



# Renewables Integration on the Grid



# Utility Challenges

## Can you relate?

- Investment tax credit
- Renewables standards
- Environmental Legislation (CPP)
- Reduced demand from central generation



*Source: Greentech Media*



**10GW in annual solar capacity to be added by 2016; 20GW by 2020.**



# Utility Challenges

## Technical Challenges in maintaining reliability and load quality

- Intermittent generation
- Feeder capacity limits
- Voltage regulation
- Two-way load flow



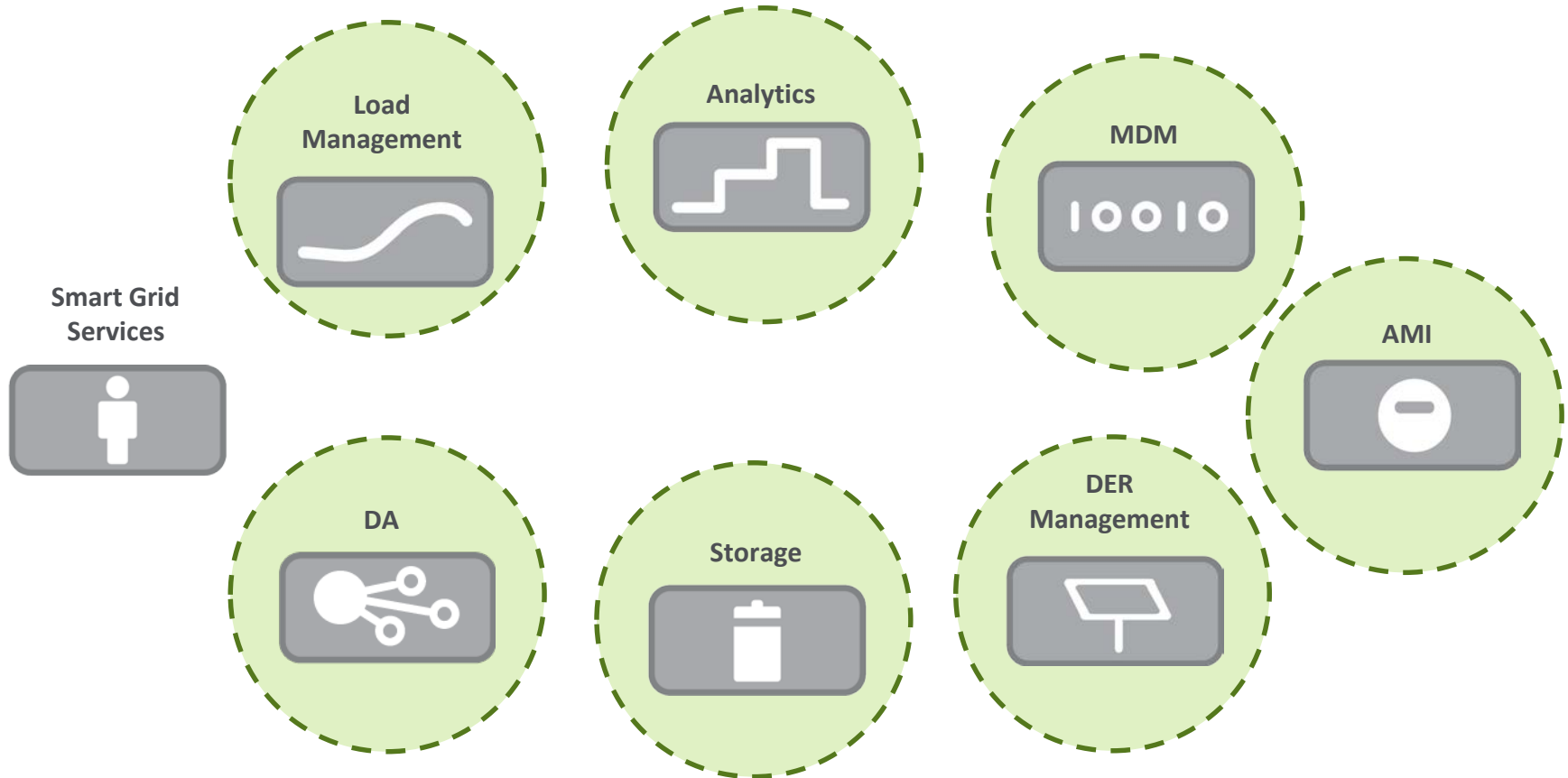
Source: Greentech Media



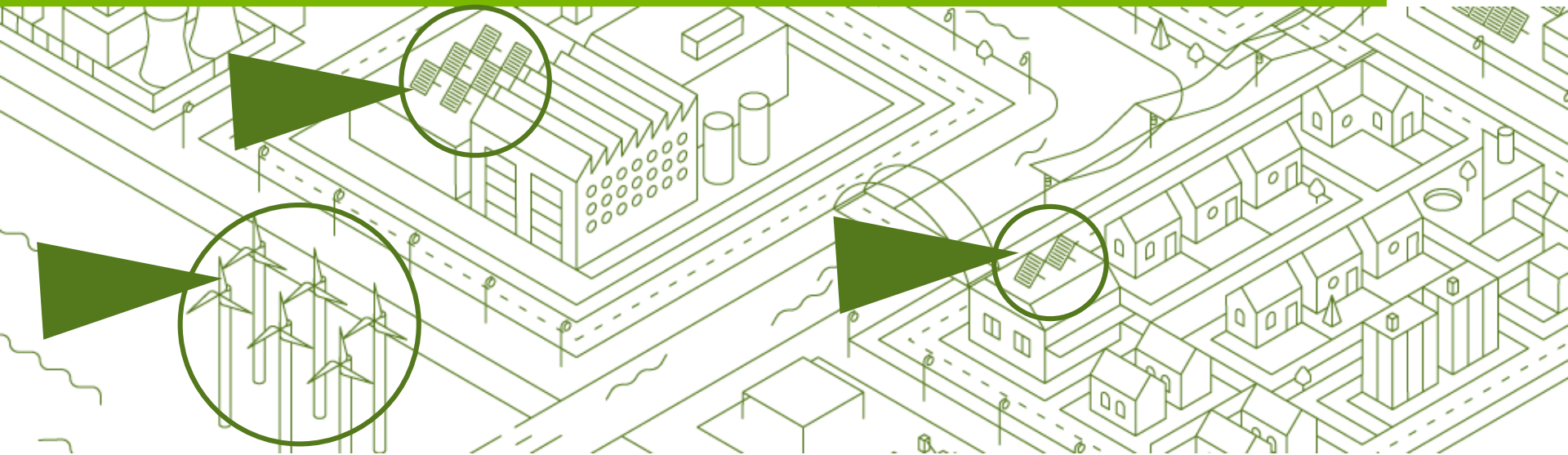
**10GW in annual solar capacity to be added by 2016; 20GW by 2020.**



# Solutions and Systems for Renewables



# Renewable Integration Solutions for Real Results



Visualize, Identify and avoid system challenges.

Dispatch storage to manage voltage.

Optimize asset placement.

Address intermittency.

Safely manage 2-way power flow.



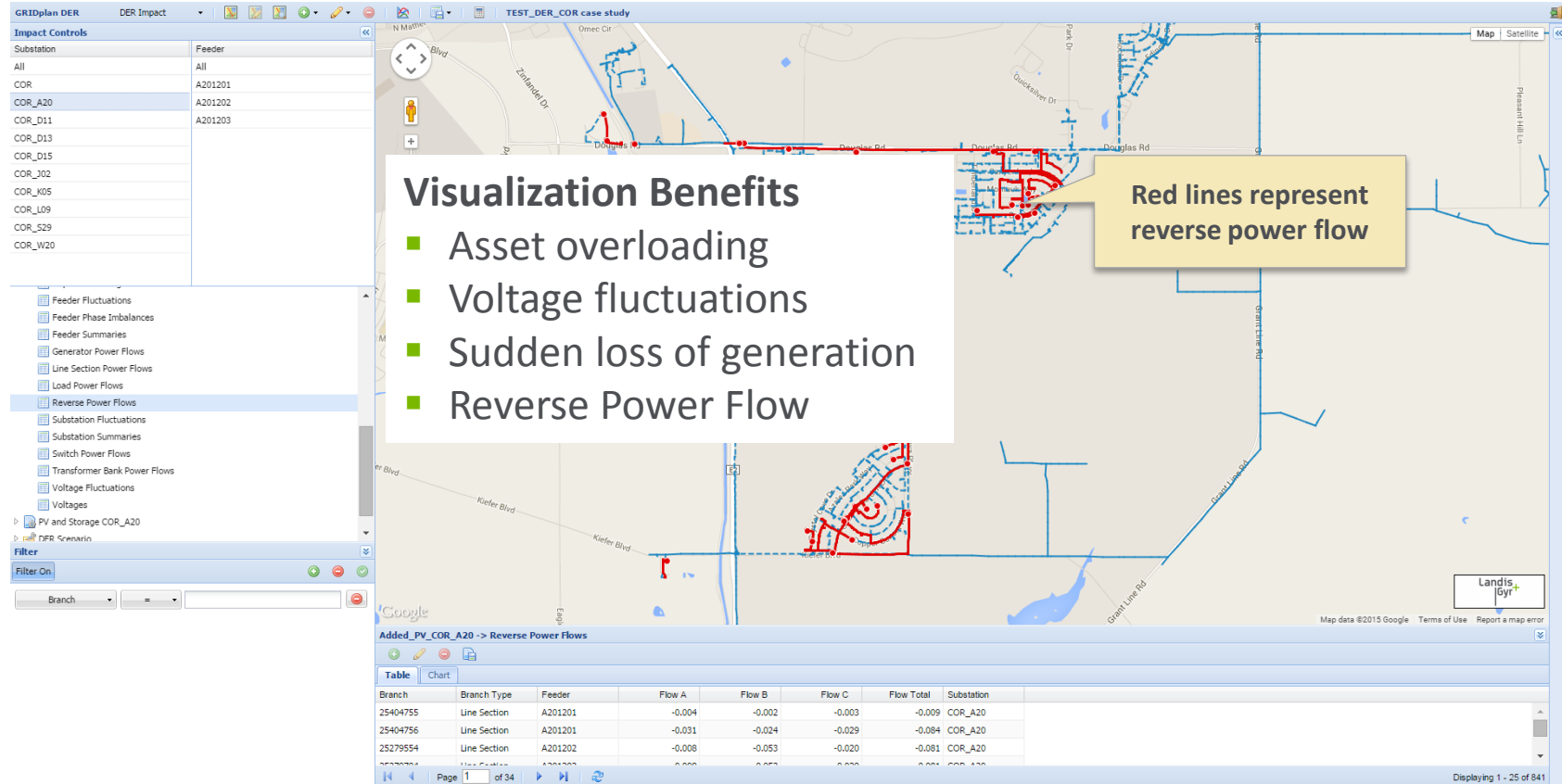


# Realize the Benefits of Renewable Optimization

- Save time on impact studies and interconnection approvals
- Optimize CapEx
- Comply with federal and state mandates
- Ensure power quality, reliability and safety of the distribution grid



# System Visualization to Optimize DER Impact





# System Visualization to Optimize DER Impact

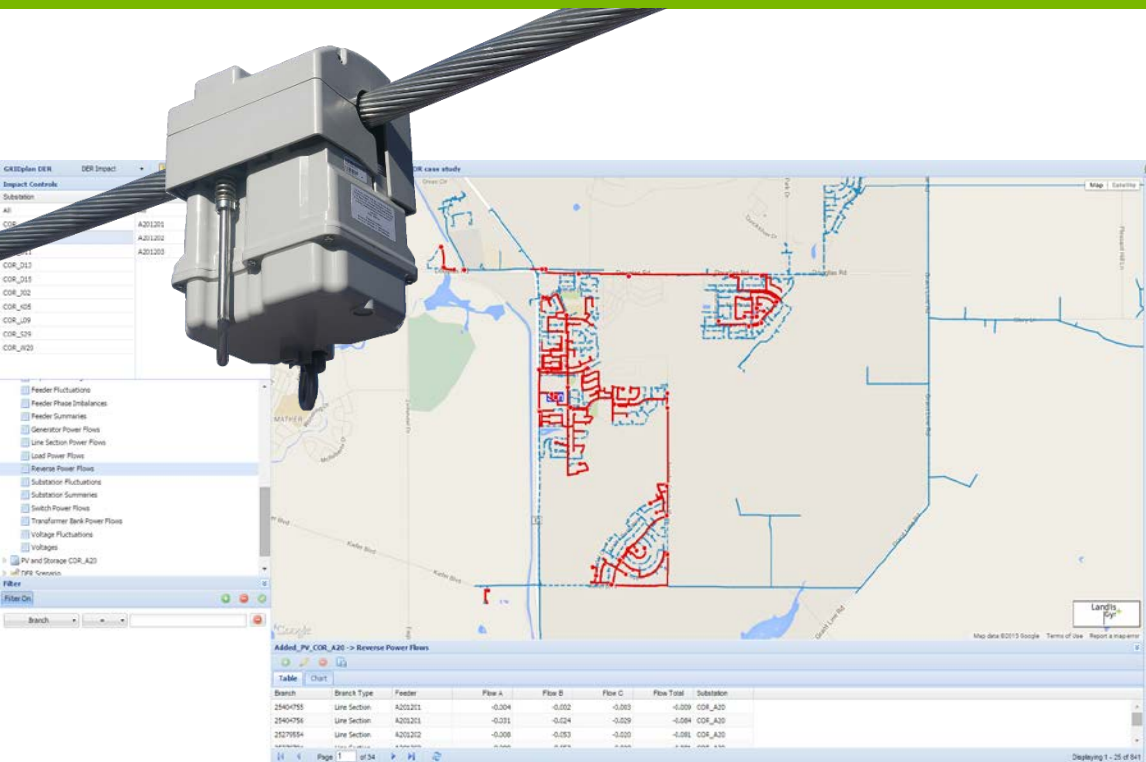


## Ability to Strategize and Address:

- Increase in rooftop solar
- Addition of utility-scale solar
- Placement of storage and renewables



# Sensing and Operating with Renewables



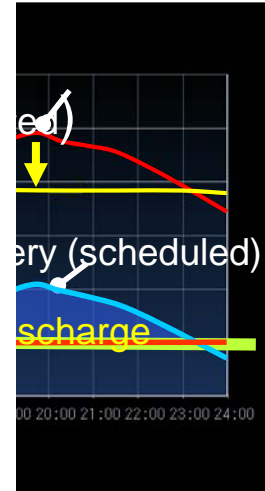
## S610 Line Sensor

- Real-time load measurements
- Conductor temperature
- Direction of flow

## Advanced Grid Sensing

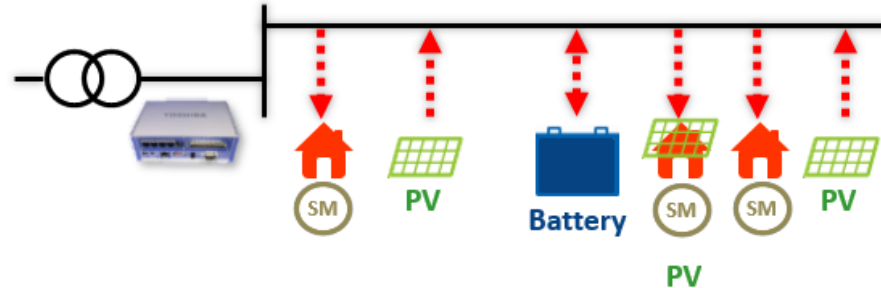
- Alert operators to intermittency
- Improve safety for maintenance where there could be 2-way power flow

# Managing Distributed Energy Resources



- Utilize historical and real-time data for predictive analysis
- Supply and demand forecasting
- Automatic dispatch of storage resources

Distribution  
feeder





## Los Alamos County

- 1MW of PV
- 1.8MW of battery energy storage
- Reduced voltage fluctuation
- Stabilized power flow through battery dispatch
- Price signals for residential Demand Response



**Leverage.**  
**Visualize.**  
**Plan.**  
**Integrate.**

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