

U.S. Carbon Emission Outlook

Near-term Reductions and Long-term Uncertainty

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US Carbon Emission Outlook

US CO₂ emissions projected to continue to fall

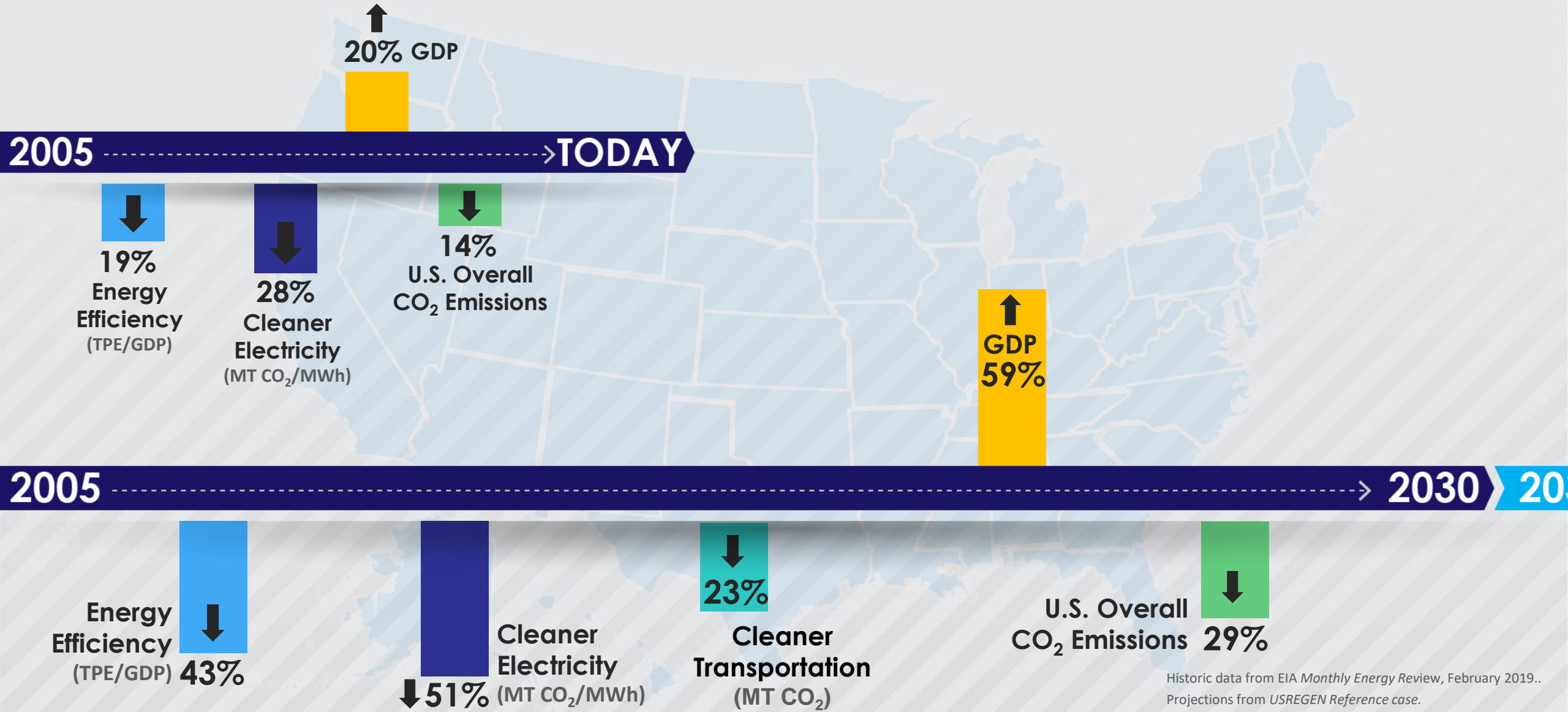
Policy directions differ widely:

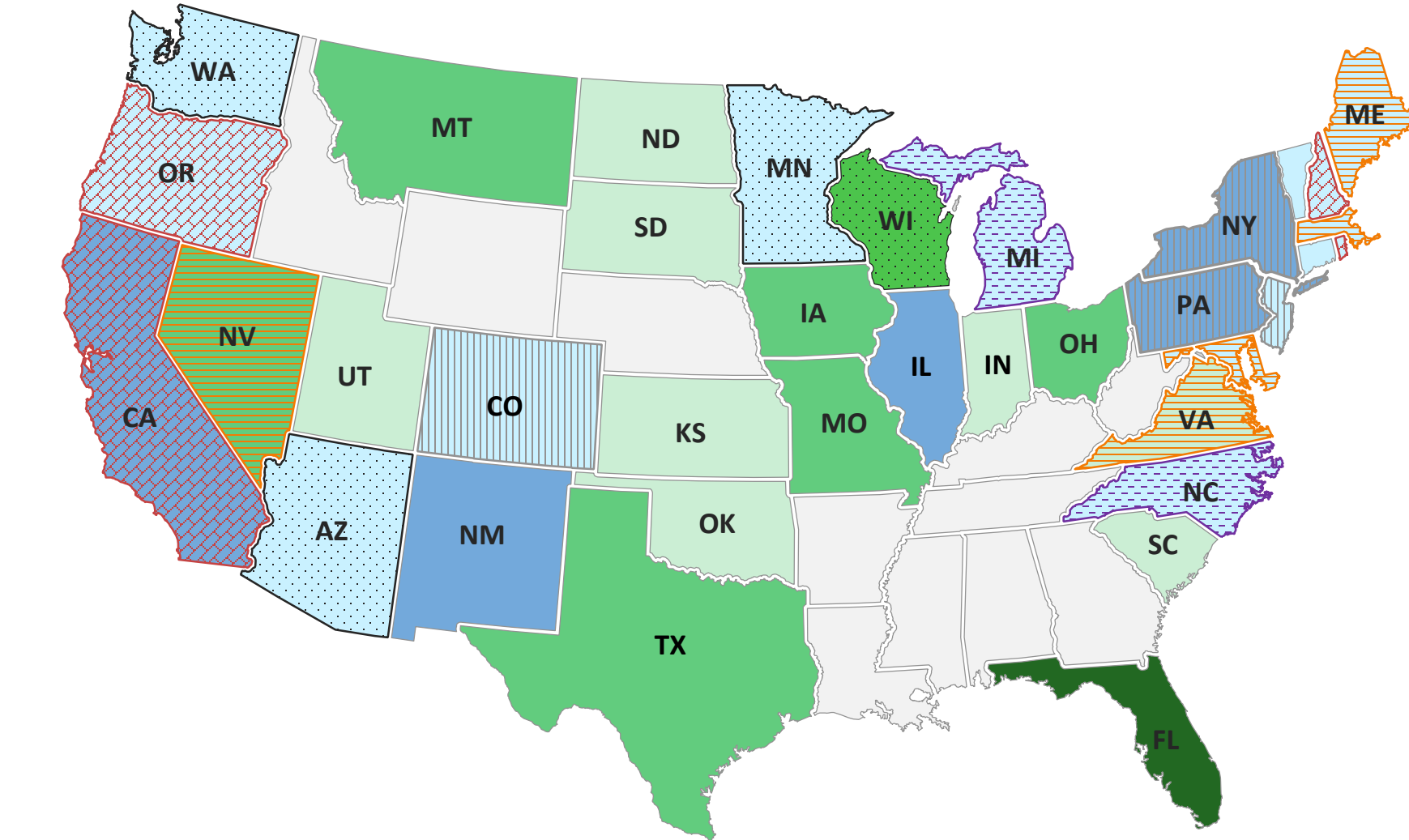
- Federal climate policy actions
 - Withdraw from Paris agreement ... effective shortly after next presidential inauguration
 - Replace electric sector's **Clean Power Plan** (CPP) with the **Affordable Clean Energy** (ACE) rule
 - Halt improvements in vehicle efficiency standards and end California's exemption (which allows CA to set stricter standards)
- Many states, companies and cities in a “race” to zero emissions

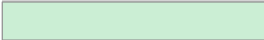
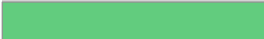



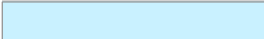




2020 elections could influence pace of reductions -- President, Senate and House of Representatives

US CO₂ Emissions Declined 14% since 2005; Project 29% by 2030

Key Drivers: Efficiency, Cleaner Electricity & Cleaner Transportation

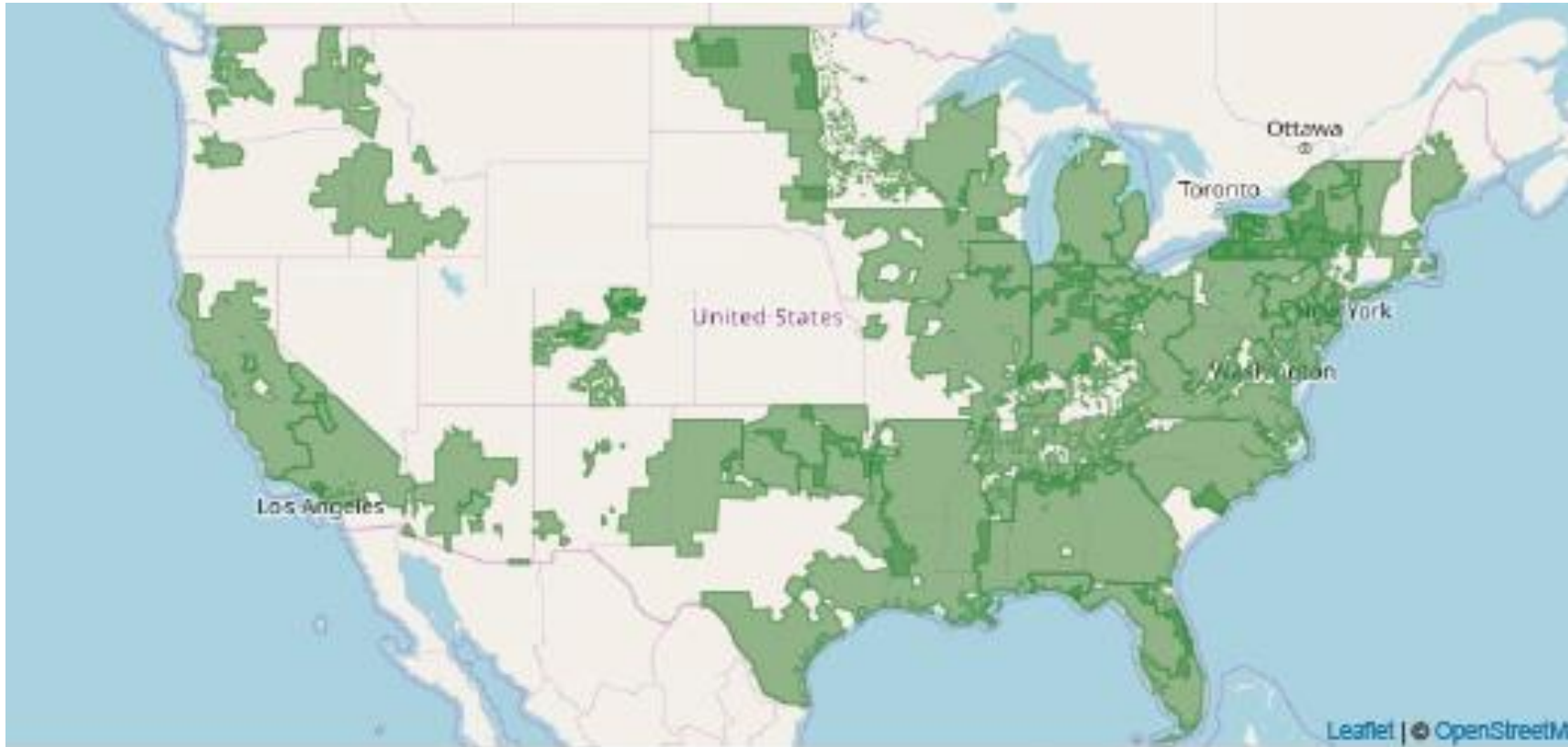




Existing	Proposed / Pending
Renewable Portfolio Goal Only	
	N/A
Renewable Portfolio Standard Only	
	
GHG Target Only	
	
RPS & GHG Targets	
	
Clean Energy & GHG Targets	
	
Clean Energy Target Only	
N/A	

Update: April 25, 2019

Electric Utilities with CO2 Reduction Goals



Source: Smart Electric Power Alliance (SEPA)

Top 40 (as of 2018) Electric Sector Emitters

Holding Company	2018 CO ₂ Emissions (short tons)*	Holding Company	2018 CO ₂ Emissions (short tons)*
Vistra Energy	123,521,952	Salt River Project	22,302,048
Duke	97,372,709	Riverstone (Talen Energy)	22,246,418
Southern	96,764,839	Basin Electric Power	21,770,694
AEP	88,244,186	AES	21,490,060
Berkshire Hathaway	74,007,697	Associated Electric Coop	19,698,608
NRG	52,239,596	Alliant Energy	17,799,821
Xcel	51,634,103	CPS Energy	17,702,070
NextEra Energy	50,843,723	Cleco Corp	16,385,934
TVA	50,187,088	Santee Cooper	15,018,020
Calpine	43,702,408	American Municipal Power	14,896,928
Entergy	40,352,214	Consumers	14,418,597
ArcLight Capital Partners	39,705,699	OGE	13,898,554
Dominion	39,227,251	PSEG	13,620,756
FirstEnergy	35,925,972	NiSource	12,691,443
DTE Energy	33,322,790	APS	12,480,359
Eversource	33,059,734	OPPD	11,934,343
PPL	32,267,261	TECO	11,843,825
Ameren	32,078,204	Tri-State	11,720,972
WEC Energy Group	28,512,242	Tenaska	10,914,739
LS Power Group	25,428,143	Exelon	10,781,377



Mass Target



Intensity Target



Renewable Target



No Target

Emission data source: ABB Energy Velocity

2020 Election Offers Policy Choice

2020 Democratic Presidential Candidates all Endorse Net-Zero GHG Emissions Economy-wide by 2050 or Sooner

	Specific Target	Energy Technology/Policy Details
Bernie Sanders	Net-zero emissions by 2050	Nuclear, CCS, and geoengineering explicitly excluded
Elizabeth Warren	100% clean energy by 2035	Nuclear not explicitly included or excluded
Cory Booker	Net-zero emissions by 2045	Explicit support of nuclear
Julian Castro	Net-zero emissions by 2045	
Kamala Harris	Net-zero emissions by 2045	
Joe Biden	Net-zero emissions by 2050	Explicit support of advanced biofuels
Pete Buttigieg	Net-zero emissions by 2050	Explicit support of CCS, carbon tax
Amy Klobuchar	Net-zero emissions by 2050	
Beto O'Rourke	Net-zero emissions by 2050	
Andrew Yang	Net-zero emissions by 2050	Emphasis on advanced nuclear and geoengineering