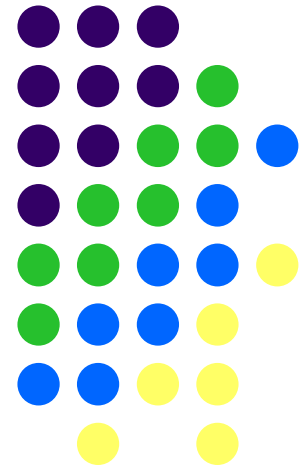


# Help Inform the Policy Debate: Six Common Energy Myths to Avoid

Lori Smith Schell, Ph.D., ERP



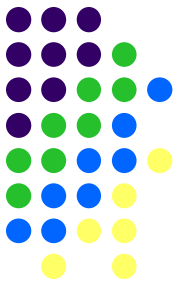
20 July 2018



**CIT SESSION III**  
CALIFORNIA'S GLOBAL BUSINESS & ECONOMY:  
OPPORTUNITIES & CHALLENGES  
Los Angeles, July 18-20, 2018

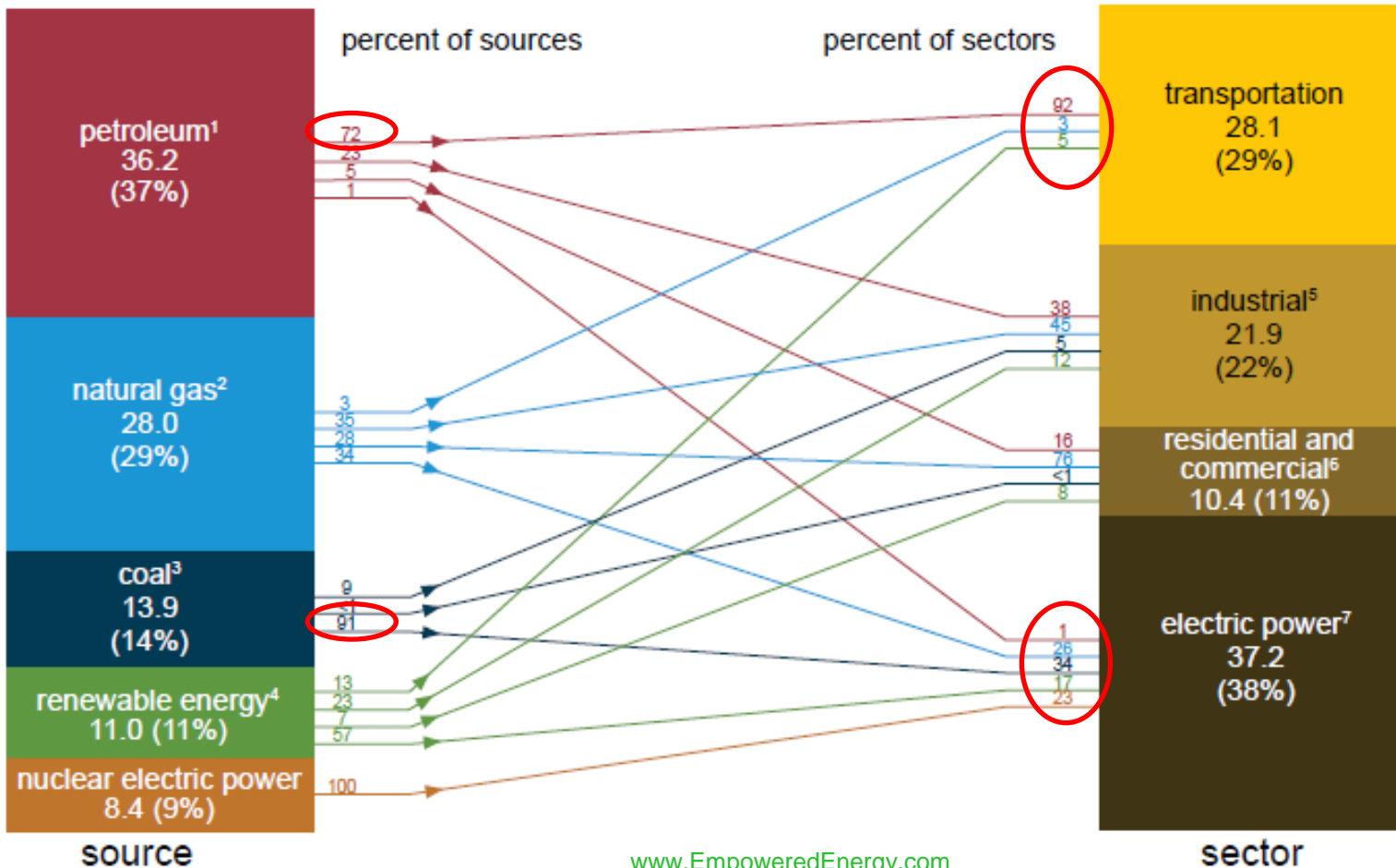
**LEADERSHIP**  
*California*

# U.S. Energy Complex: Slow-Moving Ship with Much Inertia

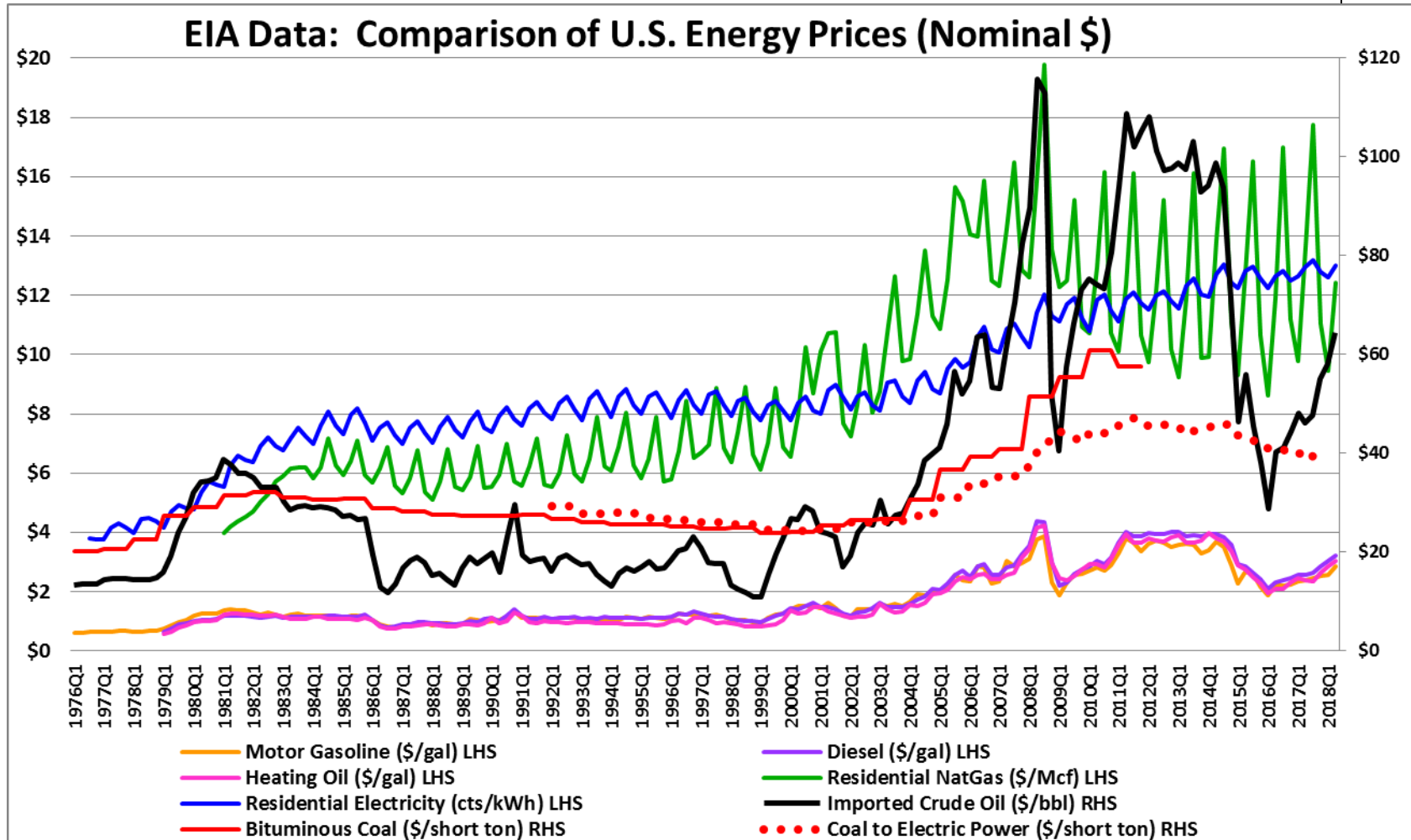
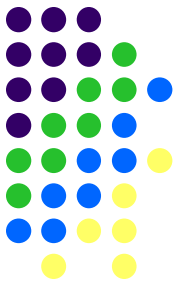


U.S. primary energy consumption by source and sector, 2017

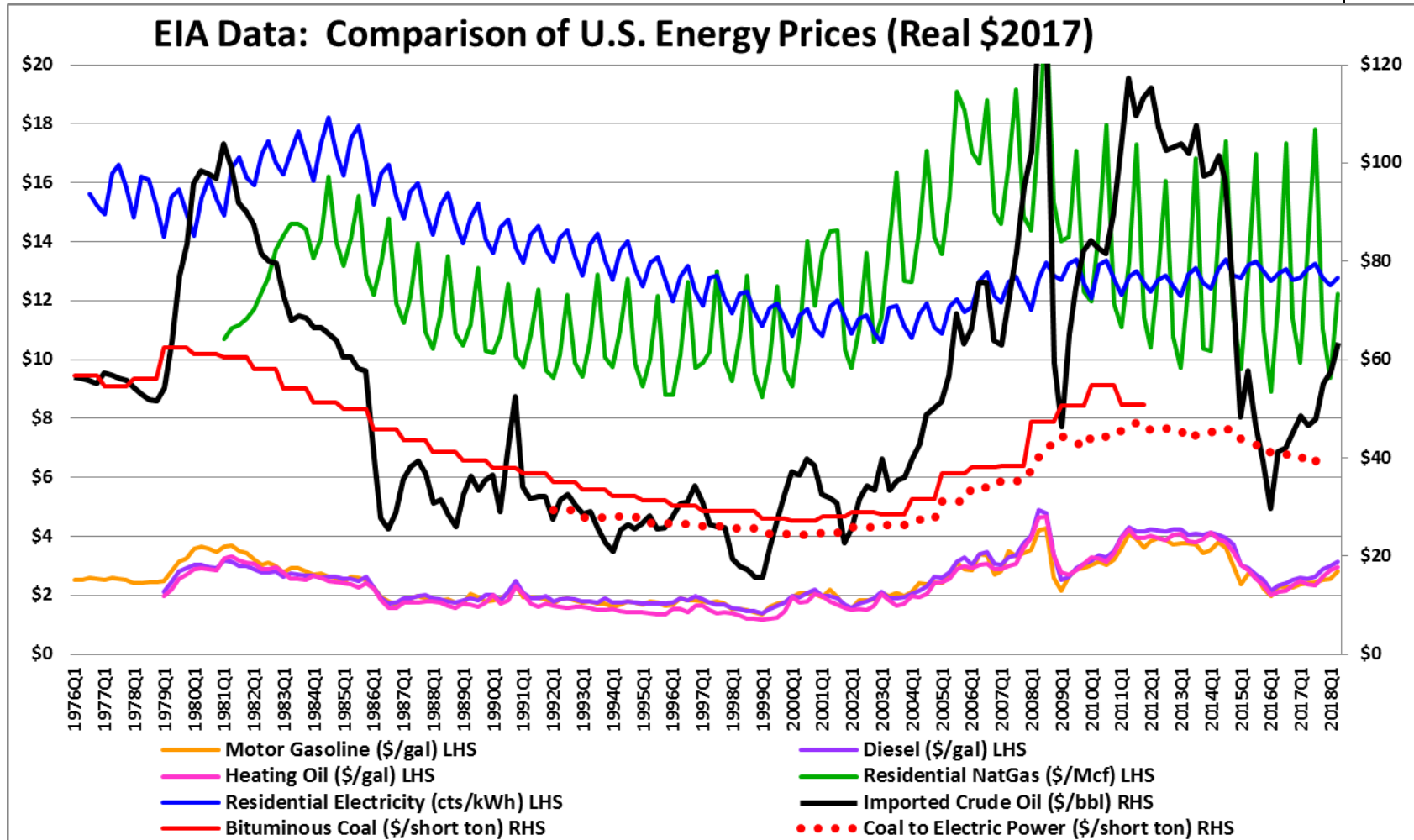
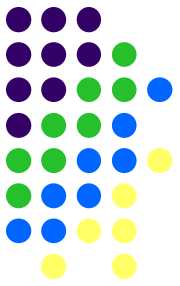
Total=97.7 quadrillion British thermal units (Btu)



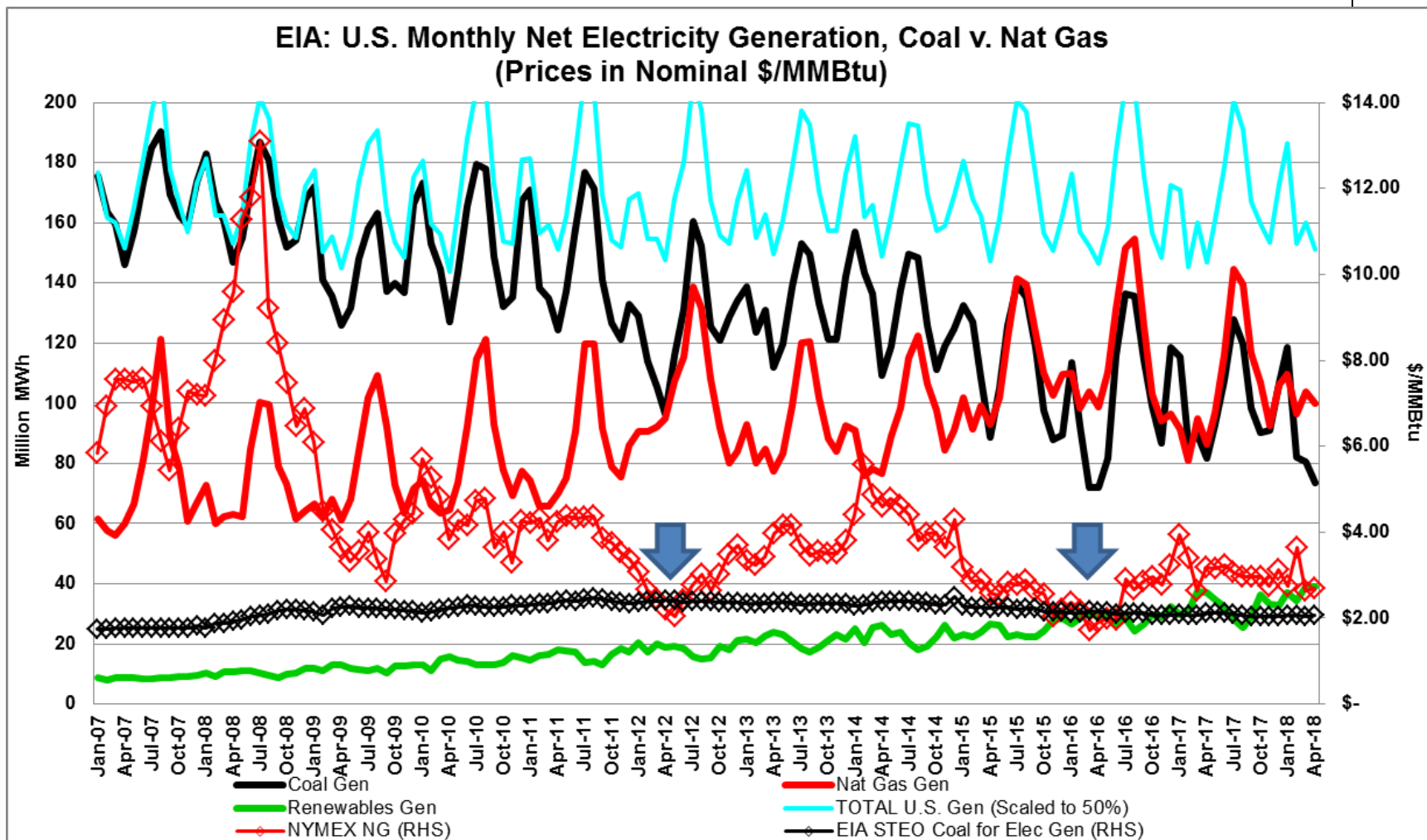
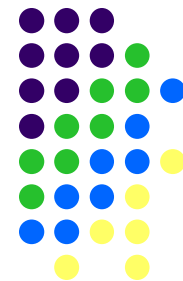
# Myth #1: Fossil-Based Energy Prices Always Increase



# Fact: Price Volatility Dominates Prices Go Up...and Down



# Myth #2: Coal Is Dead...and Natural Gas is Not Far Behind



# Fact: Shale “Revolution” Will Make U.S. Net Energy Exporter

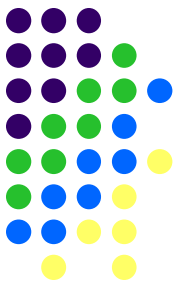


Figure 9. Net natural gas exports in three cases, 2010-2050

net natural gas exports  
trillion cubic feet

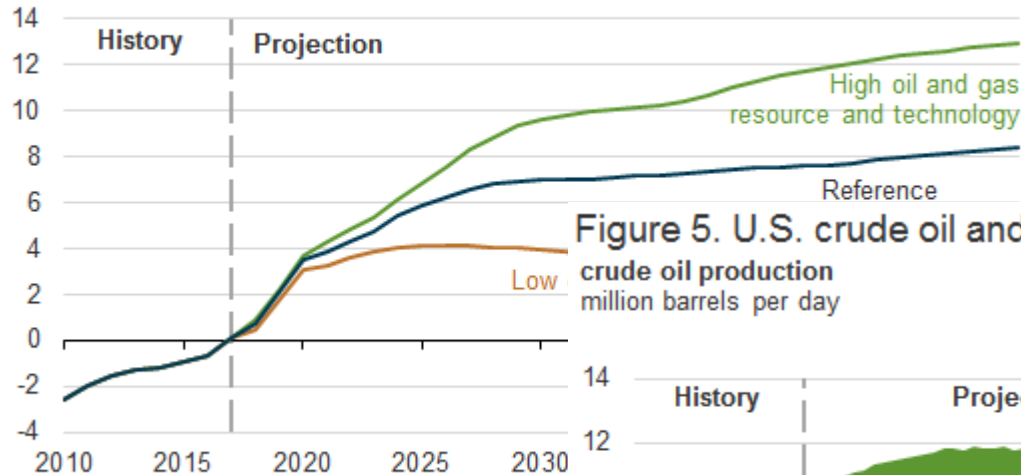
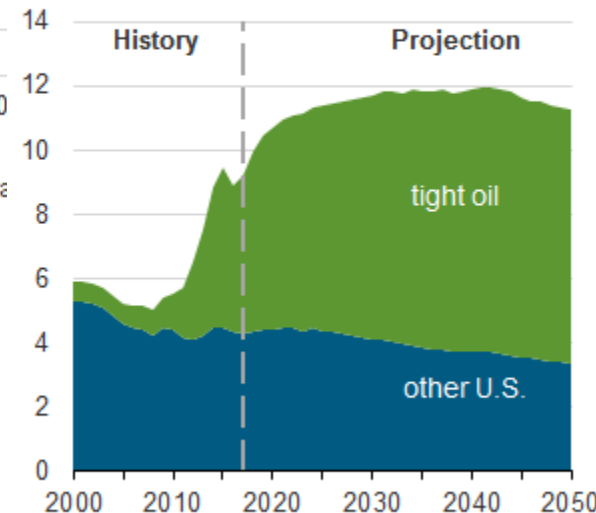
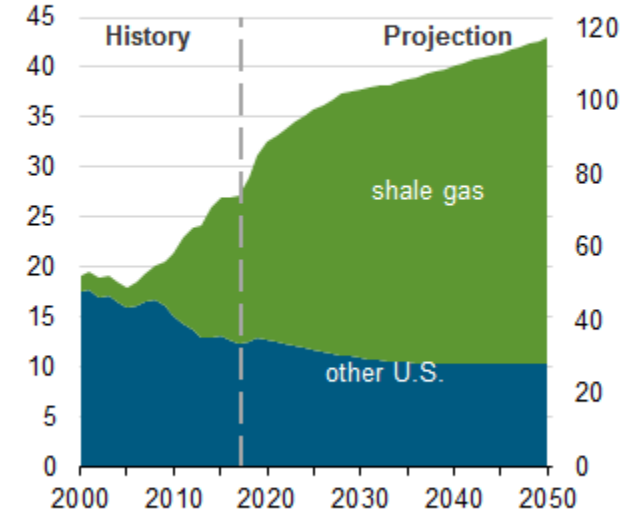


Figure 5. U.S. crude oil and dry natural gas production, Reference case

crude oil production  
million barrels per day



dry natural gas production  
trillion cubic feet      billion cubic feet per day



Source: U.S. Energy Information Administration

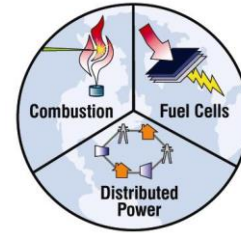
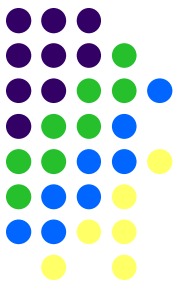


Note: Shale gas production includes associated natural gas from tight oil plays.

Source: U.S. Energy Information Administration, *Annual Energy Outlook 2018* Reference case



# Myth #3: More Renewables Right Now Will Solve Everything

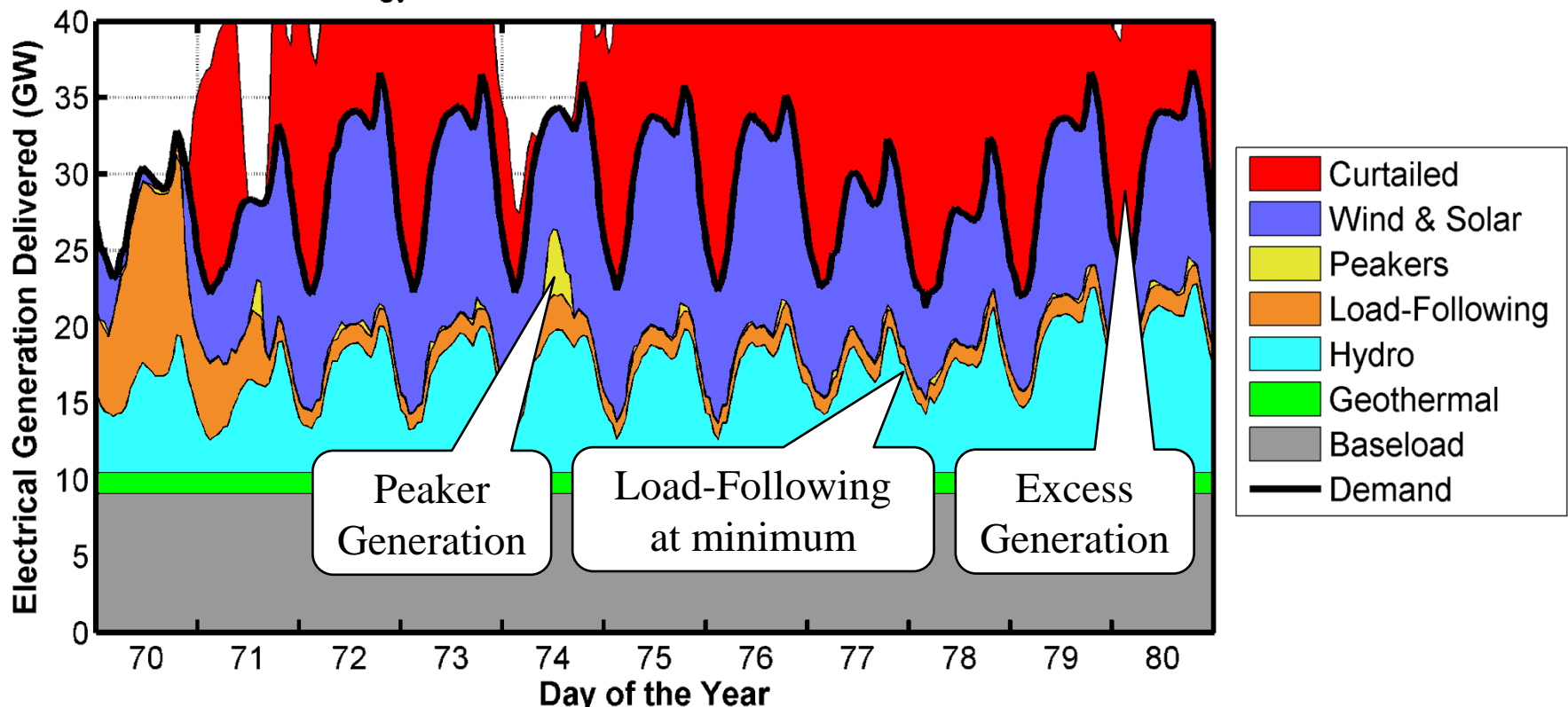


Advanced Power  
and Energy Program

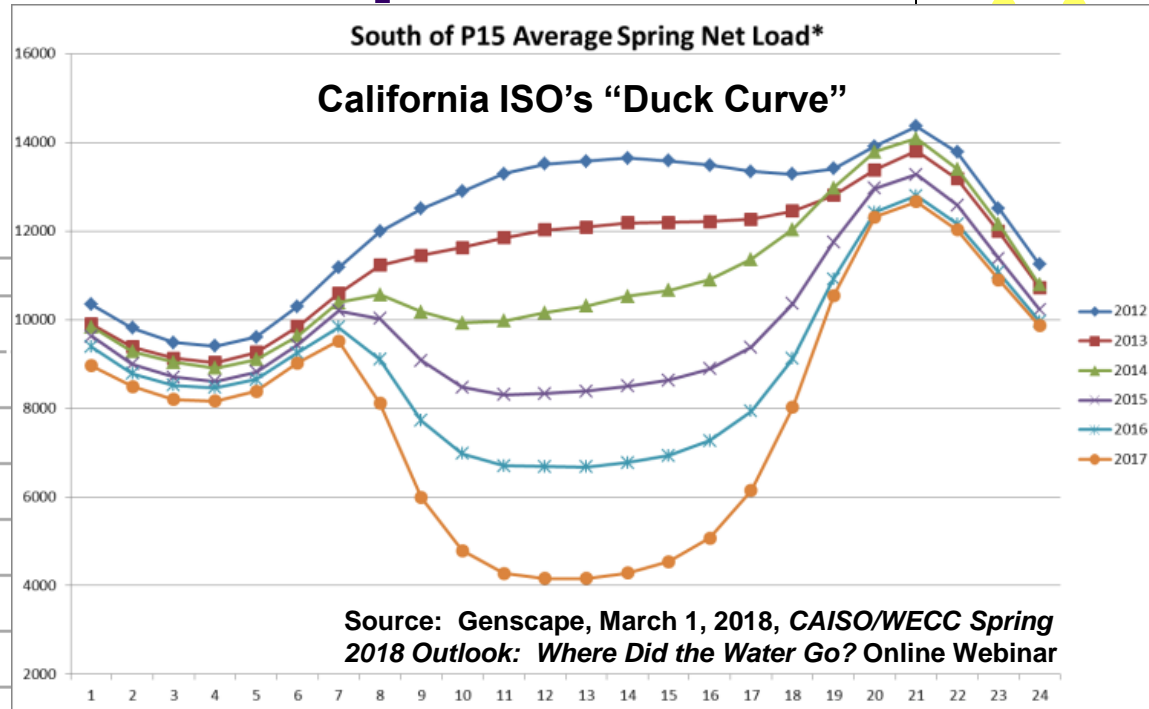
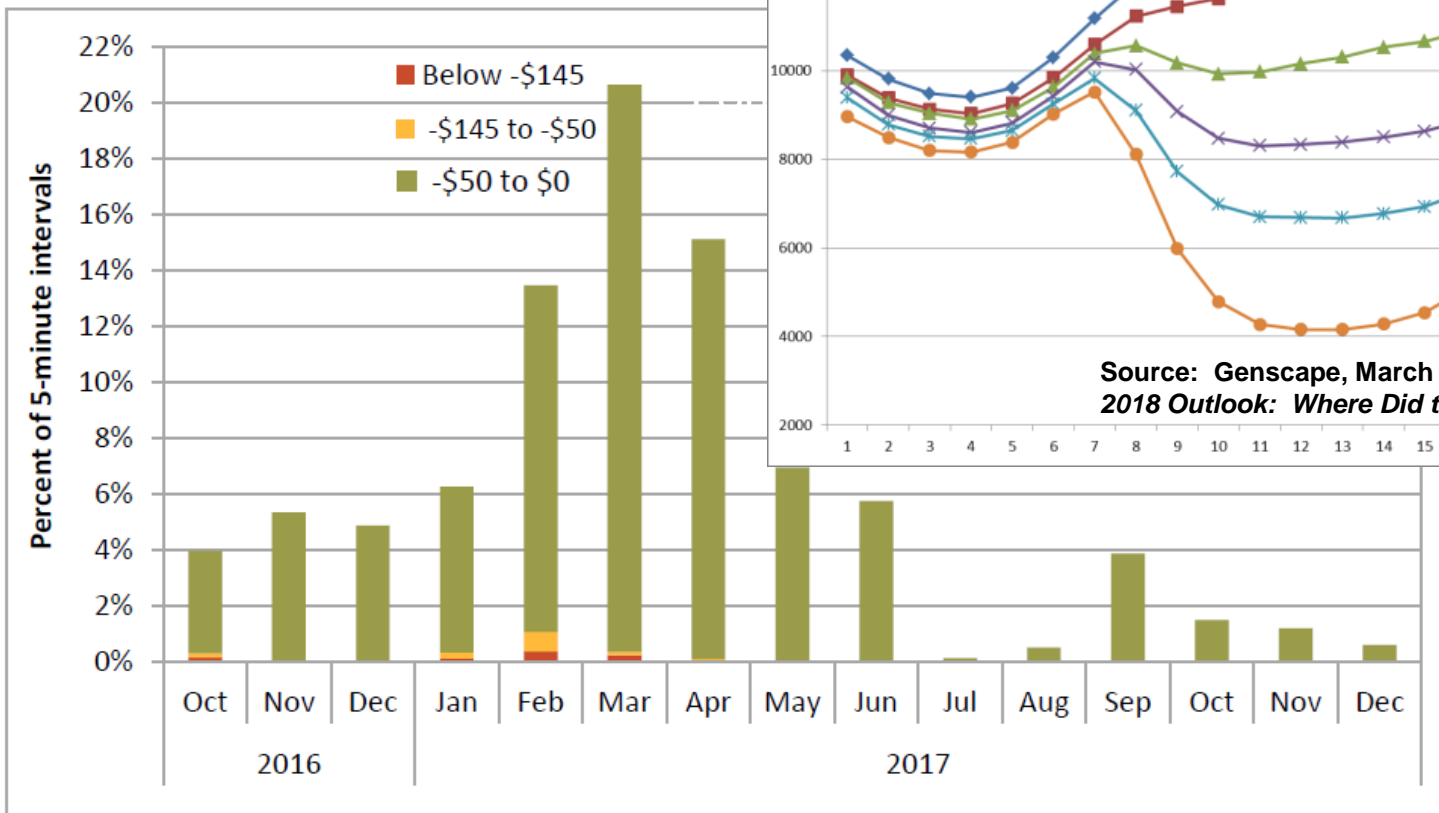
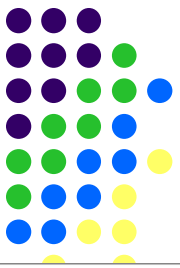
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OF CALIFORNIA

- Task: Perform spanning analysis for different resources in California
- Impact of increasing renewables??

Energy Portfolio for 33% Renewable Penetration

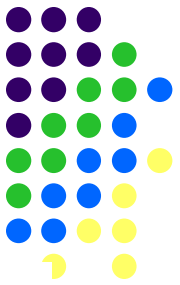


# Fact: More Renewables Have Unintended Consequences



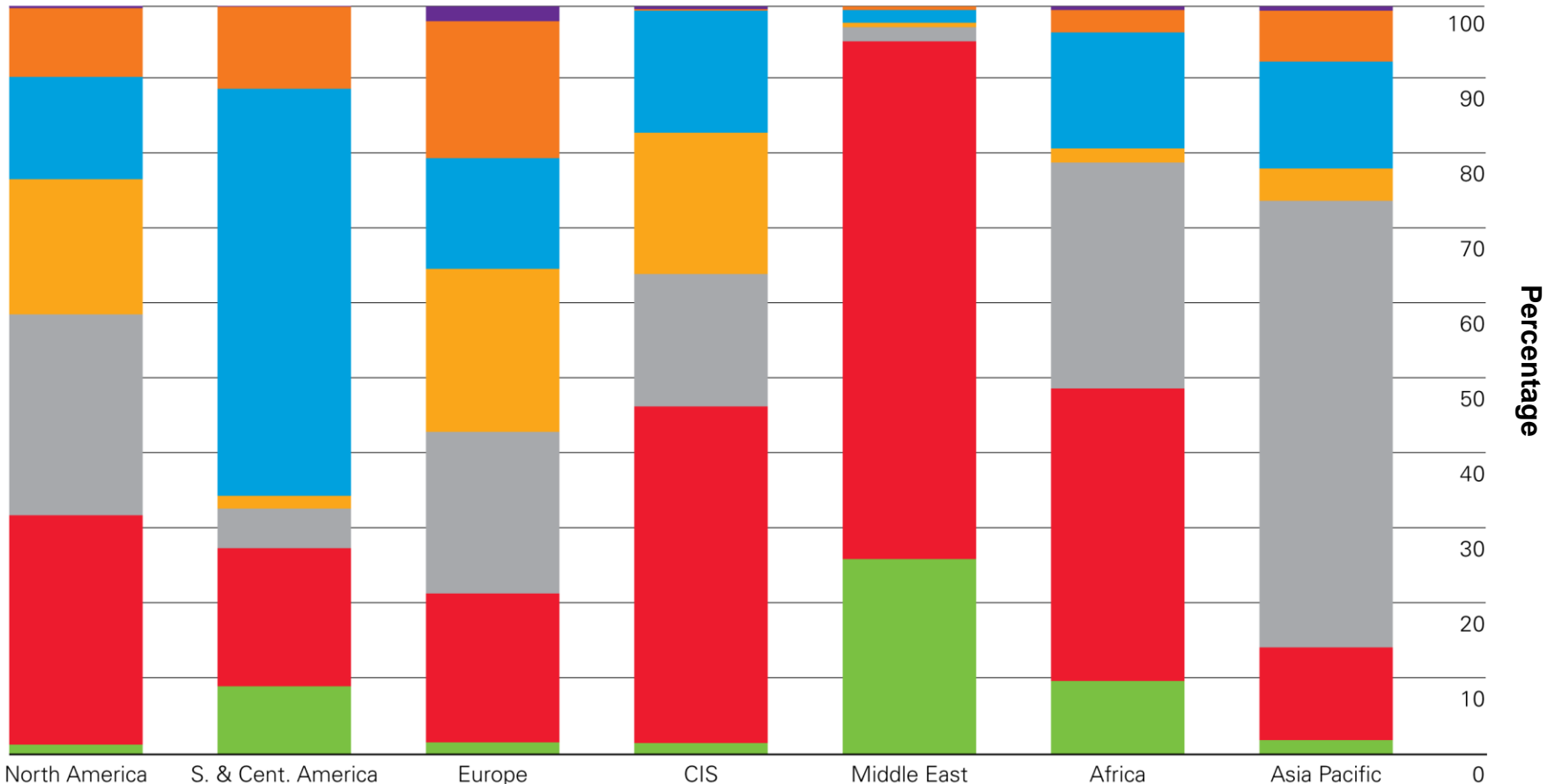


# Myth #4: Electrify Everything and Solve the World's Woes



■ Oil  
■ Natural gas  
■ Coal  
■ Nuclear  
■ Hydroelectricity  
■ Renewables  
■ Other (includes sources not specified elsewhere e.g. pumped hydro, non-renewable waste and statistical differences)

**Regional Electricity Generation by Fuel, 2017**

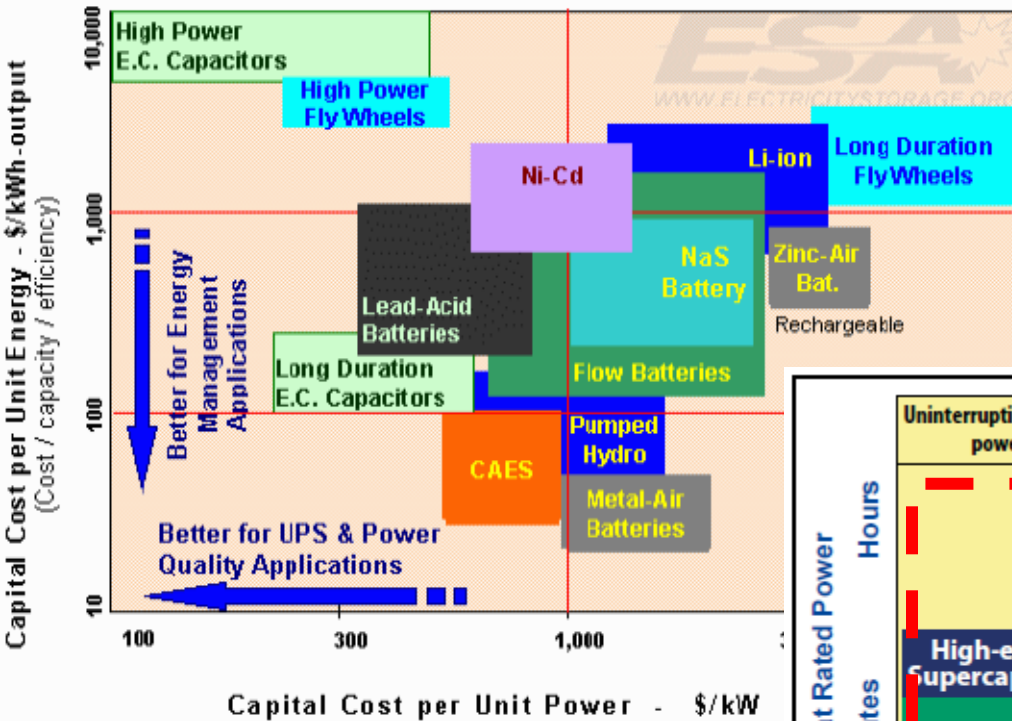
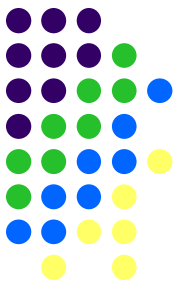


Source: BP, 2018, Statistical Review of World Energy, <https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review/bp-stats-review-2018-full-report.pdf>

20 July 2018

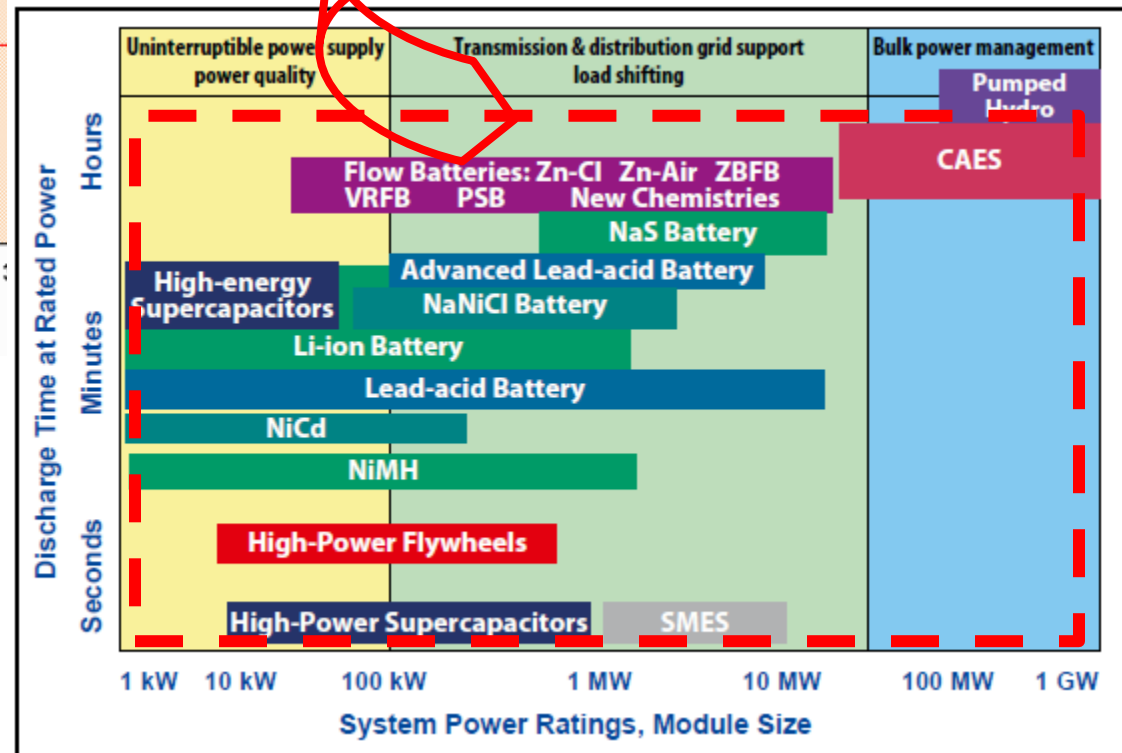
[www.EmpoweredEnergy.com](http://www.EmpoweredEnergy.com)

# Fact: Grid Resiliency Depends on Adequate Energy Storage

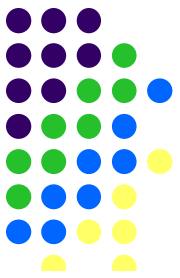


- “Energy storage” is more than batteries
- P2G is highly flexible

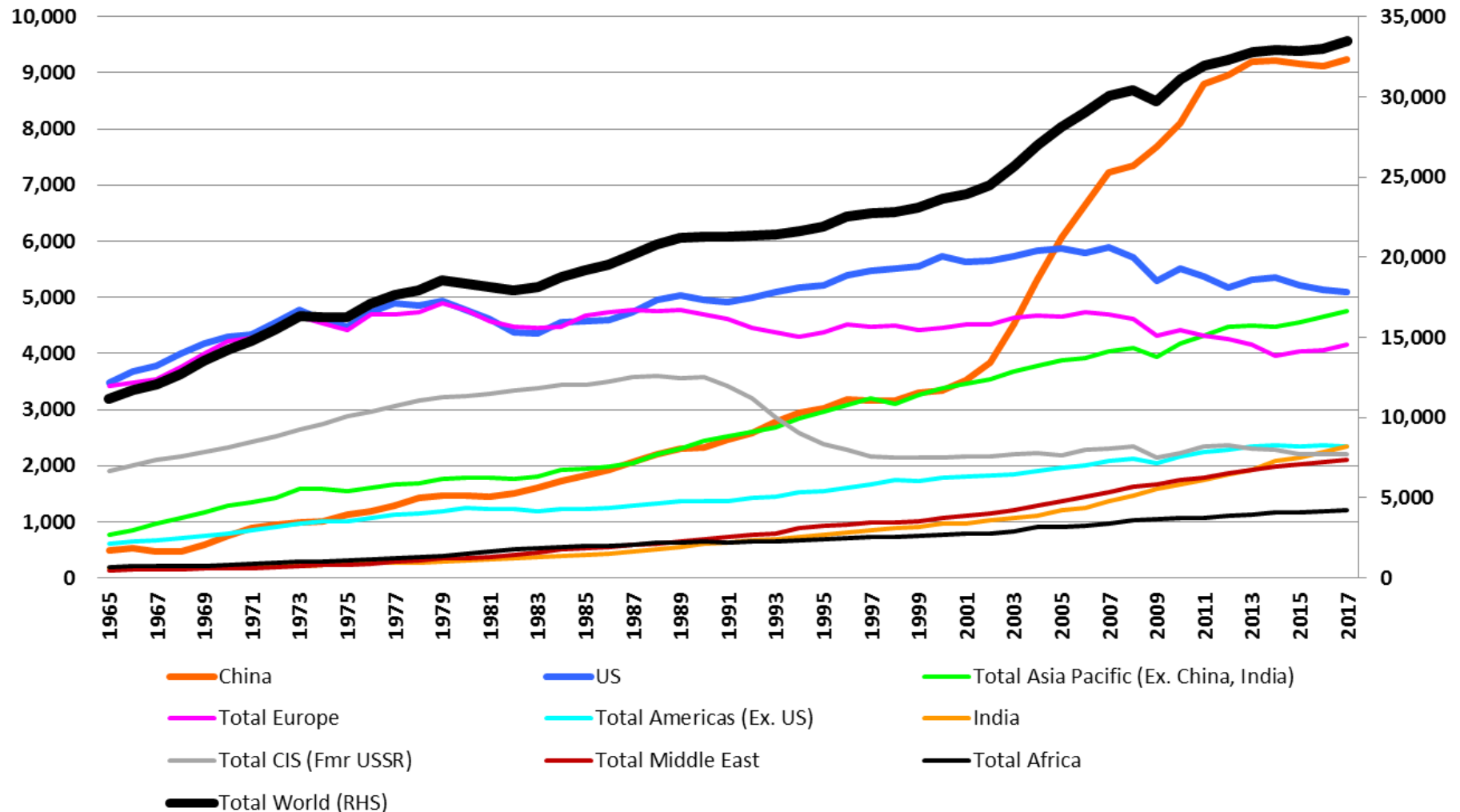
- Power vs. Energy
- Capacity vs. Flow



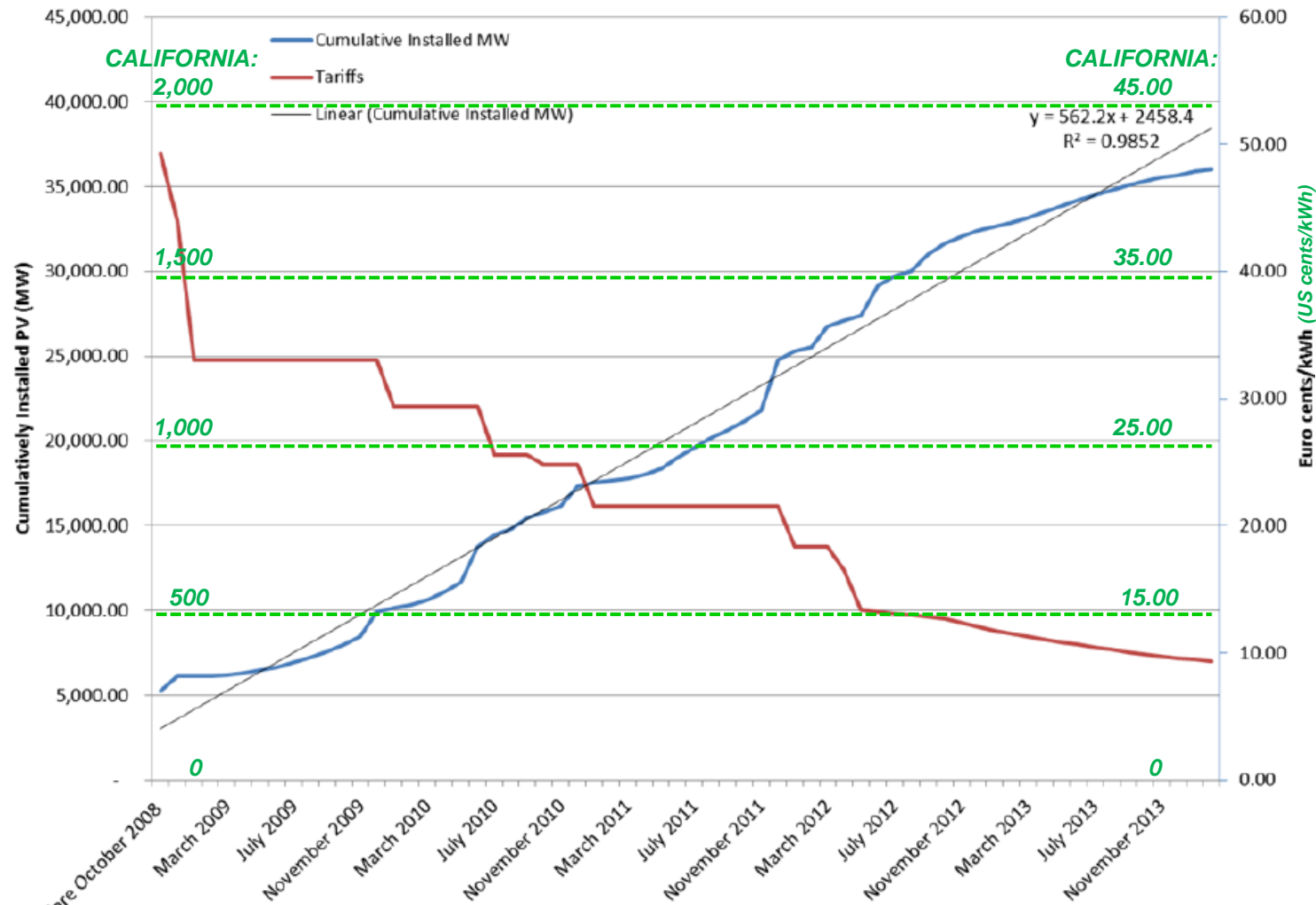
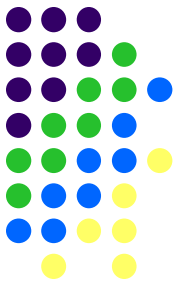
# Myth #5: California, Alone, Can Prevent Climate Change



Annual Global Carbon Dioxide Emissions (In million tonnes of CO<sub>2</sub>)



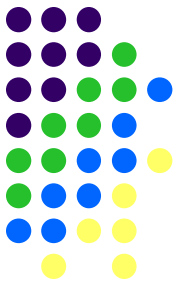
# Fact: California and Germany Lead, Each in Its Own Way



German Energiewende: Feed-in tariff ("FIT"), 52 GW solar cap vs. CA Solar Initiative ("CSI"): Performance-Based Incentive ("PBI"), 2 GW cap.

- Starting FIT > PBI
- German capacity steps much larger
- German 2018 FIT surcharge of €0.06792/kWh is almost 24% of total residential electric rates; CSI cost of \$0.0032/kWh (est.)
- FIT costs socialized across Germany vs. PBI recovery limited to customers of specific investor-owned utilities.

# Myth #6: Oil Will Be the King of Transportation...For(n)ever



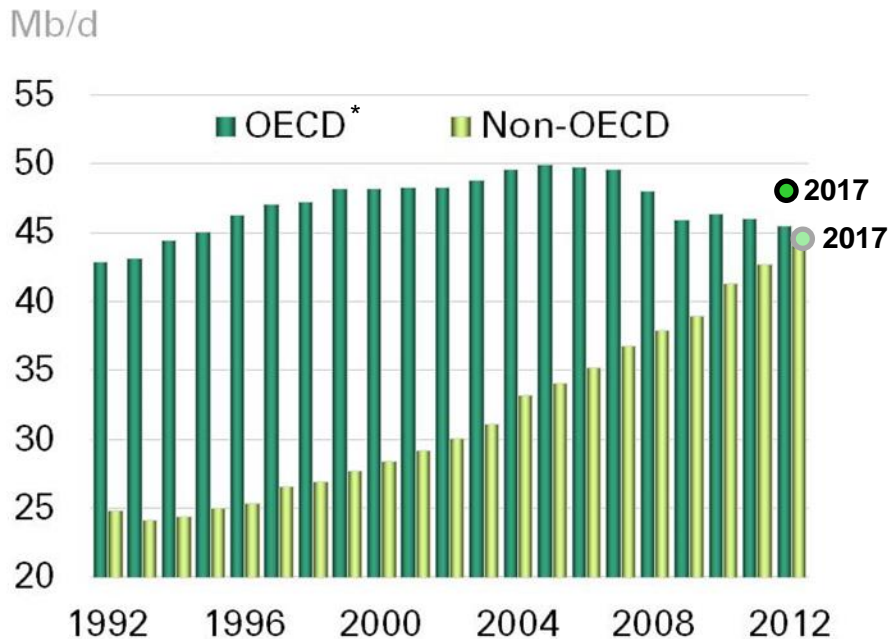
The competition *is* coming.....

## Oil consumption and mobility

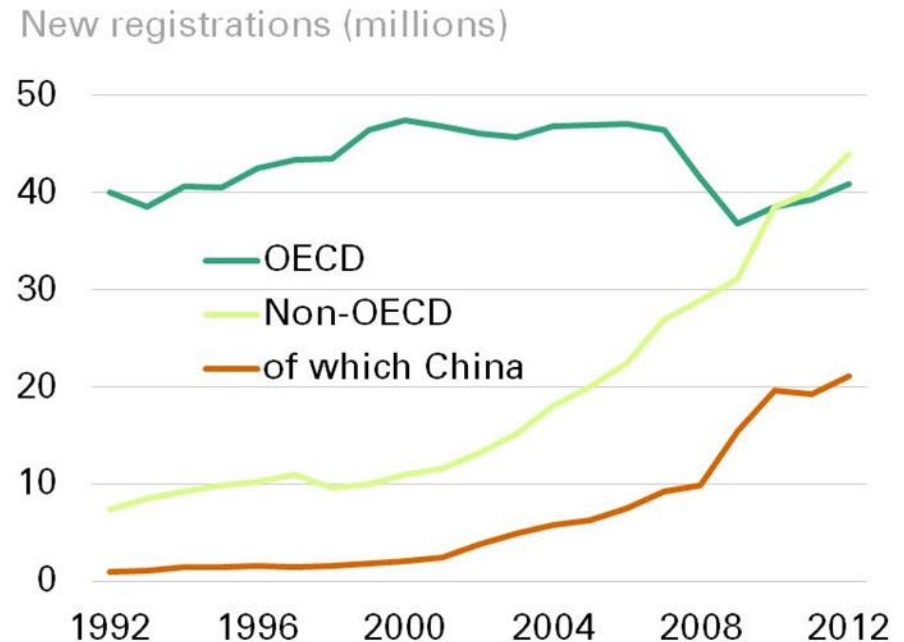
- Plug-In Electric Vehicles
- Hybrid Vehicles
- CNG/LNG Vehicles
- H<sub>2</sub> Fuel Cell Vehicles



Oil consumption trends



Vehicle sales



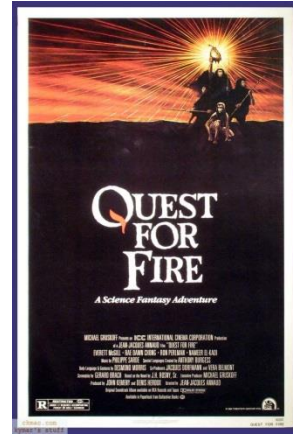
Source: includes data from R. L. Polk & Co.

BP Statistical Review of World Energy

\* OECD = Organisation for Economic Co-operation and Development

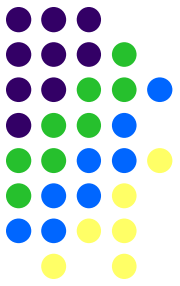
© BP 2013

# Beware of Energy Myths AND Be Aware of Energy's Impact



- Energy touches almost all of life's activities
- Energy markets are complex, interconnected, and in a constant state of dynamic transformation
- Regulatory changes need to reflect new realities
  - “Utility of the Future” must remain financially viable
  - Strength of policy commitment determines rate of change
  - Alignment of incentives is crucial
  - Even good intentions can have unintended consequences
- There is strength in diversity; no silver bullet exists
- The future is in our hands.





# Thank you!

## Questions?

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**LSchell@EmpoweredEnergy.com**

