



# On the Right Track: Chicago's Metra Saves Energy and Protects the Environment

Photo by David Fullarton

## Metra's commuter rail network

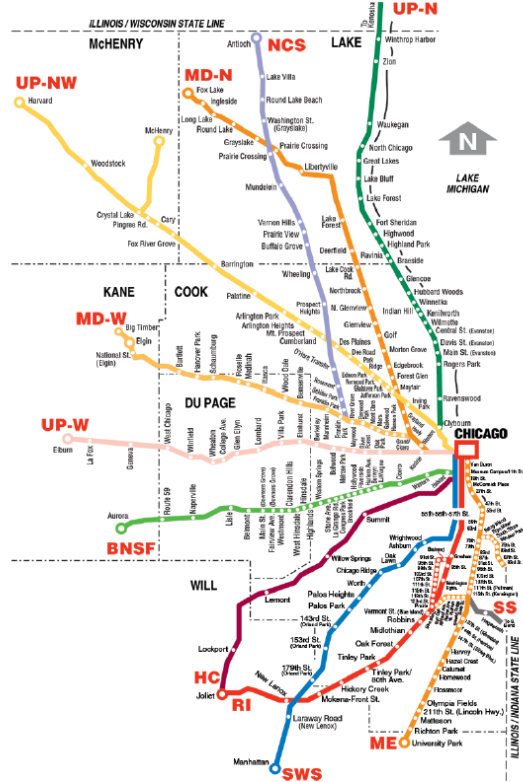
Each year, the Northeast Illinois Regional Commuter Railroad (Metra) saves area travelers about 34.8 million gallons of gasoline – the same amount of fuel consumed by more than 61,000 cars annually.

Transportation is responsible for more than two-thirds of our nation's oil consumption and nearly a third of our carbon dioxide emissions. To reduce pollution and our dependence on oil, we need transportation alternatives that use less energy.

Metra is a great example of how we can reduce energy consumption, curb our dependence on oil, and minimize pollution, while at the same time improving our quality of life, saving commuters money, and strengthening the economy.

Metra is an important form of transportation for Chicagoland residents. Metra, with 240 rail stations, is accessible to more than 8 million people in 100 communities.<sup>1</sup> Metra provides these residents with fast, safe, and reliable transportation from the city's many suburbs into downtown and vice versa.

Figure 1. Metra Map



Ridership on Metra increased by an average of 1 percent per year from 2000 to 2008.<sup>2</sup> In 2008, Metra served 77 million passengers.<sup>3</sup> The busiest line, the BNSF, carries 63,200 passengers each weekday.<sup>4</sup>

## Metra reduces energy consumption, oil dependence, and pollution

Travel on Metra trains uses less energy than travel via automobiles, helping to curb dependence on oil. Rail cars carry more passengers than automobiles. A

single rush-hour Metra train can carry hundreds of passengers, replacing hundreds of car trips and enabling highway traffic to flow more freely – reducing the amount of fuel wasted in traffic jams.

Metra’s electric train line – the Electric District – has the extra benefit of running on electricity from the grid, further reducing dependence on oil.

Metra’s energy efficiency, combined with avoided highway congestion and the role of Metra in bringing about less auto-dependent forms of development, results in a reduction of overall energy use by an amount equivalent to 34.8 million gallons of gasoline per year.

Metra also emits fewer pollutants than automobiles. Even though a Metra train emits between 18 and 31 times more carbon dioxide per mile than an automobile, Metra emits less global warming pollution per passenger because hundreds of people ride a train at once, while only one or two people ride in a car.<sup>5</sup> Per passenger, Metra emits 7.3 times less global warming pollution than sedans, 8.6 times less than SUVs, and 13.2 times less than pickup trucks.<sup>6</sup>

In total, Metra reduces carbon dioxide pollution by more than 256,000 metric tons annually, while also reducing emissions of pollutants that cause respiratory problems.

## **Metra strengthens our economy and improves our quality of life**

Metra strengthens Chicagoland’s economy and improves our quality of life in several ways.

Rail systems such as Metra help enable the creation of compact, walkable communities that deliver a high quality of life. For example, Prairie Crossing in Grayslake is a transit-oriented project with 36 condominiums and 359 homes. Prairie Crossing is within walking distance of two Metra Stations, one on the Milwaukee District North Line and the other on the North Central Service Line. With these two lines, commuters can travel to Chicago’s Union Station in a little over an hour and to O’Hare International Airport in 35 minutes. Prairie Crossing is also within walking distance of numerous stores and restaurants, and is next to the 5,800-acre Liberty Prairie Reserve with many trails.<sup>7</sup> Access to Metra, coupled with the development’s convenient and compact design, allows residents, employees, and visitors to access all parts of Prairie Crossing without using cars.

Metra also saves commuters money. A ticket on Metra is often cheaper than paying to own, operate, fuel, or park an automobile. City drivers who use public transit to the point that their family requires one less car save as much as \$11,611 every year by avoiding the costs of vehicle ownership, parking, and fuel.<sup>8</sup>

Investing in transit creates jobs. In the year since the American Recovery and Reinvestment Act, investments in transit and rail have created more than twice as

many jobs per federal dollar invested than comparable investments in new road projects.<sup>9</sup> Investment in projects like Metra creates high quality, green jobs.

Commuter rail transit, such as Metra, is one of the safest forms of commuting, with a death and injury rate one quarter that of comparable automobile travel per passenger mile.<sup>10</sup> Recently, the Obama Administration announced a \$30 million federal transit safety program to address critical needs and ensure a high and standard level of safety across all rail transit systems.

### **Metra expansion and improvement projects can further benefit residents and the environment**

By adding new Metra lines and improving existing ones, Chicagoland can benefit from transit oriented

development, cheaper transportation costs, and stronger economies, while decreasing our dependence on oil and impact on the environment.

Metra has several construction and improvement projects planned:

- **The Star Line** would travel 55 miles between Joliet and O'Hare International Airport, intersecting along the way with four existing Metra lines (North Central Service, Union Pacific West, BNSF, and Milwaukee District West), allowing commuters to easily travel between Chicago's various suburbs.<sup>11</sup> The line would run within 5 miles of 110 cities and towns, serving four out of the five most populous and fastest growing counties in Illinois.<sup>12</sup> The Star Line, which will provide access to Schaumburg, the corporate offices of Sears, Navistar, Lucent Technologies,



Photo by Eric Pancer

and PepsiCo, and many other employment centers, would provide an alternative to driving for nearly 1.2 million workers.<sup>13</sup>

- **The Southeast Service (SES)** would travel from LaSalle Street Station in Downtown Chicago 33 miles south, ending in Balmoral Park in Crete. The SES would travel along the Rock Island District line to Grisham and then split east, continuing to travel south through Dolton, South Holland, and Chicago Heights. The line would include nine new stations, giving residents in these communities easy access to work, school, and recreation in downtown Chicago and giving Chicago residents access to major employment centers such as Ford Motor Company's Chicago Stamping Plant, ConAgra Foods, and AT&T.<sup>14</sup>
- The McHenry artery of Metra's Union Pacific Northwest (UP-NW) Line will be extended one stop to **Johnsburg Station**. The extension will service eastern McHenry County and western Lake County, and improve access to the UP-NW corridor, which is expecting a 60 percent employment increase by 2030.<sup>15</sup>
- The **Union Pacific West Line (UP-W)** will be improved with additional tracks and crossovers, signal system upgrades, and restructuring of the A-2 Crossing (in Chicago where the UP-W crosses the Milwaukee District West, Milwaukee District North, and North Central Service Lines). These improvements will provide faster

service along the UP-W Line and consequently increase ridership to accommodate the anticipated population growth in cities such as Elburn and Winfield.<sup>16</sup>

## **Effective policies will expand and improve Metra**

In order to make these expansions and improvements a reality, our leaders should make these and similar projects a priority for transportation investments by taking the following approaches:

**Increase state and federal investment in public transportation, including light rail, commuter rail, and high-speed rail, as well as other transportation alternatives such as walking and biking by:**

- Prioritizing funding for rail, transit, and cleaner transportation options that will help create sustainable communities and reduce oil consumption and pollution; and
- Encouraging and rewarding states that "flex" eligible federal funding toward public transportation. State departments of transportation have great latitude on how federal money is spent once it is allocated to the state. Currently, however, federal funding is apportioned to each state based on formulas that end up rewarding higher fuel consumption, lane-miles of highway, and miles driven – formulas that encourage states to invest in highways rather than transit. These formulas should be revised so funding provides incentives to reduce, not increase, oil use and pollution.



Photo by David Fullarton

- Increase flexibility to use federal funds to pay for train maintenance and day-to-day operations, in addition to improving and expanding capacity. Rail systems like Metra face sustained or growing demand, but are having to reduce service and delay improvements due to strained budgets. Federal funds should allow for greater flexibility in funding operations – enabling buses and trains to keep running safely and effectively during economic downturns, when people need transit most.

for better public transportation. It is imperative that policy and investments accentuate and accelerate this trend in order to cut oil use, reduce pollution, and make our communities more vibrant and livable.

By adopting these approaches, we can strengthen the Metra system and create a future in which people have more transportation choices for traveling between where we live, work and play. Metra's increasingly high usage demonstrates the demand and potential

## Methodology

We calculated gasoline savings by creating a hypothetical situation in which no transit is available and estimating how much gas would have been used in cars and light trucks to transport passengers who typically ride Metra, minus the amount of fuel consumed by transit vehicles carrying those passengers.

We calculated gasoline use in light-duty vehicles assuming that all trips that are taken by commuter rail would occur in a private vehicle rather than being canceled or combined with other outings, and that those trips would cover the same distance as a trip by rail. Travelers rode 1.7 billion miles on Metra in 2008, per U.S. Department of Transportation, *National Transit Database, TS2.1 - Service Data and Operating Expenses Time-Series by Mode*. On average, a light-duty vehicle on the road carries 1.3 occupants and the vehicle averages 21 miles per gallon, according to U.S. Environmental Protection Agency, *Light Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 to 2009*, November 2009. This gave us an estimate of how much gasoline would have been consumed in cars had METRA passengers driven instead.

To compare light-duty vehicle gasoline use to energy used to move Metra trains (which are powered by both electricity and diesel), we converted data on fuel use in transit vehicles to Btus and then to a gasoline equivalent. Metra's 2008 energy use came from U.S. Department of Transportation, *National Transit Database, Annual Databases*, RY 2008.

We then subtracted transit fuel use from avoided passenger vehicle use to obtain a gasoline savings figure.

We calculated carbon dioxide savings by subtracting emissions produced by energy consumed in transit vehicles from emissions that would be produced by gasoline-powered passenger vehicles traveling the same distance. We assumed that a gallon of gasoline consumed in a passenger vehicle would emit 19.4 pounds of carbon dioxide, that diesel used in trains emits 22.2 pounds of carbon dioxide per gallon, and that the electricity used by Metra trains is responsible for 1,169 pounds of carbon dioxide per MWh, the

Illinois state average, per U.S. Department of Energy, Energy Information Administration, *State Electricity Profiles 2008*, March 2010.

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## Endnotes

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- <sup>1</sup> Communities and stations: Metra, *Ridership Reports – System Facts*, downloaded from metrarail.com, 9 April 2010. People: National Transit Database, *TS2.1 – Service Data and Operating Expenses Time-Series by Mode*, 2008.
  - <sup>2</sup> National Transit Database, *TS2.1 – Service Data and Operating Expenses Time-Series by Mode*, 2008.
  - <sup>3</sup> Ibid.
  - <sup>4</sup> Metra, *Metra Facts* (fact sheet), 2009.
  - <sup>5</sup> 18 to 31 times more global warming pollution: Metra trains emit 11,438 grams of carbon dioxide equivalent per mile while a car emits 367 grams of CO<sub>2</sub>e per mile and a pickup truck emits 618 grams. CO<sub>2</sub>e/mile: Mikhail V. Chester, Institute of Transportation Studies, UC Berkeley, *Life-cycle Environmental Inventory of Passenger Transportation in the United States*, 01 August 2008.
  - <sup>6</sup> Metra trains emit 11,438 grams of CO<sub>2</sub>e per mile and carry an average of 357 passengers. A typical passenger car emits 367 grams of CO<sub>2</sub>e per mile and carries 1.58 passengers, a typical SUV emits 478 grams of CO<sub>2</sub>e per mile and carries 1.74 passengers, and a typical pickup truck emits 618 grams of CO<sub>2</sub>e per mile and carries 1.46 passengers. The average number of passengers on a train is extrapolated from the number of trains scheduled per weekday and per weekend, and from Metra's yearly ridership, found at: Metra, *Metra Facts* (fact sheet), 2009. All other numbers from: Mikhail V. Chester, Institute of Transportation Studies, UC Berkeley, *Life-cycle Environmental Inventory of Passenger Transportation in the United States*, 01 August 2008.
  - <sup>7</sup> Prairie Crossing, *Prairie Crossing: A Conservation Community*, downloaded from www.prairiecrossing.com, 9 April 2010.
  - <sup>8</sup> American Public Transportation Association, *The Transit Savings Report*, May 2010.
  - <sup>9</sup> Phineas Baxandall, U.S. PIRG, *What We Learned From the Stimulus*, 5 January 2010.

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<sup>10</sup> Light Rail Now!, *U.S. Rail Transit Excels in Safety*, September 2007.

<sup>11</sup> Metra Connects, *Metra's Primary Rail Alternative . . . The Star Line*, downloaded from [metraconnects.metrarail.com/star.php](http://metraconnects.metrarail.com/star.php), 9 April 2010.

<sup>12</sup> Cities and Town: Metra Connects, *STAR Line (Suburban Transit Access Route) Feasibility Study*, March 2003; Counties: Illinois Census Bureau, *2000 Census Highlights*, downloaded from [illinoisgis.ito.state.il.us/census2000](http://illinoisgis.ito.state.il.us/census2000), 9 April 2010.

<sup>13</sup> See note 11.

<sup>14</sup> Metra Connects, *Metra's Primary Rail Alternative . . . Southeast Service*, downloaded from [metraconnects.metrarail.com/ses.php](http://metraconnects.metrarail.com/ses.php), 9 April 2010.

<sup>15</sup> Metra Connects, *Metra's Primary Rail Alternative . . . The Union Pacific Northwest Line*, downloaded from [metraconnects.metrarail.com/upnw/php](http://metraconnects.metrarail.com/upnw/php), 9 April 2010.

<sup>16</sup> Metra Connects, *Metra's Primary Rail Alternative . . . The Union Pacific West Line*, downloaded from [metraconnects.metrarail.com/upw.php](http://metraconnects.metrarail.com/upw.php), 9 April 2010.

Environment Illinois Research & Education Center  
407 S. Dearborn, Suite 701  
Chicago, IL 60605  
[www.environmentillinois.org](http://www.environmentillinois.org)

