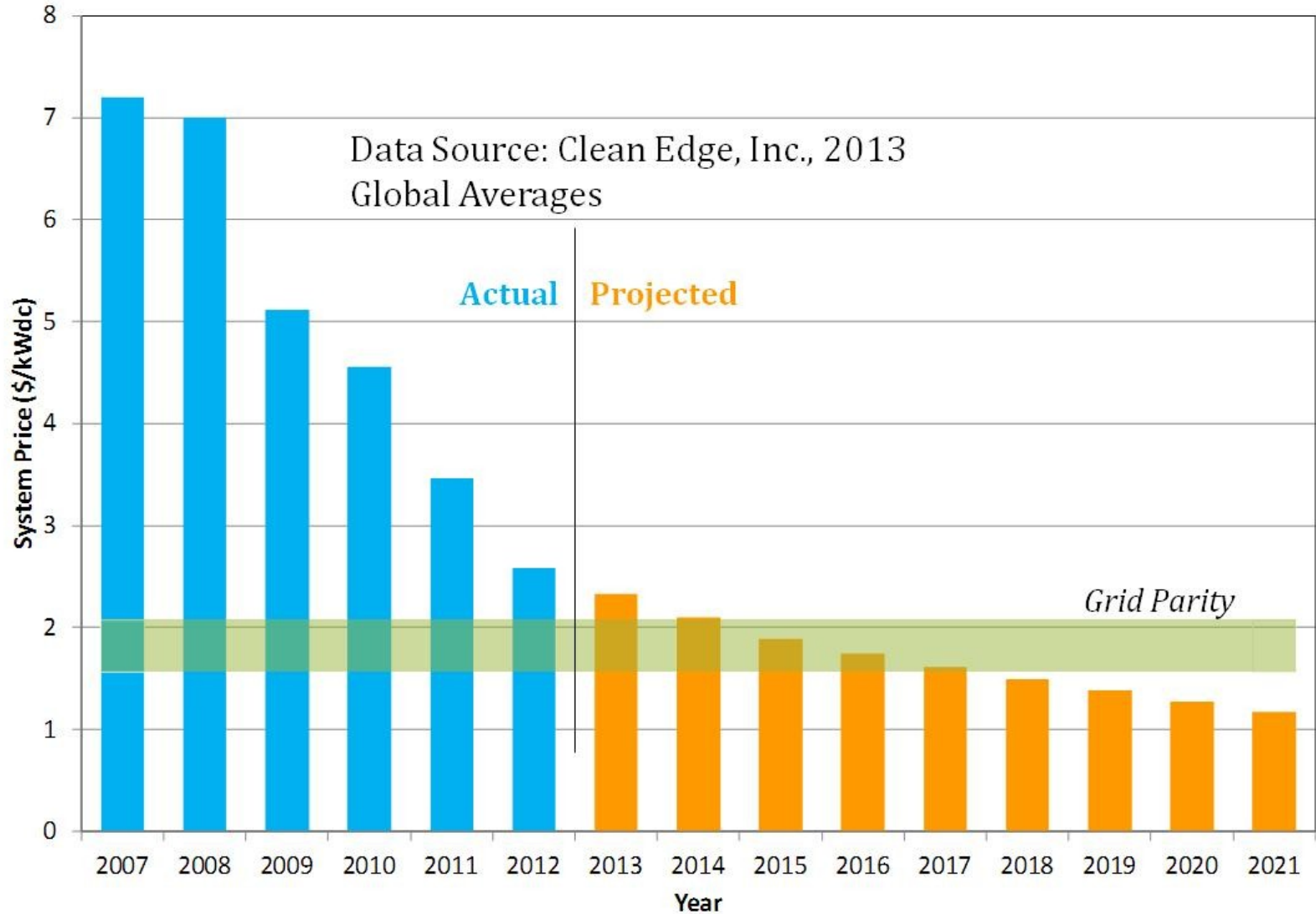
Provides greater flexibility to use sources currently most economical



# Past and Future Load Growth



# TVA Technological Advances in Solar





# IRP provides the framework for the future

Integrated Resource Plan  
TVA's Environmental & Energy Future

March 2011



**Currently  
updating IRP  
process now!  
Learn more at  
[www.tva.com](http://www.tva.com)**



## IRP Recommendations



**Nuclear generation**



**Coal capacity idled**



**Natural gas as an intermediate  
supply source**



**Energy efficiency and demand  
response**



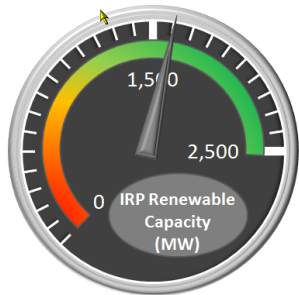
**Add 1500-2500 MW cost-effective  
renewable capacity**



**Pumped storage hydro capacity**



# Well positioned in the IRP range



Resource		Nameplate Capacity (MW)
Operating	Hydroelectric	4,659
	Wind*	1,542
	Solar	78
	Biomass	37
	<b>Total Operating</b>	<b>6,316</b>
Resource		Nameplate Capacity (MW)
Committed **	Hydroelectric	5
	Wind	18
	Solar	49
	Biomass	31
	<b>Total Committed</b>	<b>103</b>
<b>Total</b>		<b>6,419</b>
<b>IRP Renewable Operating Capacity ***</b>		<b>1,614</b>

\* The owner of a 300 MW facility is retaining the renewable attributes, but TVA has the option to purchase in the future.  
 \*\* Includes contracted and approved projects, including hydromodernization projects included in the current FY budget.  
 \*\*\* All midwest wind projects. Other renewable projects that began operations beginning in FY 11 and later.





# Renewable program offerings vary by size

## SUPPLY

### Green Power Providers

Up to 50 kW



### Renewable Standard Offer

#### Solar Solutions Initiative

>50 kW – 1 MW



>50 kW - 20 MW



### Negotiated Proposals/DPP

> 20 MW



## DEMAND



### Green Power Switch

### Products

- ❖ Original
- ❖ Pure Solar (pilot)
- ❖ Southeastern (pilot)



# Companion voluntary programs balance low cost and cleaner energy



- Launched in 2000
- 1st Green Power Program in Southeast
- \$ 4.00/150 KWh block
- Local Supply: solar, wind, methane gas
- ~ 12,000 participants
- Program currently under re-design to increase participation

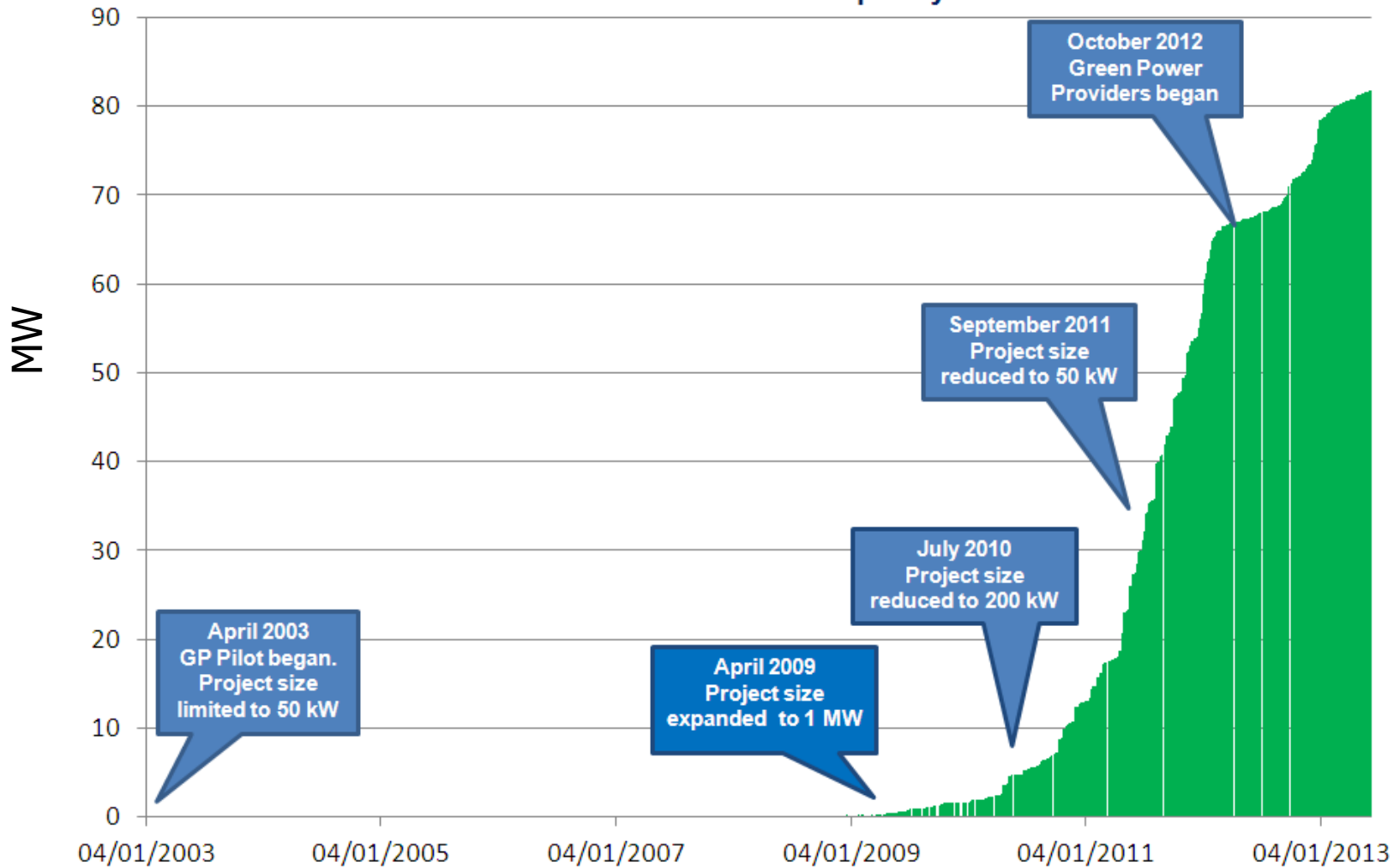
- Launched in October 2012 to replace the Generation Partners pilot program
- Targeted to homeowners & businesses
- Currently premium on top of retail price: 9¢/kWh (solar), 3¢/kWh (other)
- Participants sell 100% of renewable energy back to TVA; MW capacity limited each year
- 20 yr contracts, load requirement, fast track process for smaller systems

2014 Program Details to be updated online in mid-December



# Distributed solar projects have increased

Generation Partners & Green Power Providers  
Historical Growth in Capacity





# Generation Partners/Green Power Providers, as of 10/1/13

Participating Distributors: 132			
Nameplate Capacity By Technology			
Technology	Operating MW	Approved MW	Total MW
Solar Photovoltaic (PV)	71.36	4.33	75.69
Biomass	1.4	0.05	1.45
Landfill Gas & Wastewater Methane	9.77	0	9.77
Wind	0.12	0	0.12
Micro Hydro	0.003	0	0.003
<b>Total</b>	<b>82.65</b>	<b>4.38</b>	<b>87.03</b>
# Installations By Technology			
Technology	Operating	Approved	Total
Solar Photovoltaic (PV)	1784	202	1986
Biomass	3	1	4
Landfill Gas & Wastewater Methane	11	0	11
Wind	28	0	28
Micro Hydro	1	0	1
<b>Total</b>	<b>1827</b>	<b>203</b>	<b>2030</b>



# Market-based programs

## Renewable Standard Offer



- Launched in 2010 for mid-size projects in the TVA service area
- Contracts up to 20 years
- Market prices paid based on peak electricity demand times
- 48 MW still available in CY 2013

## Solar Solutions Initiative



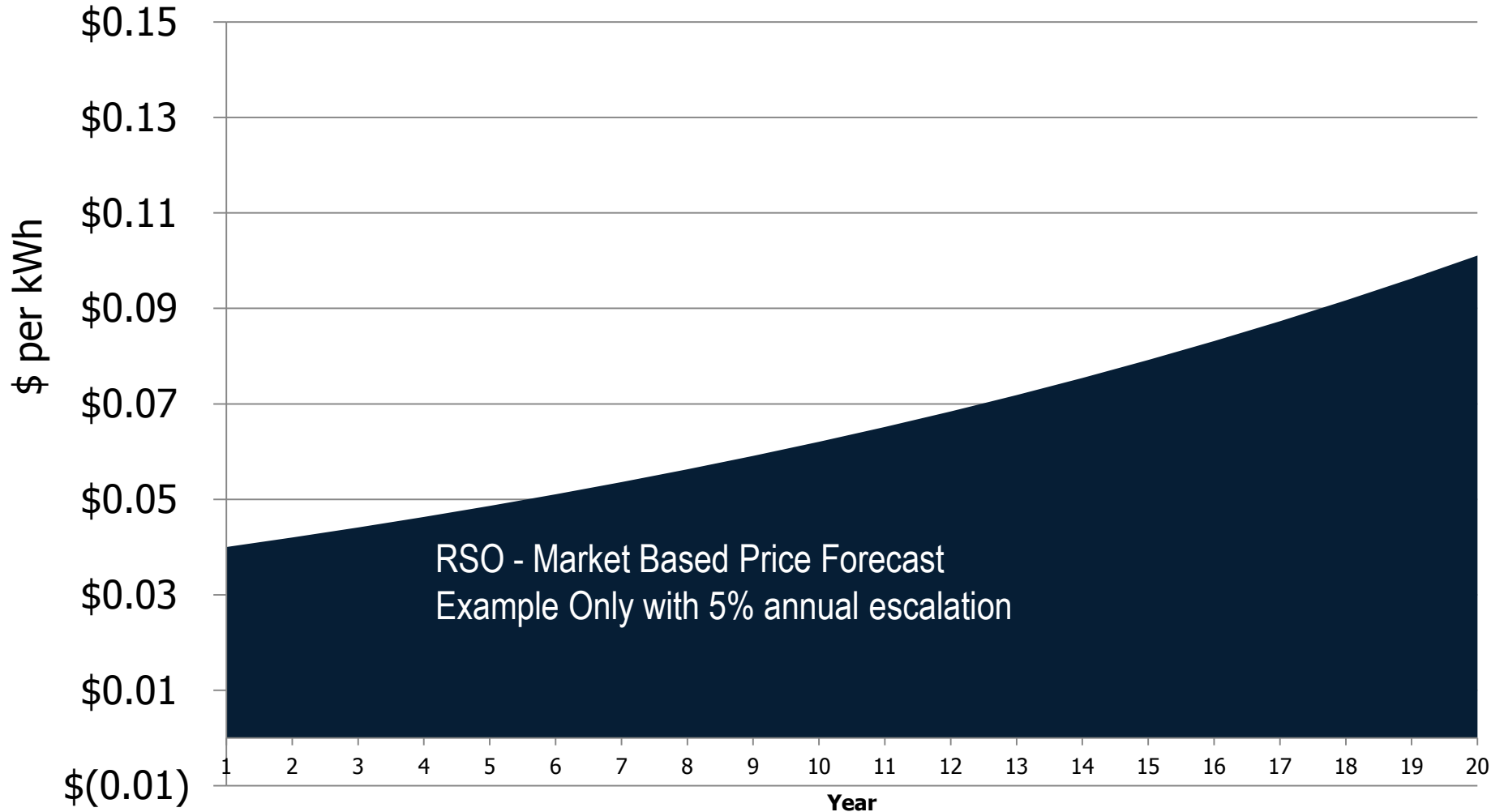
- Two year pilot launched in 2012 for projects using regional certified installers
- An overlay to the Renewable Standard Offer
- Additional \$0.08/kWh incentive
- 18.7 MW contracted – not taking applications at this time

2014 Program Details to be updated online in mid-December



# Example – RSO only project > 50 kW up to 20 MW

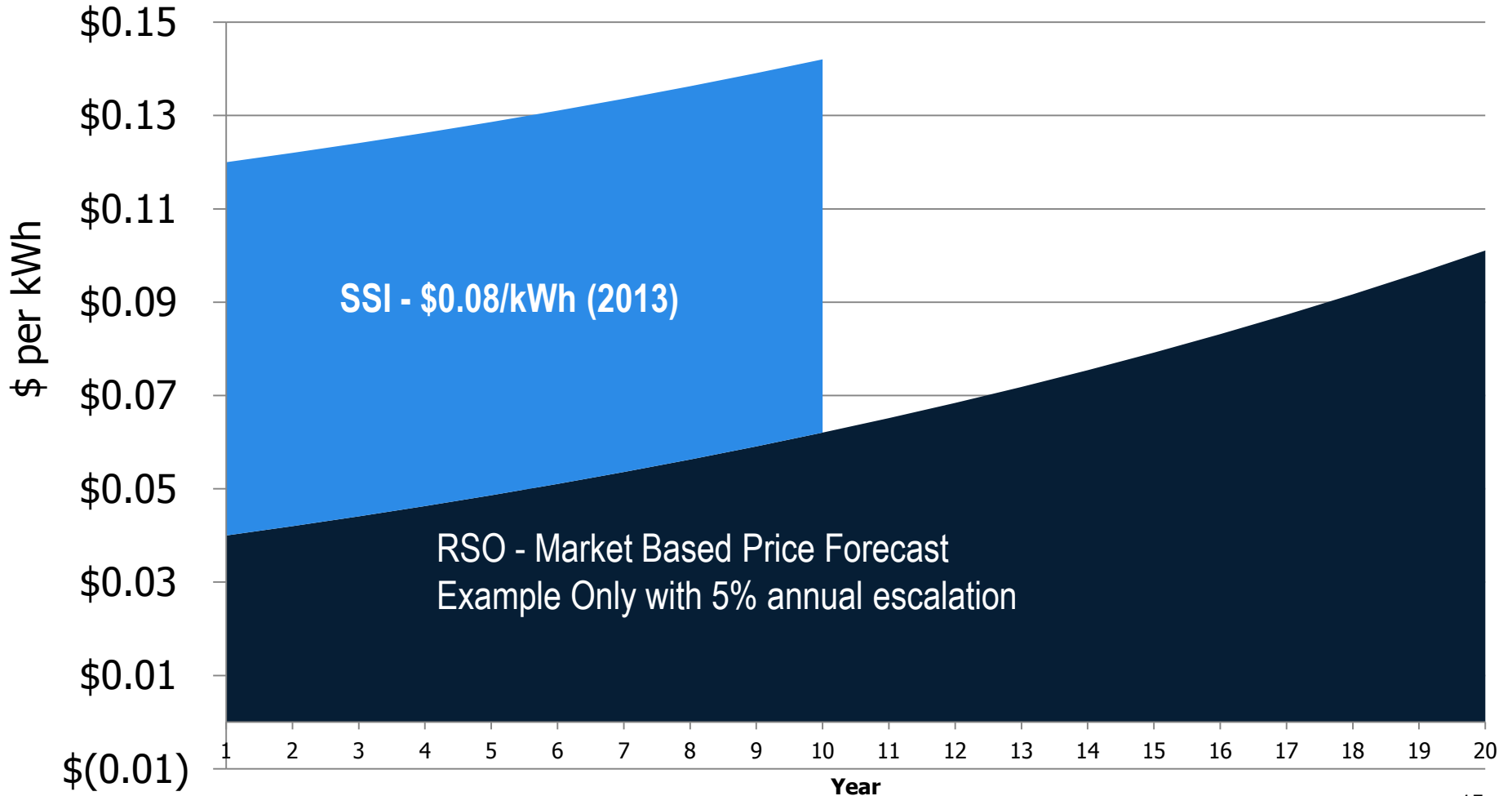
## RSO Market Price Contract - Solar





# Example – RSO and SSI, > 50 kW up to 1MW solar

## RSO and SSI - 1,000 kW Solar





# Renewable Standard Offer, as of 10/1/13

Nameplate Capacity By Technology			
Technology	Operating MW	Applications & Contracted MW	Total MW
Solar Photovoltaic (PV)	1.36	60.20	61.56
Biomass	---	20.00	20.00
Landfill Gas & Wastewater Methane	6.40	12.78	19.18
Wind	---	18.40	18.40
<b>Total</b>	<b>7.76</b>	<b>111.38</b>	<b>119.14</b>

# Installations By Technology			
Technology	Operating	Applications & Contracted	Total
Solar Photovoltaic (PV)	3	4	7
Biomass	---	1	1
Landfill Gas & Wastewater Methane	2	4	6
Wind	---	1	1
<b>Total</b>	<b>5</b>	<b>10</b>	<b>15</b>





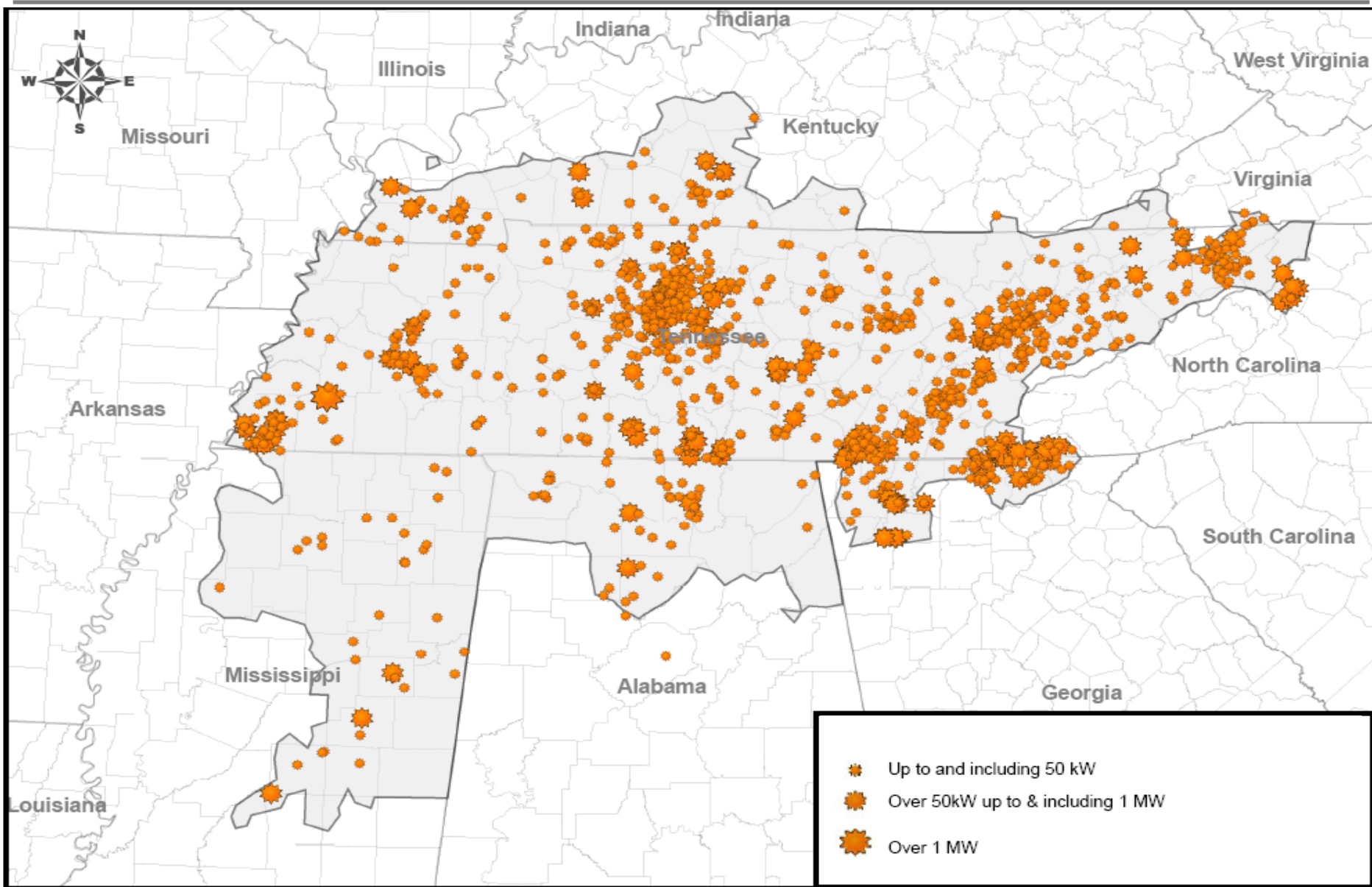
# Solar Solutions Initiative – pilot, as of 10/1/13

2012 & 2013 Pilot Offering*			
Solar Photovoltaic (PV) Only	Operating	Applications & Contracted	Total
Nameplate Capacity (MW DC)	1.15	17.54	18.69
Installations (#)	2	24	26

\*TVA is not currently accepting additional applications.



# Total Operating Solar Projects in Valley



**It is difficult to make  
predictions, especially about  
the future.**

*Yogi Berra*

