Navigating DOE Energy Code Funding: Past, Present, and Future Opportunities

2023 National Energy Codes Conference

May 3, 2023



Agenda



Current BECP Funded Projects



New Funding Opportunities!

Bipartisan Infrastructure Law Section 40511: Cost-effective Codes Implementation for Efficiency & Resilience

- Provides \$225M in technical assistance supporting updated building energy codes for energy efficiency and resilience
 - State and Local Code Adoption
 - Workforce Development
 - Implementation and Compliance
 - Innovative Approaches
 - Equity, Energy and Environmental Justice
 - Partnerships

> Initial Resilient and Efficient Codes Implementation (RECI) FOA selections expected June 26, 2023

Targeted Outcomes



Develop next-generation workforce

Facilitate energy code updates



Improve energy code compliance



Advance new and innovative polices and tools



Increase equity in code-related policies and planning

New Funding Opportunities!

Inflation Reduction Act

Section 50131: Assistance for Latest and Zero Building Energy Code Adoption

- **\$330M** supporting adoption of the latest model energy codes
- **\$670M** supporting adoption of zero energy codes
- Must implement a plan to achieve full compliance, including active training and enforcement programs and measure of the rate of compliance each year

> Notice of Intent (NOI) and Request for Information (RFI) Published March 31, 2023



\$1 Billion in funding to make U.S. building stock cleaner and more efficient

State & Local Technical Assistance

BECP offers a comprehensive collection of information, resources, and technical assistance to answer questions and address issues related to energy codes.





Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Funding Opportunity Announcements

Christina Volpi

Building Technologies Office

May 2023



Funding Opportunity Announcement (FOA)

- The Department of Energy is a granting institution and uses FOAs to solicit proposals
- The FOA is used to:
 - Communicates DOE's research objectives to applicants
 - Lays out who can and can't apply
 - Describes the application materials and phases (Concept Paper, Full Application, Replies to Reviewer Comments)
 - Describes how DOE will evaluate potential projects (e.g., criteria used to score applications)
 - <u>Explains</u> what will and won't be allowed during the project, so applicants know what they are signing up for
 - Lists all application deadlines
 - Lists funding method (Grant or Cooperative agreement) and cost share requirements

Where do I find a FOA?

- Grants.Gov
 - Listing of all government Grants
- Funding Opportunity Exchange
 - ie-exchange.energy.gov
 - ARPA-e-foa.energy.gov
 - EERE-exchange.energy.gov
- DOE Office Websites, Blogs, and Newsletters
 - https://www.energy.gov/eere/buildings/building-technologies-office
- Federal Register



Funding Opportunity Exchange

Systems to be registered in

- EERE Funding Opportunity Exchange
- Login.gov
- System of Award Management (SAM)
 - DUNS to Unique Entity ID (UEI) Transition
 - Register for your UEI in SAM
- Grants.gov
- FedConnect

ULOGIN.GOV



FOA Phases

Request for Information (RFI)	Notice of Intent (NOI)	FOA Issued	Concept Paper	Full Application	
Total <u>1</u> Time in Months	2	6	8	10	
Review	Selections	Negotiations	Active Project	Closeouts	
12	13	16	52	58	

RFI & NOI

Request for Information

- The intent of the RFI is to obtain public input regarding the solicitation process and structure of a potential DOE Funding Opportunity Announcement (FOA)
- Notice of intent
 - Published on Exchange Separately from the FOA
 - Notifies the public and stakeholders of the Technology Office's intention to publish a new FOA
 - The notification serves to heighten public awareness of the upcoming FOA, which allows potential applicants additional time to assemble project teams and prepare for applying
 - An NOI is highly encouraged, but not required

Concept papers

- Short Application format for quick evaluation
- The requirements for the concept paper are described in the FOA.
 - Two or Three page "Mini-Application"
 - Brief project and team description
- After review by DOE, applicants are notified if they are "encouraged" or "discouraged" to submit a full application
 - A discourage notification does not prevent an applicant from submitting a full application

Full Applications

- Technical Volume
- Application for Federal Assistance (SF-424)
- Statement of Project Objectives (SOPO)
- Budget Justification (EERE 335)
- Disclosure of Lobbying Activities (SF-LLL)
- One-page Summary
- Summary Slide

• Merit Review Process

- The merit review process includes a review of eligibility and a thorough technical review independent experts in the subject matter of the funding opportunity
- Merit Review Criteria is listed in the FOA
- The selection official considers the reviewers' recommendations, program policy factors as described in the published FOA, and the amount of funds available when selecting applications for negotiation of an award

Independent Reviewers

- Responsible for evaluating the Full Applications independent from the other reviewers
- Knowledgeable persons from industry, National Laboratories, Federally Funded Research and Development Centers (FFRDCs) and academia.
- Qualified individuals who are knowledgeable in the scientific or technical field that is the subject
 of the application to be reviewed. The FOA Manager selecting the Independent Reviewers will
 consider the following qualifications:
 - The individual's scientific or technical education and experience
 - The extent to which the individual has engaged in relevant work or research, the capacities in which the individual has done so, and the quality of such work or research
 - The need for the merit review to include experts from various specialty areas within relevant scientific or technical fields
- If you are interested in becoming a reviewer and qualify please notify DOE staff to be included in our reviewer database

Negotiation phase: Selection of Award



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¹⁸ Guidance for Success

- Understand the process and commitment required
- Read the whole FOA
 - Provide all required documents and nothing more
- Full Application Content Requirements
 - File Format
 - Page Limit
 - File naming structure
- Email any questions to the FOA-specific email address in the FOA document
- For technical issues email EERE-ExchangeSupport@hq.doe.gov

Thank you!

Christina Volpi Christina.Volpi@ee.doe.gov U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office



Residential Field Studies: Data About What Actually Gets Built



National Energy Codes Conference, May 3, 2023

Midwest Energy Efficiency Alliance

The Midwest Energy Efficiency Alliance (MEEA) is a collaborative network, promoting energy efficiency to optimize energy generation, reduce consumption, create jobs and decrease carbon emissions in all Midwest communities.

MEEA is a non-profit membership organization with 150+ members, including:





Energy service companies & contractors

State & local governments



Academic & Research institutions

Electric & gas utilities









- What is a Residential Field Study?
- Why Are They Important?
- What is the Process?
- What Can You Learn?



What is a Residential Field Study?

Learn What Actually Gets Built



Collects in-field **data on how new homes are being constructed** relative to the requirements of the energy code in force

Can provide **statistically significant** findings on a statewide level

Identifies the typical level of compliance with **key code measures**

Quantifies benefits of improved compliance from specific opportunities



Does not determine compliance of individual homes



What is a Residential Field Study? 75% of States Have Done a Study



State Energy Code Compliance Field Studies by Type and Year



Why Are They Important? Foundation for Improving the Built Environment



Robust, accepted method of quantifying the energy, cost and carbon savings of improved compliance



Identifies what measures are performing well and where to best target additional education and support



State specific analysis relative to the energy code in force, including any modifications



Establishes a baseline that can be used for training and program design



Use Established DOE/PNNL Protocol

- Provides statistically significant results at the state level
- Designed around a single site visit to each study home
- Data confidentiality is built into protocol
- PNNL will provide at no cost:
 - Sampling Plans
 - Measure Statistical Analysis
 - Measure Savings Analysis Annual
 - Measure Savings Analysis Cumulative





Establish a Collaborative or Working Group

- Host a kick-off meeting!
- Include diverse stakeholders
 - Homebuilders, code officials, design professionals, representatives from state and local government, academics, advocates, and others
- A collaborative or working group provides
 - Valued feedback on sampling plan
 - Channels for local contacts and information distribution
 - Aids with site access (the biggest challenge)
 - Ideas for additional measures to include in the study



Sampling Plans

- Based on random samplings of statewide construction starts
- Based on US Census permit data from recent years
- Multiple, equally valid sampling plans will be developed
- Review by stakeholder group to assure reasonableness and buy-in





What is the Process? Key Items

- Study is focused around significant energy impact energy code measures known as **Key Items**
 - Envelope Tightness
 - Duct Tightness
 - Windows
 - Wall Insulation
 - Ceiling Insulation
 - Foundation Insulation
 - High Efficacy Lighting





Additional Items

Some studies have added additional items to address particular concerns of a given state

- HVAC equipment sizing
- Electrical service size
- Energy burden
- Mechanical ventilation





Study Requirements

Minimum of 63 data sets, or a minimum of 126 site visits

A data set consists of one pre-drywall site visit and one visit at final

A home can only be visited once

?

Required measures must be observed in the field – no assumptions or data from plans

Data recorded on approved PNNL forms



Residential Energy Code Field Study Dashboard





What Can You Learn? Measure Level Trends – KY Example



Key Measure Weighted Average: Envelope Tightness

Training Opportunities – Insulation Installation



Potential Savings (Energy, Economic, Emissions)

If typical non-compliance measures were fully compliant



1st Year Potential Savings with 100% Compliance (All)

Measure Level Savings – Cumulative (19 states)

If full compliance continues over time

	Economic (\$)			Emissions (MT CO2e)		Energy (MMBTU)			
ivieasure (s)	5yr	10yr	30yr	5yr	10yr	30yr	5yr	10yr	30yr
Duct Tightness	\$ 111,352,08	8 \$ 408,290,99) \$ 3,451,914,733	2,015,030	7,388,445	62,465,945	6,474,950	23,741,483	200,723,443
Wall Insulation	\$ 106,270,01	4 \$ 389,656,71	9 \$ 3,294,370,439	2,045,377	7,499,714	63,406,672	6,678,500	24,487,832	207,033,485
Ceiling Insulation	\$ 84,148,30	4 \$ 308,543,78) \$ 2,608,597,412	2,101,410	7,705,169	65,143,697	4,579,498	16,791,494	141,964,452
Envelope Tightness	\$ 41,509,21	2 \$ 152,200,44	5 \$ 1,286,785,584	715,766	2,624,477	22,188,756	2,768,453	10,150,994	85,822,037
Lighting	\$ 36,128,89	7 \$ 132,472,62	1 \$ 1,119,995,794	1,121,009	4,110,366	34,751,273	847,154	3,106,230	26,261,760
Foundation	\$ 14,835,50	7 \$ 54,396,86) \$ 459,900,728	(73,627)	(269,966)	(2,282,440)	1,718,555	6,301,367	53,275,197
Window U-factor	\$ 5,820,32	5 \$ 21,341,19	2 \$ 180,430,079	21,328	78,204	661,182	518,582	1,901,466	16,076,032
Window SHGC	\$ 1.679.09	6 \$ 6.156.68	4 \$ 52.051.964	104.983	384.938	3.254.474	10.000	36.667	310.002
Total	\$ 401,743,443	3 \$ 1,473,059,291	\$ 12,454,046,732	8,051,276	29,521,346	249,589,559	23,595,691	86,517,532	731,466,408



Lessons Learned Residential Field Studies

Early stakeholder engagement is **critical**

Site access via code officials, builders, call first or just show up

Take a **LOT** of pictures – of everything!

Identify useful additional data to collect In-field part of study takes 6-12 months to complete

Use dashboard to explore, organize and compare data



Thank you!



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MEEA MIDWEST ENERGY EFFICIENCY ALLIANCE



NEXT GENERATION ENERGY TRAINING

NEWPORT PARTNERS

QUIZ ACCESS AND CURRICULA SUMMARY



- How to Comply with the Residential Energy Code
- Linking Advanced Building and Workforce to Career Programs
- Wholehouse Mechanical Ventilation Options
- High performance All Electric Home Design and Construction for Cold Climates
- Insulation Strategies for Difficult Details
- Cost Effective Zero Energy Strategies
- Hot Water Innovations for Decarbonization
- Heating and Cooling Innovations for Decarbonization

"We want a workforce to imagine and shape—not just maintain and fix—this complex future of buildings. Let's give students the skills to do that. Today's labor shortage is a challenge and an opportunity....We need to reimagine workforce education so that today's students see themselves as the creators—not just the maintainers—of tomorrow's buildings." – Nora Wang Esram, ACEEE Blog

ADAPTABLE, CREATIVE WORKFORCE WILL BE KEY TO ACHIEVING FULL POTENTIAL OF FEDERAL CLIMATE FUNDS – APRIL 20, 2023



EVERYTHING NEEDS TO BE ADAPTABLE

Energy Code Course Example



VIRTUAL PLAN REVIEW

Avoid Printing Plans

GREEN CAREER PATH CURRICULUM

Building Technology Green Credentials Evolution Limited ٠ SOLAR INSULATION Trades Rooftop solar panels collec energy from the sun and send it directly to the home's central breaker. Properly constructed and insulated walls create a thermal barrier that reduces the amount of heating and cooling needed to keep the house **Building Perf** BP Institute Response Keep Water Out LIGHTS LOW-FLOW FIXTURES Light emitting diodes (LEDs) o other high-efficiency lighting throughout the house reduce energy consumption. Reducing hot water consumption reduces the energy consumed by the bot water heater RESNET RESNET Keep Heat In RANGE HOOD WINDOWS Å₽ A properly-sized range hood captures les released into the air from cooking sends them outside, where they don't affect the occupants' breathing. Windows with U and SHGC value appropriate to their climate allow natural light in while keeping indoors comfortable. Sealing arc Associated Builders and Fuel Used for Heat the windows prevents drafts an **ÄBC** Contractors INDUCTION STOVE This cooktop is electric and safer to use than gas and electric resistance stoves. It releases no harmful toxins into the air. PROGRAMMABLE 圕 Ë THERMOSTAT ් REFRIGERATOR College The thermostat is programmed with adaptive recovery to avoid unnecessary use of the electric resistance backup heat. Leadership in Energy and Fuel Gets More Expensive Limited The refrigerator is electric and has scellent energy efficiency according to its ENERGY STAR label. Environmental Design 00000 no propose write down, they begin to purchase that 'rom wood, to coal, to natural gas in the 1900s. As copulation grows, fuel is in higher demand and recomes scarce, making it difficult to afford. BD+C Classes Response **F** HEAT PUMP WASHER AND DRYER Insulation Reduces Fuel Use A heat pump operates more than three times as efficiently as a conventional furnace and is powered by electricity. It cools in the summer and heats in the winter. The washer and dryer are electric and have excellent energy efficiency according to their ENERGY STAR labels. 6 learning how to keep inside air indoors more effectively. This leads to the practice of insulating wit eventhing from newspacer to cellulose. **Possible Career Paths** HEAT PUMP WATER HEATER Code Official: How do I get there? electric water heater operates more efficiently than other types of water extens by extracting energy from the Moisture Problems Occur High School Diploma air through a refrigeran + Building Science Principles Certificati formes are getting more insulated, bu properly ventilated. Condensation lea ventileme in the walk Energy Efficiency Technician Building Analyst Certification, HERS Rater Certification, or Energy Auditor Certification **High School** sealing and Ventilation Jobs that Make High Performance Building Happen Certified Home Energy Rater Immediate Licensure Exam (in some state Residential Building Code Official Green Building Expe ~3D Research Regulate Design Build Enforce Response Classes General Construction Building Code Architect Code Official Building Scientist Energy Efficiency Development and design building projects, uring all work is carried out to specfications as well as specifi ards, building codes, guideline and regulations. lation plans and application Building Scientist: How do I get there? reate the codes that buildin seasured against to ensure urability, and proper constr practices. indext and the lifecycle of building from construction to operation and maintenance to demolition or reuse of buildings, often with a High School Diploma ower door-guided ensure code compliance for construction projects. Associates Degree in Computer Aide Drafting and Design (CADD) Energy Code Energy Engineer Lighting Designer Draftspersor Energy Auditor Electrician Development Design and plan high-efficiency lighting and control systems for eidential, multifamily, institutional commercial or industrial spaces. + 4-Year Architecture Degree ion develop and eval Test buildings to determine whe Design and install energy efficient. 2 <u>-</u> codes dictating energy-es required for building standard is the interna The Home of the Future energy-related projects or pr to reduce energy costs of ne existing buildings Master's Degree ove-Code Program Sustainability Specialist Materials Scientist Home Energy Rater HVAC Contractors Development + Green Building and Design Experience

BE PART OF THE GREEN BUILDING REVOLUTION

esion and install energy efficient

green building practices, save money, and help their local

efficient huilding

assessments and perform energy modeling to determine the current and desired energy performance, safety, and durability of building



FIELD TRAINING

Temporary Mockups

DOE FOA LESSONS LEARNED

Build in Flexibility	 Write Statement of Project Objectives (SOPO) that allows for flexibility Set Expectation in SOPO that you will review approach/adjust 		
Stay Relevant	 Actively seek stakeholder/expert feedback DURING project Consider adjustments to meet market needs 		
Communicate Often	 Keep DOE updated on changes in direction that you are even considering 		



EMPOWERED FOA Streamlining Permitting and Inspection for DERs

Diana Burk, NBI May 3, 2023



About New Buildings Institute (NBI)

We push for **better buildings** that achieve **zero energy, zero carbon, and beyond**—through research, policy, guidance, and market transformation—to protect people and the planet.

NBI's work targets the aspects of the built environment that can make the greatest impact for the climate.



Overview of Project

Streamline the design, permitting, and inspections process for Distributed Energy Resource (DER) solutions.

- Electric Vehicle Supply Equipment (EVSE)
- Solar
- Energy Storage

Funded by DOE EMPOWERED (DE-EE0009457)





Project Objective

- Develop a series of design and permitting guides for simple DER solutions in:
 - Three technologies: EVSE, Storage, Solar
 - Two building types: Single Family/Duplex and Multifamily/Office
 - Two code versions: 2020 NEC/2021 IBC and IFC and 2017 NEC/2018 IBC and IFC
- Deploy guides in two areas: Boston and Arizona





Project Partners











Permitting and Inspection Guide Development Process

- Developed guidelines for expedited permit applicability
- Reviewed/compared existing permitting and inspection guidelines
- Included barriers/mistakes code officials and installers have identified through interviews and surveys
- Did not include many items that are often correct or not technology specific.
- Expert review provided by many code officials, National Electrical Manufacturers Association, Tesla, Sustainable Energy Action EV Working Group,



EVSE Permitting and Inspection Guide Timeline Budget Period 1 (Month 1- Month 18)



EVSE Permitting and Inspection Deployment Timeline Budget Period 2 (Month 19- Month 36)



Outline of Guides

- Permit Submission Requirements (e.g. checklist of what should be included on electrical line diagrams or site plans, load calculations, spec sheets)
- General Installation Guide (checklist with example electrical line diagrams/site plans)
- Plan Review and Field Inspection Checklist (1-page each)
- Resources and Agency Contacts
- Bibliography
- Sample Permit Application



EVSE General Installation Guide

- EVSE requirements: NRTL certification, enclosure type.
- Public Parking Accessibility requirements: % EVSE that must be accessible, dimensions of ADA spaces
- Location and EVSE Installation
 Requirements: Location height, vehicle
 impact protection
- Electrical Requirements: Load calculation requirements, overcurrent protection size rating, wire gauge, outlet requirements, automatic load management system requirements

GENERAL INSTALLATION GUIDE

MINIMUM EVSE REQUIREMENTS

- 1 EVSE installed according to manufacturer's installation instructions. (NEC 110.3(B))
- 2 EVSE is suitable for the environment (indoor/outdoor) in which it will be installed. (NEC 110.28)
- 3 EVSE has a Nationally Recognized Testing Laboratory (NRTL) approved listing mark. (UL 2202/UL 2594)(NEC 625.5)
- 4 If EVSE with adjustable amperage setting is installed, equipment is fixed in place and adjusting means is accessible by qualified personnel with the use of a tool or password protected commissioning software. (NEC 625.42)





- 5 Permanently installed EVSE are located at a height of (NEC 625.50):
 a) Indoor location: 1.5 feet or more above floor level
 b) Outdoor location: 2 feet or more above grade level.
- 6 Charging cord meets one of the following: (NEC 625.17)

 a) Does not exceed 25' in length, or
 b) Is equipped with a cable management system that is part of the EVSE
- 7 Charging cord length reaches the vehicle's charging inlet without excessive slack. (NEC 625.17)
- B The EVSE is protected from vehicular impact through one of the following:
 a) Installation in a location not subject to vehicular impact such as a side wall or 4 feet or more above floor level,
 b) Wheel barriers,
 c) Bollards, or
 d) Other approved barrier. (NEC 110.27(B))

- 22 Portable EVSE is connected by one of the following: (NEC 625.44(A))
 - a. A nonlocking 2-pole, 3-wire grounding-type receptacle outlet rated at 125V, single phase, 15 or 20 amps
 - b. A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 250V, single phase, 15 or 20 amps
 - c. A nonlocking, 2-pole, 3-wire or 3-pole, 4-wire
 - grounding-type receptacle outlet rated at 250V, single phase, 30 or 50 amps
 - d. A nonlocking, 2-pole, 3-wire grounding-type outlet rated at 60V DC maximum, 15 or 20A



- 23 Fastened-in place EVSE are connected by one of the following: (NEC 625.44(B))
 - A nonlocking 2 pole, 3-wire grounding-type receptacle outlet rated at 125V or 250V, single phase, up to 50 amps
 - b. A nonlocking, 3-pole, 4-wire grounding-type receptacle
 - outlet rated at 250V, three phase, up to 50 amps c. A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated at 250V, single phase, 30 or 50 amps
 - d. A nonlocking, 2-pole, 3-wire grounding-type receptacle outlet rated at 60 V DC maximum, 15 or 20A amps
- 24 Fixed EVSE are permanently wired and fixed in place to the supporting surface. (NEC 625.44(C))
- 25 Receptacles have GFCI protection. (NEC 625.54)
- 26 All receptacles installed in a wet location for EV charging have a weatherproof enclosure with the attachment plug cap inserted or removed. If an outlet box hood is installed, it is extra duty. (NEC 625.56)

The following figure illustrates the effect that the location limitations have on an ESS. The highlighted area depicts zones that meet the location limitations for outside walls in this guideline



PERMITTING CHECKLIST

MINIMUM EVSE REQUIREMENTS

- **1** EVSE installed according to manufacturer's installation instructions.
- EVSE is suitable for the environment (indoor/ outdoor) in which it will be installed.

$\mathscr{Q}_{\mathscr{D}}$ location and evse installation requirements

- 4 Permanently installed EVSE are located at a height of: a) Indoor location: 1.5 feet or more above floor level b) Outdoor location: 2 feet or more above grade level.
 6 The EVSE is protected from vehicular impact through one of the following: a) Installation in a location not subj b) outdoor location content of the following: b) Outdoor location content of the f
- 5 Charging cord meets one of the following:

 a) Does not exceed 25 in length.
 b) Is equipped with a cable management system that is part of the EVSE.
- The EVSE is protected from vehicular impact through one of the following:
 a) Installation in a location not subject to vehicular impact such as a side wall or 4 feet or more above floor level;
 b) Wheel barriers;
 c) Bollards; or
 d) Other approved barrier.

3 EVSE has a Nationally Recognized Testing Laboratory (NRTL) approved

listing mark. (UL 2202/UL 2594)

- 7 For EVSE and 240V outlets installations, electrical service rating is greater than or equal to the electrical service load as demonstrated by electrical service load calculations.
- **8** EVSE has a sufficient rating to supply the load served.
- 9 Service and feeder are sized for EVSE to be considered continuous loads unless an automatic load management system (ALMS) is used. If an ALMS is used, the maximum equipment load on the service/feeder matches the maximum load permitted by the ALMS.
- The required overcurrent protection for the proposed EVSE are

 a)Sized for continuous duty
 b)Have a rating of 125% or more of the maximum load of the equipment specification based on Table 1 below.
- 11 If the EVSE is rated more than 60 amps or more than 150V to ground, the disconnecting means is able to be locked in the open position and is in an easily accessible location not protected by locked doors or other obstructions.
- **12** Circuits serving EVSE do not serve any other end uses.
- **13** Circuit conductors are sized at 125% or more of EVSE nameplate current

- 14 Underground conduit meet minimum depth requirements in Table 1 below. Insulated conductors and cables are suitable for use in wet locations and protected from physical damage.
- Portable EVSE is connected by one of the following: a) A nonlocking 2-pole, 3-wire grounding-type
 - receptacle outlet rated at 125V, single phase, 15 or 20 amps b) A nonlocking, 2-pole, 3-wire grounding-
 - type receptacle outlet rated at 250V, single phase, 15 or 20 amps c) A nonlocking, 2-pole, 3-wire or 3-pole, 4-wire
 - grounding-type receptacle outlet rated at 250V, single phase, 30 or 50 amps d) A nonlocking, 2-pole, 3-wire grounding-type
 - outlet rated at 60V DC maximum, 15 or 20A
- **16** Fastened-in place EVSE are connected by one of the following:
 - a) A nonlocking 2 pole, 3-wire grounding-type receptacle outlet rated at 125V or 250V, single phase, up to 50 amps
 - b) A nonlocking, 3-pole, 4-wire grounding-type receptacle outlet rated at 250V, three phase, up to 50 amps
 - c) A nonlocking, 3-pole, 4-wire groundingtype receptacle outlet rated at 250V, single phase, 30 or 50 amps d) A nonlocking, 2-pole, 3-wire grounding-type
 - receptacle outlet rated at 60 V DC maximum, 15 or 20A amps

EVSE PERMITTING AND INSPECTION GUIDELINES / 13

17 Fixed EVSE are permanently wired and fixed in place to the supporting surface.

NSPECTION CHECKLIST

MINIMUM EVSE REQUIREMENTS

- Specifications of EVSE match the approved plans:

 a) Maximum kW rating,
 b) Voltage,
 c) Ampacity,
 d) Manufacturer
 e) NEMA enclosure type.
- EVSE installed according to manufacturer's installation instructions. (1)
- **3** EVSE is suitable to for the environment in which it is installed (indoor and outdoor). (2)
- EVSE has a Nationally Recognized Testing Laboratory (NRTL) approved listing mark. (UL 2202/UL 2594). (3)
- 5 If EVSE with adjustable amperage setting is installed, equipment is fixed in place and adjusting means is accessible by qualified personnel with the use of a tool or password protected commissioning software.

- **6** EVSE installation location matches approved floor plan.
- 7 Permanently installed EVSE are located at a height of: (4)
 a)Indoor location: 1.5 feet or more above floor level
 b)Outdoor location: 2 feet or more above grade level.
- B Charging cord meets one of the following: (5)

 a) Does not exceed 25' in length.
 b) Is equipped with a cable management system that is part of the EVSE
- **9** Charging cord length reaches the vehicle's charging inlet without excessive slack.
- 10 The EVSE is protected from vehicular impact through one of the following:(6)

 a) Installation in a location not subject to vehicular impact such as a side wall or 4 feet or more above floor level;
 b) Wheel barriers;
 c) Bollards; or
 d) Other approved barrier.

- 11 For EVSE and 240V outlets installations, electrical service rating is greater than or equal to the electrical service load. (7 and 9)
- 12 Overcurrent protection are the type and size according to the approved plan. (10)
- 13 For EVSE rated greater than 60 amperes or 150 volts, a disconnecting means is able to be locked in the open position and is located an easily accessible location not protected by locked doors or other obstructions. (11)
- 14 Circuits serving EVSE do not serve any other end uses. (12)
- 15 Circuit conductors are the type and size according to the approved plan. (13)
- 16 All electrical materials, devices, fittings, and associated equipment are listed and labeled.

- 17 Underground conduit meet minimum depth requirements according to the approved plan. Insulated conductors and cables are suitable for use in wet locations and protected from physical damage. (14)
- 18 Portable and fastened-in-place EVSE are connected to the wiring system according to the approved plans. (15 and 16)
- **19** Fixed EVSE are permanently wired and fixed in place to the supporting surface. (17)
- 20 Receptacles have GFCI protection.
- 21 All receptacles installed in a wet location for EV charging have a weatherproof enclosure with the attachment plug cap inserted or removed. If an outlet box hood is installed, it is extra duty.

HELPFUL TIP Numbers that correspond to the requirement in the permitting

checklist are provided next to the same requirement in the

field inspection checklist.

Appendix A – Sample Permit Application

APPENDIX: EVSE PERMIT APPLICATION



SECTION 1 - GENERAL INFO

PROJECT ADDRESS			
PROPERTY OWNER'S NAME	PHONE NUMBER	EMAIL	

PROPERTY OWNER'S MAILING ADDRESS (IF DIFFERENT FROM PROJECT ADDRESS)

SECTION 2 - PROJECT DETAILS



PROJECT DESCRIPTION:



SECTION 3 - CONTRACTOR INFORMATION

CONTRACTOR BUSINESS NAME		CONTRACTOR LICENSE NUMBER
BUSINESS ADDRESS		
CONTRACTOR CONTACT NAME	PHONE NUMBER	EMAIL

SECTION 4 - PERMIT FEE

[Include fee schedule/options and/or instructions for calculating fee, directions on how and when to submit the permit fee.]

SECTION 5 - IMPORTANT NOTICE

A permit must be obtained for all installations or alterations of electrical equipment BEFORE WORK STARTS. Refer to EVSE Permitting Checklist for additional documents required. Failure to provide all required documents, including (1) Site Plan, (2) Electrical Diagram, and (3) Specification Sheets and Installation Manuals will delay permit approval. All permits expire six (6) months after date of issuance. Failure to start the work authorized by a permit within this six-month period renders the permit invalid and a new permit must be obtained. Once work begins, noticeable progress must continue until completion. All work must be complete within eighteen (18) months of a permit issue date.

Please Submit the following additional documents with the EVSE Permit Application

- Site Plan - Electrical Diagram - EVSE Specification Sheets and Installation Manuals	 Transformer Specification Sheets Load Calculation Automatic Load Management System Specification sheet if applicable
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Submit Permit Application

[Describe the submission process, how should the permits be submitted? In-person, on-line, e-mail, fax, etc.]

SECTION 6 - APPLICANT SIGNATURE

I, the undersigned, certify that I have proper authority to apply for this permit, that the Contractor has obtained a signed contract from the Property Owner for the specified work, that all contractors have consented to being listed, and that all the information contained on this application is true and accurate to the best of my knowledge.



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Deployment of Guides

- Held two virtual trainings and conducted baseline survey
 - Permit time: 1-5 days
 - Number of Field Inspections: 1 3
 - Permit cost: \$100-\$300/permit
- Jurisdiction Goals:

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- Consistent enforcement
- Better education of contractors
- Lessons learned: Many building departments are understaffed

Photo: https://www.valewoodelectric.com/electrical-inspection/



Collaboration: Amplify Project Success



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conduct outreach to encourage adoption, customization, and use of guidelines.

Southface Energy Institute

Develop interactive diagrams to illustrate concepts in the guides.





Secretary Jennifer Granholm 🤣 @SecGranholm

DOE is working in partnership to train the workforce for our clean energy buildings future—building operators, managers, safety officials. Thank you @IRECUSA @SouthfaceInst @NewBldgsInst :



ngtnews.com

DOE, IREC, NBI, Southface Offer Resources to Advance Cl... Three clean energy organizations have formed a partnership to provide educational resources and training on clean ...

7:01 AM · Jun 4, 2022 · Twitter for iPad

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Milestones and Partners

- Strong collaborative partners are essential
- State and local governments may be understaffed
- Milestones:
 - Make them doable
 - Consider start up time for early milestones
 - Continuation Application: Go/No Go Milestones due 3 months before budget period ends
 - Pace your team in achieving milestones
- No cost time extensions may be necessary: projects can be unpredictable
- Budget for outreach efforts



Questions?

diana@newbuildings.org

Wrap up and Q&A

U.S. DEPARTMENT OF ENERGY OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY

Thank you



Contacts lan.blanding@ee.doe.gov

Building Energy Codes Program https://www.energycodes.gov/

BECP Help Desk

https://www.energycodes.gov/technicalassistance/help-desk