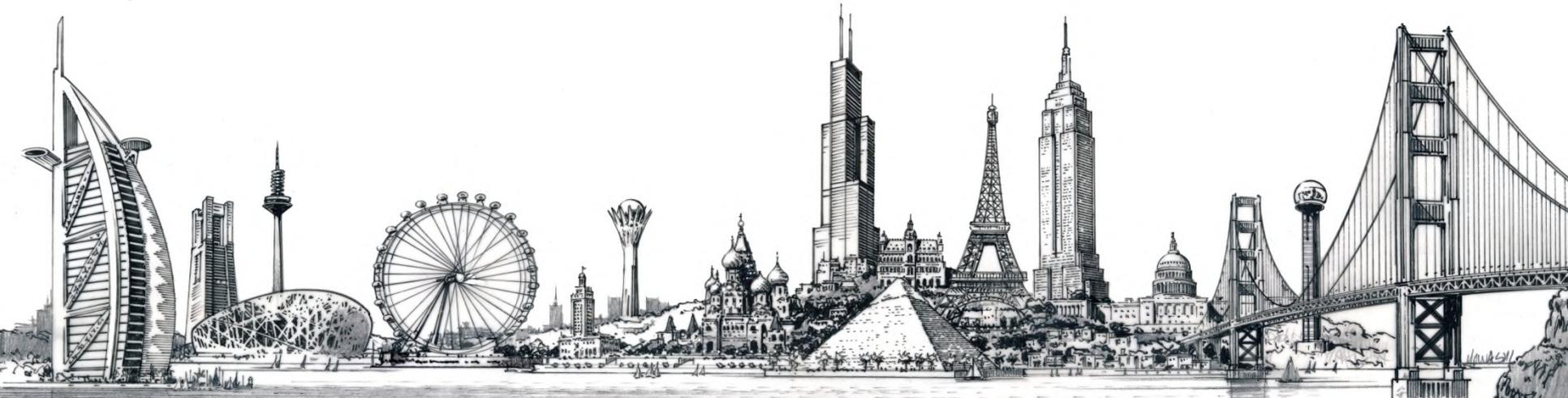


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# **EPA'S CLEAN POWER PLAN: OPPORTUNITIES AND EFFECTS**

**Stephen M. Spina & J. Daniel Skees**

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Volume  
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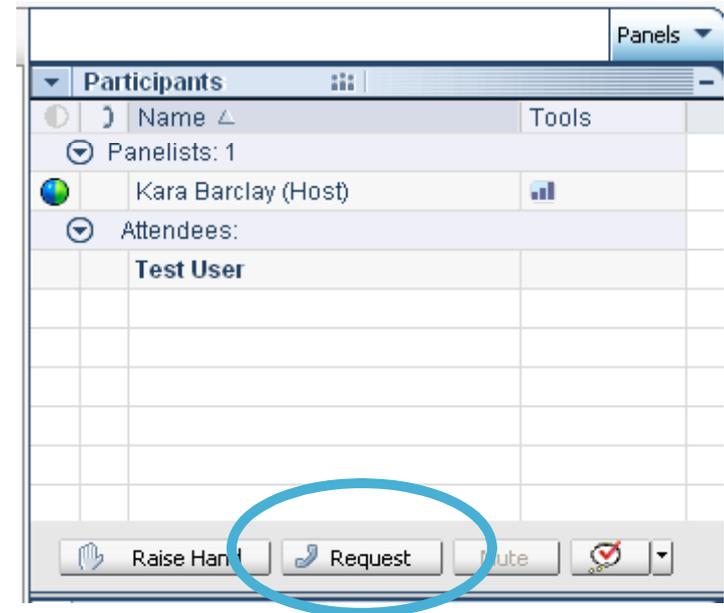
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# Legal Background to Clean Power Plan

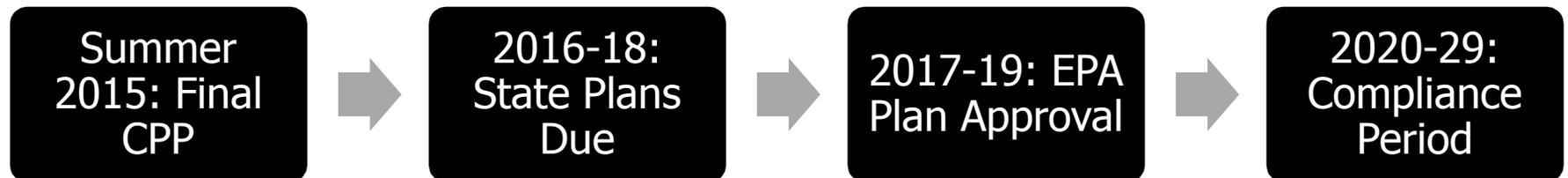
- 2007: *Massachusetts v. EPA*: Supreme Court holds that GHGs qualify as “air pollutant” under the Clean Air Act
- GHG action on existing power plants:
  - 2013: President Obama issues presidential memorandum directing EPA to use section 111(d) of the Clean Air Act to propose regulations to reduce carbon pollution from existing power plants
  - June 2014: EPA issues draft Clean Power Plan
    - Novel approach: Rather than focusing only on emissions limits from plants, addresses mechanisms “outside the fence line” of power plants such as energy efficiency, renewables, and cap & trade
    - Legal challenges on the “outside the fence” proposals (Building Blocks 3 and 4)
    - If Building Blocks 3 and 4 are ruled invalid, EPA might come back with greater reductions through Building Blocks 1 and 2

# Political Landscape

- The Obama Administration sees this as part of its legacy
- President wants the final rule in place before he leaves office
- Some on Congress are opposed
- Lisa Murkowski, Chairman of the Senate Energy Committee, has used FERC to counter the EPA agenda on climate change
- States upset with reduction targets
- RTOs and NERC have raised reliability concerns
- FERC caught in the middle; wants to protect reliability but wary of trying to regulate through another agency's rule
- Senator Mitch McConnell has urged states to refuse to draft SIPs
- Legislation to delay implementation has been introduced

# Clean Power Plan Overview

- Focuses on electricity production, which is the largest source of GHG emissions in the US (32% of all US GHG emissions)
- Goal: 30% reduction in carbon dioxide emissions from 2005 levels by 2030
  - Interim goals would require most reductions by 2020 (causing most concern)
  - State-Based Goals: EPA-established state baseline measured in CO2 per MWh, resulting in reductions stemming from 11% (ND) to 72% (WA)
    - States can choose to measure using a mass-based emission standard such as tons of CO2 per state per year



# Anticipated Timeline for Legal Challenges

- **August 2015:** EPA promulgates Final CPP Rule
- **September – October 2015:** Petitions for Review filed
- **May – June 2016:** Parties submit briefs
- **September – November 2016:** Oral arguments
- **March – May 2017:** Court issues decision
  - These are estimated dates; ultimate timeline will depend on timing of EPA action and the appeals court's timeline for briefing and issuing its decision
  - EPA has had success recently before the courts:
    - DC Circuit upheld the MATS rule
    - Supreme Court upheld the Cross-State Air Pollution rule
    - Some legal experts believe Building Blocks 3 and 4 are the most vulnerable

# Options for Compliance

- Voluntary state compliance: State Implementation Plans
  - 1) Reduction in reliance on coal power
  - 2) Increased natural gas
  - 3) Increased renewables and nuclear
  - 4) Enhanced energy efficiency
    - Future changes by states regarding resource planning would require EPA approval
- No voluntary state compliance: Federal Implementation Plan
  - Limited flexibility because of limitations on co-opting state regulatory authorities
  - Likely focused almost exclusively on coal reduction
- Inter-state cooperation encouraged, but not required

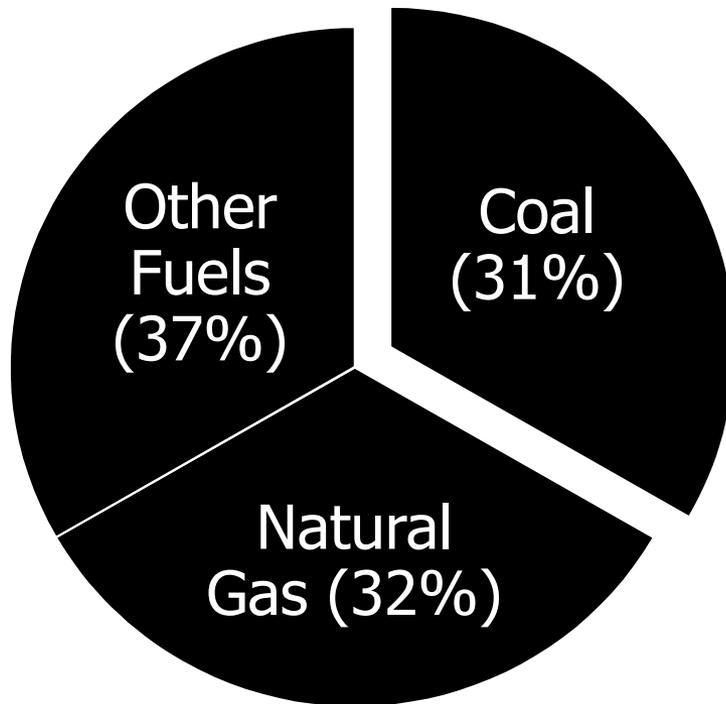
# EPA's List of Tools for Meeting Goals

- Demand-side energy efficiency
- Electricity from low/zero emission facilities
- Greater use of existing combined-cycle units
- Improvements to transmission efficiency
- Energy storage
- Retirement of high-emission units
- Energy conservation
- Retrofitting units for partial carbon capture & storage
- Biomass generation
- Efficiency improvements at high-emission plants
- Market-based trading (e.g. cap & trade)
- More renewable generation
- Changes in dispatch
- Conversion of generation to natural gas
- New natural gas combined cycle units

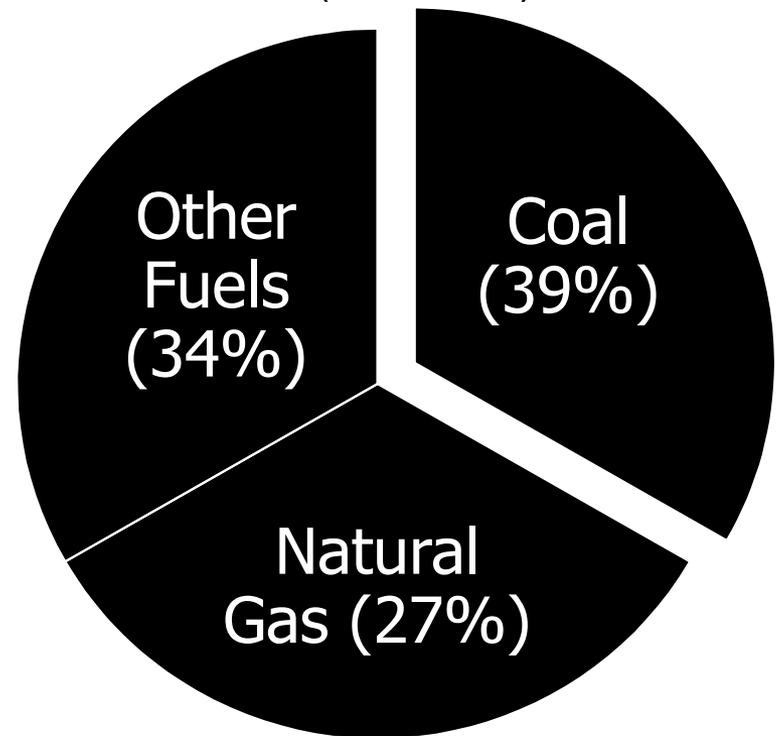
# EPA's Expected Fuel Mix in 2030

- EPA expects coal and natural gas to each be more than 30% of the US generation mix in 2030

2030 Estimated



2014 (EIA Data)



# Commercial Issues from Clean Power Plan

- Electricity costs increasing:
  - As much as \$366B from 2017 through 2031
  - Utility estimates:
    - For coal-dependent states, increases up to 20%
    - For less coal-dependent states, increased up to 10%
  - EPA estimates 6 to 6.5% increase
- EPA compliance does not mesh well with capacity market rules
  - Entities must bid in well ahead of time (e.g. 3 years), but the final rule is uncertain, as is each state's individual plan, so the ultimate effect on generation remains unclear
  - Generation may be bid in for multiple years, but forced to retire by CPP
    - Violate capacity market commitments?
  - How do you determine existing capacity if it is unclear whether certain plants will be available in three years?

# Reliability Implications of Clean Power Plan

- Reductions in coal-power generation likely to create reliability issues
- NERC's View (April 2015 Report):
  - Uncertainty regarding whether new generation can be built in the time needed to address the retirement of coal resources
  - Change in generation mix drive concerns regarding frequency response, voltage support, and ramping capability
  - Extensive transmission expansion needed
  - Power flow changes will require significant planning and coordination to address
- Opposing Views:
  - Retirement of worst plants leverages CO2 reduction, not all coal the same
  - Options exist for avoiding risks of overreliance on natural gas reliability
  - States have flexibility to fashion their own plans

# Reliability Implications of Increased Natural Gas Reliance

- NERC estimates gas usage may increase from 39 Bcf/d to 50 Bcf/d (approximately 30% increase)
- Natural gas is a lower emission fuel, but increasing reliance leads to additional reliability issues
  - Gas-fired generation more susceptible to cold weather disruptions
    - Freezing plants; Competition from LDCs
  - Gas-electric coordination still in need of improvement
  - Gas pipelines face security issues more extreme than the more resilient “grid” of electric transmission
  - Gas is not as easily stockpiled as coal against disruptions in delivery
- Gas may not be available
  - Sufficient gas capacity may not exist in some regions to support new plants
    - Gas pipelines typically built to accommodate existing commitments, not significant headroom for future growth
  - May not be able to site, permit, and construct enough pipeline and distribution capacity

# Implementation Issues

- Possible regional approaches rather than state-by-state
  - Flexibility, shared burden
    - States with easier compliance (e.g. high wind) assisting those that are more coal-dependent
  - More reliance on transmission construction
  - Increased reliance on interstate markets
- Reliability mechanism to address reliability issues during implementation by providing compliance flexibility
  - Could include FERC input during EPA review of state plans
  - FERC is coordinating with EPA through interagency review
  - Possible removal of 2020 interim goal to provide longer ramp time

# FERC Reliability Review Role

- Reliability Assurance Mechanism

- Core elements could include:
  - State or regional CPP plans
  - Reliability assessment of CPP plans by NERC
  - Evaluation of CPP plans against established reliability criteria
  - Consideration of reliability assurance mechanism options such as:
    - Infrastructure implementation options
    - Adjustments to implementation targets
    - Reliability Must Run generation
    - Entity or state-specific CPP implementation plan modifications
    - Reliability-specific adaptations and provisions to maintain reliability
- NERC's role:
  - Serve as a resource for states/regions in developing plans before sent to EPA
  - Reliability assessments and review of plans during plan review period
  - Identify risks to reliability during implementation period, including insufficient time to add infrastructure, unanticipated conditions, conflicts between reliability and CPP implementation, load shedding to satisfy CPP

# FERC Reliability Review Role

- Reliability Safety Valve
  - Unit-Specific enforcement discretion if permit limits violated because of reliability response
  - FERC documents reliability concerns
  - Does not prevent citizen suits under the Clean Air Act
  - Not clear how such an approach would work under the CPP

# MATS

- Mercury and Air Toxics Standards
  - Coal fired power plants must install Maximum Achievable Control Technology (MACT), protecting against mercury, other toxic metals, acid gases, and some toxic organic compounds
    - Costly, particularly for plants burning Appalachian and Illinois Basin coal
      - Capital cost similar to a new gas-fired power plant
    - Less expensive for plants burning Powder River Basin coal
    - Due April 16, 2016, but extensions available
- Estimated retirement up to 35 GW (100M MWh/year)
- Retirement of coal units result in:
  - Significant increase in gas generation output
  - New gas generation construction
  - Increased gas usage

# Estimated Generator Retirements

- Likely retirements are:
  - Older units (online in 1960s-1980s)
  - Smaller units (300MW or less)
  - Higher pollution plants
  - Less used plants
- Retirements Driven by CPP = 60 GW of coal-fired generation
- Retirements Driven by MATS = 35 GW of coal-fired generation  
= Total of 95 GW (EPA estimates as much as 120 GW retired)
- NERC expects most significant retirements to occur in ERCOT, SPP, NPCC, and MISO
- Caveat: Poor capacity factors for remaining coal units could drive further retirements

# Compounding Drought-Related Reductions

- 2005 level used to set CPP baseline for each state was before worst effects of Western drought
- West relies on a significant amount of zero-emission, low-cost hydropower to meet generation needs
- If drought continues, reservoir water levels fall, reducing water speed and therefore generation capacity
  - Some retrofitting to assist
- Lost hydro capacity will need to be replaced by other generation
  - Increases need for new capacity
  - Replacements may not be zero-emission



# Near-Term Opportunities

- Markets
  - Expanded sub-RTO markets across states
    - E.g., Energy imbalance markets
  - More capacity products (energy efficiency, advanced demand response, regional bulk storage)
  - Capacity more valuable (but could create regulatory risk if cost is too high)
  - Greater need for ancillary service providers due to increased reliance on renewable generation and distant generation
    - Frequency response and spinning and supplemental reserves
    - Strategically-placed dynamic reactive power resources (shunt capacitors, synchronous condensers, static Var compensators, etc.) to maintain voltage stability
- Expansion of gas-electric coordination efforts
- Leveraging existing transmission planning
  - Increased development in existing transmission planning processes
  - Post-Order 1000 competition in transmission planning
- Investments in initiatives incorporated in state plans:
  - Demand response, distributed renewable generation, energy efficiency, etc.

# Long-Term Opportunities

- Facility Investment Opportunities
  - New and expanded natural gas generation
    - Unlikely to have new nuclear (2030 deadline is too soon for nuclear construction)
  - Major renewable generation investments
  - Gas pipeline expansion (up to 10,000 miles predicted)
  - Increased gas storage (both gas and LNG)
  - Electric transmission construction (greatest need in RFC, NPCC, and Southwest WECC)
  - Benefits
    - Need to meet compliance objectives may speed siting approvals
  - Risks
    - Environmental opposition to gas pipeline expansion
    - Electric transmission siting is increasing difficult due to political and legal complications
      - Potential return to federal statutory solution
    - Reductions in ROE for transmission investment
- Expanded energy markets
  - Expansion of existing RTOs
  - Creation of new RTOs
  - BUT . . . state-specific requirements could increase segmentation of regional grids

# THANK YOU

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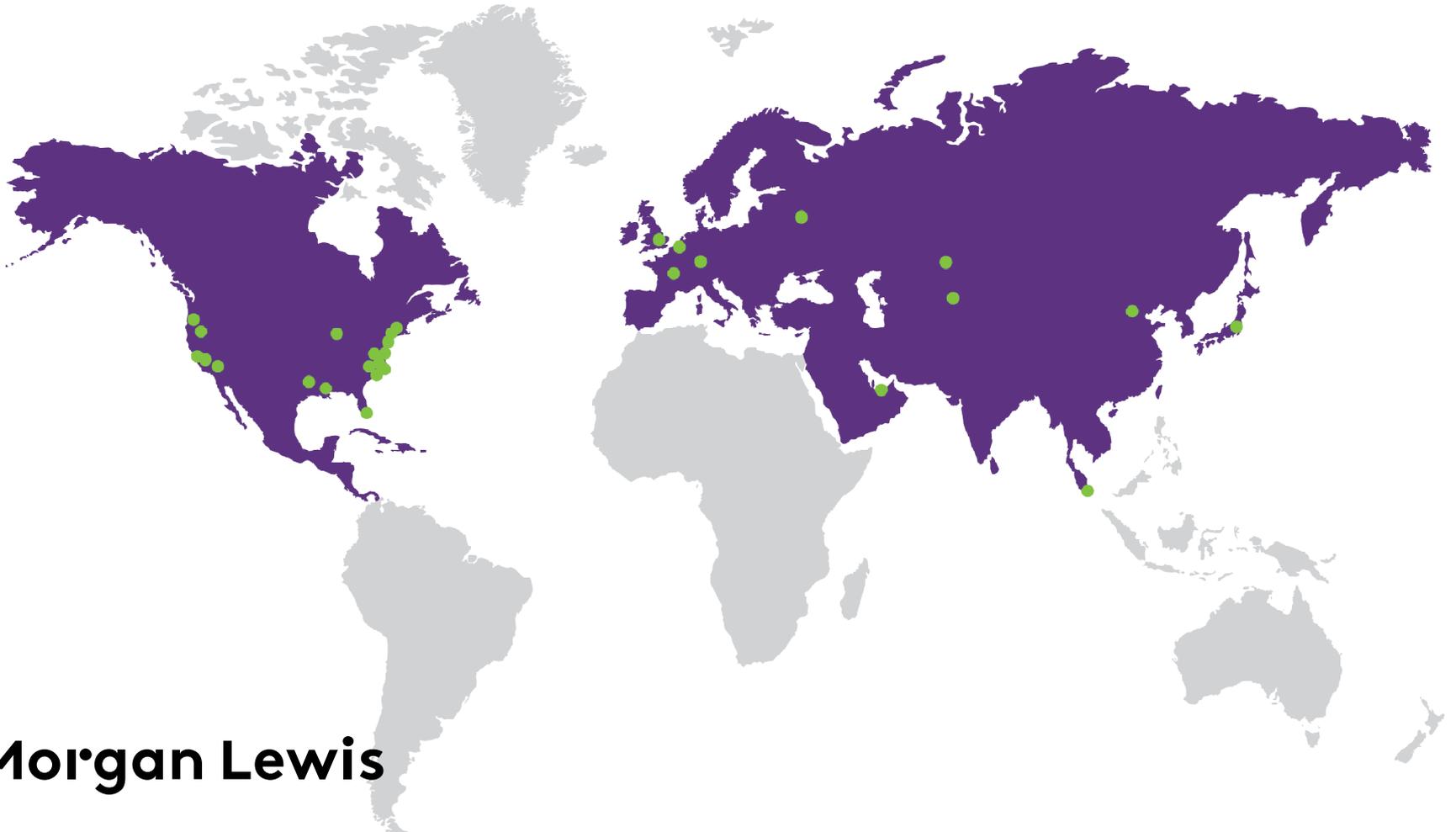
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