



## Smart Grid and Climate Change

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# Company Overview

## About Us

- Leading provider of Smart Grid solutions hardware, software and services
- Open, secure, flexible, proven platform
- Founded in 2002
- Born to solve the utility challenges of connecting devices on the grid
- World-class team and unique approach

## Awards



## Growing Deployments Worldwide

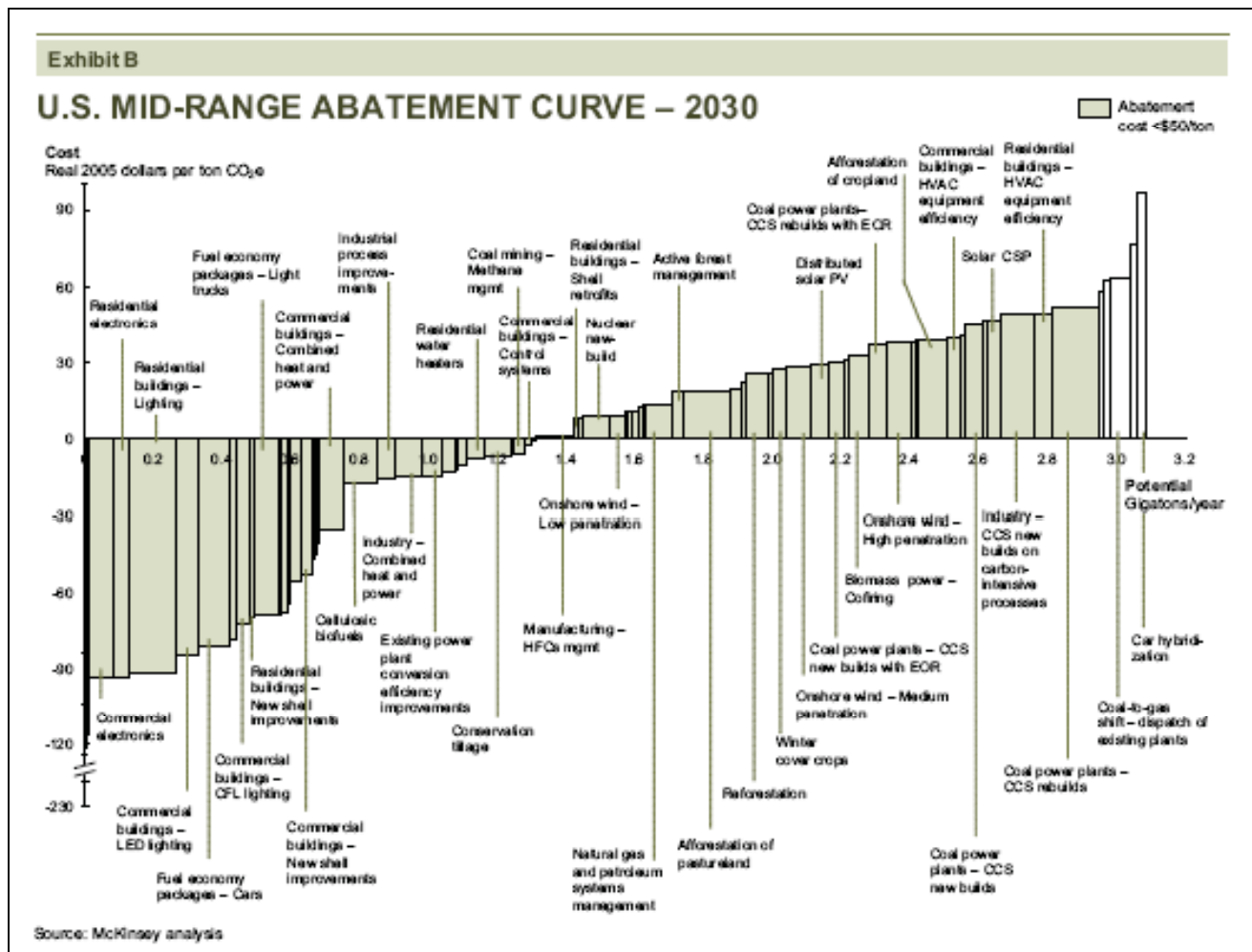


## Silver Spring Highlights

- The world's leading utilities trust Silver Spring
- Deployed on 5 continents
- Market leader in advanced metering solutions
- Largest Home Area Networking deployment
- Innovative consumer education and engagement programs
- Leading Smart Home applications

# There is no silver bullet to address climate change

## McKinsey US GHG Abatement Cost Curve – December 2007

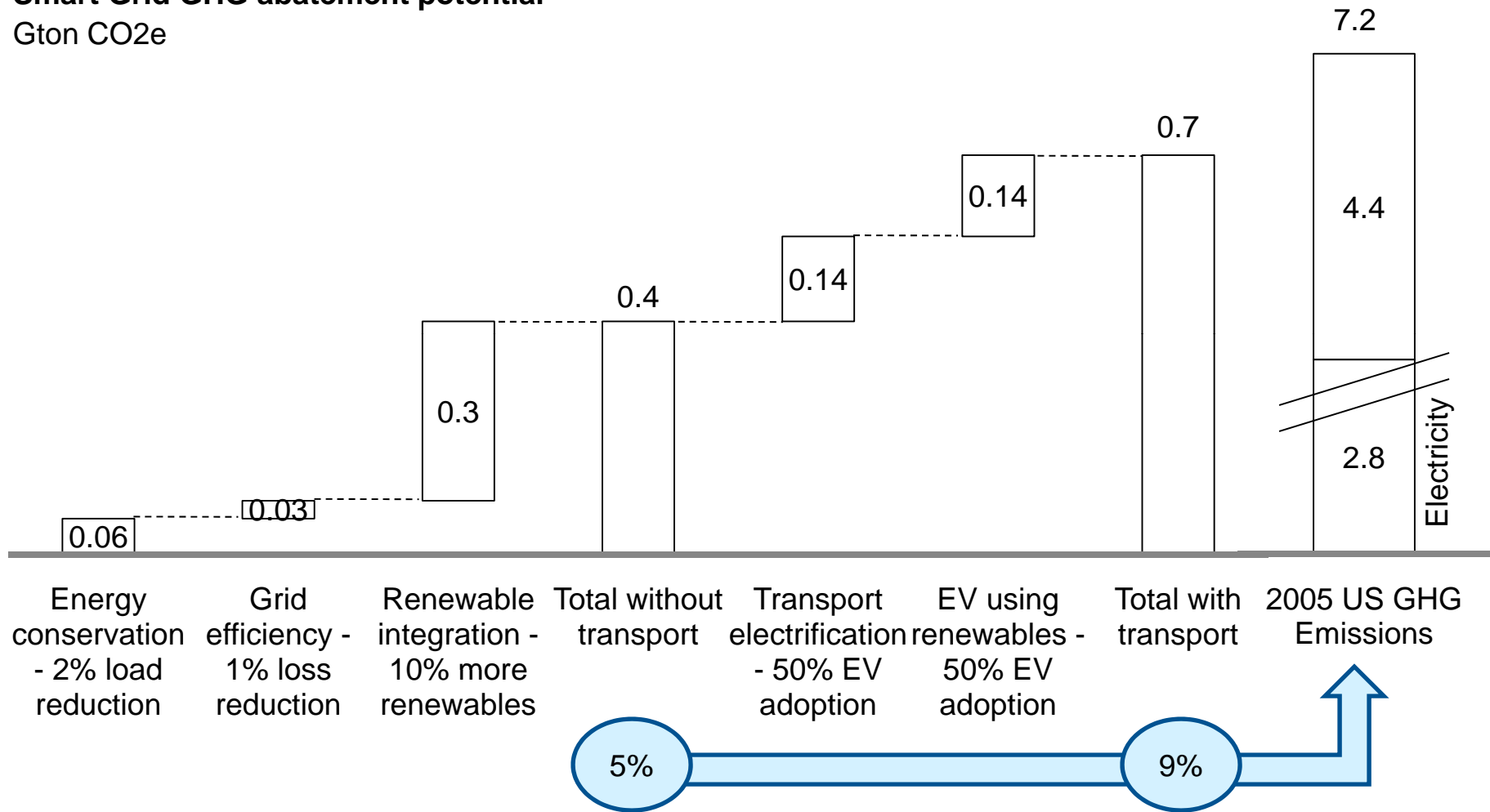


- 2030 US abatement goals - 3.5-5.2 Gton CO<sub>2</sub>e (based on 2007 proposed bills); 3 Gton Waxman Markey
- Meeting abatement goals would require doing everything on GHG abatement cost curve
- Smart Grid can enable/enhance significant abatement opportunities

# Smart Grid can enable the reduction of ~5-9% of 2005 GHG emissions

## Smart Grid GHG abatement potential

Gton CO2e



One-quarter of Waxman-Markey GHG reductions can be realized through Smart Grid by 2030

# Smart Grid reduces the cost of GHG reductions



## Energy conservation

### How SG enables

- Provides more real time feedback on energy usage
- Home Area Network enables information

### Potential impact

- Studies show 5-15% energy usage reduction

### Without SG

- Only monthly feedback (bill), or next day (with AMI only)



## Grid efficiency

- Distribution Automation allows for Volt-VAR optimization and reduction of line losses

- Initial utility pilots show 1-2% baseload improvements, more during peak

- Utilities generally pre-program cap banks seasonally



## Renewable integration

- Demand Response creates active loads to follow renewables
- Distribution Automation provides voltage stabilization

- Renewables impact the grid ~20% of load
- DR of 15-20% could allow ~10% more renewables

- Utilities need to build more generation to firm renewables



## Transport Electrification

- DA can prevent local distribution problems from large EV load draws
- Manages peak demand with DR applications

- Electric motors are more efficient than ICE, allowing for greater efficiency, even with coal

- Utilities need to build more generation to handle additional peak load



## EV with renewables

- Allows for Smart Charging of EV's to firm renewable generation
- Can be used as ancillary services

- Drives to zero GHG fuel if charging is flexible with renewable production

- Utilities fuel EV's with coal and natural gas

# The Smart Grid business case in a carbon constrained world

## US Smart Grid Business Case

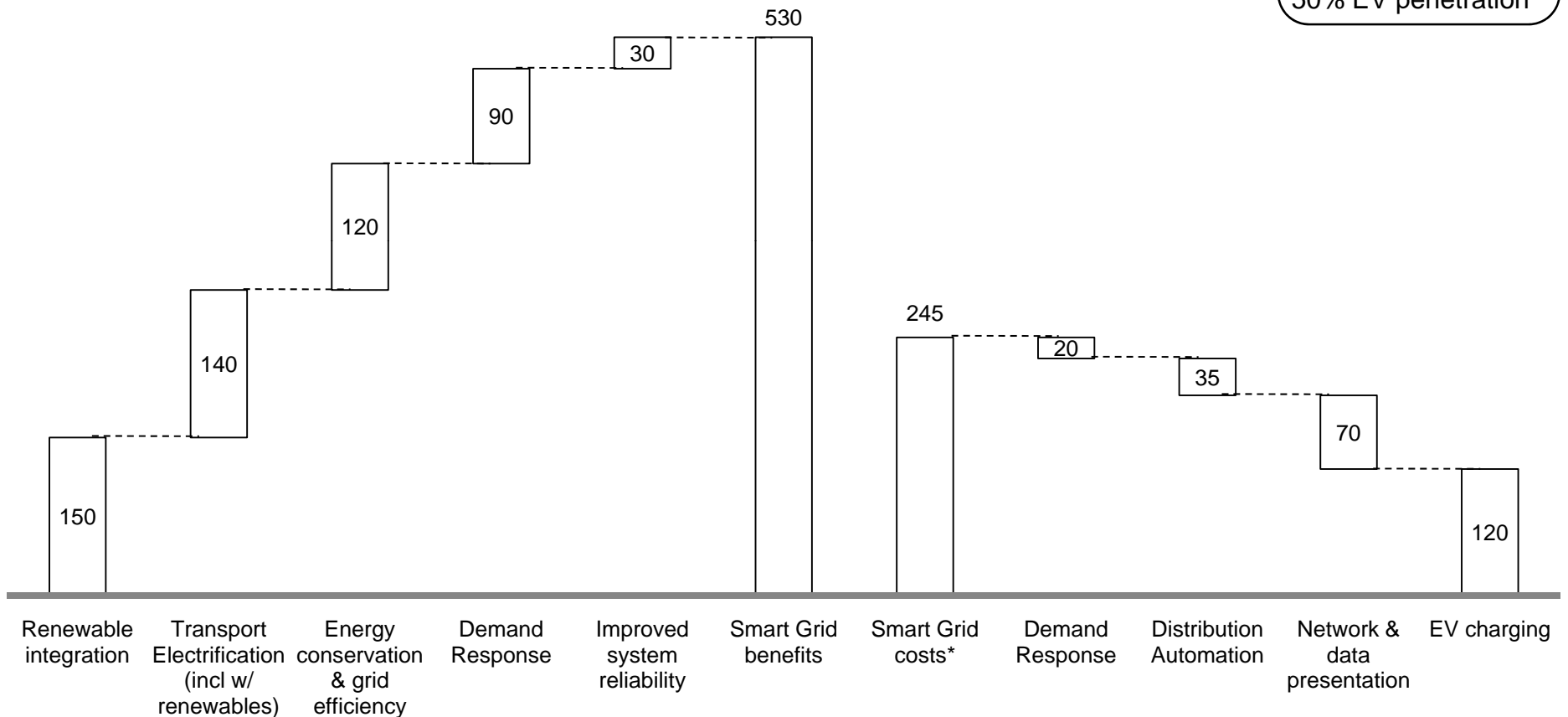
\$ Billions

### Benefits

### Costs

#### Major assumptions

- \$40/ton CO<sub>2</sub>e
- \$50/MWh
- \$70/kW-yr capacity
- 50% EV penetration



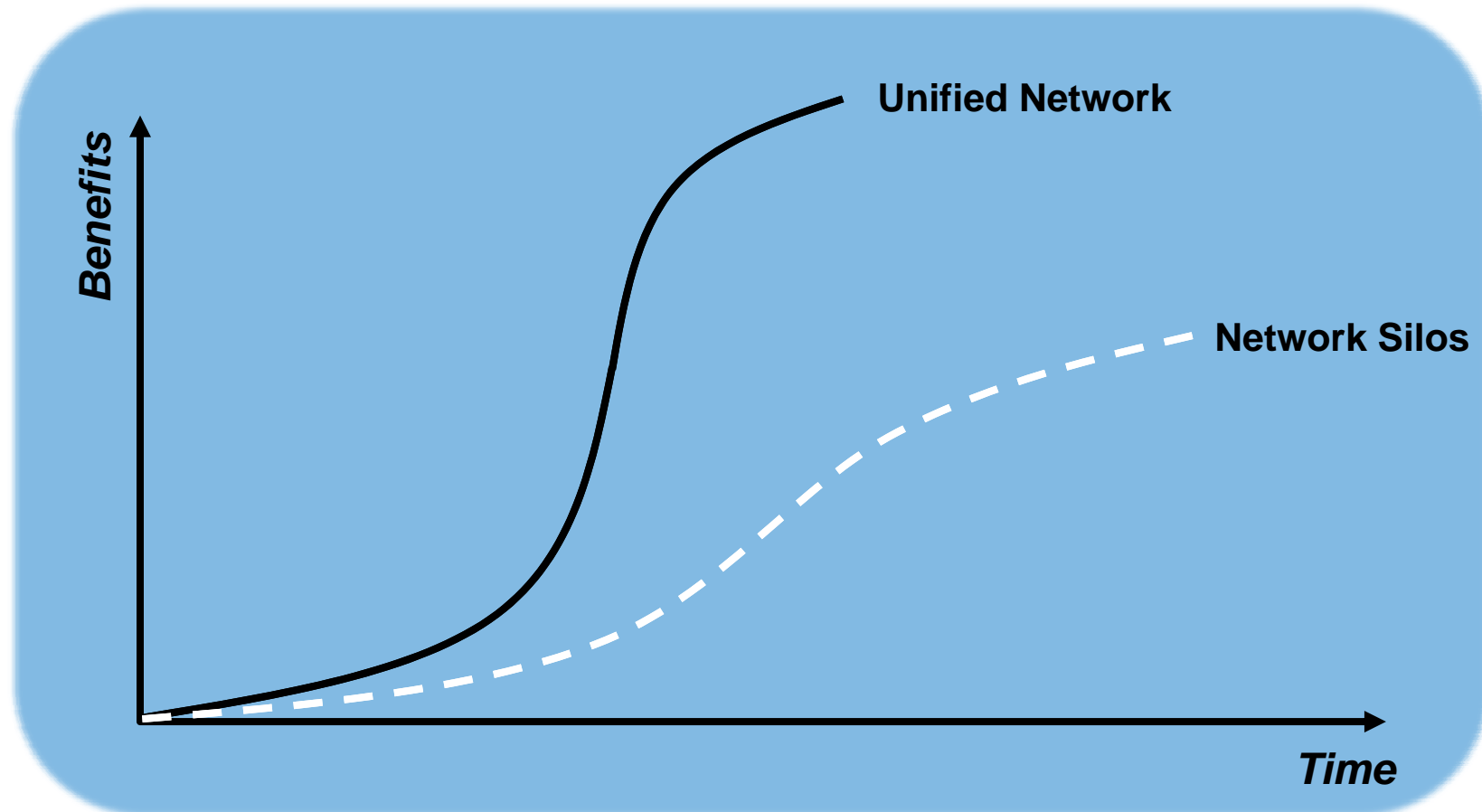
Most benefits are linked to value from improving the environment (e.g. – carbon)

\* Does not include any generation costs (renewable or distributed)

## Recommendation: Unify Smart Grid Networking

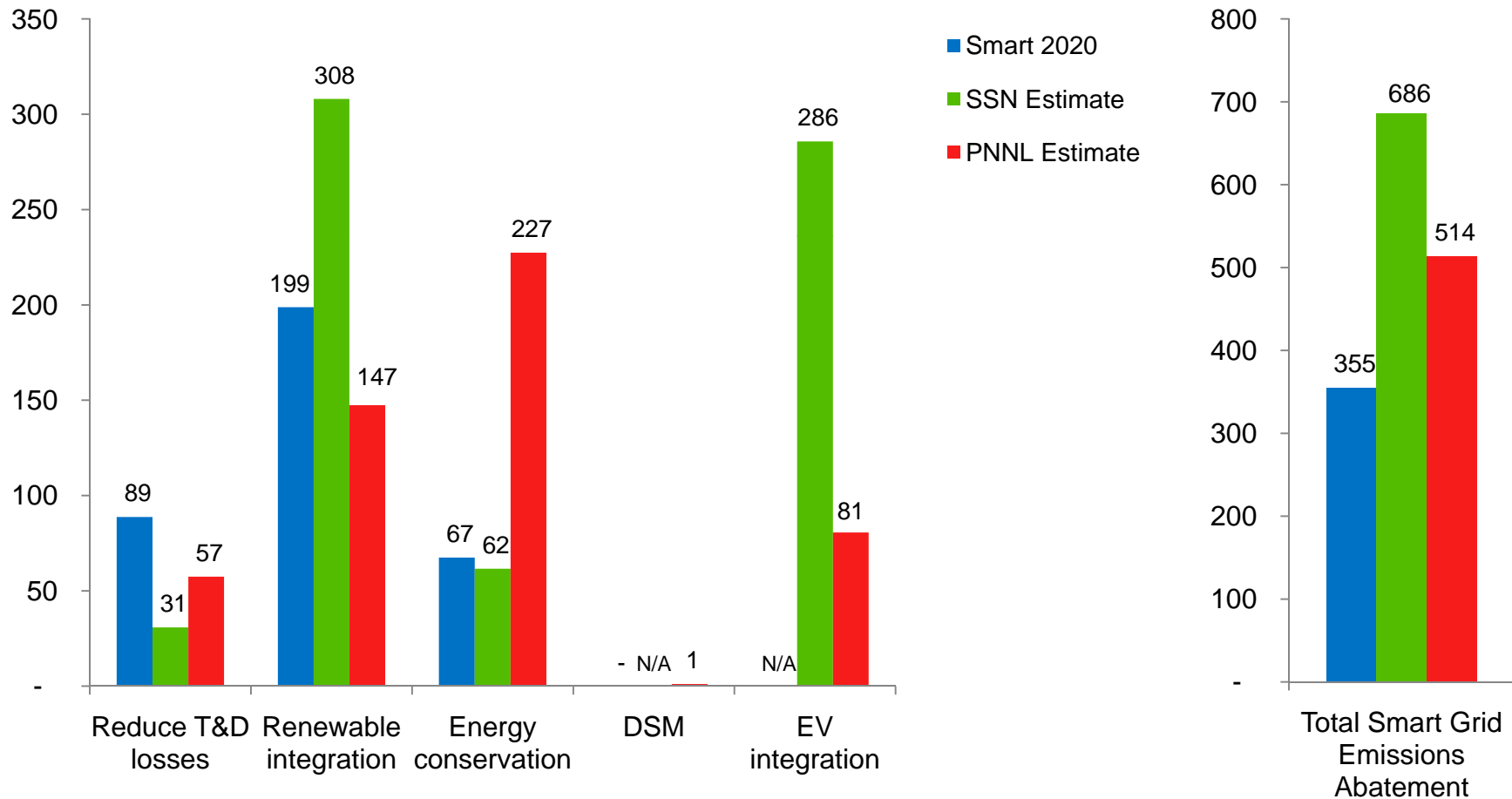
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An integrated network delivers Smart Grid benefits, including GHG reductions, faster and cheaper



# Reference Point: SSN analysis vs Smart2020, PNNL studies

## Percent of BAU power emissions enabled abatement with Smart Grid 2020 US BAU, MMT CO2\*



\* Calculated as total emissions from power sector in 2020 + estimated reductions. Smart2020 presents a range of reductions from 230 MMT Co2 – 480 MMT CO2. Average numbers are shown. PNNL results have been extrapolated from 2030 to 2020 BAU.  
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