GE Power & Water

Meeting the challenges of the next decade

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U.S. Energy Information Administration
Annual Energy Conference – April 6th

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GE Energy businesses

ecomagination℠

82,000 employees - **140** countries **25%** world's electricity from GE technology

Power & Water

- Thermal power gen
- Renewables
- Gas Engines
- Nuclear
- Gasification
- Water treatment
- Process chemicals

Energy Services

- Maintenance agreements
- Smart Grid
- Field services
- Parts and repairs
- Optimization technologies
- Plant management

Oil & Gas

- Drilling/production for … land, offshore, subsea
- LNG and pipelines
- Refining/petrochemical
- Industrial power gen
- Complete lifecycle services

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The next decade

Confronting new **challenges**

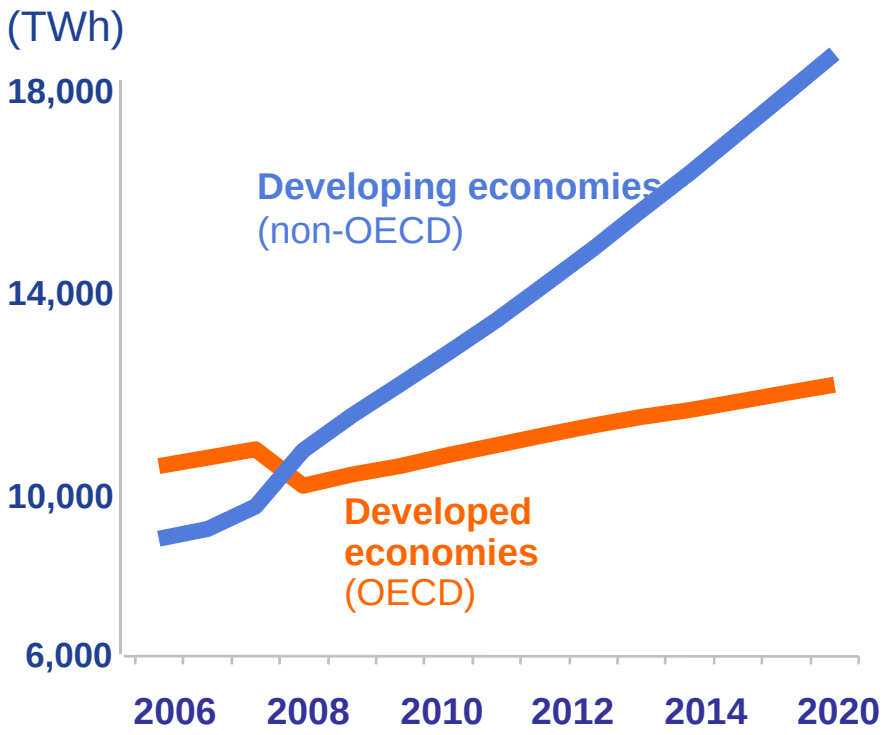
Diverse **technology** solutions

Pragmatic **policies** needed

Who will lead?

Growth centers are shifting

Electricity generation



Developing economies

2X electricity growth

More energy intensive

Uses **higher** carbon fuels

Source: GE analysis

Driving power generation technology mix

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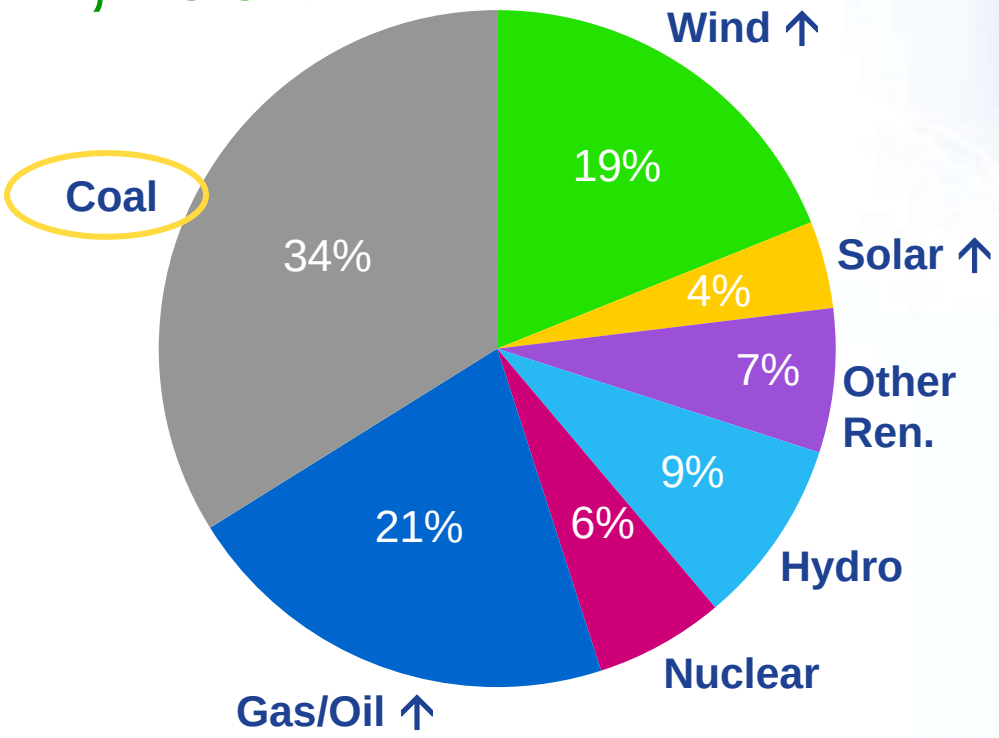
Diverse power generation mix

10 year global investment

2,700 GW



Source: GE analysis

Energy independence

Emissions/ environment

Resource constraints

Green energy growing … coal still 1/3 of additions

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Revolution in North American NG?

Game changing success

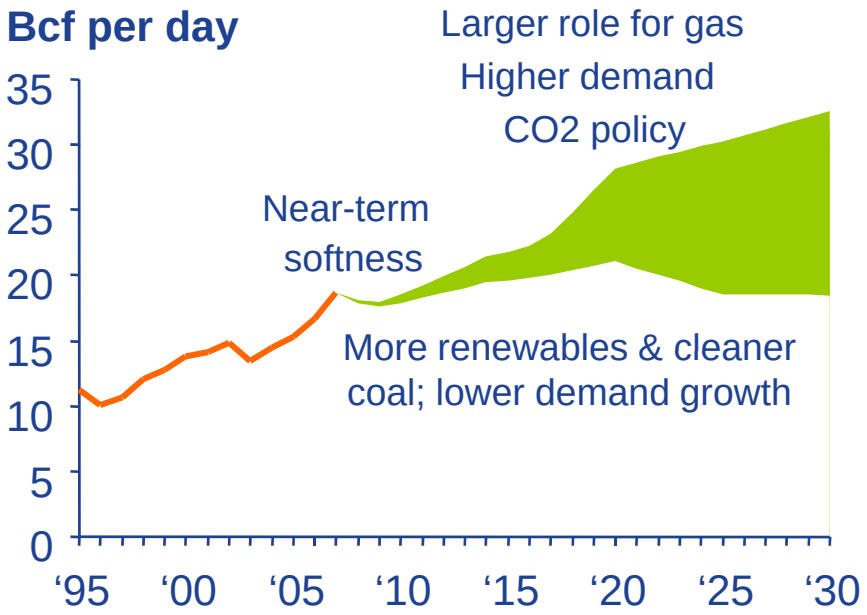
Major North American unconventional plays

Source: EIA, OG&J, GE Energy

Orange: shale gas
Blue: other unconventional gas

... In a policy driven marketplace

U.S. gas demand for power outlook range



Source: EIA, GE Energy Research

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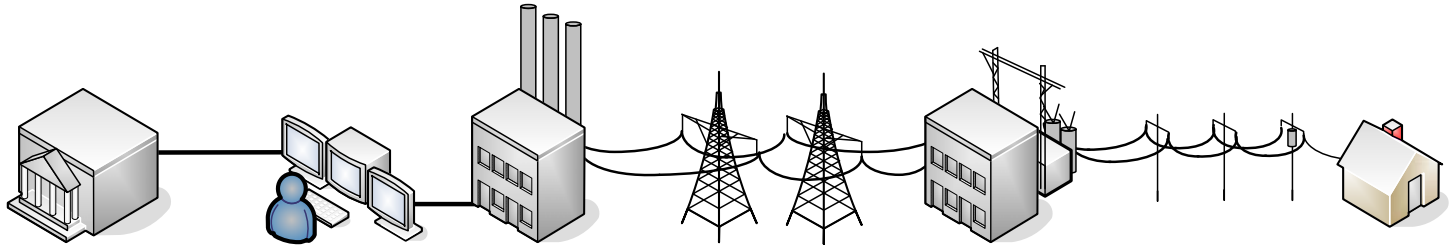
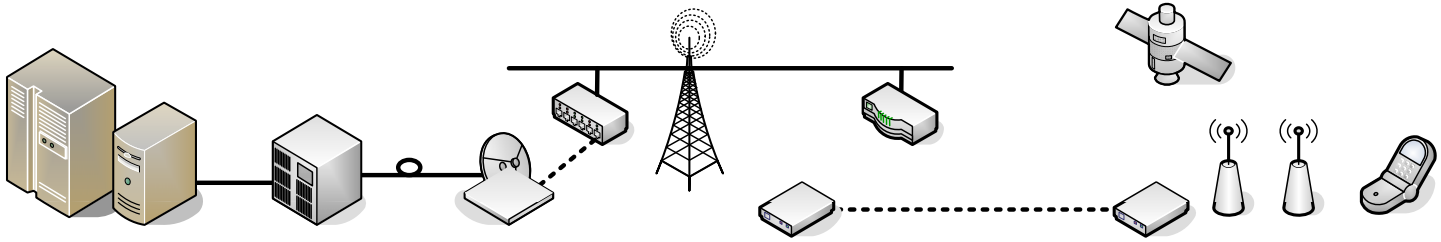
Integration of two infrastructures

Electrical infrastructure



+

Information infrastructure



Roll-out of smarter grid … energy efficiency

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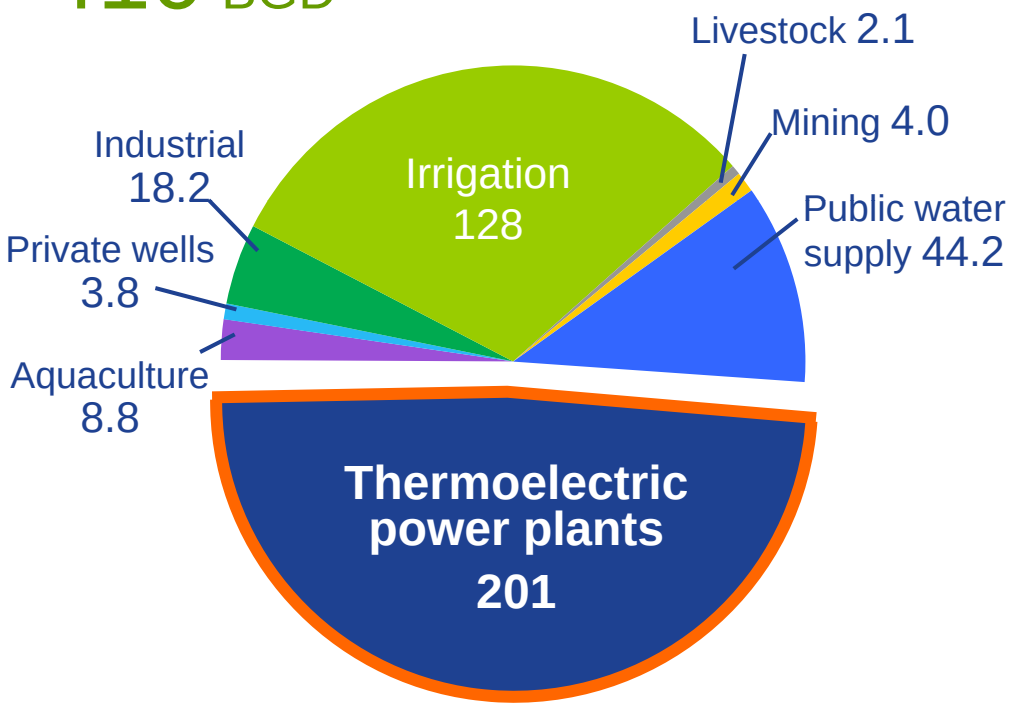
Sources: (1) UtilityPoint, by Ethan Cohen 7/18/0 (2) EPRI® Intelligrid

The power / water nexus

U.S. total water withdrawals today

Billion gallons per day (BGD)

410 BGD



Source: GE analysis

50%
US water usage
due to power plants

30%
worlds population
water constrained today …
60% by 2025

Power **1st** to be
curtailed in a
water scarce world

Carbon emissions and water scarcity challenges interlinked

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Source: The 2030 Water Resources Group, Centre for Environmental Systems Research, University of Kassel

The next decade

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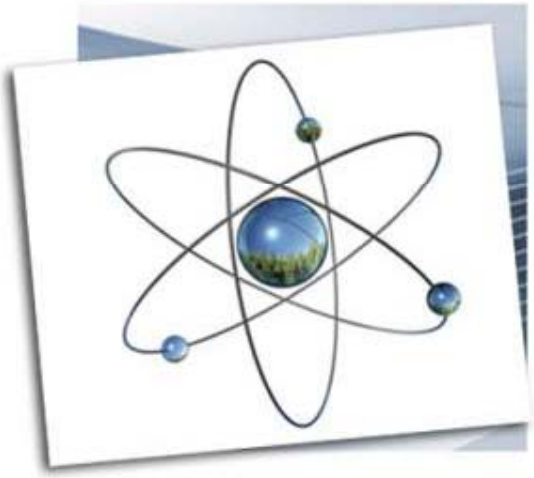
Diverse technologies delivering solutions

Wind

Gas engines



Nuclear

Combined-cycle

IGCC w/CCS

Water technologies

Diverse technologies delivering solutions

Renewables - Wind

- **Onshore well-established, offshore emerging … "0" carbon & water**
- **EU 20-20-20: 160GW onshore 30GW offshore … US #1 installs '08, fell to #3 '09**

Combined-cycle

IGCC w/CCS

Water technologies

Diverse technologies delivering solutions

Combined-cycle

- **Low CAPEX - High efficiency - Short project cycle**
- **Replacing 10GW of old coal = 50 million tons/yr CO_2 reduction**

Combined-cycle

IGCC w/CCS

Water technologies

Diverse technologies delivering solutions

Gas engines

- **Distributed generation … alternative gas to power**
- **Global flare gas = 5% global gas production**

Combined-cycle

IGCC w/CCS

Water technologies

Diverse technologies delivering solutions

IGCC w/CCS

- **Base load coal with 90% carbon capture capability and 30% less water use***
- **High cost & sequestration regulations must be addressed**

Combined-cycle

IGCC w/CCS

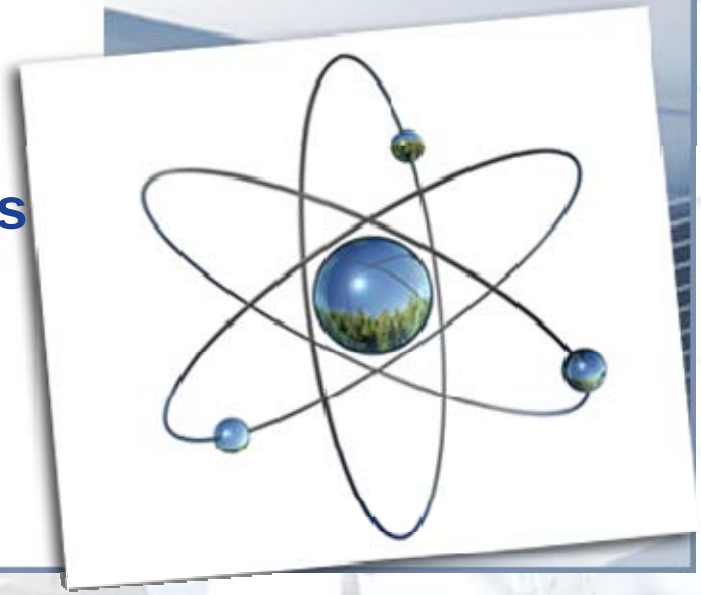
Water technologies

* Compared to pulverized coal

Diverse technologies delivering solutions

Nuclear

- **Base load generation, near “0” carbon emissions solution**
- **39 GW new plants under construction … U.S. financing obstacles**



Combined-cycle

IGCC w/CCS

Water technologies

Diverse technologies delivering solutions

Water technologies

- **Advanced membranes & chemicals, zero liquid discharge**
- **Solutions exist for 70%+ water reuse today**

Combined-cycle

IGCC w/CCS

Water technologies

The next decade

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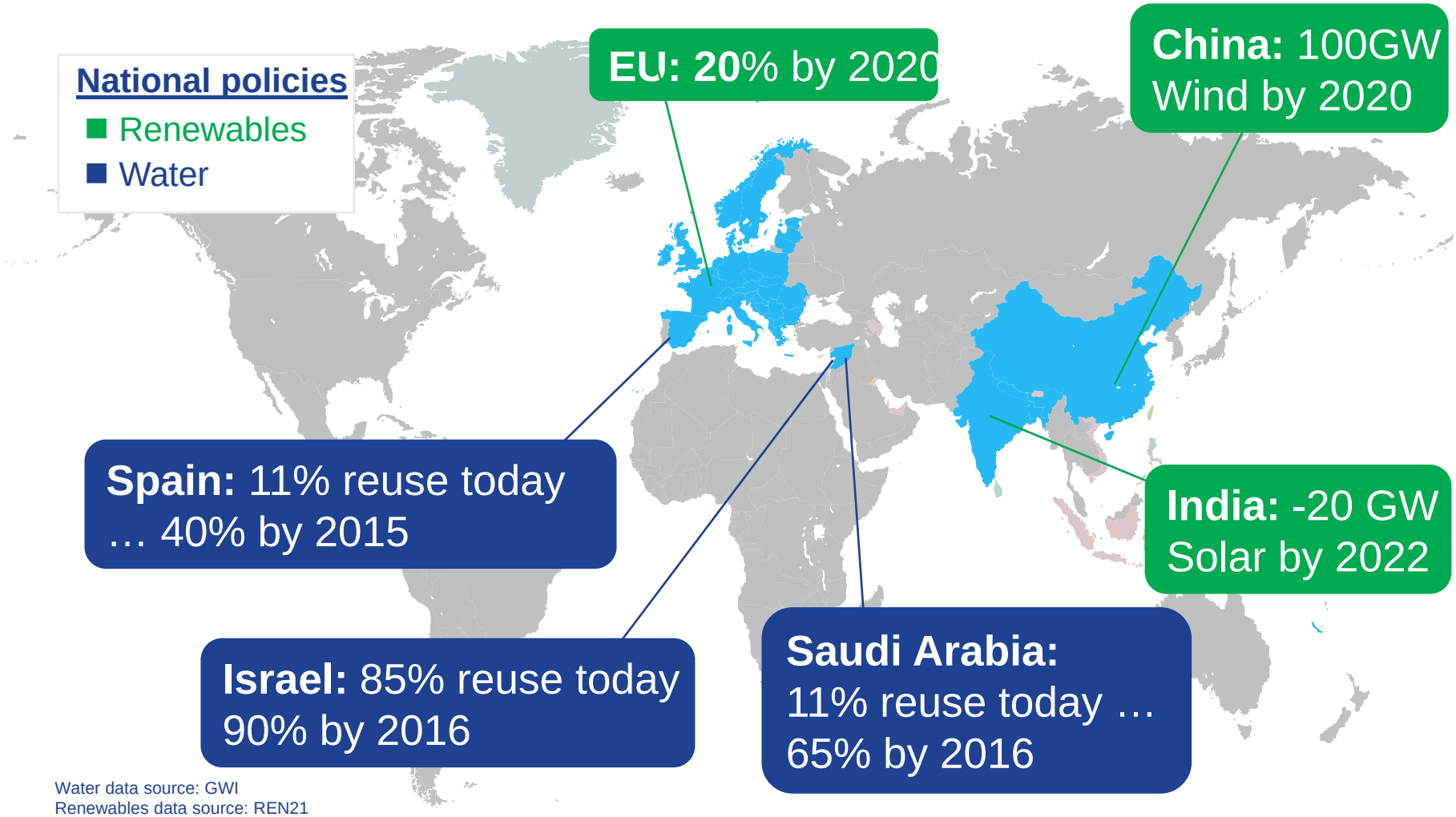
Diverse **technology** solutions

Pragmatic **policies** needed

National long-term policy critical



Water data source: GWI
Renewables data source: REN21

Many countries taking action … US currently stalled

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US Clean Energy Standard

Opportunity for “creative” Energy bill in ’10 …
A down payment on climate change

- Widen the technology tent … + CCS, efficiency, nuclear
- Meaningful goals … short and medium term impact
- Upgrade the system … incentives to retire old inefficient coal
- Build U.S. future … large markets will prevail, sustainable “green” jobs

Long-term … price for carbon essential

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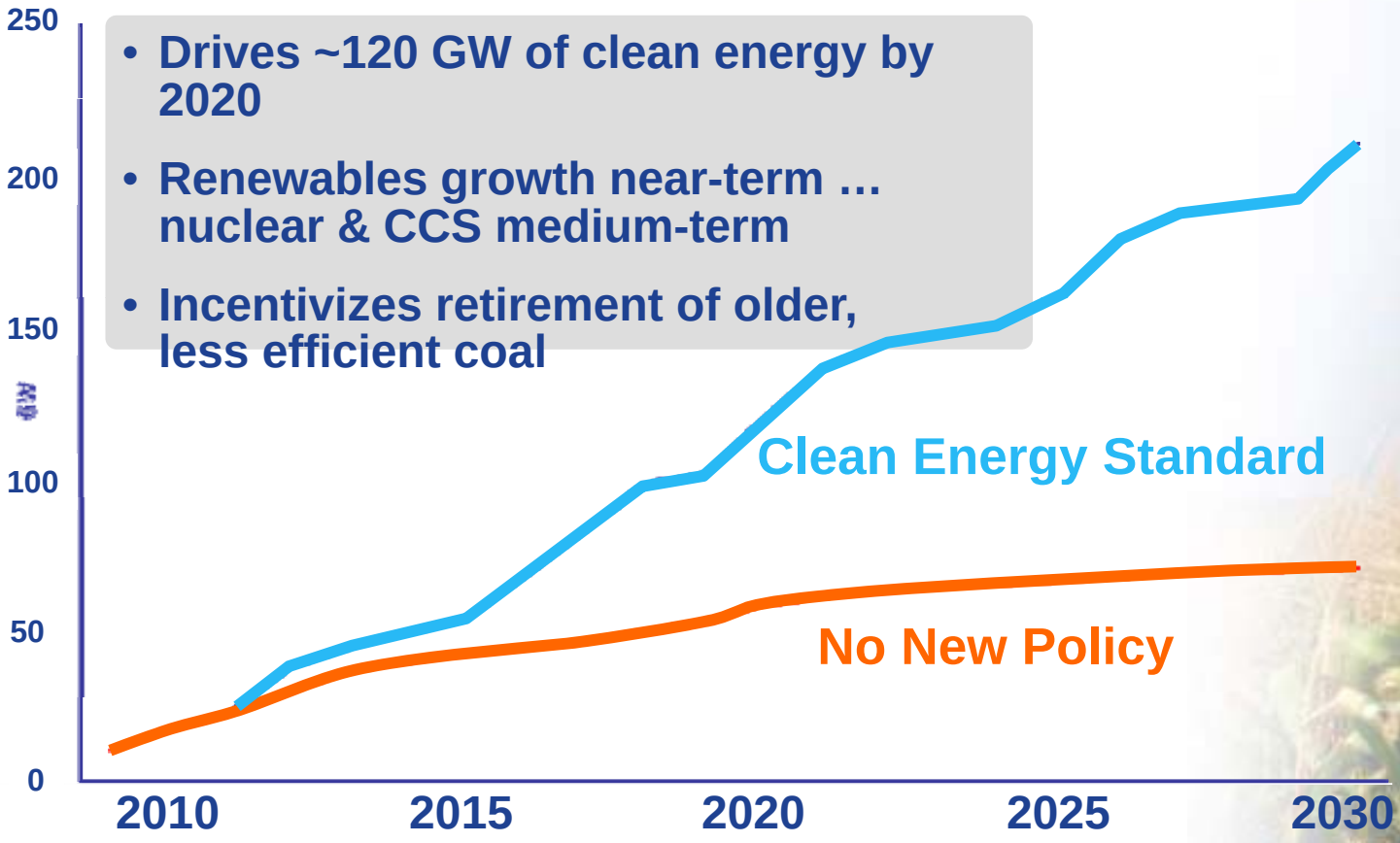
Impact of CES … higher deployments

US Clean Energy Additions (2009-2030)



- Drives ~120 GW of clean energy by 2020
- Renewables growth near-term … nuclear & CCS medium-term
- Incentivizes retirement of older, less efficient coal

Source: GE Energy. For illustrative purposes only. Preliminary analysis of Graham CES proposal (RECAST 03.31.10)
Clean energy includes renewables, carbon capture and storage technologies, and nuclear power.

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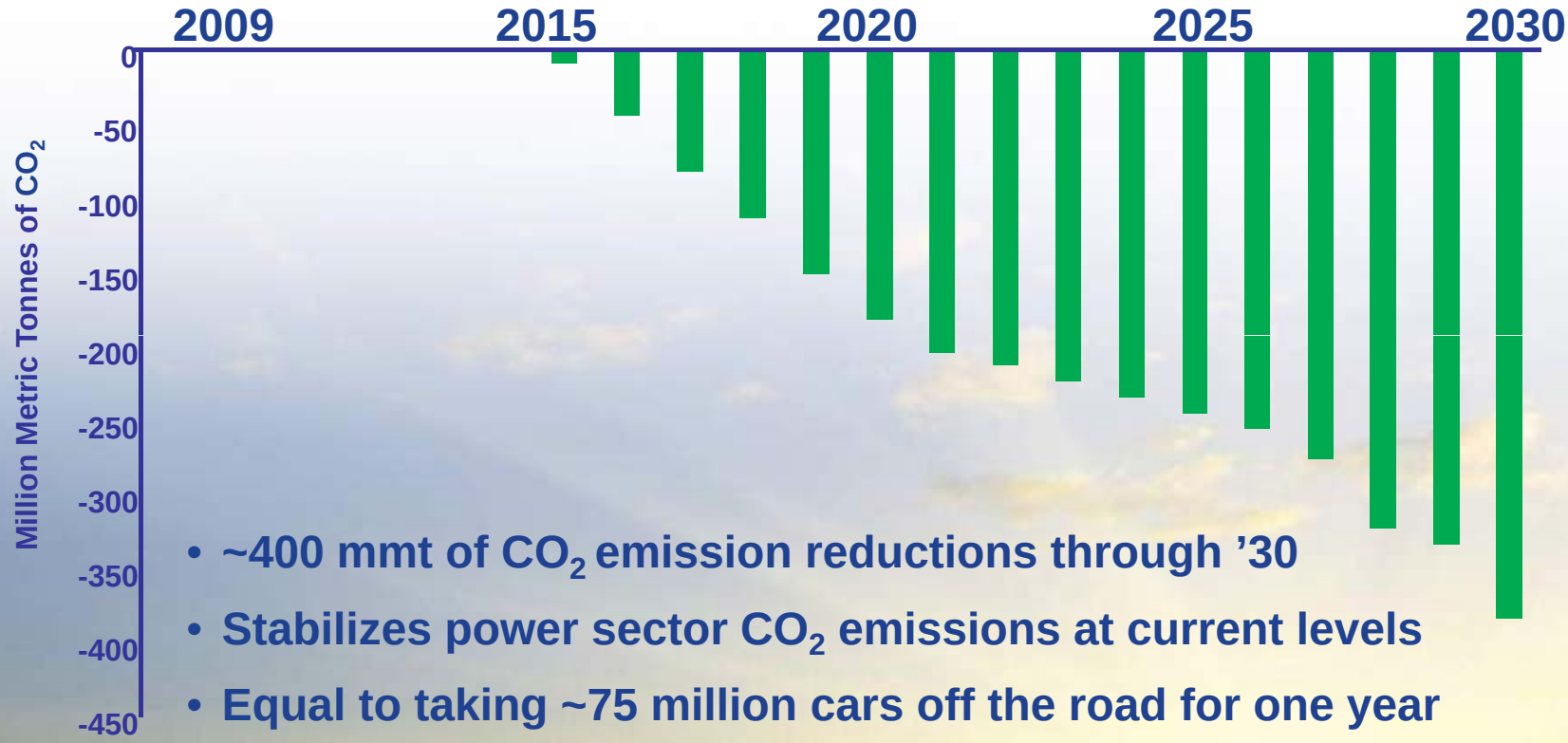
CES … potential reduction impact

Cumulative CO_2 reductions from power sector (2009-2030)



- ~400 mmt of CO_2 emission reductions through ’30
- Stabilizes power sector CO_2 emissions at current levels
- Equal to taking ~75 million cars off the road for one year

Down payment on climate change

Source: GE Energy. For illustrative purposes only. Preliminary analysis of Graham CES proposal (RECAST 03.31.10)
Compared with new supercritical pulverized coal.

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