



Certified Industrial Energy Professional™

A Certification for Energy Efficiency Professionals.

CERTIFICATION SCHEME 1.0

Version No: 1
Effective Date: 11/1/2022



Scope

Certified Industrial Energy Professionals (CIEP™) ensure that industrial plants and manufacturing facilities are operated and maintained to the highest performance while using the lowest amount of energy possible. Using proven energy management systems and audit processes, such as ISO 50001 and ISO 50002 they help identify inefficiencies and define energy strategies for reducing costs. As technical experts, they understand the varied equipment and systems used throughout industry and can leverage this knowledge to improve overall systems performance.

Certified Industrial Energy Professionals demonstrate competency in the following areas that are included in the CIEP Body of Knowledge to gain certification: fundamentals to industrial energy audits and energy management systems, instrumentation and controls, energy investigation support tools, fuels, furnaces, and fired equipment basics, plant water systems, heat exchange systems, boiler and steam systems, electric motors & drives, pump systems, fan systems and compressed air systems.



Eligibility Requirements for Competence

Individuals applying for the CIEP™ certification examination must attend an approved preparatory training course, meet the following education, and experience requirements, and complete a certification application.

Education and Experience Requirements

Education		Work Experience
4-year related* degree OR Professional Engineer (PE) OR Registered Architect (RA)	and	2+ years related** experience
4-year unrelated degree	and	3+ years related** experience
2-year technical degree*	and	4+ years related** experience
NONE	and	6+ years related** experience
Current status of Certified Energy Manager® (CEM®)		

*Related degree in technology, plant engineering, industrial engineering, mechanical/electrical engineering.

**Related experience in manufacturing or industrial facilities or plant facilities operations.

Examination Requirements for Competence

To earn the CIEP™ Certification, candidates must pass the certification examination. The competency requirements assessed are the following:

Certified Industrial Energy Professional - Examination Blueprint

Body of Knowledge / Duties and Tasks (% Exam)	
1	Fundamentals to Industrial Energy Audits and Energy Management Systems (5-7%)
101	Define the objectives of energy management
102	Awareness on climate change & clean energy
103	Conceptualize the need for industrial energy management
104	Understand energy basics
105	Understand energy systems efficiency
106	Understand energy balance
107	Overview of the energy audit types
108	Overview of the ISO50002 energy audit standard
109	Overview of the ISO50001 energy management systems standard
110	Develop an energy review, baseline, and energy performance indicators
2	Instrumentation and Controls (6-8%)
201	Understand the basic process and concepts of control systems
202	Determine the types of control systems
203	Identify field input elements
204	Identify field output elements
205	Understand control valves, control algorithms, and control technologies
206	Define energy information systems
207	Identify Energy Efficiency Measures (EEMs) to enhance instrumentation and control system effectiveness

3	Energy Investigation Support Tools (6-8%)
301	Consider industrial safety
302	Understand electrical metering equipment and data loggers
303	Understand combustion metering
304	Understand temperature metering
305	Understand leak detectors
306	Understand pressure metering
307	Understand flow metering (velocity, differential pressure, displacement, open flow)
308	Understand solar PV metering
309	Understand building metering (IAQ, humidity, building envelope)

4	Fuels, Furnaces, and Fired Equipment Basics (8-12%)
401	Differentiate fuel types
402	Define heat transfer
403	Understand furnace types
404	Test furnace efficiency
405	Describe fired heater construction and components
406	Understand fuel train construction and components
407	Describe burner systems and combustion
408	Adjust fuel air ratio
409	Minimize flaring
410	Identify EEMs on furnaces and fired equipment

5	Plant Water Systems (6-8%)
501	Establish water context and the need for water treatment
502	Understand basics and types of water treatment
503	Understand reverse osmosis system basics
504	Evaluate cooling towers and its water loss
505	Understand ion exchange in steam systems
506	Overview industrial water uses (Oil & gas, food & beverage, mining, construction, forestry, pulp & paper)
507	Compare water desalination methods and its energy consumption
508	Identify water efficiency measures on filtration, cooling towers, and operations

6	Heat Exchange Systems (8-12%)
601	Define heat exchanger basics and design
602	Identify main heat exchangers types and its applications
603	Understand heat recovery
604	Assess heat exchange fouling
605	Identify EEMs on heat exchangers and its components

7	Boiler and Steam Systems (10-14%)
701	Comprehend fundamentals to steam systems and boiler types
702	Understand steam properties and use saturated and superheated steam tables
703	Compare fuel heating values
704	Determine boiler losses (shell, blowdown, stack)
705	Calculate and improve combustion efficiency
706	Assess boiler blowdown
707	Evaluate deaerators
708	Audit the distribution system, steam traps, flash steam, and steam leaks
709	Understand the basics and the types of cogeneration
710	Compare CHP technologies
711	Understand conventional power generation cycles
712	Understand steam turbines and its components
713	Understand distributed generation and smart grids
714	Identify EEMs on boilers, steam systems, and turbines

8	Electric Motors and Drives (8-12%)
801	Understand electrical fundamentals (induction, electromagnets, powerfactor)
802	Understand electric motor basics, types, and construction
803	Comprehend electric motor nameplate data (Frame size, kW, class, SF, Volt, etc.)
804	Evaluate motor efficiency and efficiency classes
805	Evaluate losses in motors
806	Understand motor drives and speed control
807	Identify EEMs in motors

9	Pump Systems (8-12%)
901	Establish pump system fundamentals
902	Differentiate pump classifications and pump types
903	Understand pump system components (impellers, casings, bearings, seals, piping, controls)

9	(Continued)
904	Calculate delivered power, total head and efficiency of a pump
905	Calculate total head, friction head and efficiency of a pump
906	Determine distribution losses
907	Analyze pump and system performance curves
908	Analyze pump in series and in parallel
909	Identify pump cavitation, its causes, and remedies
910	Calculate Net Positive Suction Head available
10	Fan Systems (7-11%)
1001	Establish fan system fundamentals and components
1002	Differentiate fan types and their pros and cons
1003	Apply fan types to its optimal application regarding impeller efficiency and dust loading
1004	Analyze fan and system performance curves
1005	Understand damper types and its impact on fan system performance
1006	Compare fan controls methods
1007	Calculate the effect of variable flow by using the fan/affinity laws
1008	Establish fan maintenance practices
1009	Identify low cost, retrofit, and maintenance EEMs on fan systems
11	Compressed Air Systems (8-12%)
1101	Establish compressed air system fundamentals
1102	Understand compressed air
1103	Understand compressor types and their applications
1104	Analyze flow capacity control
1105	Apply multiple compressors and correct sizing
1106	Understand air treatment, distribution, and storage
1107	Measure leaks and perform leakage tests
1108	Identify and reduce artificial demand
1109	Identify and reduce inappropriate use
1110	Identify EEMs on compressed air supply, treatment, and demand

Examination Specifications

The examination will follow the specifications outlined in the examination blueprint and will include 100 multiple-choice graded questions in accordance with the percent of exam range for each task.

Code of Ethics

Codes of Practice are found in the Code of Ethics for Energy Professionals V1.1 dated November 21, 2019, available at www.aeecenter.org/CodeofEthics.



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Recertification Requirements

A CIEP™ must accumulate ten professional credits every three years and submit a completed Renewal Form to AEE to remain certified. Professional credits for recertification can be accumulated at any time within the three-year period. Detailed explanation of activities applicable as credits for certification renewal available at www.aeecenter.org/certification/renewal.

Activities for CIEP™ Renewal Credits

Continued employment in industrial energy management activities:

- 1 credit per year

Membership in a professional engineering society

- 1 credit per year

Offices held in a professional engineering society

- 1 credit per year

Continuing education (CEU's) / professional activities (seminars or conferences) including but not limited to industrial energy management.

- 2 credits per CEU, college credit hour or 10 contract hours for training

Awards presented and/or papers published involving industrial energy management:

- 2 credits each

Certified Professionals who do not acquire sufficient CIEP™ maintenance points to be recertified on the recertification date will be dropped from active certifications and notified in writing of suspension from using the CIEP designation. They will also no longer be listed as a CIEP™ in any AEE publication. A lapsed CIEP™ must resubmit to the certification process and successfully meet the criteria for certification by personal data information and examination. Another option for certified professionals is to acquire make-up points at a cumulative total equal to 3.5 per year for every year since date of expiration. This option is available one-time only. Certifications that have lapsed more than three renewal cycles must retake the CIEP™ exam.

A CIEP™, upon retiring and/or reaching the age of sixty-five, can be designated as "CIEP™ – Retired," will no longer be required to pay renewal fees, and will no longer be listed in our directory of actively practicing CIEP™s. No further reporting is necessary except to notify AEE of meeting the age requirement by sending a copy of the retired CIEP™'s Driver's License.

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