Decarbonizing Minnesota's Natural Gas End Uses

Meeting 10 – Equity & Workforce

September 16, 2020

Via Zoom

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Agenda

9:00AM	Welcome & Introductions
9:15AM	Brief check-in on E3 modeling
9:30AM	Presentation and Q&A: Workforce
10:30AM	Break
11:00AM	Presentation and Q&A: Equity
12:00PM	Lunch Break
1:00PM	Discussion
2:30PM	Adjourn

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Meeting Goals

1. **Check-in briefly on the E3 modeling.**
2. **Build a shared understanding of current state and future opportunities around equity and workforce considerations.**
3. **Identify the following through facilitated discussion:**
    1. What are the group's collective conclusions about workforce and equity considerations with respect to decarbonizing natural gas end uses?
    2. What are the group's collective remaining (unanswered) questions about workforce and equity?
    3. What are the perceived challenges and opportunities to achieve our guiding principles around workforce and equity?

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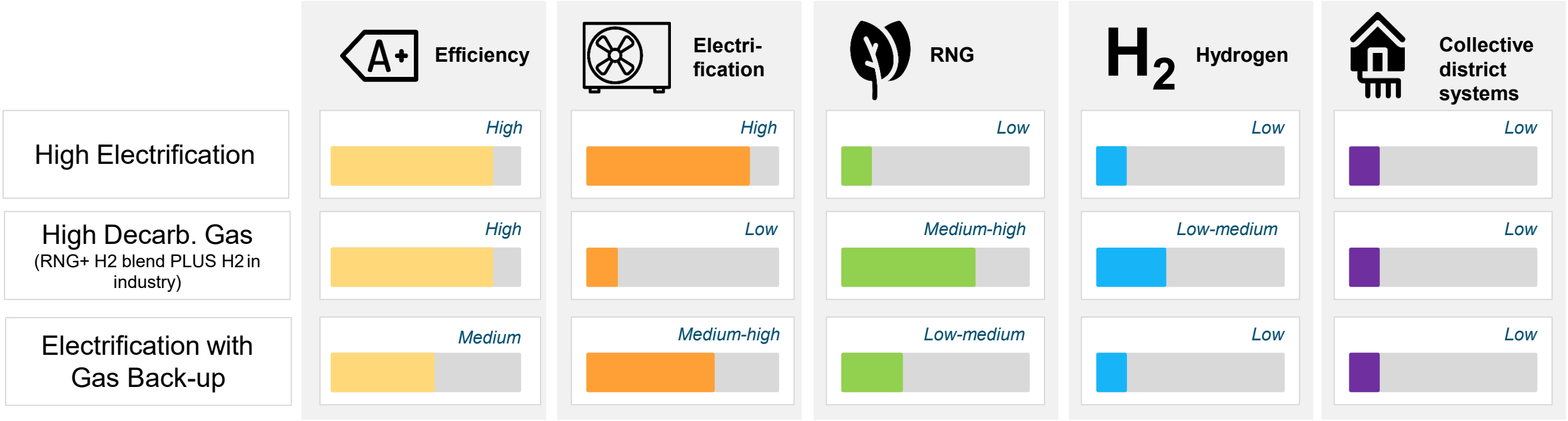
Energy+Environmental Economics

Decarbonization of Natural Gas End-Uses in Minnesota

Scenario overview

The stakeholder meeting resulted in a preference for 3 scenarios

+ **Analysis of 3 main scenarios: "High Electrification", "Electrification with Gas Back-up" and "High Decarbonized Gas (with H2 in industrial sector)"**
+ **Significant interest in the modeling of collective district systems (open end)**
  - Discussion on potential 4th scenario
  - Follow-up meetings with part of stakeholder group (8/18) and MA HEET team (8/21) to discuss possibilities



Approach to district system modeling

- **Rather than adding district systems as a 4th scenario, E3 proposes to include the potential deployment of district systems as a high-level modeling sensitivity onto the High Electrification and Hybrid scenario.**
  - Main modeling question: by how much can the electric peak be reduced if X% of load would be served by a collective district system, and how would it alter the costs?
  - Approach: high-level quantification of the potential effect of district systems compared to an electrification scenario, *without data analysis on locational feasibility of those systems and their thermal sources*
- **Main assumptions/limitations:**
  - ***Load:*** % of load to include in sensitivity (should be large enough to have a meaningful effect), potentially using the ~20% consumption from identified load clusters in the Barr report.
    - Limitation: the load % can be an arbitrary figure (not backed by locational data), with emphasis on required further research. Used as a "what if" assumption.
  - ***Thermal source:*** Thermal source used as input for future collective district systems. Study would assume all of extra load can be supplied by a mix of geothermal and waste heat (potentially using Barr report estimates for the latter), with emphasis on required further research
    - Limitation: no locational analysis of where and how much geothermal/waste heat would actually be available
  - ***Gas infrastructure costs:*** assuming district systems replace aging gas pipelines (if applicable) or gas infrastructure for new construction, reducing the need for further gas infrastructure investments (replaced/repurposed by hot water pipeline investments). Data availability to discuss with Xcel & CenterPoint.
    - Limitation: based on overarching assumption that gas infrastructure would escalate in (more unstructured) high electrification/hybrid scenario, whereas infrastructure investments can potentially be avoided with district system replacement
  - **District system connection costs:** taking fixed assumptions on # of buildings per load cluster and retrofitting/infrastructure cost per cluster, using data from the HEET analysis & European examples.
    - Limitation: no locational analysis of cost differences per cluster, no detailed analysis of required retrofitting for hot water/forced air based heating systems

Workforce:

Kevin Lee, State Policy Director, BlueGreen Alliance

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Natural Gas Workforce

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Kevin Lee, State Policy Director

Sept. 16, 2020

Job categories in natural gas

- Extraction
- Processing/refining
- Gas field machinery manufacturing
- Gas utilities (multiple categories)
- Construction
- Installation & repair
- Wholesale trade/distribution/transport
- Office/Professional/Administration: Engineers, scientists, consultants, finance, sales, marketing etc.

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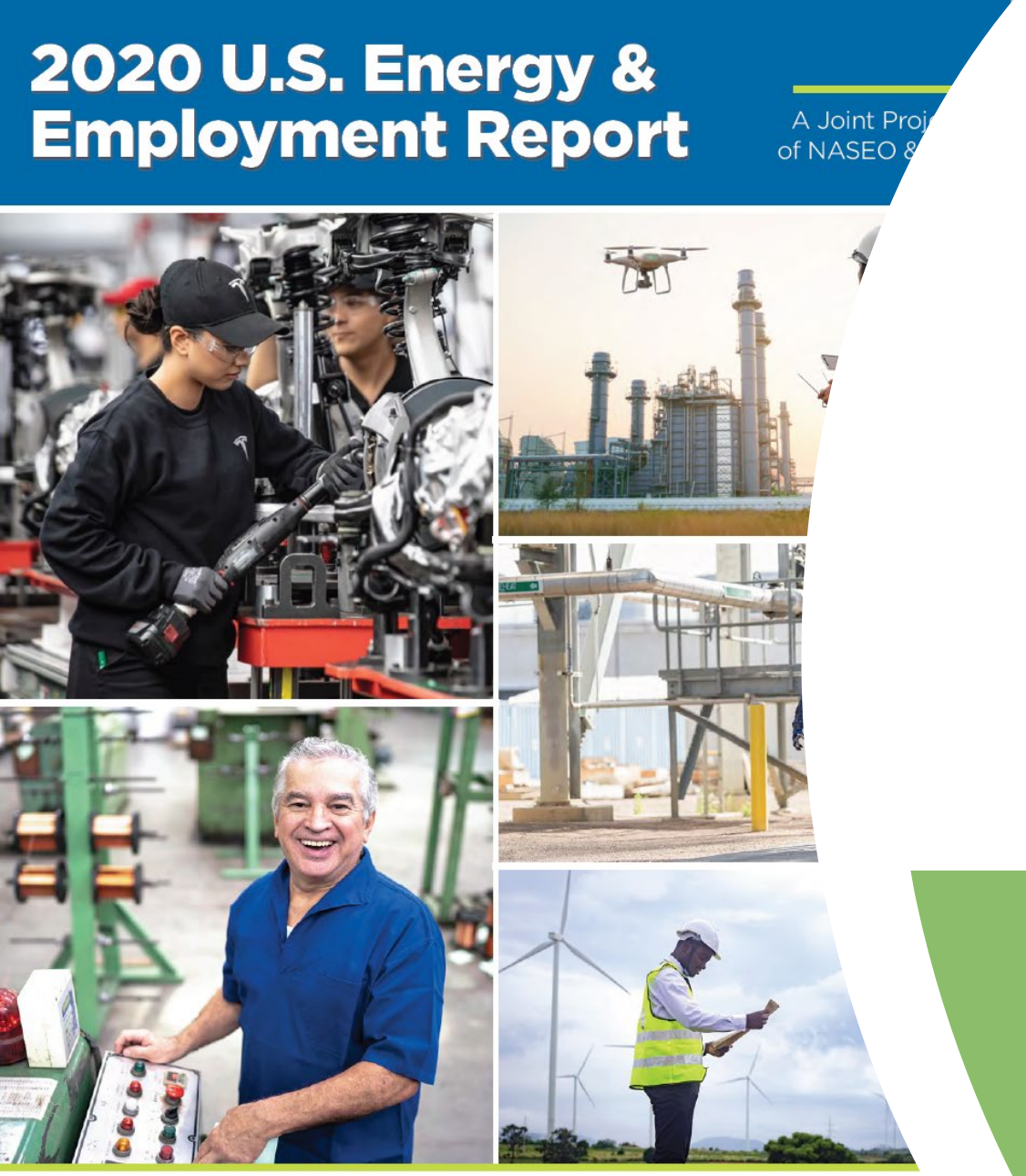
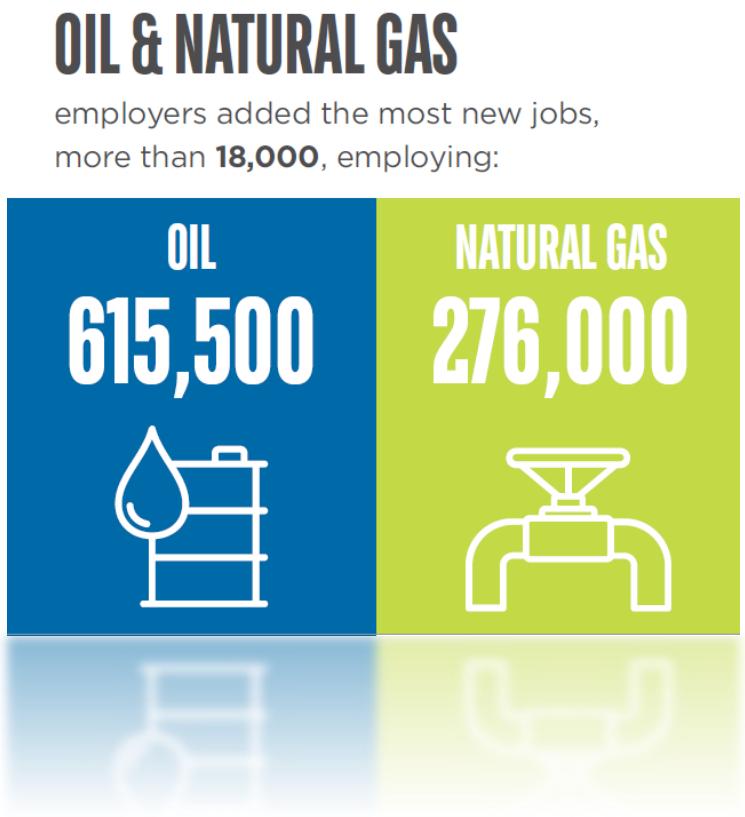


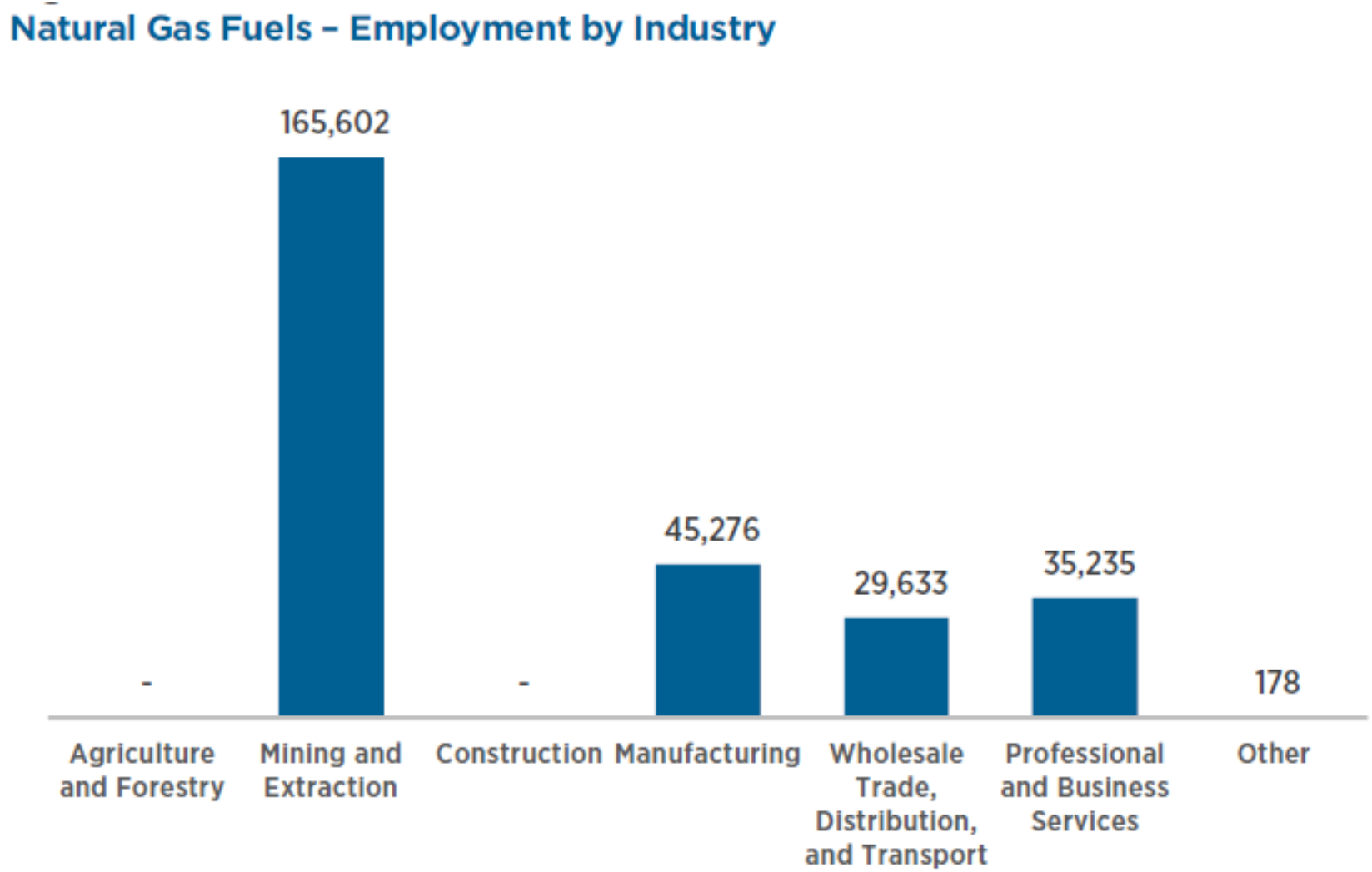
Highlights from 2020 USEER Report

National Employment in Natural Gas Sector



Extraction, manufacturing, wholesale trade, distribution (wholesale), transport, professional

National Employment in Natural Gas Sector – broken out by industry



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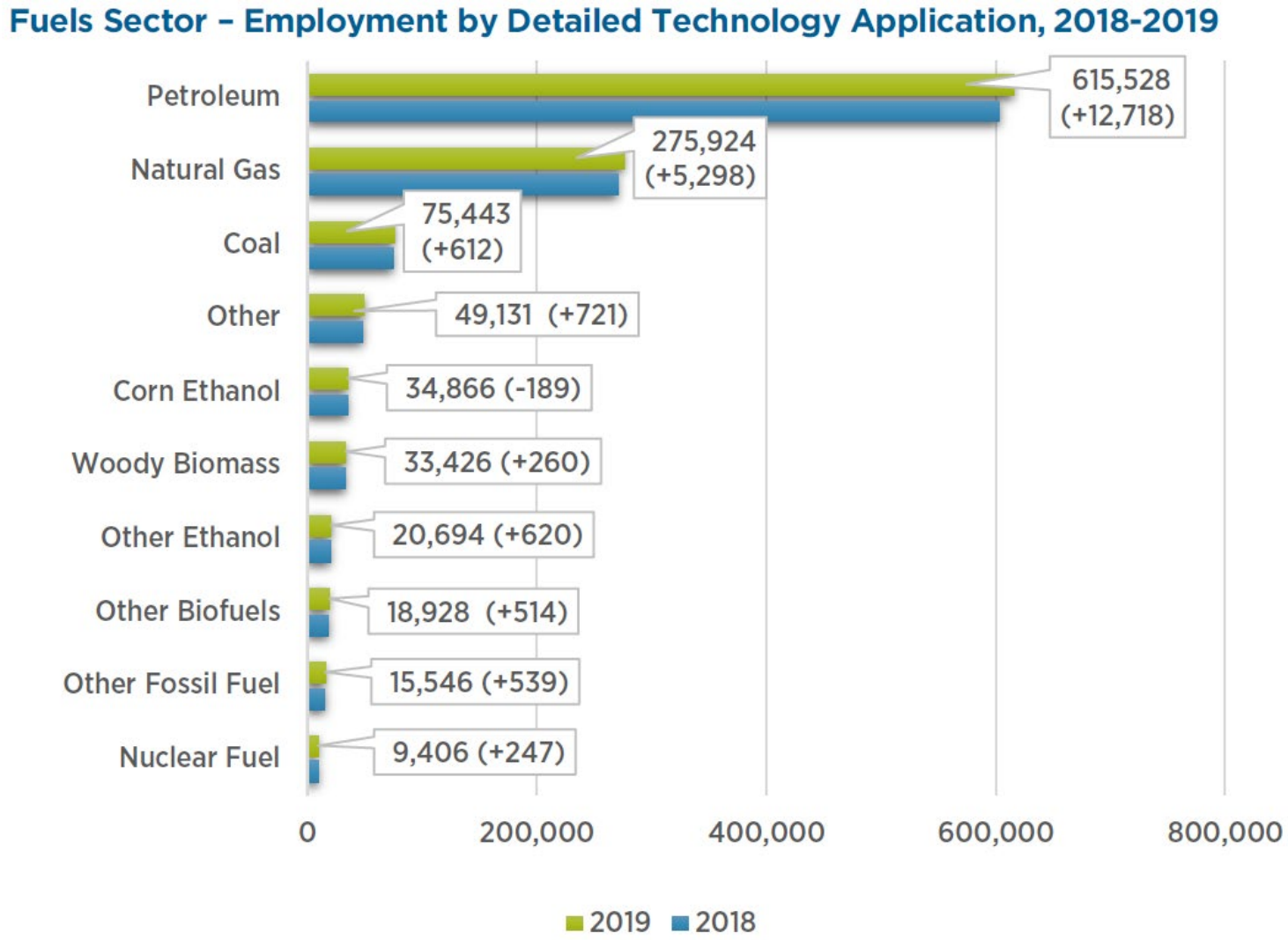
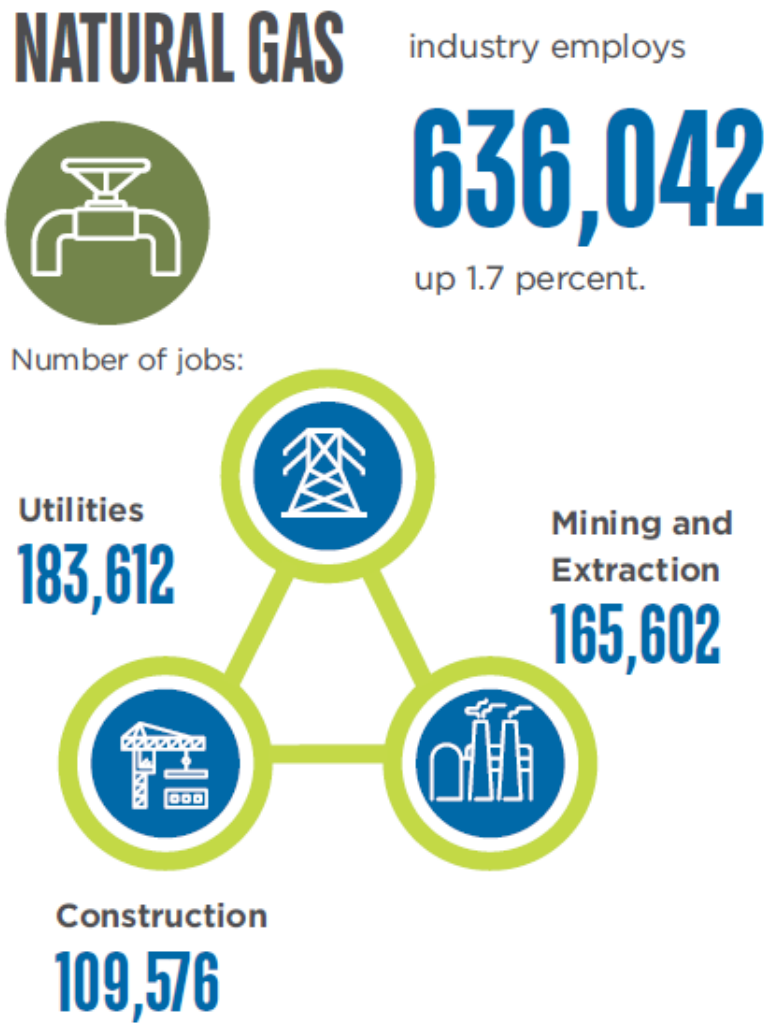


Cross-cutting employment in natural gas



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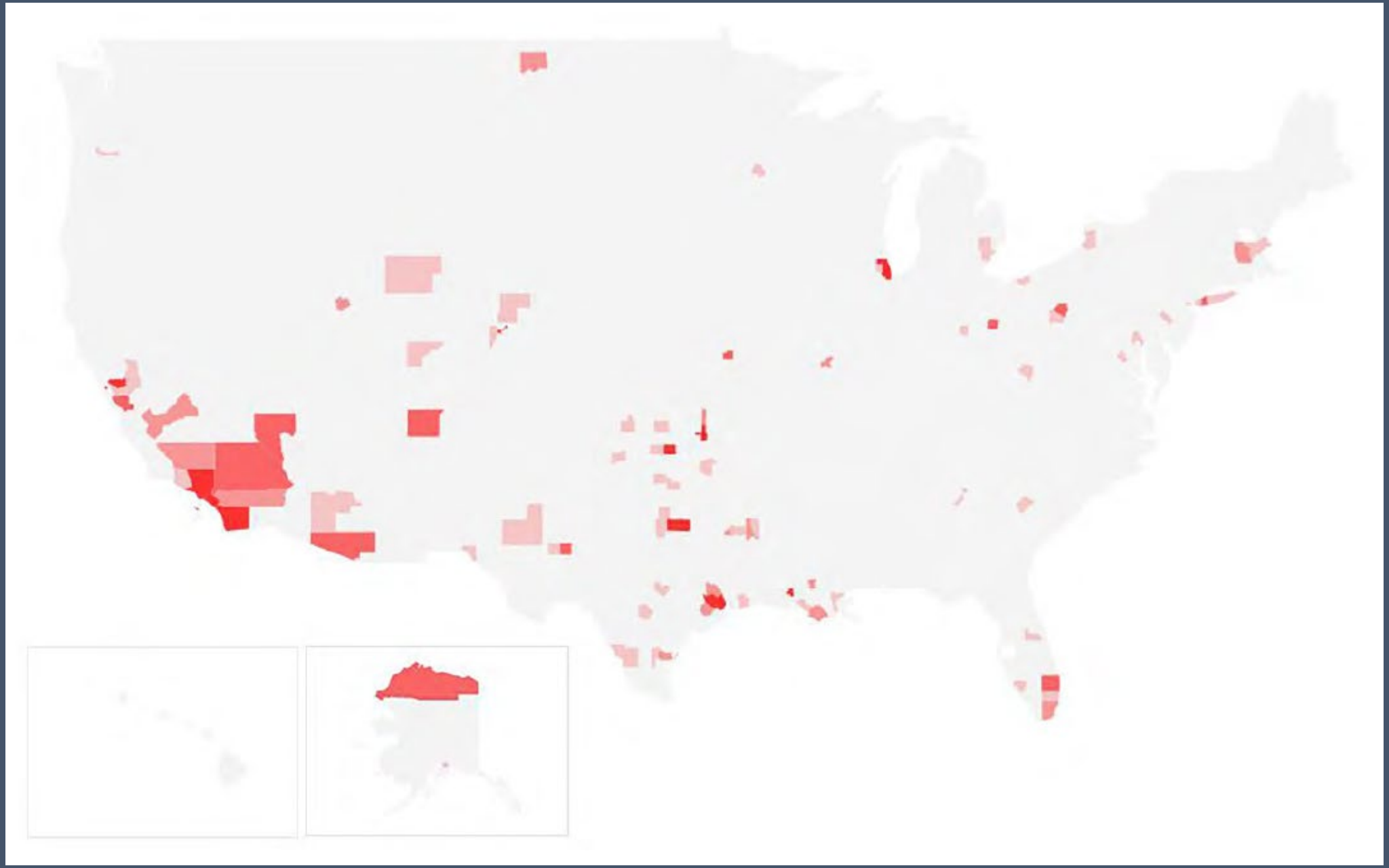
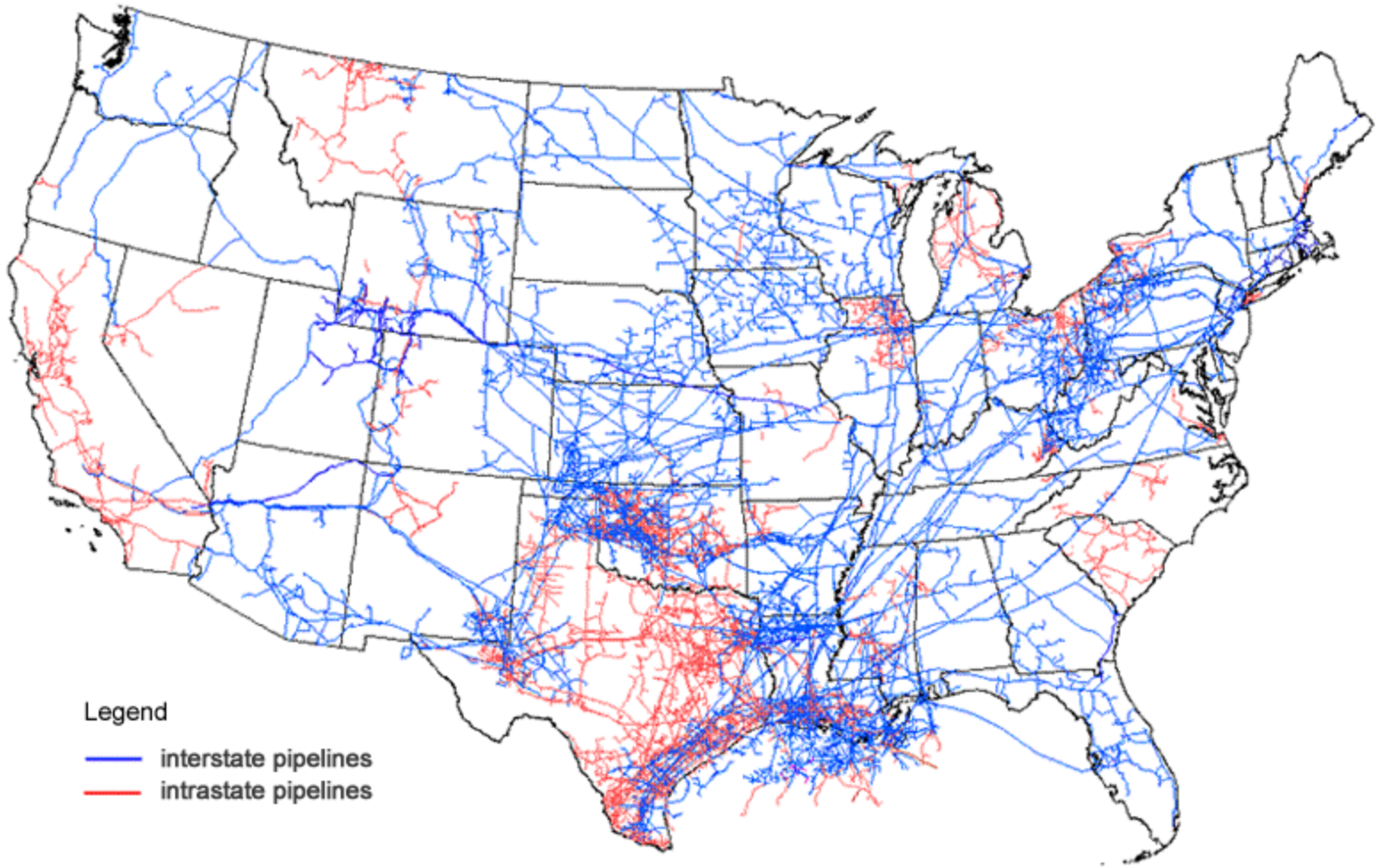
Natural Gas Jobs Heat Map



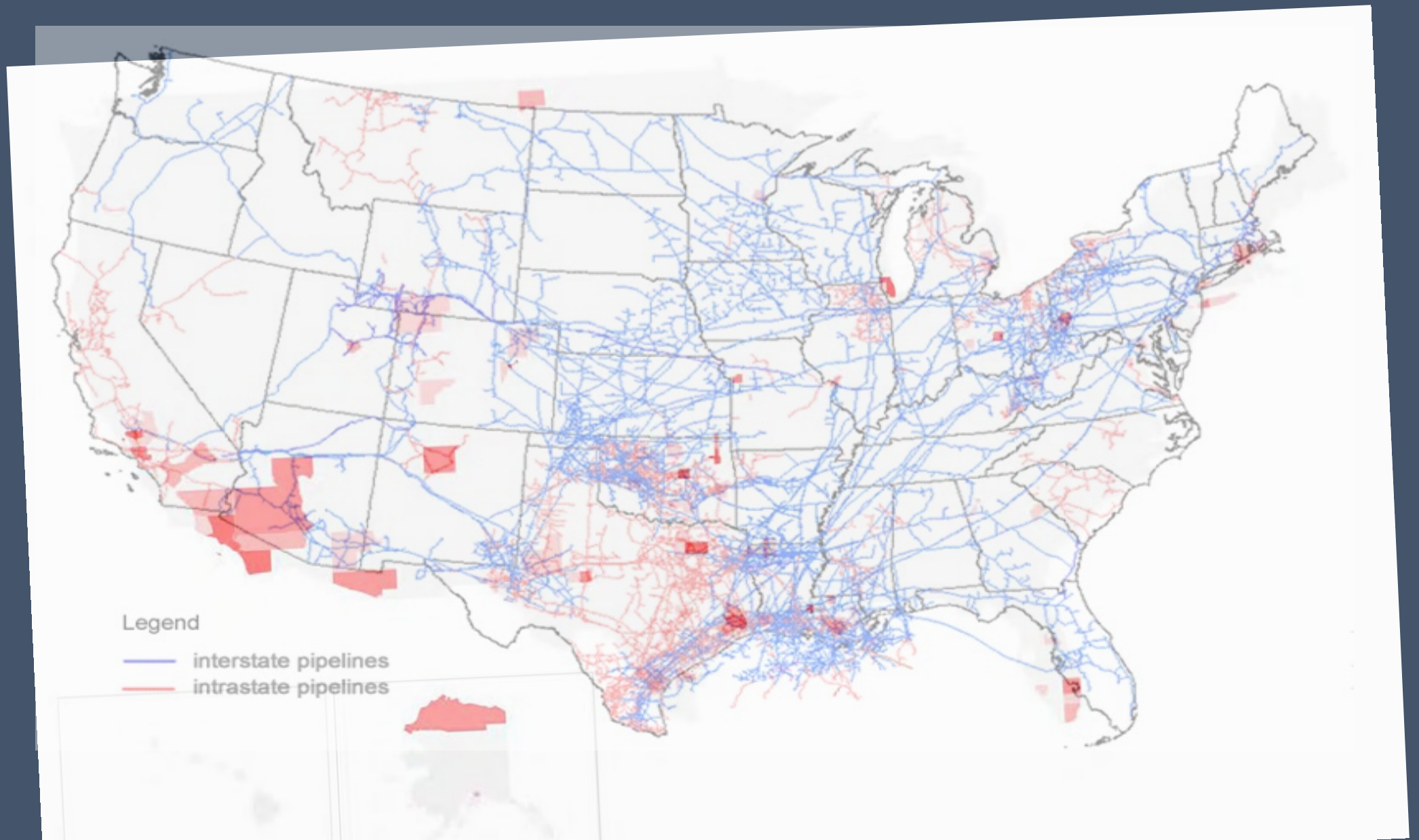
Natural Gas Pipeline System

Map of U.S. interstate and intrastate natural gas pipelines



Source: U.S. Energy Information Administration, *About U.S. Natural Gas Pipelines*

Natural Gas Jobs Heat Map



Average wages in natural gas industry

- Fuels sector (extraction, manufacturing, wholesale trade/distribution):

  $67,330

- Utilities/Electric Power Generation (incl. gas plant operators, in-house trades, system operators, etc.):

  $74,638

- Construction (incl. contracted trades work):

  $58,850

*Solar installation median: $46,850

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Unionization in natural gas industry

- Fuels sector (extraction, manufacturing, wholesale trade/distribution):

  3% (driven mainly by low unionization in extractive industry)

- Utilities/Electric Power Generation (incl. gas plant operators, in-house trades, system operators, etc.):

  11%

- Construction (incl. contracted trades work):

  17% (driven by high unionization for contracted pipeline/storage trades work)

*Solar PV: 4%

*Workforce at large: 6%

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Minnesota Jobs in Natural Gas

- Fuels: **372** (mostly wholesale trade and manufacturing)

- Utilities: ~**3,000**
  - Gas-fired power: **700** (plant workers, EPG construction, professional)
  - In-house trades for distribution, pipeline construction/maintenance, gas services (appliance service and repair): **~2,000**
  - Office/Admin/Finance/Professional: **~300**

- Construction (non-in-house trades for pipeline/storage system work): **~3,000**

Total: ~6,372

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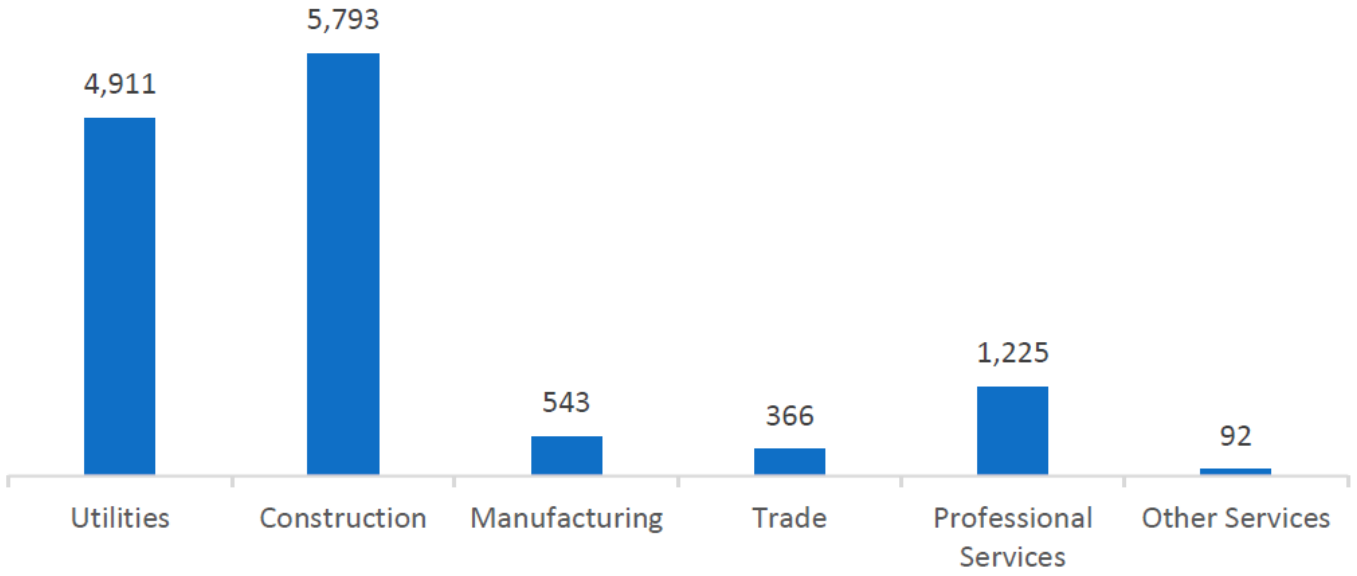
National Employment in Natural Gas Sector – broken out by industry

Construction is the largest industry sector in Electric Power Generation, with 44.8 percent of jobs. Utilities are next with 38.0 percent.

Figure MN-3.



Clean Energy Jobs in MN by Sector

46,191	Energy Efficiency
8,098	Renewable Energy
3,345	Advanced Transportation
2,763	Grid & Storage
650	Clean Fuels

Takeaways:

- Jobs cover utility jobs, extraction, wholesale trade, manufacturing, construction
- 636,000 nationwide working in gas
- 6,000+ working in MN in gas
- High paying, high rates of unionization

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Sources:

- 2020 USEER
- 2019 USEE MN
- DEED data on gas pipeline jobs
- BLS wage data
- 2017 economic census
- Data from union partners

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Questions and Discussion

Thank you!

klee@bluegreenalliance.org

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BREAK – RETURN AT 11:00AM

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Equity Considerations in the Natural Gas System

Decarbonizing Minnesota's Natural Gas End Uses Meeting 10
September 16, 2020

Ben Passer
Director, Energy Access and Equity
passer@fresh-energy.org

Fresh Energy

For 28 years, shaping and driving realistic, visionary energy policies that benefit all Minnesotans.

Strategic Imperatives:
Fresh Energy leads Minnesota's transition to a clean energy future with:

- Dramatic, economy-wide reductions in carbon emissions;
- A thriving clean-energy economy; and
- Holistic solutions that reduce disparities and increase equity.

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Advancing clean energy policy in Minnesota

- We engage across various forums:
  - State Legislature
  - Public Utilities Commission
  - State Agencies and Local Governments
- Our advocacy is driven by science- and market-based solutions.
- Our team has subject matter expertise in climate and energy science, policy, and law.

Overview

- What do we mean by “equity?”
- Why does it matter?
- How can we advance equity in the decarbonization of natural gas end uses?

Fresh Energy

What do we mean by “equity?”

- Equity means: elimination of barriers to full participation in the *process*, and access to the full benefits of the *outcome*.

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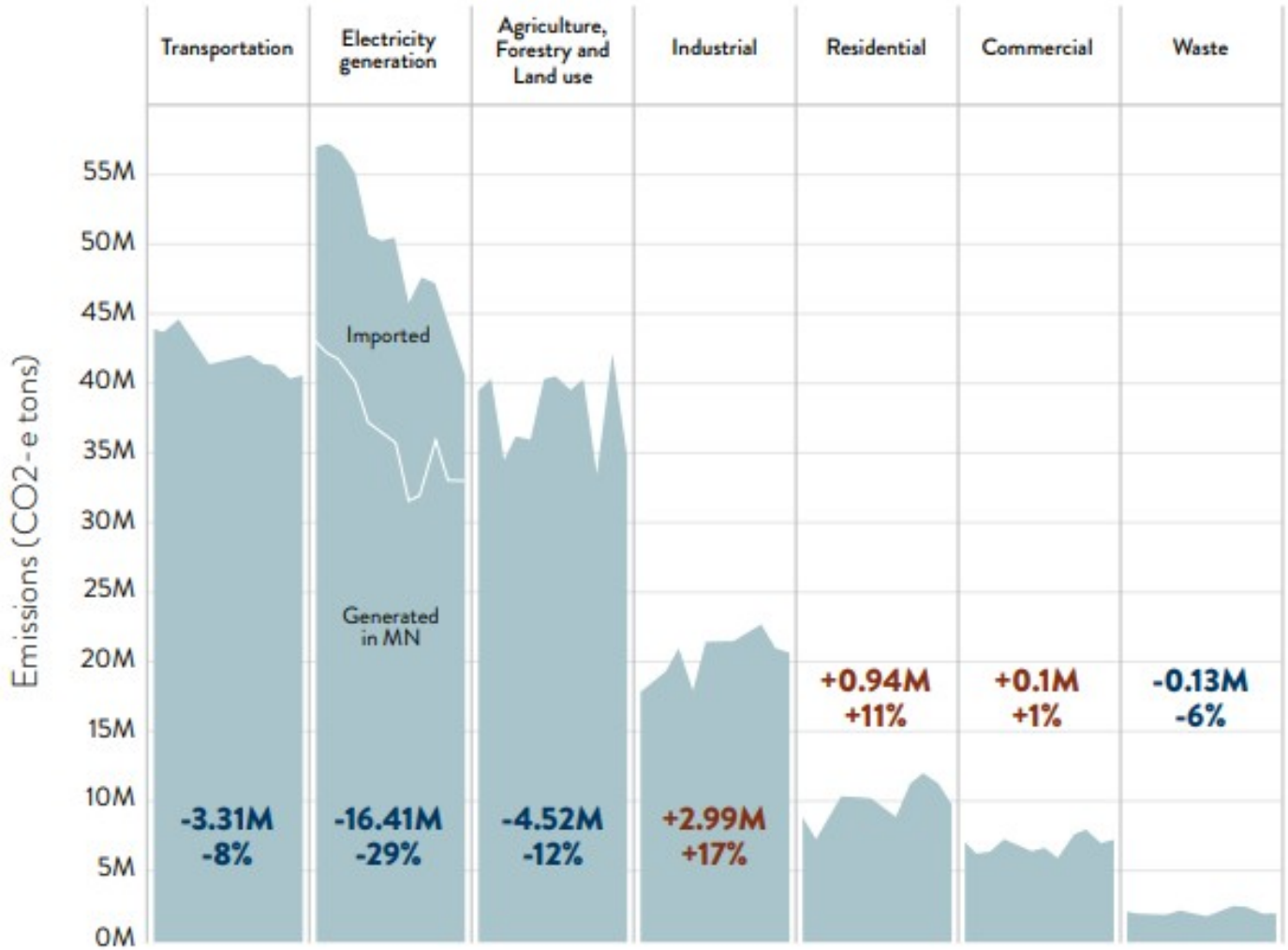
Emissions change (2005-2016)



Credit: 2019 MNDOT Pathways Report/2016 MPCA Greenhouse Gas Inventory

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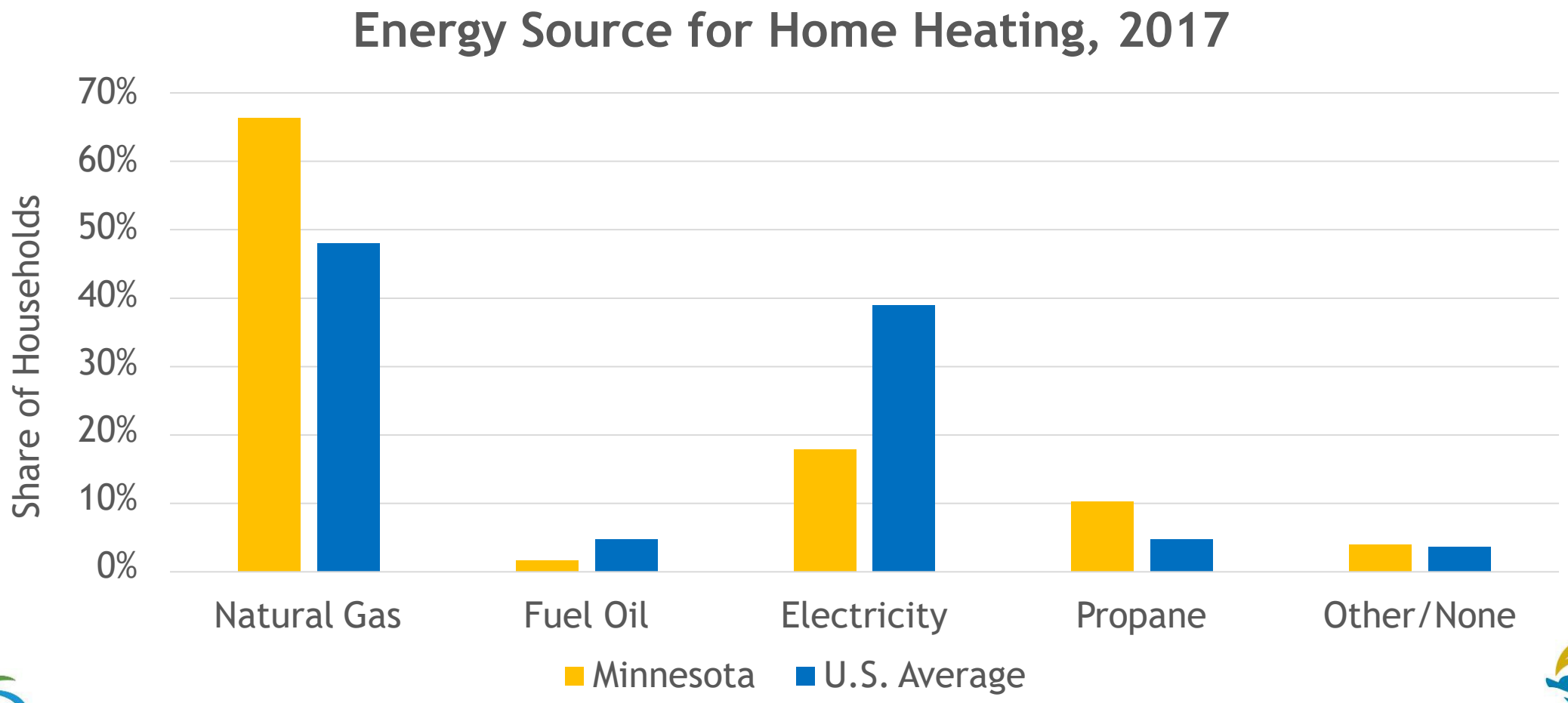
Natural gas and propane play an outsized role in heating



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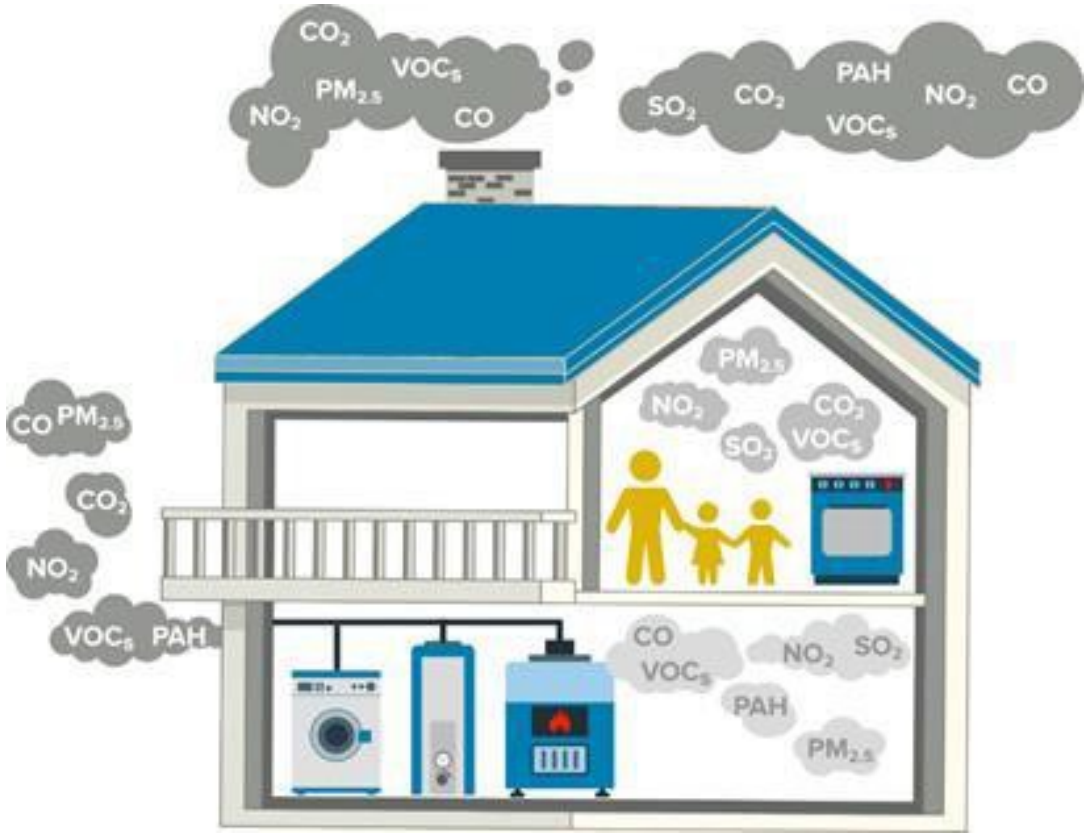
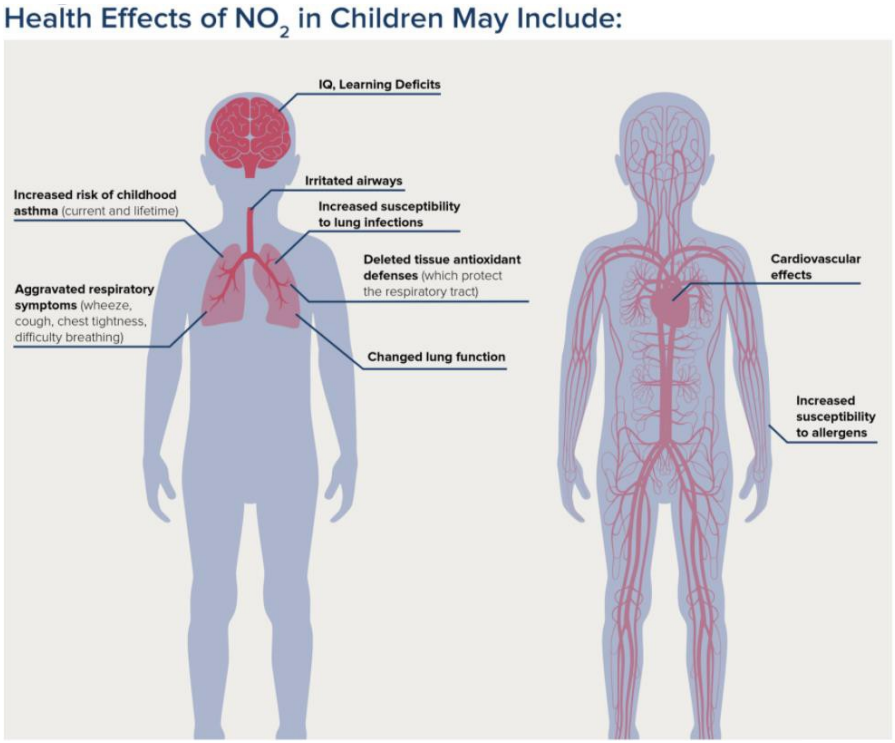
Indoor and outdoor air pollution in homes





Credit: Rocky Mountain Institute

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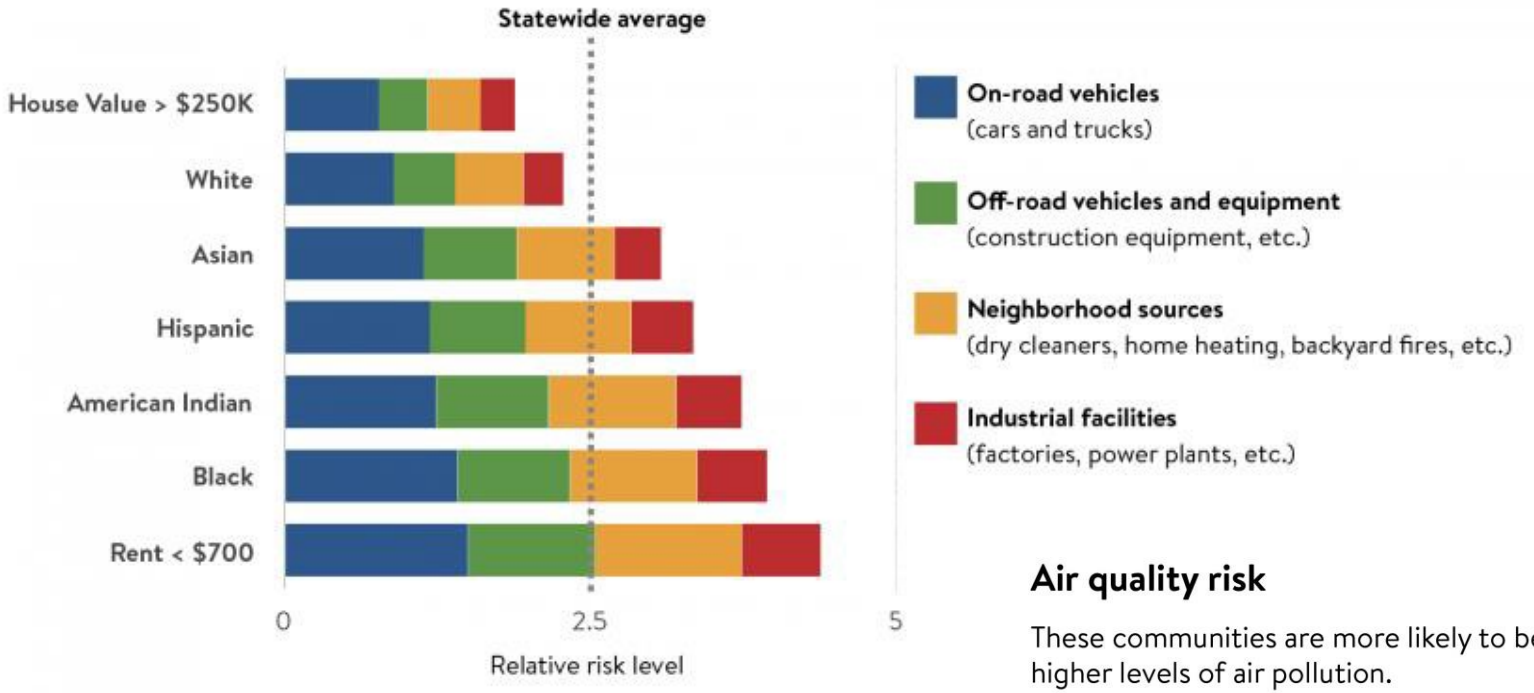

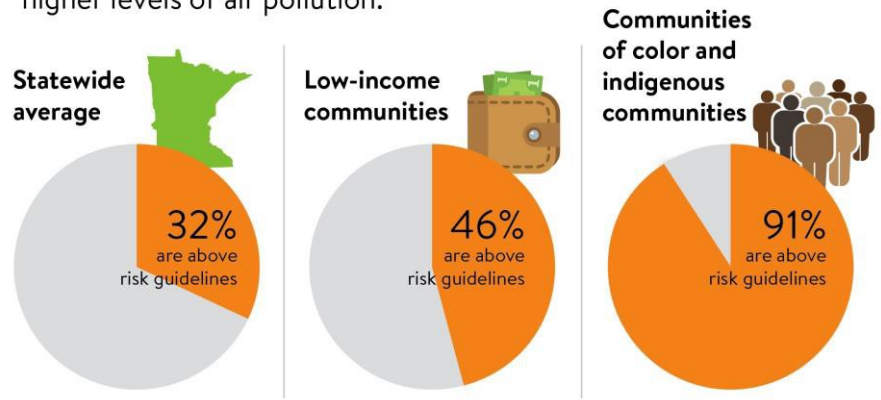

Credit: Minnesota Pollution Control Agency

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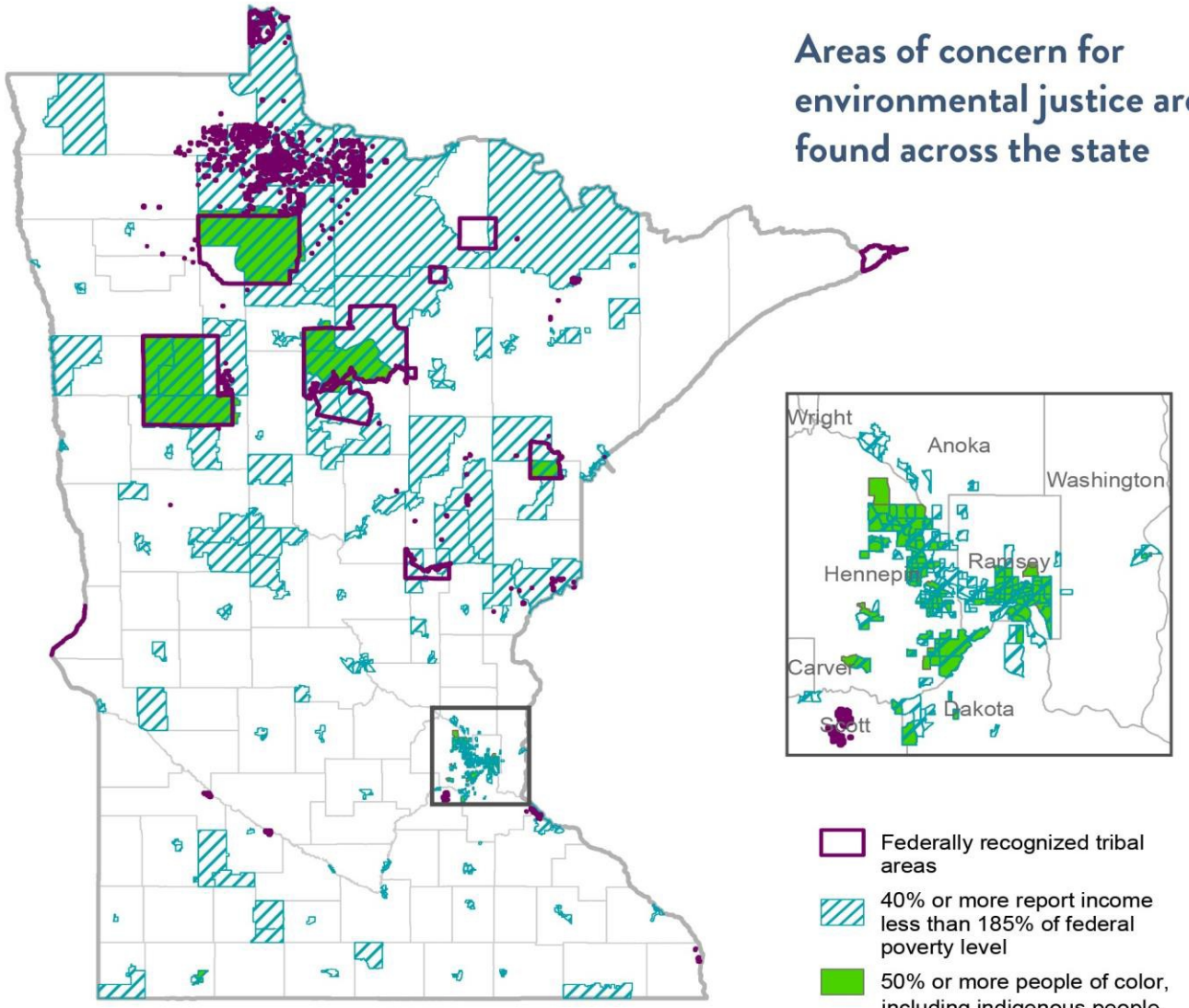
Areas of concern for environmental justice are found across the state



Credit: Minnesota Pollution Control Agency

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$$\text{Energy Burden} = \frac{\text{Household Energy Costs}}{\text{Gross Household Income}}$$

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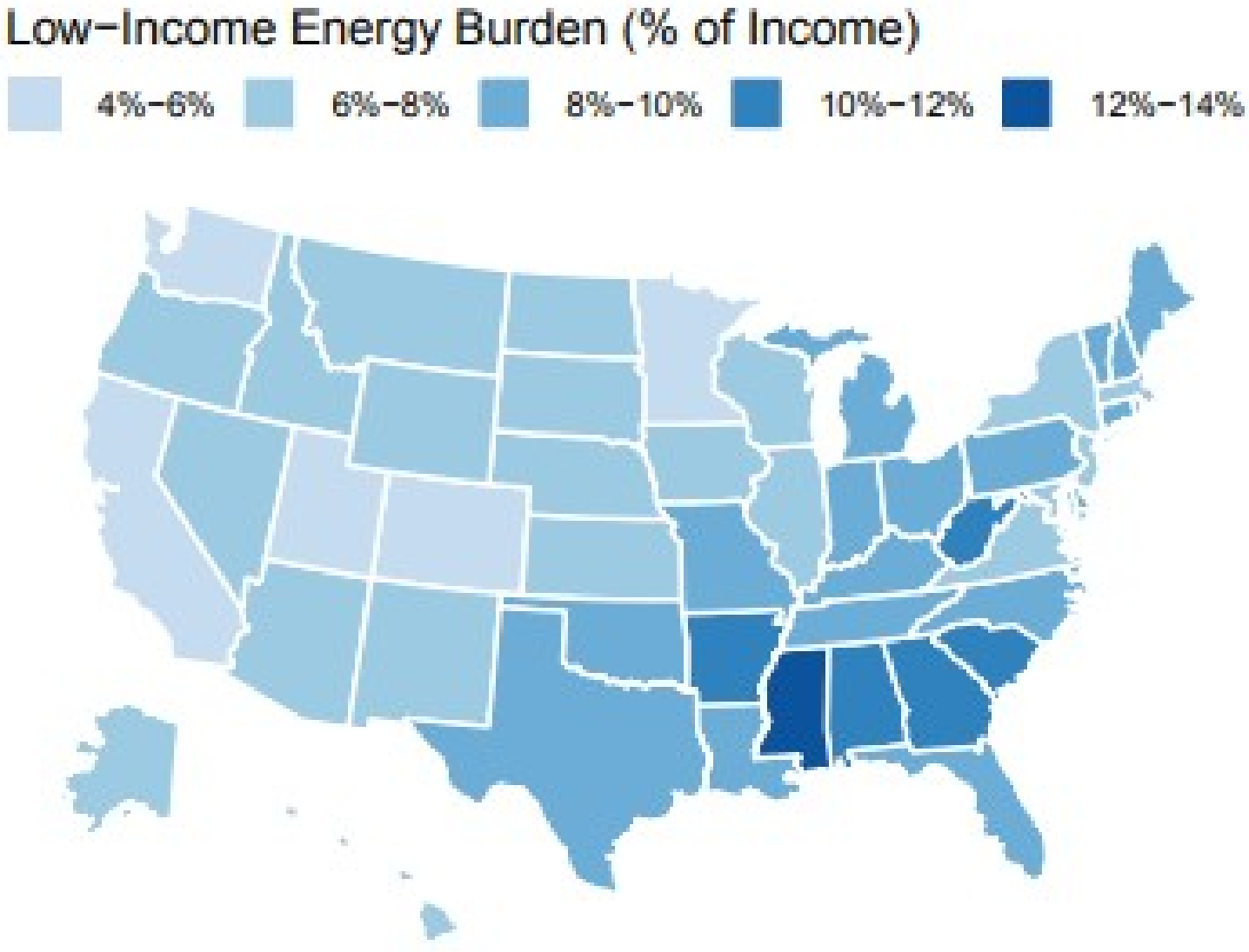

Credit: US Department of Energy

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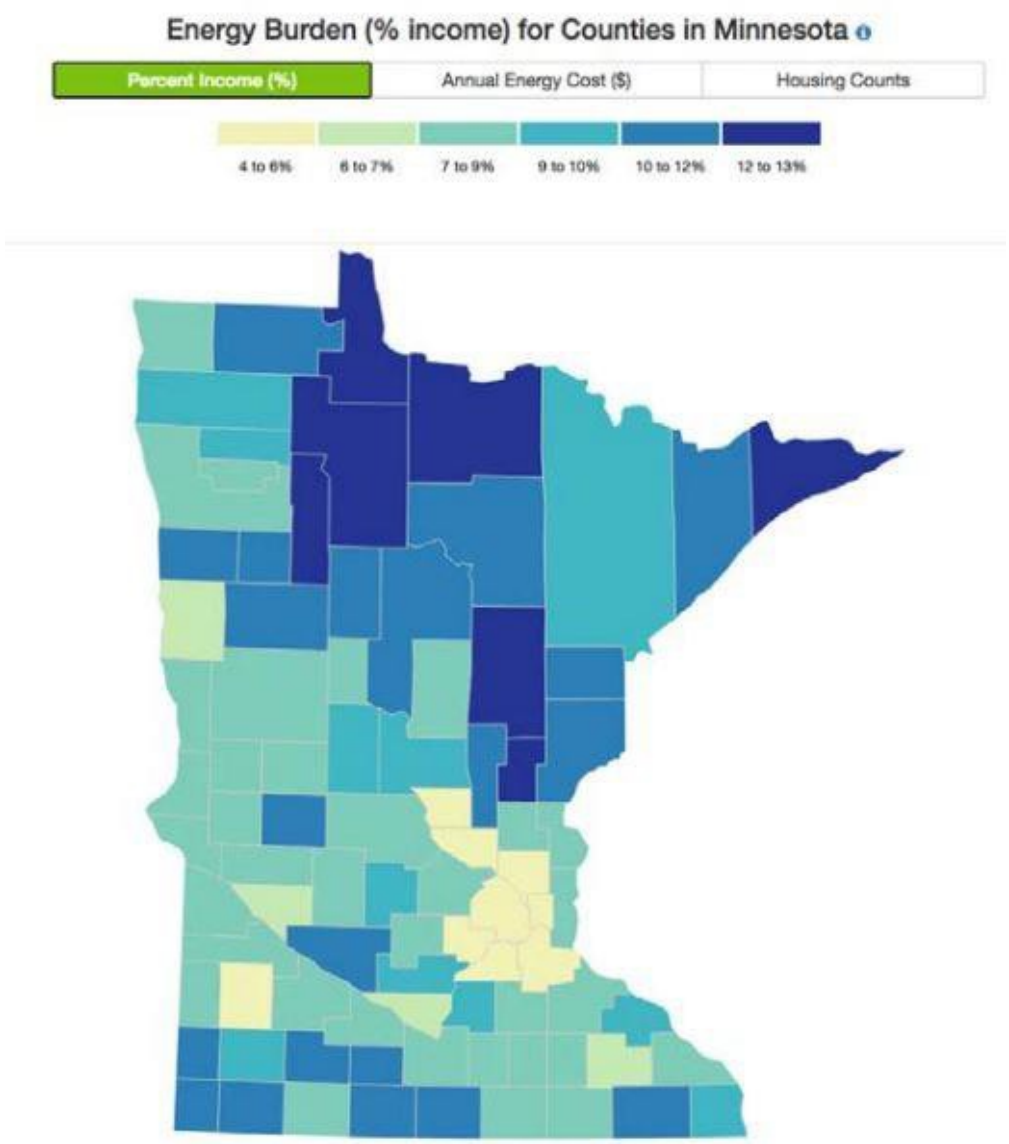

Credit: National Renewable Energy Laboratory (NREL)

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Poverty Level	Home Energy Burden
Below 50%	33%
50 – 100%	18%
100 – 125%	12%
125 – 150%	10%
150 – 185%	8%
185% - 200%	7%

Credit: *The Home Energy Affordability Gap* Report (2019), Roger Colton et al.

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TABLE ES1. Median income, utility bill, energy burden, and unit size for households based on income type, building type, building ownership, and household race for groups across all metro areas

	Household type	Median annual income	Median size of unit (square feet)	Median annual utility spending	Median annual utility costs per square foot	Median energy burden[1]
Income type	Low-income[2] (≤80% AMI)[3]	$24,998	1,200	$1,692	$1.41	7.2%
	Non-low-income	$90,000	1,800	$2,112	$1.17	2.3%
	Low-income multifamily (≤80% AMI)	$21,996	800	$1,032	$1.29	5.0%
	Non-low-income multifamily	$71,982	950	$1,104	$1.16	1.5%
Building ownership	Renters	$34,972	1,000	$1,404	$1.40	4.0%
	Owners	$68,000	1,850	$2,172	$1.17	3.3%
Head of household race	White	$58,000	1,600	$1,956	$1.22	3.3%
	African-American	$34,494	1,290	$1,920	$1.49	5.4%
	Latino	$39,994	1,200	$1,704	$1.42	4.1%
All households	N/A	$53,988	1,573	$1,932	$1.23	3.5%

[1] Energy burden is the percentage of household income that is spent on energy bills. To calculate median energy burden, we calculated energy burden for all households and then took the median. This value differs from the median energy burden that is calculated using median annual utility spending and income.
[2] Low-income includes both single- and multifamily households. [3] Area median income (AMI) is the median dollar amount that divides the population into two equal parts.
Source: American Housing Survey (Census Bureau 2011 and 2013a).

ENERGY EFFICIENCY FOR ALL ACEEE

Credit: Energy Efficiency for All/American Council for an Energy Efficient Economy

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ENERGY EFFICIENCY FOR ALL ACEEE

Credit: Energy Efficiency for All/American Council for an Energy Efficient Economy

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Renters face unique barriers

- Lack of ownership
- The “split incentive”
- Homeownership rates in Minnesota: 77% white vs. 41% people of color

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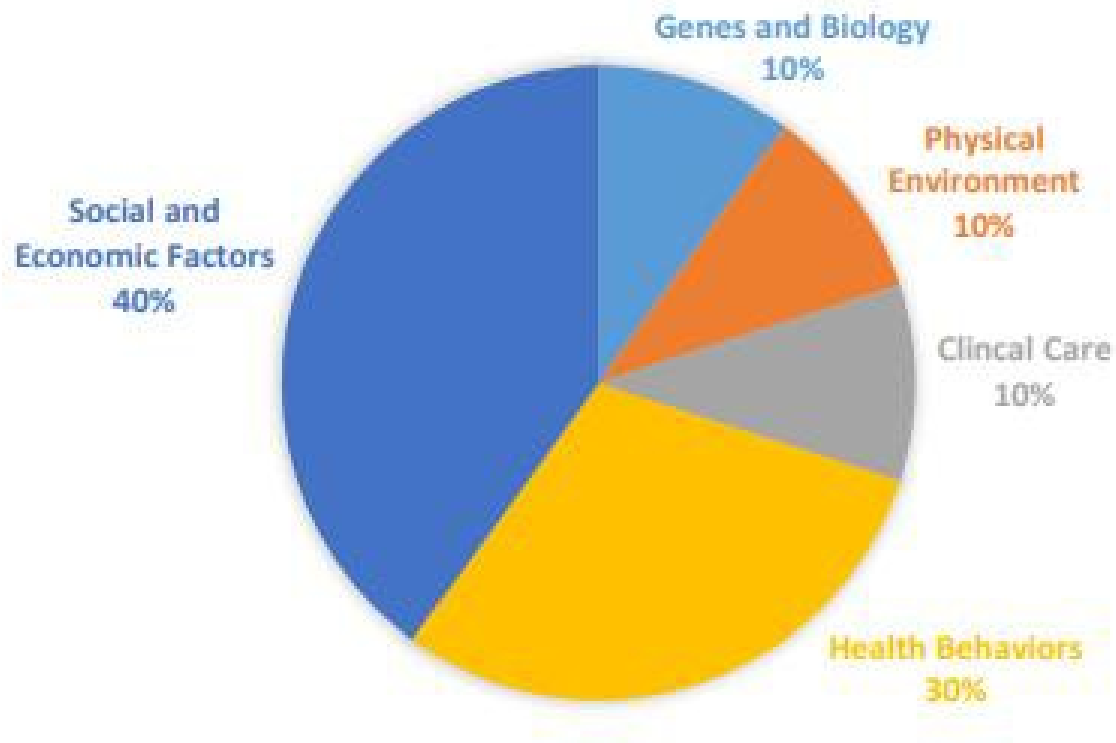
Social determinants of health



Credit: Minnesota Department of Health and Minnesota Pollution Control Agency

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What do we mean by “equity?”

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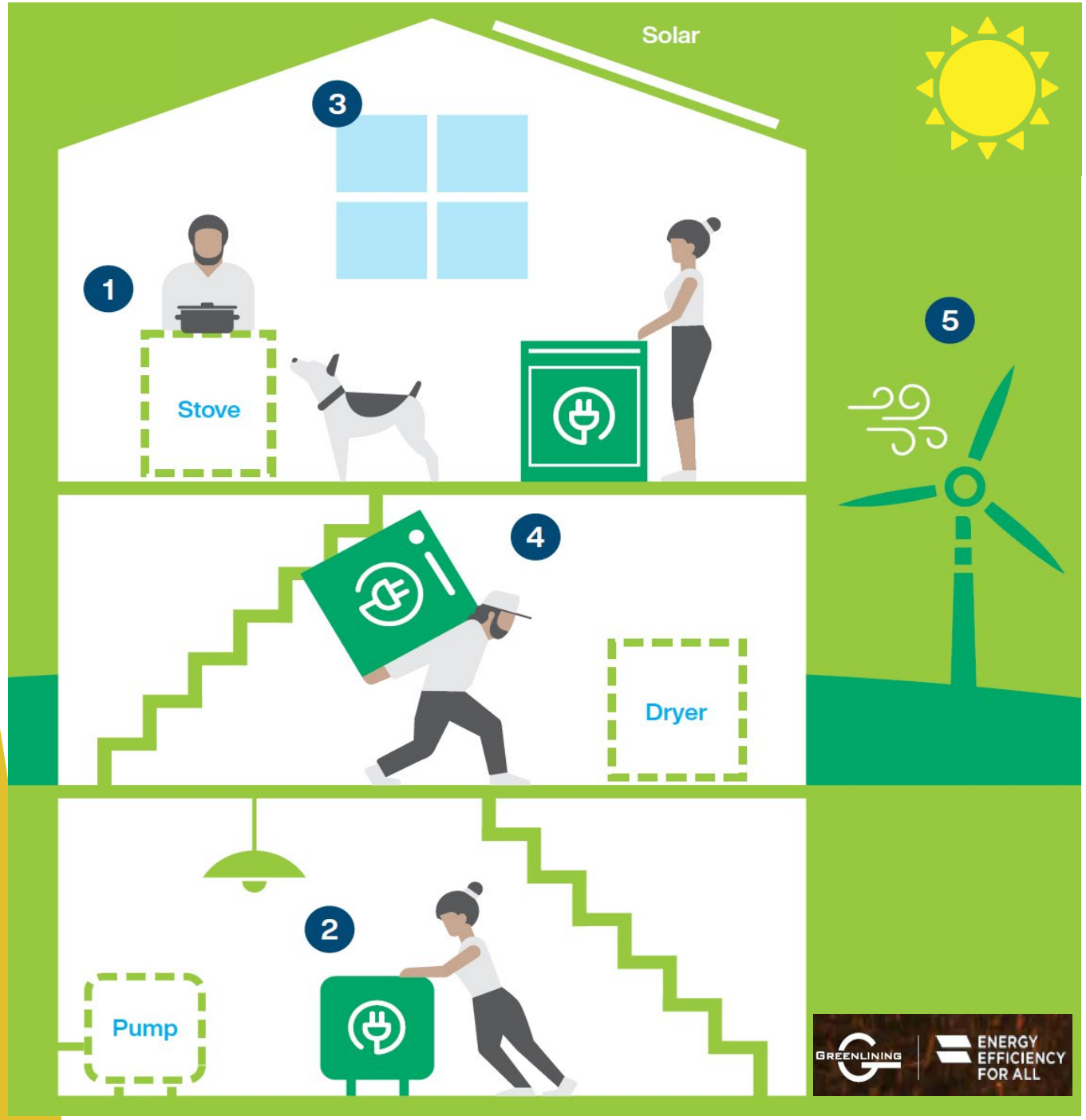

Benefits of electrifying homes

1. Healthier and safer homes
2. Save money and energy
3. Clean air
4. Local clean energy jobs
5. Sustainable environment

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Equity requires an inclusive and participatory process

- Engaging community members and impacted voices, especially those who are under-resourced, historically marginalized, and renters
- Establish metrics and track outcomes
- Ensures solutions work for everyone

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Considerations in coalitions and stakeholder processes

- When and where are meetings held?
- What resources are available to attendees (stipends, translation services, etc.)?
- How is the agenda structured?

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THE SPECTRUM OF COMMUNITY ENGAGEMENT TO OWNERSHIP

Facilitating Power

STANCE TOWARDS COMMUNITY	0 IGNORE	1 INFORM	2 CONSULT	3 INVOLVE	4 COLLABORATE	5 DEFER TO
IMPACT	**Marginalization**	**Placation**	**Tokenization**	**Voice**	**Delegated Power**	**Community Ownership**
COMMUNITY ENGAGEMENT GOALS	Deny access to decision-making processes	Provide the community with relevant information	Gather input from the community	Ensure community needs and assets are integrated into process & inform planning	Ensure community capacity to play a leadership role in implementation of decisions	Foster democratic participation and equity through community-driven decision-making; Bridge divide between community & governance
MESSAGE TO COMMUNITY	***Your voice, needs & interests do not matter***	***We will keep you informed***	***We care what you think***	***You are making us think, (and therefore act) differently about the issue***	***Your leadership and expertise are critical to how we address the issue***	***It's time to unlock collective power and capacity for transformative solutions***
ACTIVITIES	Closed door meeting Misinformation Systematic	Fact sheets Open Houses Presentations Billboards Videos	Public Comment Focus Groups Community Forums Surveys	Community organizing & advocacy House meetings Interactive workshops Polling Community forums	MOU's with Community-based organizations Community organizing Citizen advisory committees Open Planning Forums with Citizen Polling	Community-driven planning Consensus building Participatory action research Participatory budgeting Cooperatives
RESOURCE ALLOCATION RATIOS	**100%** Systems Admin	**70-90%** Systems Admin **10-30%** Promotions and Publicity	**60-80%** Systems Admin **20-40%** Consultation Activities	**50-60%** Systems Admin **40-50%** Community Involvement	**20-50%** Systems Admin **50-70%** Community Partners	**80-100%** Community partners and community-driven processes ideally generate new value and resources that can be invested in solutions

Credit: Facilitating Power and Movement Strategy Center

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The Greenlining/Energy Efficiency for All (EEFA) Framework

- Assess the communities' needs.
- Establish community-led decision-making.
- Develop metrics and a plan for tracking.
- Ensure funding and program leveraging.
- Improve outcomes.

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Questions to Consider

- What existing barriers and inequities (e.g. income, the "split incentive," and social determinants of health) need to be considered?
- How can future engagement include an inclusive and participatory process?
- What resources will be necessary?
- Who needs to be involved?
- What are the risks of not centering equity going forward?

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Opportunities

- Community engagement in building design standards (e.g. Minnesota Housing Qualified Allocation Plan process)
- Low- or no-carbon affordable housing development
- Cost-effectiveness (e.g. health and safety) and related approaches
- Economic development and workforce

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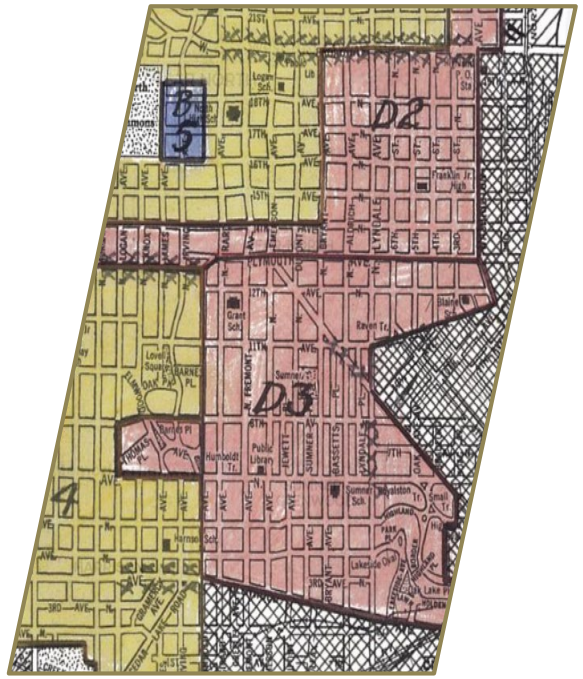
Lessons From Past Transitions

Transportation

Credit: Minnesota Historical Society via MinnPost

Housing



Credit: Home Owners' Loan Corporation, via Mapping Inequality/MinnPost

Broadband

Credit: Star Tribune

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Thank you!

Ben Passer
Director, Energy Access and Equity
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fresh-energy.org

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September 16th, 2020

LUNCH – RETURN AT 1:00PM

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Decarbonizing Minnesota's Natural Gas End Uses

Next Meeting:

Friday, October 9, 2020

Via Zoom

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