

Best Practices Toolbox for Alternative Fuel Codes

Presented by: Metropolitan Energy Center & the
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Best Practices Toolbox

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This toolbox is available electronically at www.metroenergy.org

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Metropolitan Energy Center, a 501(c) 3 based in Kansas City, serves as the lead in this U.S. Department of Energy funded project. MEC provides staffing and administration for the Kansas City Regional Clean Cities Coalition.

The Mid-America Collaborative for Alternative Fuels is the Kansas City Regional Clean Cities Coalition, Nebraska Clean Cities Coalition, St. Louis Regional Clean Cities and the Iowa Clean Cities Coalition. The Collaborative endorses a multi-pronged approach where appropriate fuel diversity creates an energy secure future. We aim to eliminate obstacles to adoption of vehicles and infrastructure using natural gas, B20 biodiesel, E85 ethanol, propane autogas, electricity, and hybrid electric technologies. The project is funded by U.S. DOE Award DE-EE0006009. Visit www.metroenergy.org to learn more about the Collaborative.

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Mid-America Collaborative for Alternative Fuels Implementation



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Introduction

The Alternative Fuel Codes Summit, which was held in November 2014, offered policy and fleet decision-makers the opportunity to gain a greater appreciation for the benefits that alternative fuels can provide. All alternative fuels were represented with experts in the fields of fleet facility modifications, electric vehicle charging, and biofuel, propane autogas and compressed natural gas fueling stations who spoke on best practices, trends, how to interpret & implement codes in different jurisdictions as well as how to find those codes pertaining to specific jurisdictions. The Toolkit presented here was created in order to provide stakeholders with a readily accessible document where they could find essential information on best practices and codes relating to alternative fuels. While the information contained within is primarily intended for first responders and codes officials, we believe it will be useful to anyone with related interests. These include fleet and facility managers, architects, engineers and transportation planners. We wish to thank our participants and presenters who agreed to make their insights available for public use.

Information Regarding Codes and Hyperlinks

This list is **not** comprehensive, and cannot cover every aspect of alternative fuel management, design and safety. It is intended to provide codes professionals and first responders with quick access to codes most directly related to electric, propane autogas, compressed natural gas as well as biofuels. Specific, technical questions should be directed to the appropriate codes authorities and to state and local jurisdictions. Hyperlinked headings for each fuel category page connect to DOE/NREL full listings of codes & standards; hyperlinks to individual listings link to the appropriate code sites. Preparer shall not be liable for losses or damages of any kind arising out of or in connection with the use of any information in this report.

Best Practices Presentations

Each of the Best Practices Presentation Files were used in the Mid-America Alternative Fuel Codes Conference. The link above gives you access to both the presentations as well as the speaker bios of those that did the presentations.

The below links give you access to individual presentations, but the full list of available presentations can be found [here](#).

[Biofuels – Infrastructure Development](#), Kristi Moriarty, NREL

[Biofuels – Station Operations](#) – Scott Zaremba, Zarco USA

[CNG – Maintenance Facility Codes for NGVs](#) – Tony Fulton, P.E.

[CNG – KCATA Fast-Fill Facility](#) - Jay Guerra, Gibbens Drake Scott

[CNG – KCATA Fast-Fill Facility](#) – Keith Sanders, KCATA

[Electric Vehicles – Workplace Charging](#) – Amy Bond, Sprint

[EV Charging Stations](#) – Larry Kinder, LilyPad EV

[Regulatory Impacts on State and Local Codes](#) – Luke Hagedorn

[Oil and Gas Regulation and Current Issues](#) – Alan Anderson

State Authorities Having Jurisdiction (AHJs) & Standard/Code Organizations

The following four links provide quick shortcuts to State Codes Authority Websites:

- [International Code Council – Missouri](#)
- [International Code Council – Kansas](#)
- [International Code Council – Iowa](#)
- [International Code Council – Nebraska](#)

Local Authorities Having Jurisdiction

Below is a list of various local codes at the municipality level. This is NOT a complete list but offers codes for larger municipalities relative to state population.

Iowa-[Ames](#), [Ankeny](#), [Bettendorf](#), [Burlington](#), [Cedar Falls](#), [Cedar Rapids](#), [Clinton](#), [Clive](#), [Coralville](#), [Council Bluffs](#), [Davenport](#), [Des Moines](#), [Dubuque](#), [Ft. Fodge](#), [Iowa City](#), [Johnston](#), [Marion](#), [Marshalltown](#), [Mason City](#), [Muscatine](#), [Ottumwa](#), [Sioux City](#), [Urbandale](#), [Waterloo](#), [West Des Moines](#)

Kansas-[Derby](#), [Dodge City](#), [Wichita](#), [Overland Park](#), [Kansas City](#), [Topeka](#), [Olathe](#), [Lawrence](#), [Shawnee](#), [Manhattan](#), [Lenexa](#), [Salina](#), [Hutchinson](#), [Leavenworth](#), [Leawood](#), [Garden City](#), [Junction City](#), [Emporia](#), [Prairie Village](#), [Hays](#), [Liberal](#), [Gardner](#), [Pittsburg](#), [Newton](#), [Great Bend](#)

Missouri-[Kansas City](#), [St. Louis](#), [Springfield](#), [Independence](#), [Columbia](#), [Lee's Summit](#), [O'Fallon](#), [St. Joseph](#), [St. Charles](#), [St. Peters](#), [Blue Springs](#), [Florissant](#), [Joplin](#), [Chesterfield](#), [Jefferson City](#), [Cape Girardeau](#), [Wildwood](#), [University City](#), [Wentzville](#), [Ballwin](#), [Liberty](#), [Raytown](#), [Kirkwood](#), [Maryland Heights](#), [Gladstone](#), [Hazelwood](#), [Grandview](#), [Webster Groves](#), [Belton](#), [Sedalia](#), [Arnold](#), [Affton](#), [Nixa](#), [Spanish Lake](#), [Warrensburg](#), [Rolla](#), [Raymore](#)

Nebraska-[Omaha](#), [Lincoln](#), [Bellevue](#), [Grand Island](#), [Kearney](#), [Fremont](#), [Hastings](#), [Norfolk](#), [Columbus](#), [Papillion](#), [La Vista](#), [Scottsbluff](#), [S. Sioux City](#), [Beatrice](#)

Standard and Code Organizations

The following links provide shortcuts to organizations that are heavily involved in codes including, but not limited to, alternative fuels:

- [American Society of Mechanical Engineers](#)
- [American National Standards Institute](#)
- [Compressed Gas Association](#)
- [National Fire Protection Association](#)
- [Underwriters Laboratory, Inc.](#)
- [Underwriters Laboratory Code Correlation Database](#)

Electric Vehicles & Electric Vehicle Supply Equipment

[NFPA 70 \(2014\)](#), National Electrical Code, Article 625 – Next Update – 2017

Adopted in all 50 states, the NEC is the benchmark for safe electrical design, installation, and inspection to protect people and property from electrical hazards.

EVs & EVSE - Additional Resources

- [Plug-In Electric Vehicle Handbook for Electrical Contractors](#)
- [Plug-In Electric Vehicle Handbook For Workplace Charging Hosts](#)
- [Plug-In Electric Vehicle Handbook For Fleet Managers](#)
- [NECA – Managing EVSE Installations \(2011\)](#)

Natural Gas Vehicles & Facilities – Applicable Codes

[Natural Gas Vehicle and Infrastructure Codes and Standards Citations](#)

- [NFPA 30A \(2012\)](#) Code for Motor Fuel Dispensing Facilities and Repair Garages – Next Edition 2018
- [NFPA 52 \(2010\)](#) Vehicular Gaseous Fuel Systems Code
- [NFPA 52 \(2013\)](#) Vehicular Gaseous Fuel Systems Code (CNG and LNG *ONLY*)
- [NFPA 88A \(2011\)](#) Standards for Parking Structures – Next Edition 2019
- [IFC 2012](#) International Code Council's International Fire Code
- [IMC 2012](#) International Mechanical Code
- [IBC 2012](#) International Building Code

Compressed Natural Gas/Liquefied Natural Gas - Additional Resources

- [Codes, Standards & Advisories Applicable to Natural Gas Vehicles and Infrastructure](#) (Clean Vehicle Education Foundation)
- [Compressed Natural Gas Infrastructure –](#) (American Natural Gas Association)
- [Costs Associated With Compressed Natural Gas Vehicle Fueling Infrastructure](#) (AFDC – U.S. Department of Energy)
- [A Recommended Permitting Guide For Compressed Natural Gas Fueling Stations](#) – (Conference of Northeast Regional Fire Safety Officials)
- [LNG Safety Q&A Reference](#) (NGV America)
- [2012 DOT Emergency Response Guidebook](#) (Comprehensive)

Propane Facilities & Vehicles – Applicable Codes

[Propane Vehicle and Infrastructure Codes and Standards Citations](#)

- [NFPA 30 \(2015\)](#) Flammable and Combustible Liquids Codes – Next Edition 2018
- [NFPA 30A \(2012\)](#) Code for Motor Fuel Dispensing Facilities and Repair Garages – Next Edition 2018
- [NFPA 58 \(2014\)](#) Liquefied Petroleum Gas Code – Next Edition 2017
- [NFPA 70 \(2014\)](#) National Electrical Code – Next Edition 2017
- [UL 132 Standard](#) on Safety Relief Valves for Anhydrous Ammonia and LP Gas
- [UL 567 \(2014\)](#) Standard Pipe Connectors for Flammable and Combustible Liquids and LP
- [Rules for Construction of Unfired Pressure Vessels, Section VIII](#), Division I of the ASME Boiler and Pressure Vessel Code

Propane - Additional Resources

- [Propane Jurisdictional Systems Guide](#)
- [Fire Safety Analysis Manual For LP-Gas Storage Facilities](#)
- [Department of Transportation Compliance Guide](#)
- [Environmental Protection Agency Compliance Guide](#)
- [Occupational Safety & Health Administration Compliance Guide](#)
- [Propane Emergency Response Scenarios](#)
- [2012 DOT Emergency Response Guidebook](#) (Comprehensive)

Biofuels Facilities & Vehicles – Applicable Codes

[Biodiesel Vehicle and Infrastructure Codes and Standards Citations](#)

- [NFPA 30 \(2015\)](#) Flammable and Combustible Liquids Codes – Next Edition 2018
- [NFPA 30A \(2012\)](#) Code for Motor Fuel Dispensing Facilities and Repair Garages – Next Edition 2018
- [NFPA 51B](#) (2014) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work – Next Edition 2019
- [NFPA 77](#) (2014) Recommended Practice on Static Electricity – Next Edition 2019
- [NFPA 68](#) (2013) Standard on Explosion Protection by Deflagration Venting – Next Edition 2018
- [NFPA 69](#) (2014) Standard on Explosion Prevention Systems – Next Edition 2019
- [NFPA 91 \(2010\)](#) Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids – Next Edition 2015
- [NFPA 101 \(2015\)](#) Life Safety Code – Next Edition 2018

Biodiesel and Ethanol - Additional Resources

- [Biodiesel Handling & Use Guide](#) - (National Renewable Energy Laboratory)
- Biodiesel State Fuel Quality Index – [IA](#) [KS](#) [MO](#) [NE](#)
- [Biofuel Release Prevention, Environmental Behavior and Remediation](#) – (IPEC)
- [E15 Retailer Handbook](#) (AFDC – Department of Energy)
- [Handbook for Handling, Storing and Dispensing E-85 and Other Ethanol-Gasoline Blends](#) (U.S. Department of Energy)
- [Gasoline/Ethanol Blend Fuel Dispensing](#) (UL)
- [Responding To Ethanol Incidents](#) (National Hazmat Fusion Center)

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