

2. Iowa Context

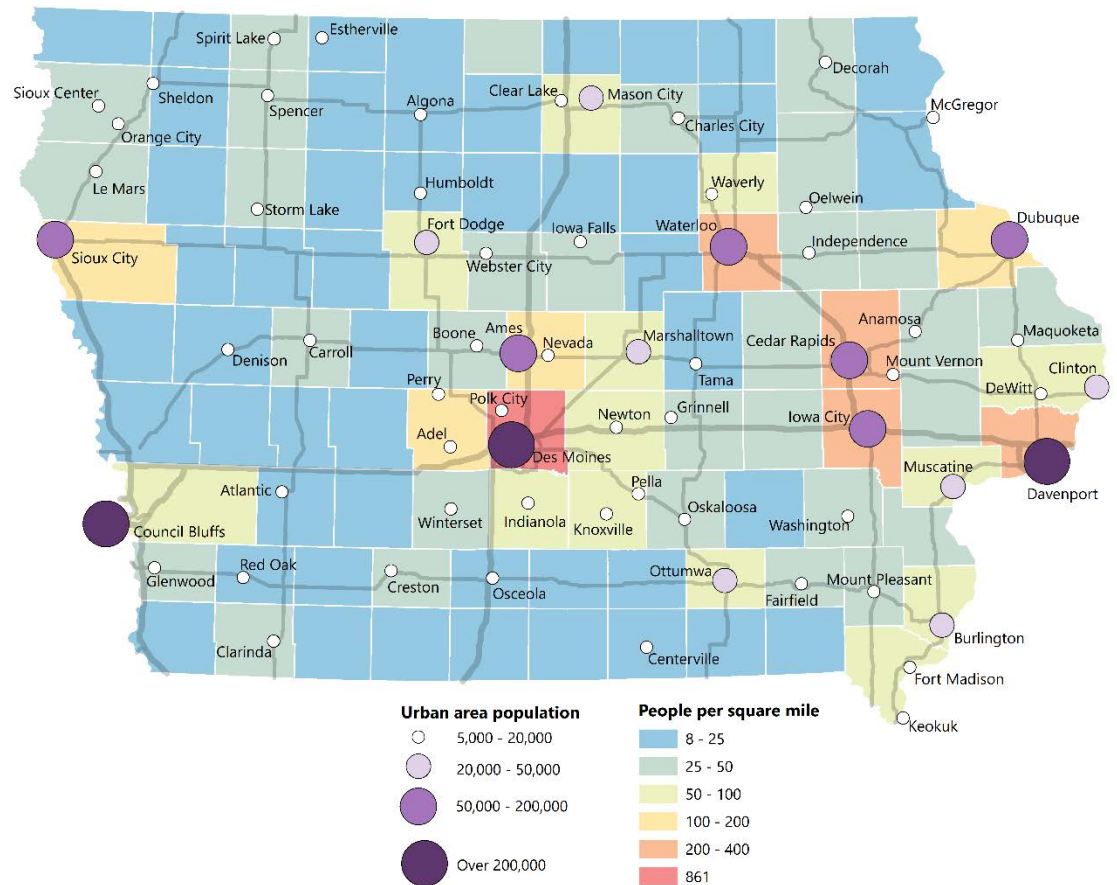
2.1 Population and Economy

Iowa is a largely **rural** state, interspersed with nine metropolitan areas that are served by MPOs, along with numerous smaller urban areas. Over time the state has grown more **urbanized** as its population has continued to concentrate in the metropolitan areas. Iowa's overall population density is relatively low – while it is the 23rd largest state by land area, it is the 36th largest by population density.

Over 60% of Iowa's gross domestic product is generated by **service industries** such as finance, insurance, education, health care, and retail trade. However, transportation-intensive sectors have a significant impact on the state. **Agriculture** plays a key role in the state's land use and economy. Iowa is second only behind California in terms of overall agricultural cash receipts. Iowa routinely leads the nation in the production of corn, hogs, and eggs, and is one of the top producers for soybeans, oil crops, oats, turkeys, and cattle and calves. Iowa also has a significant **manufacturing** presence. This includes the production of **renewable fuels** – Iowa leads the nation in ethanol and biodiesel production – along with agricultural equipment and other manufacturing enterprises. Iowa is a producer state, shipping more products from the state than it receives. Nearly 70% of Iowa's freight is carried by truck and freight movements are expected to grow significantly into the future.

Over half of the state's 3.2 million people live in just 10 of its 99 counties.

Iowa's urban areas* and population density by county



*Urban areas based on 2020 Decennial Census and FHWA's urban area population requirement of 5,000

Source: U.S. Census Bureau



2.2 Transportation System

Iowa has an extensive **highway system** complemented by a vast secondary (county) and municipal (city) roadway network. Among the 50 states, Iowa ranks fifth in rural roadway miles. In addition to this expansive roadway system, other transportation options include the following.

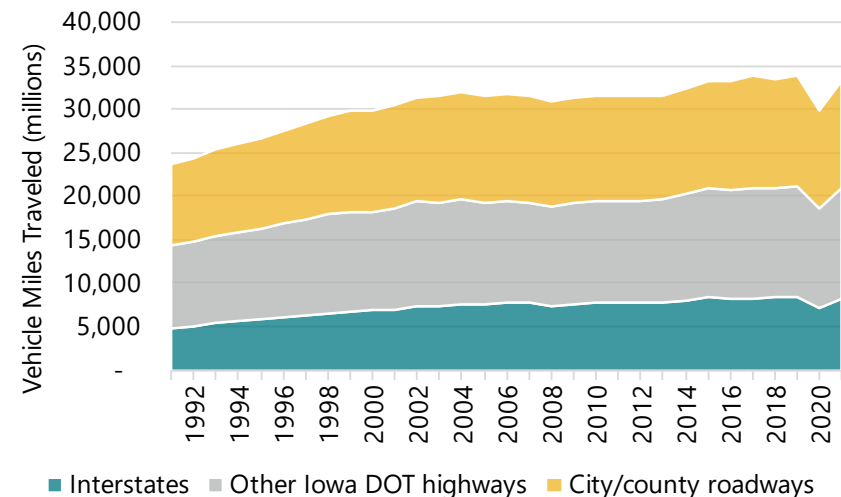
- A variety of **bicycle and pedestrian** accommodations such as multiuse trails, side paths, sidewalks, and on-road bicycle accommodations
- **Public transit** service availability in all 99 counties
- **Passenger transportation options** such as intercity bus service, paid rideshare, and other shared transportation options
- Freight and passenger **rail** service
- Commercial, general, and freight **air** service
- Mississippi and Missouri **waterway** systems

The state's roadway system is the predominant mode of transportation for both passenger and freight traffic. Vehicle miles traveled (VMT) have been increasing over time, though the growth rate has slowed. A little over 60% of total miles, and over 90% of large truck miles, occur on the Primary Highway System, owned by the Iowa DOT.

Most people travel to work by vehicle. Eight out of ten drive themselves to work while one out of ten carpools. Other transportation modes and working from home account for the remainder. Iowa's average commute time is lower than the national average; while 80% of Iowans have a commute time of 30 minutes or less, only 60% of the population across the country does.

The state's highway system provides the backbone for the overall transportation system. It is a mature and extremely accessible network that provides a high level of mobility throughout the state. Almost the entirety of the state's land area is within ten miles of the Primary Highway System. While there are locations that can experience bottlenecks or congestion, the vast majority of the highway system operates smoothly. The Iowa DOT's primary focus is stewardship of the existing system, as pavement and bridge maintenance and rehabilitation needs continue to outpace funding availability.

Annual VMT by roadway system



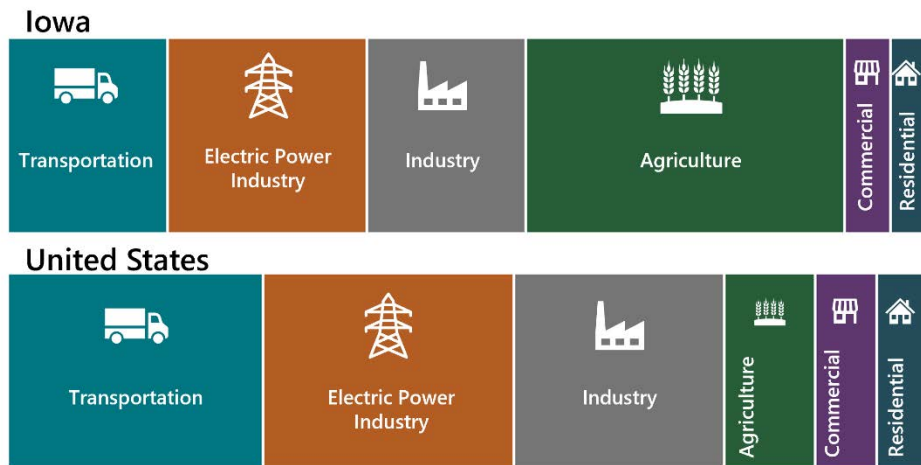
Source: Iowa DOT

In recent years, Iowa has averaged around 33.5 billion vehicle miles traveled (VMT) annually. That's enough miles for five round trips from Earth to Pluto.

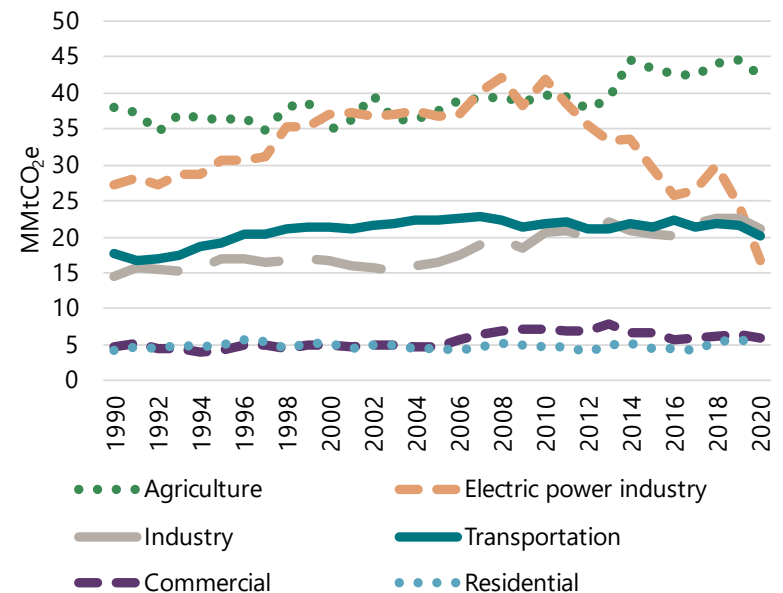
2.3 Greenhouse Gas (GHG) Emissions

Common GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases. According to the Environmental Protection Agency (EPA), transportation accounted for 28% of GHG emissions nationally from 2015-2019. In Iowa, the transportation sector accounts for a significant portion of emissions, but it is a smaller percentage than nationally, averaging 17% from 2015-2019. Total emissions from most sectors in Iowa, including transportation, have been relatively stable over time. The main exception to this is that GHG emissions from electricity production have decreased steadily in recent years as use of coal has decreased and use of wind and other alternative energy sources has increased.

Average 2015-2019 GHG emissions by economic sector, Iowa vs. U.S.



Iowa gross GHG emissions 1990-2020 by sector



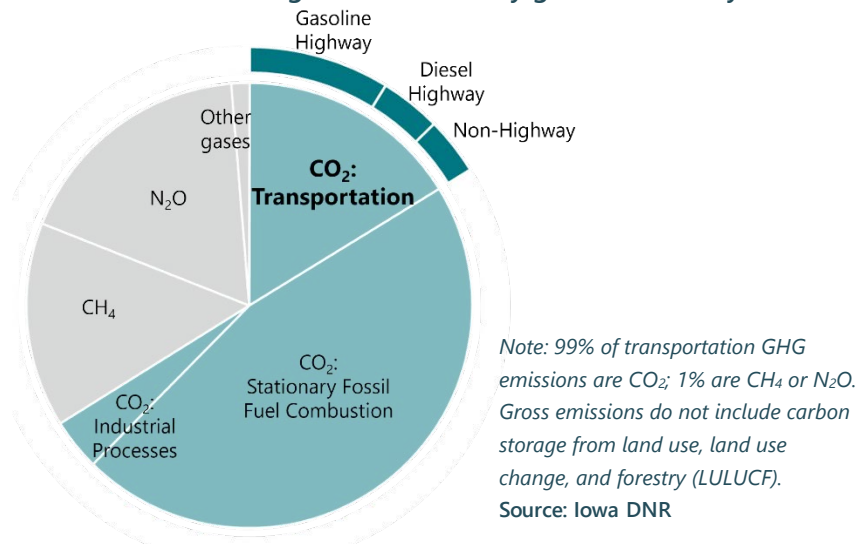
Note: MMtCO₂e: Million metric tons carbon dioxide equivalent. Excludes emissions and removals from Land Use, Land Use Change, and Forestry (LULUCF). 2020 is the most recent year that EPA provides state-level data for; due to the influence of the COVID-19 pandemic in 2020, the prior five years were used for the U.S.-Iowa comparison. EPA publishes state-level GHG data consistent with the national inventory, and this data is used here to provide an even comparison. This is an important consideration for multistate MPOs as many states publish their own GHG inventories that may be calculated differently. The Iowa Department of Natural Resources (DNR) provides annual GHG inventories for the state as required by Iowa Code 455B.104; data from Iowa DNR is used for the chart on page 9.

Source: U.S. EPA



The 2021 GHG Inventory from the Iowa Department of Natural Resources (DNR) provides additional insights into GHG emissions from transportation in Iowa. CO₂ is the dominant GHG emitted in the state, accounting for two thirds of the total GHG emissions. The transportation sector accounts for one quarter of the CO₂ emissions, and most transportation emissions are from highway vehicles. While transportation emissions only account for about one sixth of Iowa's overall GHG emissions, transportation projects can have a significant impact on CO₂ emissions in the state. Also, transportation is a more significant GHG contributor in metropolitan areas due to land use and population density.

Iowa 2021 GHG gross emissions by gas, with CO₂ by sector



While reducing carbon emissions in the transportation sector is an important aspect of overall GHG reduction, economy wide GHG emission reductions will be needed to significantly lower the state's overall emissions. Also, it is important to consider the links between transportation emissions and other sectors. For example, a zero-emission vehicle may still be associated with emissions in other sectors for its manufacturing and disposal.

There have been several statewide planning efforts related to reducing emissions across the economy over the past couple decades.

The legislatively required 2008 **Iowa Climate Change Advisory Council Final Report** resulted in strategies for reducing GHG emissions. Potential policy areas were considered related to energy efficiency and conservation; clean and renewable energy; transportation and land use; and agriculture, forestry, and waste management. Four of the transportation and land use strategies were among the top five strategies by benefit/cost – smart growth with transit; fuel efficient operations for light duty vehicles; low carbon fuel standards; and new vehicle standards for GHG emissions and fuel economy.

There have been prior planning efforts by the Iowa Economic Development Authority (EDA) and the Iowa DOT related to alternative fuel vehicles, including the 2016 **Iowa Energy Plan**. It focused on four foundational pillars for strategy development: economic development and energy careers; energy efficiency and conservation; Iowa's energy resources; and transportation and infrastructure. The plan included several strategies for expanding the use of alternative fuel vehicles.

A recent undertaking was the 2022 **Governor's Carbon Sequestration Task Force Report**. This effort included strategies focused on agriculture stewardship and the production of renewable fuels to enhance carbon capture in Iowa. There are strong relationships between these strategies and transportation, particularly those focused on increasing investment in biofuel infrastructure.

The context of GHG emissions in Iowa and these past planning efforts provide lessons for developing effective CRS strategies. They show the importance of coordination across public and private entities to achieve GHG emission reductions. Transportation is interlinked with many other sectors, and it will require cooperation across stakeholders to fully implement transportation-related strategies and to ultimately have an economy-wide impact on GHG emissions.