

# Measuring Transportation: The U.S. Experience

## 运输能源推算：美国的经验



---

*For*

*IEA-NBS Energy Statistics Training*

*May 23-25, 2018 | Beijing, China*

*By*

*Eileen O'Brien, Office of Energy Consumption & Efficiency Statistics, U.S. EIA*

能源消费及效益办公室,美国能源部能源信息署

# Overview of transportation energy data programs at EIA

## 美国能源部能源信息署运输能源数据项目概览

- Transportation data needs  
运输能源数据的需求
- Coverage and sources of transportation energy data  
运输能源数据的范围和来源
- Current and historical efforts to collect transportation demand data  
运输能源数据收集的成效 - 過去和現在
- Future efforts under consideration  
未来展望

## Why does EIA study transportation energy demand? 能源信息署为什么要做运输能源的研究?

- As a net oil importer in the 1970s, sudden energy shortages had a long, severe impact on the U.S. economy, especially the transportation sector  
在1970年代做为一个石油净输入国, 能源短缺对美国经济有深远的影响, 对交通运输部门的影响更是严重
- EIA needs high quality data to accurately estimate current and future energy needs for transportation  
能源信息署搜集高质量的信息以便对当前和未来的运输能源的需求做出精确的估量

## EIA regularly publishes these two series on transportation: 能源信息署定期发布有关运输的两个数据

- U.S. historical transportation energy consumption data by fuel type in the *Monthly Energy Review*  
依燃料类型而分的运输能源历史消费数据 - *能源统计月报*
- Detailed projections of energy demand by mode of transportation in the *Annual Energy Outlook*  
运输能源需求的预测 - *能源展望年刊*

*These data are a product of EIA's National Energy Modeling System (NEMS).  
Most of the transportation inputs to the model are non-EIA data.*

能源统计月报及能源展望年刊为国家能源建模系统 (NEMS) 的产品  
大部分有关运输的数据都是采用能源信息署外部的数据

## Data about U.S. transportation come from many sources 美国的运输能源的数据来源

- What information is available? What is the source?  
数据種類 ?数据来源?
- How do federal agencies coordinate their efforts?  
如何协调联邦政府部門間的工作?
- Data gaps and future uses  
如何处理间断的数据及未来的使用?

## What transportation information is available from non-EIA sources? 能源信息署以外有关运输能源的信息?

The US Department of Transportation (USDOT) collects and publishes extensive data on travel and energy consumption by mode of travel

美国运输部搜集及发布许多有关旅游和运输能源的数据 (水上, 陆上和天空)

Waterborne (freight, ferries, and recreational boating)

水运 (货物运输, 渡船及休闲船隻)

- **Travel:** US Department of Army Corps of Engineers, USDOT, Federal Transit Administration

**旅游:** 美国工兵署, 美国运输部联邦运输署

- **Energy and emissions:** U.S. Environmental Protection Agency (USEPA), Office of Transportation and Air Quality, USDOT/FHWA, Federal Transit Administration

**能源及排放:** 美国环境保护署运输及空气质量办公室, 美国运输部联邦高速公路局, 美国运输部联邦运输署

# Transportation data about travel by rail

## 铁路方面的数据

Rail (freight and passenger)

铁路 (货运及客运)

- **Travel:** USDOT's Federal Railroad Administration and Federal Transit Administrations, Association of American Railroads (trade association), American Public Transportation Association (trade association)

**旅游:**美国运输部铁路管理局, 美国铁路协会, 美国大众运输协会

- **Energy and emissions:** USDOT, Federal Transit Administration, Association of American Railroads (trade association), American Public Transportation Association (trade association), USEPA, Office of Transportation and Air Quality

**能源及排放:**美国运输部联邦运输署, 美国铁路协会, 美国大众运输协会, 美国环境保护署运输及空气质量办公室

# Transportation data about travel by air

## 航空方面的数据

Air (certified route carriers and general aviation)

航空(认证航线运营商和一般航空)

- **Travel:** USDOT, Federal Aviation Administration, USDOT, Bureau of Transportation Statistics, USDOT, Civil Aeronautics Board  
**旅游:**美国运输部民航局,美国运输部运输统计署,美国运输部民用航空委員會
- **Energy and emissions:** USDOT, Federal Aviation Administration, USDOT, Bureau of Transportation Statistics, USDOT, Civil Aeronautics Board, USEPA, Office of Transportation and Air Quality  
**能源及排放:**美国运输部民航局,美国运输部运输统计署,美国运输部民用航空委員會,美国环境保护署运输及空气质量办公室



## Transportation data about travel by on-road vehicles, I 在路上旅游车辆的运输能源数据, 1

On-road (light-duty vehicles, heavy-duty vehicles, buses, and motorcycles)  
路上车辆包括轻型车辆，重型车辆，公共汽车和摩托车

- **Travel:** USDOT; Federal Highway Administration, USDOT; US Department of Commerce, Bureau of the Census; USDOT, Federal Transit Administration  
**旅游:** 美国运输部;美国运输部联邦公路管理局;美国商务部人口普查局;美国运输部  
联邦运输管理局
- **Energy and emissions:** USDOT, Federal Highway Administration, USDOT, US Department of Commerce, Bureau of the Census, USDOT, Federal Transit Administration, USEPA, Office of Transportation and Air Quality  
**能源和排放:** 美国运输部;美国运输部联邦公路管理局;美国商务部人口普查局;美国  
运输部联邦运输管理局;美国环境保护署运输和空气质量办公室

...and more data about [travel by on-road vehicles, II](#)

路上车辆旅游的运输能源数据, 2

[On-road](#) (light-duty vehicles, heavy-duty vehicles, buses, and motorcycles)

路上车辆包括轻型车辆,重型车辆,公共汽车和摩托车

- [RITIS \(Regional Integrated Transportation Information System\)](#) is an automated blended data product and dissemination system (data come from many different data providers including US DOT, private companies and local transportation companies.)

[RITIS \(区域综合运输信息系统\)](#)是自动化混合数据产品和发放系统(数据来自许多不同的数据提供者,包括美国运输部,私营公司和本地运输公司)

- [Examples of data](#): incident layers, congestion heat mapping, speed and volume sensor data, work zone analysis, vehicle and person hours of delay, user delay costs, travel time and reliability

[示例数据](#)包括拥塞热量映射,速度和流量传感器数据,工作区分析,车辆和人员的延误时间,运输者延误成本,旅游时间和可靠性

## ... and more about travel by on-road vehicles, III

路上车辆旅行的运输能源数据, 3

On-road (light-duty vehicles, heavy-duty vehicles, buses, and motorcycles)

路上车辆包括轻型车辆,重型车辆,公共汽车和摩托车

- **INRIX**, is a private data collection company that utilizes crowd sourcing information from vehicles to understand real time traffic conditions

**INRIX**是一家私人数据收集公司,利用车辆的聚集信息了解即时交通状况

- **Examples of data:** real-time traffic conditions, volume and speed measurements, population movement, trips, connected vehicles and alternative fuel vehicle information

**示例数据**包括即时的交通状况, 交通流量和速度测量,人口流动量,行程,联网车辆和替代燃料车辆的信息

## And finally, more about travel by on-road vehicles, IV

路上车辆旅行的运输能源数据, 4

On-road (light-duty vehicles, heavy-duty vehicles, buses, and motorcycles)

路上车辆包括轻型车辆,重型车辆,公共汽车和摩托车

- **Private commercial data collection** companies also use GPS information systems that connects people with millions of data points about traffic services.

私人商业数据收集公司也使用全球定位信息系统,将人们与数百万关于交通服务的数据点联系起来

- **Examples of data:** real time traffic conditions, volume and speed measurements, population movement, trips, traffic flow management, predictive traffic patterns based on historical information

示例数据包括使用历史信息预测即时的交通状况, 交通流量和速度测量,人口流动量,行程, 交通流量管理的交通模式

Non-EIA data efforts are coordinated across federal, state, and local agencies 能源信息署外部的数据通过联邦,州和地方机构来协调

## How do agencies coordinate their efforts and identify future data needs? 机构间如何协调他们的工作并确定未来各机构的数据需求?

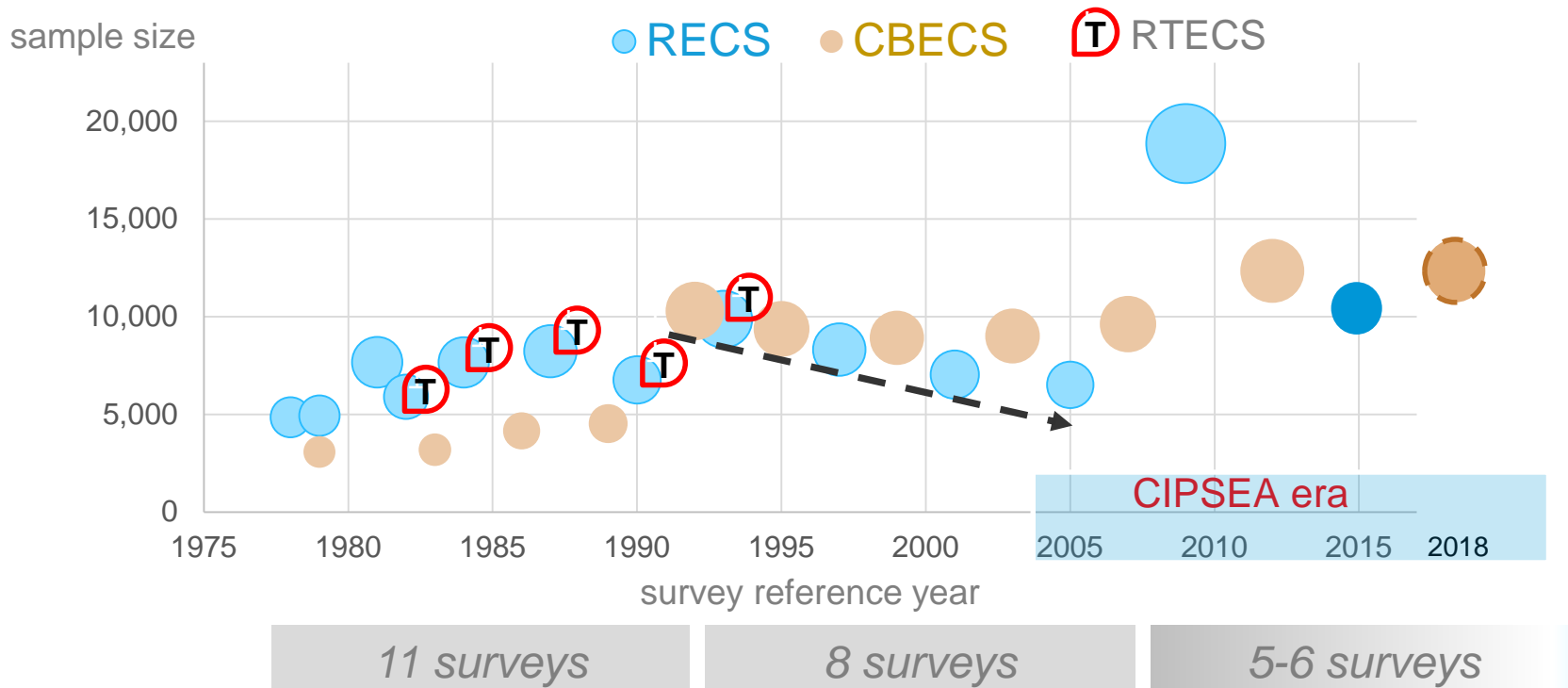
- Participation in the Transportation Research Board of the National Academies of Science
- 参加美国国家科学院运输研究委员会
- Interagency committees and working groups
- 参加跨机构委员会和跨机构工作组
- Professional research conferences on transportation data and needs
- 参加关于运输数据和需求的专业研究会议

## Here are some topics of mutual interest: 以下是一些共同感兴趣的话题：

- Policy change (both economic and environmental), advanced technologies, alternative fuels, and how to study travel behavior.
- 政策变化 (包括经济和环境),先进技术,替代燃料以及研究旅游行为。

# EIA has conducted five residential transportation studies, “RTECS”

## 美国能源部能源信息署曾进行了五次住宅运输研究 - RTECS

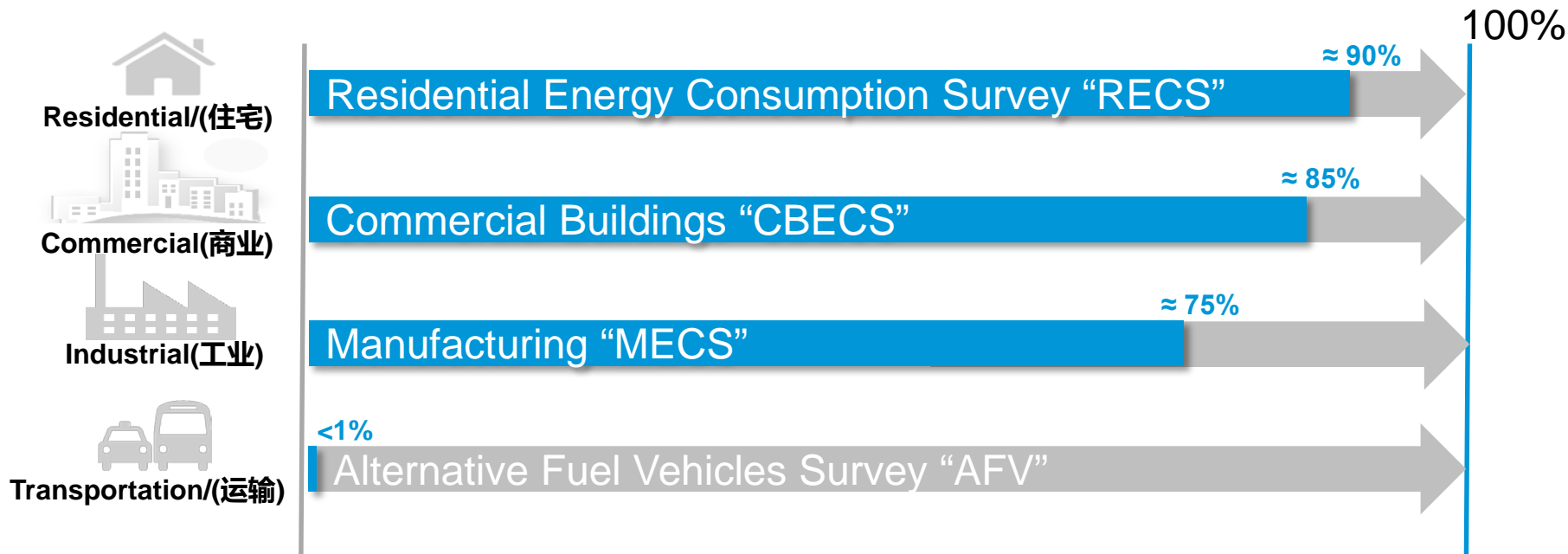


# What data were collected from the RTECS?

## RTECS调查数据

- RTECS was conducted on a national subsample of RECS respondents  
住宅运输能源消费调查是家庭能源消费调查的一部分.
- Data described the vehicle stock, vehicle-miles traveled, energy use and expenditures for personal vehicles  
数据包括车辆库存,行驶里程,个人车辆的使用和能源支出情况.
- Earlier rounds used in-person interviews with respondents keeping a weekly transportation diary; by 1994, data were collected in three modes, no diary  
过去的调查采用面对面方式,每周记录日用运输能源消耗. 1994年以后,不再使用这种模式.
- Historical RTECS data and documentation are not available on the web  
過往住宅运输能源消费调查数据和文档不在网上提供.

# Compared to other sectors, EIA collects little data on transportation 与其他部门相比，EIA收集的运输数据很少



*\*These are approximations of site energy for major fuels consumed estimated by the consumption surveys, over primary energy plus electricity retail sales (MER Tables 2.2-2.5), referred to as 'net energy'. This does not account for energy losses in commercial and industrial CHP and electricity-only plants and energy losses from fuel ethanol production.*



# The survey of Alternative Fuel Vehicles “AFV”

## 替代燃料车辆调查

- The AFV survey collects fuel use and number of vehicles mainly from fleets  
替代燃料车辆调查主要收集各类替代燃料车辆的燃料使用量.
- Fleets include federal, state, and transit agencies as well as ‘fuel provider’ fleets  
调查包括联邦,州和运输机构以及‘燃料供应商’车队.
- Results only represent these fleets; no national totals are provided by EIA  
数据只代表这些车队;能源信息署不提供全国总量.
- Current data on (目前的数据网站) <https://www.eia.gov/renewable/afv/>

## Future directions for EIA transportation data

### 能源信息署运输能源数据的未来方向

- Growth of “pervasive computing” may allow EIA to purchase third party data from commercial firms that gather navigation data from apps  
“计算技术的普及”让能源信息署从商业公司购买导航数据作为第三方数据.
- EIA may work with the DOE National Labs and universities to test data logger technologies, possibly as a component of the RECS program  
能源信息署与美国能源部国家实验室和大学合作测试运输数据记录器技术,可能会作为家庭能源消费调查计划的一部分.

# 美国能源部能源信息署咨询

美国能源部能源信息署官方网站 | [www.eia.gov](http://www.eia.gov)

能源消费及效益 | <http://www.eia.gov/consumption/>

开放资料 | <http://www.eia.gov/opendata/>

美国能源测绘系统 | <http://www.eia.gov/state/maps.cfm>

能源统计月报 | [www.eia.gov/mer](http://www.eia.gov/mer)

能源展望年刊 | <https://www.eia.gov/outlooks/aeo/>

今日能源特报 | [www.eia.gov/todayinenergy](http://www.eia.gov/todayinenergy)

# 附加资料

- 全国家庭旅游调查 <https://nhts.ornl.gov/>
- 车辆库存和使用情况调查  
<https://www.census.gov/svsd/www/vius/2002.html>
- 美国国家科学院运输研究委员会 <http://www.trb.org/Main/Home.aspx>
- 混合数据：家庭车辆能源消费 - 2005 年最新数据和趋势  
<https://www.eia.gov/consumption/residential/pdf/046405.pdf>
- 替代燃料车辆数据 <https://www.eia.gov/renewable/afv/>