

GRIP

Grid Reliability Infrastructure Plan

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Grid Reliability Infrastructure Plan

GHG-target driven infrastructure plan to reduce emissions in the energy sector, administered by a group of principals of the six participating entities convened by the Governor. Key components include:

- Direction of coordinated emissions reduction planning across participating entities
- Consideration of cost-effectiveness, California job creation, greenhouse gas emissions, reliability, equity, 2030 goals, and 2050 goals
- Transparency of process and methodology through regular public workshops and regular plan updates

Planning for a Decarbonized Future: Policy Recommendations

Planning for this transition will require four key elements:

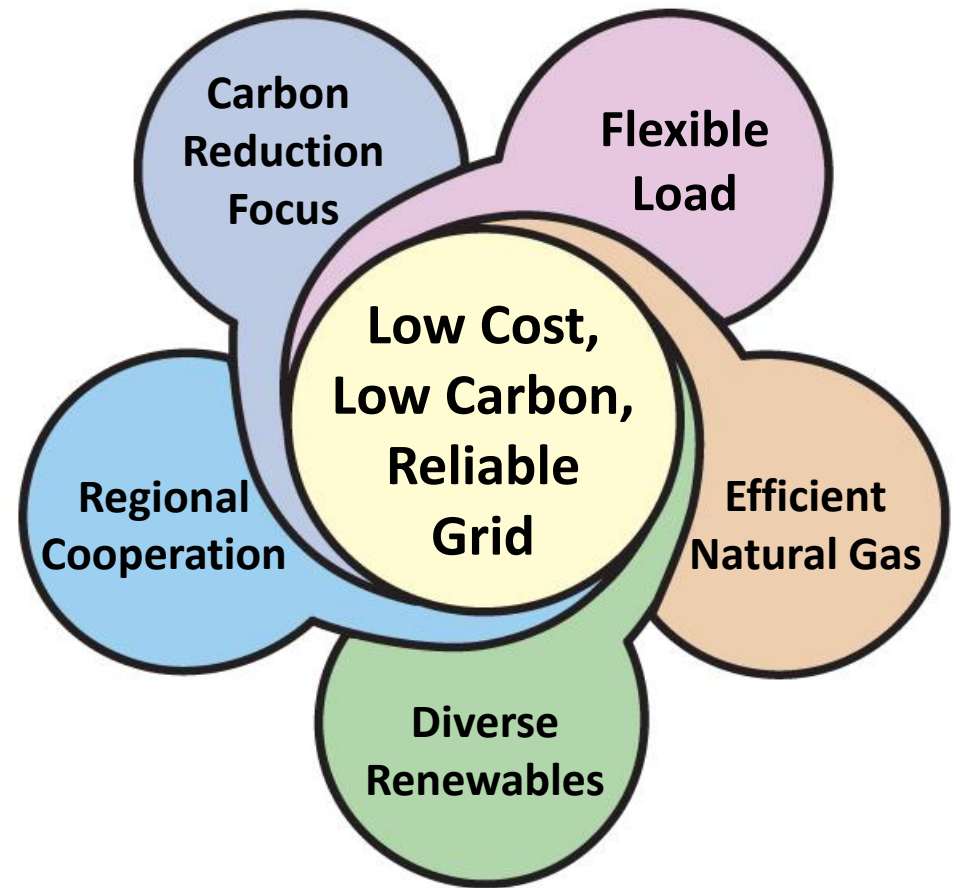
- 1) Higher renewable procurement mandate, with consideration of overall portfolio balance, GHG emissions, essential reliability services, and capacity
- 2) Greenhouse-gas-driven interagency Grid Reliability Infrastructure Plan
- 3) Expansion of California electric grid via regional coordination and balancing area coordination
- 4) Deployment of Cap and Trade funds to support high cost, high value renewable technologies, including projects that stimulate economic development in disadvantaged communities

Grid Reliability Infrastructure Plan

CARB	CPUC	CAISO
metrics and tracking	bulk and distributed procurement planning, transportation integration	transmission and reliability
<ul style="list-style-type: none"> – Compilation of data from other agencies – Transparent emissions tracking and metrics 	<ul style="list-style-type: none"> – Explicit greenhouse gas targets integrated in long-term planning – RPS and other procurement with contracts that value GHG reduction, dispatchability, capacity, and essential reliability services – Bulk and distributed storage – Price and rates – Integration of targets into transportation and distributed and demand-side resources 	<ul style="list-style-type: none"> – Transmission planning, including 15- and 20-year plans with an eye towards 2050 – Technology-neutral valuation of grid services – Research study to plan for reliability and integrating high levels of renewables – Planning for regional coordination
CEC	UTILITIES	DWR
siting, buildings, and transportation infrastructure	jurisdictional planning and coordination with other agencies	pump operation and the water-energy nexus
<ul style="list-style-type: none"> – Transportation infrastructure – Siting, including clutches in new and existing fossil plants/facilities – Buildings standards, including electrification – GHG consideration in Integrated Energy Policy Report (IEPR) 	<ul style="list-style-type: none"> – Procurement and planning by both investor-owned and municipal utilities to achieve renewable and greenhouse gas targets and coordinate with CAISO 	<ul style="list-style-type: none"> – Coordination with CAISO and Bureau of Reclamation to operate pumps and storage facilities to minimize GHGs, and provide storage and flexibility to the electric grid

The California 2030 Low Carbon Grid Study (LCGS)

In order to achieve affordable greenhouse gas (GHG) reductions, the California electric grid should be reassessed in a framework of low carbon and low cost, along with a higher renewables purchase requirement.



The California 2030 Low Carbon Grid Study (LCGS)

- **National Renewable Energy Laboratory (NREL): 2030 Low-Carbon Grid Study**

- Study shows how the electric sector can most cost-effectively reach California's greenhouse gas emissions goals

- **Phase I of the LCGS**

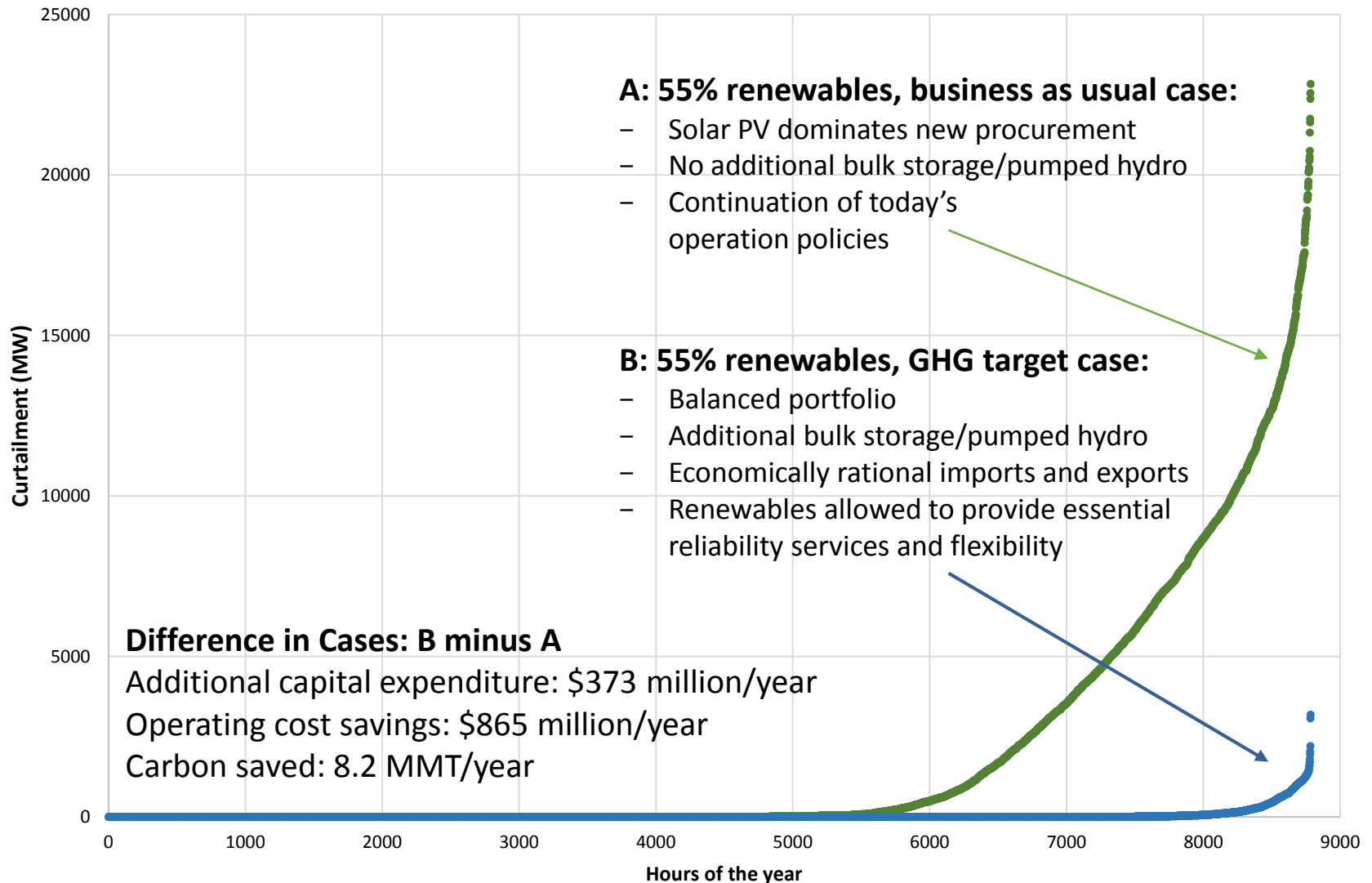
- Identified a Target Case and an Accelerated Case for GHG reductions
 - Increased transmission investment
 - Phase-out of coal imports
 - Demand-side improvements through rooftop solar, energy efficiency and demand response
 - Substantially increase biogas, geothermal, wholesale solar, wind and storage
- Developed resource portfolios
- Ran production cost models for each using NREL's PLEXOS model

- **Results of Phase I**

- By 2030 the California grid **can** reduce GHG emissions by more than 50% below 2012 levels
- Minimal rate impact, no loss of reliability, minimal curtailment of renewables
- Energy storage has remarkable potential to provide reserve energy

LCGS Phase II Results

Curtailment of renewable energy in 2030



Optimizing Renewable Resources

- **Cooperation between Generation and Transmission**

- Fossil fuel generation can be used to complement renewables generation, rather than as a primary energy source
- Two-way trade of zero carbon resources between states
- Taking advantage of geographic diversity and system needs

- **Demand-Side Adjustments**

- Aligning electricity demand with attributes of zero carbon resources
- Encouraging electricity use during the day when solar output is abundant: electric vehicle charging, pre heating and pre cooling, etc.
- Reducing load in evening hours
- Incentivizing renewables to be partially dispatchable and to provide system electrical needs

Results of Study

- Cost impact of achieving deep reductions is minimal
- Zero carbon sources are used to provide essential reliability services
- Use of zero carbon essential reliability services allows gas fleet to be used efficiently (block-loaded)

THANK YOU

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