CleanTech Alliance™

Existing and Emerging Fusion Technician Training Programs Across the Globe

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Introduction

Fusion energy is moving from national laboratories into commercial development. Four fusion developers operate in Washington: Helion Energy and Zap Energy in Everett, Avalanche Energy in Seattle with its FusionWERX test facility in Richland, and Kyoto Fusioneering. Two more Washington companies serve the sector: ExoFusion in Bellevue, which works in fusion design, simulation, and IP licensing, and Altrusion at the SWIFT Center in Sedro-Woolley, which is building fusion supply chain manufacturing capacity.[1] Helion is building a 50 MW plant at Malaga under a power purchase agreement with Microsoft, targeting 2028.[2] Globally, the Fusion Industry Association reports that 56 fusion companies raised $4.48 billion in the twelve months to July 2026, bringing total reported funding since 2021 to $14.24 billion, and that the industry now employs more than 16,000 people.[3]

This report provides an overview of fusion technician training programs worldwide, whether operating today or announced and in development.[4] Fusion technicians build, install, maintain, and operate the hardware — vacuum systems, cryogenics, superconducting magnets, lasers and optics, power electronics, diagnostics, robotics, and the structures around them. They work from drawings and procedures rather than designing the machine, and the work is skilled trades and advanced manufacturing applied to fusion equipment, including the small-scale fusion machines being built commercially. Health physics and radiation protection roles are included. These are primarily sub-baccalaureate jobs, reached through certificates, associate degrees, and apprenticeships, and distinct from the plasma physicists and design engineers most commonly associated with fusion.

Fusion companies are hiring technicians now. Our search found no published evidence of a dedicated fusion technician certificate or associate degree at any community or technical college, in the United States or abroad. Fusion education worldwide is concentrated at the masters, doctoral, and postdoctoral level, and that pattern held in every country reviewed. A 2024 National Science Foundation workforce conference reached a parallel conclusion, finding that community colleges and trade schools are under-utilized in fusion workforce development.[5] Three programs meet the definition used here and are operating today: one in the United Kingdom and two in the United States. Each was established by an employer or a national laboratory rather than by an educational institution, and each contracts its classroom instruction to an outside training provider. Five further efforts have been announced or launched but are not yet training learners; none has published a curriculum or credential level.

Programs Operating Today

Three programs train fusion technicians today. One is in the United Kingdom, sponsored by the UK Atomic Energy Authority, and two are in the United States, one at a Department of Energy national laboratory and one run jointly by a national laboratory and a community college. Two take the form of multi-year apprenticeships; the third is an eight-week course. In every case, the sponsor supplies the facility, the equipment, and the employment, and an education partner supplies the instruction and the credential.

Program	Sponsor	Location	Level and duration	Occupations covered
PPPL Apprenticeship Program	Princeton Plasma Physics Laboratory (U.S. Dept. of Energy)	New Jersey, USA	Registered apprenticeship 4 years	Multiple occupations, including mechanical and electrical technicians, machinists, welders, HVAC, information technology, cybersecurity, cryogenics, and environment, safety and health technicians
Oxfordshire Advanced Skills (OAS)	UK Atomic Energy Authority and STFC, managed by MTC Training	Culham, Oxfordshire, UK	Apprenticeships Levels 2 to 6	Engineering technicians; nuclear health physics monitors; nuclear operatives (decommissioning)
Laser Optics Workshop	Lawrence Livermore National Laboratory with Las Positas College	California, USA	Non-credit short course 8 weeks	Laser and electronic optics technicians

Princeton Plasma Physics Laboratory Apprenticeship Program

The first U.S. Department of Labor registered apprenticeship in fusion energy and engineering.[6] Launched in 2019 with support from the U.S. Department of Energy and the New Jersey Department of Labor's Growing Apprenticeship in Nontraditional Sectors grant program.[7] The first cohort graduated in November 2023 and a further cohort in April 2026.[8] Classroom instruction is delivered by Mercer County Technical Schools.[9]

Two rounds of $3 million in Department of Energy investment have converted the model into a national framework. PPPL now leads the DOE Office of Science National Apprenticeship Expansion on a hub-and-spoke basis, with other national laboratories acting as employing spokes.[10]

Oxfordshire Advanced Skills

A training center on the UK Atomic Energy Authority's Culham Campus, a partnership between UKAEA and the Science and Technology Facilities Council with training delivered by MTC Training, offering apprenticeships from Level 2 through Level 6. Learners are drawn from employers across motorsport, pharmaceuticals, maritime, and fusion; the fusion share is not published separately.[11] MTC Training reports having delivered engineering training to more than 400 apprentices at the center since 2019.[12]

In autumn 2025, the center added two Level 2 programs, Nuclear Health Physics Monitor and Nuclear Operative (Decommissioning), developed with UKAEA subject matter experts. The first cohort was 36 learners; courses were full for the 2025 intake.[12] A £13 million facility extension was funded through the Fusion Foundations Programme,[13] and the Level 2 provision is supported by UKAEA's Fusion Opportunities in Skills, Training, Education and Research program, known as FOSTER.[12]

The center is shared infrastructure rather than a single employer's asset. Tokamak Energy partnered with OAS to create four-year Level 3 engineering technician apprenticeships, trained at Culham, where the company is also building its ST80-HTS prototype.[14]

Lawrence Livermore National Laboratory and Las Positas College

An eight-week Laser Optics Workshop runs through Las Positas College's Community Education program, covering laser safety and geometrical and physical optics, with hands-on work and lectures from laboratory staff. Tuition is $150, the course carries no college credit, and it is supported by the NNSA Minority Serving Institutions Partnership Program.[15] The program exists because laser and electronic optics technicians are in short supply: LLNL recruits from only three institutions in the United States offering associate degrees in laser technology.[16]

The 2025 pilot drew 30 participants, about 40 percent of them LLNL employees, with the remainder made up of student interns, Las Positas students, and community members. Instructors are working to restart an accredited laser technology degree program at Las Positas College, and LLNL convened an Optics Education Summit in April 2026, described as the first national effort of its kind focused on college-level optics and photonics education.[17]

Note on scope: these technicians build and maintain the laser and optical systems that drive inertial confinement fusion machines, and the same skills serve the wider laser and photonics sector. The training is not fusion-specific in the way the other programs are, and no Washington fusion company uses a laser-driven approach.

It is included here for two reasons. First, laser and electronic optics technicians are a fusion technician occupation for the inertial confinement segment of the industry, which includes Marvel Fusion, Focused Energy, and Xcimer Energy. Second, the delivery model is the most directly transferable of the three to a state building capacity from a standing start. A national laboratory identified a technician shortage it could not hire its way out of, partnered with its local community college to run a low-cost non-credit pilot through community education, used the pilot to test demand, and is now working toward an accredited associate degree at that college. That sequence — employer-identified shortage, non-credit pilot, credential — applies equally to vacuum, cryogenics, and power electronics technicians in Washington, whatever the confinement approach.

Programs Announced or in Development

Five more efforts are announced or launched but not yet training technicians. Three are tied to facilities under construction in the United States — a stellarator prototype in Tennessee, a laser facility in Colorado, and a manufacturing campus in New Mexico. The fourth is a German federal research program and the fifth a UK robotics skills center that launched in April 2026 with its first intake planned. The New Mexico effort is the furthest developed, with state funding attached and a community college named as coordinating lead. Elsewhere the workforce component was announced alongside the facility rather than built with an education partner, and none of the five has published a curriculum or credential level.

Project	Sponsor	Location	What is planned	Timing
Project Infinity	Type One Energy with Tennessee Valley Authority	Bull Run Energy Complex, Clinton, Tennessee	Infinity One prototype to serve as engineering verification tool and workforce training center	Infinity One commissioning and startup scheduled 2029
ATLAS facility	Marvel Fusion with Colorado State University	Fort Collins, Colorado	Laser fusion research hub serving research, workforce training, and industry engagement	Substantial completion scheduled December 2026; opening anticipated 2027
Technician pipeline	Pacific Fusion with Central New Mexico Community College and UNM-Valencia	Los Lunas and Albuquerque, New Mexico	College-partnered technician pipeline; company recruits and trains technicians directly	Mesa del Sol groundbreaking August 2026
Fusion 2040 competence hubs	German Federal Ministry for Research, Technology and Space	Germany	Three topic hubs on magnetic fusion, laser fusion, and fuel cycle and materials; mandate includes training and attracting skilled workers	Awarded July 2026; funding begins August 2026
Cumbria Robotics Operations Skills Centre (CROSS)	UK Atomic Energy Authority with National College for Nuclear and Clean Energy	West Cumbria, UK	Robotics and automation training for fusion and nuclear decommissioning; apprenticeship delivery and modular routes	Facility launched April 2026; first apprenticeship intake from Sellafield Ltd planned

Type One Energy and the Tennessee Valley Authority

Project Infinity encompasses the Infinity One prototype and the 350 MWe Infinity Two power plant, proceeding in phases at TVA's Bull Run Energy Complex in Clinton, Tennessee. Type One describes Infinity One itself as serving both as an engineering verification tool and as the workforce training center, rather than as a separate facility. Infinity One is scheduled for commissioning and startup in 2029. No curriculum, credential level, or education partner has been announced.[18]

Marvel Fusion and Colorado State University

A public-private partnership to build the Advanced Technology Lasers for Applications and Science facility in Fort Collins, to serve as a hub for U.S.-based laser fusion research, workforce training, and industry engagement.[19] Colorado State University topped out the two-story, 77,626 square foot facility in April 2026, and it remained on track at that point for substantial completion in December 2026, with an official opening anticipated in 2027.[20]

Pacific Fusion in New Mexico

Pacific Fusion opened a 200,000 square foot Build Center in Los Lunas in December 2025 and is developing a $1 billion campus at Mesa del Sol in Albuquerque, where it says it will employ up to 200 people.[21] As of August 2026 the Los Lunas site employed 73 workers, 95 percent of them New Mexicans, and the company broke ground at Mesa del Sol on August 25, 2026.[22] Published accounts describe the company recruiting technicians directly through regional job fairs and training them on site; no company training curriculum or credential has been published.[23]

The state-side mechanism is a community college initiative rather than a company program. Central New Mexico Community College holds a $6 million technician training initiative funded directly by the New Mexico Legislature, covering quantum technologies, advanced energy, and defense-related industries, which names CNM the statewide coordinating lead for technician education and training. Working with other community colleges, employers, workforce partners, national laboratories, and economic development organizations, CNM is developing technician pathways, work-based learning, and industry-recognized credentials. CNM's published description of the initiative does not name participating employers.[24] Separately, New Mexico has committed nearly $4 million to the company through its Job Training Incentive Program, which reimburses employee wages,[22] and in 2026 the legislature appropriated $380 million to the state Economic Development Department to build out the quantum and fusion sectors.[25] CNM also launched the country's first Quantum Technician Bootcamp in September 2025 — ten weeks, forty hours per week, no prerequisites.[26]

Germany

Germany's Federal Ministry for Research, Technology and Space announced funding decisions on July 29, 2026 for the three competence hubs foreseen in the Fusion 2040 research program, covering magnetic fusion, laser fusion, and the fuel cycle and materials development. Each hub receives roughly €125 million in the first funding round, with funding beginning in August 2026 and the program expanding in phases through 2029. The laser fusion hub, coordinated by Focused Energy and Marvel Fusion, will be based at RWE's former Biblis nuclear power station in Hesse. The fuel cycle and materials hub, MAT-TRIx, is coordinated by the Karlsruhe Institute of Technology. Alongside research and supply chain objectives, the hubs are charged with recruiting and training skilled personnel. No curriculum, credential level, or education partner has been named.[27]

Cumbria Robotics Operations Skills Centre

UKAEA and the National College for Nuclear and Clean Energy formally launched CROSS in April 2026 to build the robotics-skilled workforce needed for UK fusion ambitions and the nuclear decommissioning mission. It combines UKAEA's robotics expertise with the college's curriculum delivery capability and is funded through FOSTER, which also supplied more than £700,000 of equipment. CROSS is a physical training facility in West Cumbria rather than a curriculum alone. It will initially support apprenticeship delivery, including a first intake from Sellafield Ltd, alongside modular training routes. Enrollment had not been publicly confirmed as of August 2026.[28]

Countries Without Documented Technician Training

China, South Korea, and India all have substantial fusion programs, and no technician training program was found in any of the three. Documented workforce development in all three runs through universities and national research institutes: China's national fusion education program operates across ten universities and ten research institutes,[29] and Korean and Indian efforts are similarly anchored in national institutes and university departments.[30],[31] Companies in all three countries are building hardware and therefore employing technicians. What could not be established is how those technicians are trained. The absence of a published credential in these countries should be read as an absence of English-language documentation, not as evidence that no training exists.

Findings

Fusion developers are hiring technicians in Washington now, and Helion is targeting power delivery from Malaga in 2028. No credential pathway for those jobs exists anywhere in the state.

The three programs training fusion technicians today share one structural feature: none was created by an educational institution. A national laboratory or an employer established each of them, supplied the facility, the equipment, and the employment, and contracted the classroom instruction to an outside training provider. The credential levels vary widely — a four-year registered apprenticeship at PPPL, Level 2 through Level 6 apprenticeships at Oxfordshire Advanced Skills, an eight-week non-credit course at Las Positas College — but the direction is constant. Employers went looking for training capacity. Colleges did not go looking for fusion.

The announced efforts follow the same pattern with one exception. Tennessee, Colorado, and the German hubs each attached a workforce commitment to a facility rather than to an education partner, and none has published a curriculum or credential level. New Mexico is the exception: the state legislature put $6 million into a community college and named it the statewide coordinating lead for technician education. That is the only case found in which the education system, rather than a company or a laboratory, holds both the money and the mandate.

The occupations themselves are not exotic. Vacuum systems, cryogenics, superconducting magnets, lasers and optics, power electronics, diagnostics, robotics, and health physics are skilled trades and advanced manufacturing work applied to fusion equipment. The UK programs are explicit that fusion, fission, and adjacent sectors draw on the same skills. The constraint appears to be not the absence of fusion-specific curriculum but the absence of any route that puts these technician skills, with fusion context attached, in front of sub-baccalaureate students.

Three replicable models emerged. LLNL and Las Positas ran a low-cost non-credit pilot through community education to test demand before pursuing an accredited degree. PPPL built a registered apprenticeship that DOE has since funded twice and expanded across the national laboratory system on a hub-and-spoke basis. New Mexico used direct state appropriation to designate a coordinating lead and build pathways across multiple colleges. Each begins from a different institution and a different funding source, and each is documented well enough to be examined in detail.

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