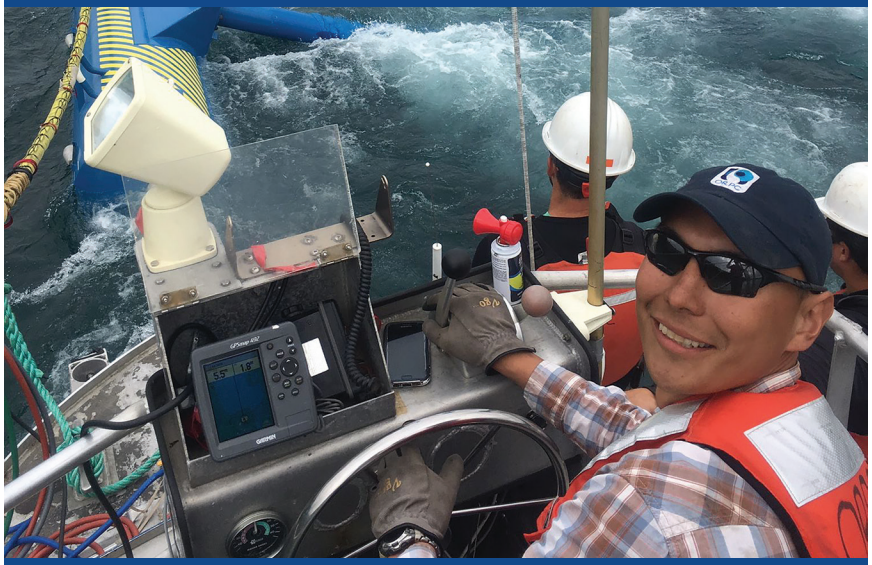
CLEAN ENERGY CAREERS IN ALASKA

REAP

Renewable Energy Alaska Project

INTRODUCTION



Alaska is an energy state. For thousands of years through today, Alaska Natives have innovated and thrived in some of the most extreme environments on the planet. Survival in Alaska has long depended on the stewarding of natural resources, the ability of humans to tap into the flow of energy around us, to conserve that energy, and to find new pathways toward greater energy efficiency. Alaska's future depends upon continuing this tradition of energy innovation. We often think of the oil and gas industry as the primary driver of energy jobs in the state. The Clean Energy sector (energy efficiency and renewables) includes all activities that generate jobs, businesses, and investments, while expanding clean energy production, increasing energy efficiency, reducing greenhouse gas emissions, waste, and pollution, and conserving water and other natural resources. Alaska's future clean energy infrastructure will be built and maintained by the same broad categories of workers who can proudly claim to have built the state's original infrastructure.

The clean energy sector is a fast-growing field and needs people with a variety of skill sets, training, and expertise. If you are considering a career in energy, this booklet is your guide.

Wages and salaries vary greatly for each of these careers based on region, experience, employer, and other factors. Many wages are also rapidly increasing; for the most recent wages information in Alaska, visit: https://live.laborstats.alaska.gov/wage/index.html.

Photo from Ocean Renewable Power Company deploying the in-river hydro generator in Igiugig

ENERGY AUDITOR

Energy auditors visit homes, public buildings, and businesses (including fishing vessels) to help people identify how they can use less energy. They study the way we use heating, cooling, gas, and electricity and recommend ways to use energy more efficiently. To detect heat or air leaks, energy auditors often conduct tests using blower doors (pictured right) or thermal infrared cameras. Once they discover where the inefficiencies are, they identify solutions and make suggestions on how to implement them.

CAREER REQUIREMENTS

- A high school diploma

Preferred qualifications

- An associate's or bachelor's degree in building science or construction

Certification/Licensing

- Certifications are offered by The Building Performance Institute (www.BPI.org) and the Residential Energy Services Network (www.resnet.us)
- Optional to register as an Energy Rater with Alaska Housing Finance Corporation (www.ahfc.us/pros/energy/energy-rater)
- Association of Energy Engineers (www.aeecenter.org)

ALASKA TRAINING

- Wisdom & Associates (www.wisdomandassociates.com), located in Kenai, Alaska, offers in-person training and energy audit related certifications

Photo by Chandler Kemp

WEATHERIZATION CONTRACTOR

Weatherization contractors inspect homes to see if they are leaking air or heat. If they find leaks, they recommend the best ways to seal them and provide cost estimates. Fixing leaks can involve repairing or replacing windows, sealing air ducts, filling in insulation, applying weather stripping, or servicing heating ventilation and air conditioning (HVAC) systems. Weatherization contractors often work on projects for the Weatherization Assistance Program, a federal government initiative designed to help low-income clients save money on their energy bills. Depending on the complexity and nature of the weatherization tasks, a weatherization crew may consist of any combination of the following job categories: contractors, technician/installers and laborers. Contractors are able to make bids, prepare contracts and execute the entire job. Weatherization technicians/installers can perform the majority of weatherization tasks. Laborers familiar with tasks like caulking and light construction can perform basic weatherization needs.

CAREER REQUIREMENTS

- A high school diploma or equivalent

Preferred qualifications

- An associate's degree in some aspect of the building trade or a certificate from a training program is recommended
- Weatherization coursework is helpful and is available both at Weatherization Training Centers (https://nascsp.org/wap/waptac/weatherization-training-centers) and at some community colleges and vocational schools
- With relevant work experience, you can get on-the-job training, which can last 6 months to a year

Certification/Licensing

- Certification is not required, but a Home Energy Professional certificate from The Building Performance Institute is recommended (www.bpi.org)

ALASKA TRAINING

- Alaska Construction Academy has a variety of in-person courses that offer introductory training opportunities in weatherization-related fields. www.alaskaworks.org/training-schedules

POWER PLANT OPERATOR

Plant operators monitor and run the equipment that generates power in coal, gas, or renewable energy power plants: boilers, turbines, generators, hydroelectric, and other power-producing equipment. They test and inspect the systems to make sure they are running properly, check gauge readings, and adjust controls to regulate the power flow. They complete preventative maintenance and troubleshoot any issues that arise.

CAREER REQUIREMENTS

Preferred qualifications

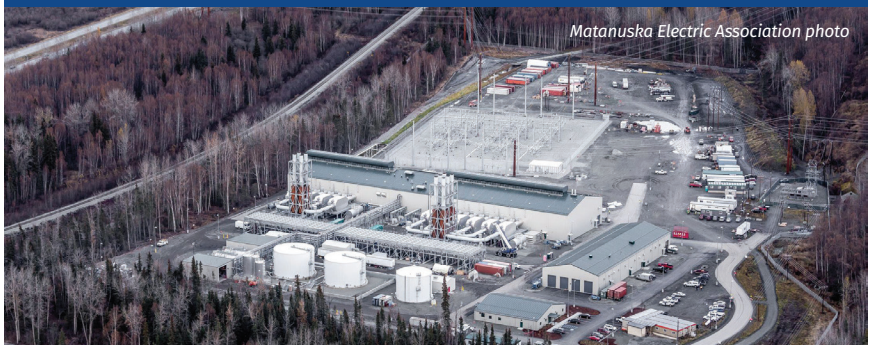
- Vocational training certificate is recommended
- In rural communities, comfortable working with heavy equipment and willingness to take Power Plant Operator I from Alaska Vocational Career Technical Institute (AVTEC)
- In urban communities, additional certification or pre-employment training may be required
- Many power plants have operators who have come up through union training

Certification/Licensing

- Some employers require operators to pass the Plant Operator (POSS) and Power Plant Maintenance (MASS) exams designed by the Edison Electric Institute (www.eei.org). After passing the exams, get on-the-job training at a power plant, which can last several years

ALASKA TRAINING

- Most training is completed on the job
- AVTEC (https://avtec.edu) offers Power Plant Operator II classes through Alaska Energy Authority for rural Alaskans



Matanuska Electric Association photo

LINE WORKER

Alaska Electric Light & Power photo

Line workers install and repair overhead and underground wires and cables that transmit electricity from power plants to homes and buildings. They mount equipment on poles; inspect and test power lines and equipment; and detect faulty switches, fuses, and wires. Line workers often put together electrical components or systems and may need to operate cranes or other moving equipment. They need an understanding of electrical equipment and electrical currents.

CAREER REQUIREMENTS

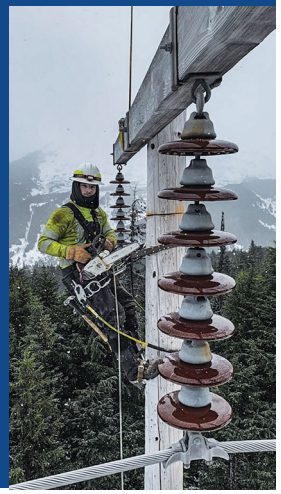
- A high school diploma or GED
- Vocational training in electronics or electrical repair
- An apprenticeship involving hands-on training under a senior line worker
- A commercial driver's license to drive utility trucks may be required

Certification/Licensing

- State of Alaska Electrical License

ALASKA TRAINING

- Apprenticeship and training is available through the International Brotherhood of Electrical Workers (IBEW- www.ibew1547.org)
- Additional information can be found through The Alaska Joint Electrical Apprenticeship and Training Trust (https://alaskaelectricalapprenticeship.org)



UTILITY PERSONNEL

There are many people who work at electric utilities outside power plant operators and engineers. These utility personnel include maintenance workers, customer service, financial managers, communications directors, meter readers, information technology/cybersecurity and other administrators. They may assist with power plant operations or support the delivery of power to customers/member-owners. Utility personnel ensure efficient power distribution which is important for the wise use of resources that generate the power.

CAREER REQUIREMENTS

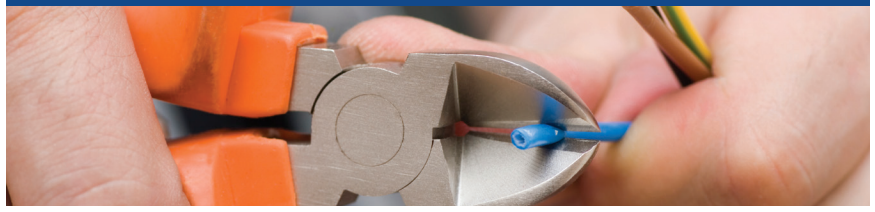
- High school diploma and additional education depending on position
- An associate's or bachelor's degree in applicable field
- Experience maintaining and operating machinery

Certification/Licensing

- Licenses may be required for more complex specialties

ALASKA TRAINING

- AVTEC Industrial Electricity program: (https://avtec.edu/industrial-electricity)
- The University of Alaska Fairbanks Bristol Bay Campus offers an occupational endorsement in sustainable energy (https://uaf.edu/bbc/academics/sustainable-energy) that would be a good foundation for employment with a utility



SOLAR INSTALLER

Solar installers install, inspect, and maintain photovoltaic solar panels, which convert sunlight into electricity on homes, businesses, and on land. They plan solar-panel arrangements based on the customer's needs and the site, install the panels and supporting equipment, and connect it to the power grid. Solar installers must ensure the installation meets building codes and safety standards. They need to be good with their hands and comfortable using hand and power tools.

Solar installers provide quotes and information to clients to help them decide size of system and estimated payback, which will differ depending on electricity cost and location of system (i.e. home in an urban area vs. water plant in a village).

CAREER REQUIREMENTS

- A high school diploma and on-the-job training, which involves working with an experienced installer for up to a year; or
- Coursework on solar-panel installation from a community college or vocational school

ALASKA TRAINING

- The University of Alaska Fairbanks Bristol Bay Campus offers solar professionals installation training (https://uaf.edu/bbc/academics/sustainable-energy/solarprofessionalstraining.php)

WIND TECHNICIAN

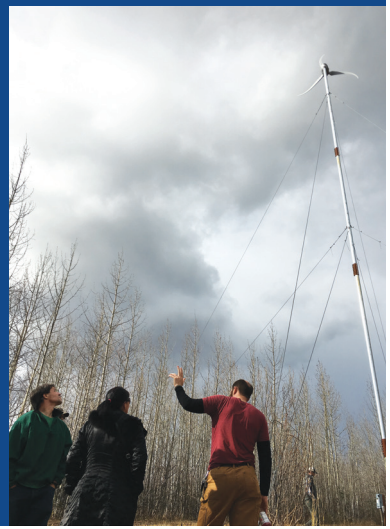
Wind technicians install, operate, maintain, and repair wind turbines. They inspect the towers, collect data from turbines for analysis, test electrical parts and systems, and replace old components. Because most of the work is done in the nacelle, the housing that sits atop the turbine, wind technicians work in small spaces high off the ground. Wind technicians may also fly in small planes to rural communities to perform work for utilities that don't employ their own technician.

CAREER REQUIREMENTS

- A high school diploma or GED
- 6 months to 2 years of technical training from a technical school or an associate's degree from a community college
- At least 12 months of on-the-job training, which can be done partially through an internship or an apprenticeship

ALASKA TRAINING

- Most training is done on the job and/or technicians complete training in the lower 48 such as Northwest Renewable Energy Institute in Vancouver (www.nw-rei.com)
- The Alaska Joint Electrical Apprenticeship and Training Trust (www.alaskaelectricalapprenticeship.org) offers trainings for a variety of electrical careers



ELECTRICIAN

Electricians install, maintain, and repair the wiring and equipment for electrical systems in homes and businesses. They need to understand blueprints and diagrams, use hand and power tools, and operate testing equipment to inspect for problems. Electricians must ensure that all work complies with the National Electric Code and building regulations.

CAREER REQUIREMENTS

- A high school diploma or GED
- An apprenticeship with a licensed electrician, which will include on-the-job training and classes. You can find apprenticeships through the Alaska Joint Electrical Apprenticeship and Training Trust: (www.alaskaelectricalapprenticeship.org)

Preferred Qualifications

- Trade school classes are recommended but not required

Certification/Licensing

- Must have an Alaska ID
- Must obtain an electrical certificate from the Department of Labor and Workforce Development

ALASKA TRAINING

- The Alaska Joint Electrical Apprenticeship and Training Trust (www.alaskaelectricalapprenticeship.org) offers trainings for a variety of electrical careers

PLUMBER

Plumbers install and repair pipelines that carry water and gas in buildings, and take away waste. They also install and fix toilets, sinks, bathtubs, and water heaters, and they may work with heating and cooling equipment. Plumbers sometimes work under dangerous conditions with welding, electrical equipment, and natural gas lines. They are integral to the installation of many types of HVAC and renewable technologies, such as solar hot water and geothermal heating.

CAREER REQUIREMENTS

- A high school diploma or GED
- Vocational training at a trade school or community college
- An apprenticeship program working under an experienced plumber, which will include on-the-job training and classes

Certification/Licensing

- To work legally as a Plumber in Alaska you must be licensed. Alaska has licenses for every level from trainees to journeymen to contractors. Licensing occurs through the Alaska Department of Labor and Workforce Development (https://labor.alaska.gov/lss/plumbing_electrical.htm)

ALASKA TRAINING

- Alaska Vocational Technical Center (AVTEC - https://avtec.edu/plumbing-and-heating) offers plumbing classes.
- The Alaska Works Partnership (www.alaskaworks.org/training-schedules) also has more information on becoming a plumber

HVAC TECHNICIAN

HVAC technicians install and repair heating ventilation and air-conditioning (HVAC) and refrigeration systems in homes and buildings including heat pumps. They often work with contractors, installing systems in new buildings or homes. The work includes repairing pipes or defective parts, adjusting equipment, and working with electrical components. HVAC technicians may be called at off hours if systems suddenly break down. Because they can be exposed to contaminants like gas or odors, they need to wear protective gear.

CAREER REQUIREMENTS

- A high school diploma or GED in order to take the necessary HVAC courses at a vocational college or trade school
- An accredited HVAC training program: 6-month HVAC training programs provide a HVAC technician certificate; 2-year HVAC training programs lead to an associate's degree and certification
- Complete an HVAC apprenticeship, which lasts 3 to 5 years

Certification/Licensing

- Some jobs require Mechanical Administrator License from the State of Alaska
- HVAC technicians working with refrigerants must be certified by an EPA-approved organization and pass a test

ALASKA TRAINING

- Alaska Vocational Technical Center (AVTEC - https://avtec.edu/plumbing-and-heating) offers HVAC courses

ARCHITECT

Architects design, plan, and oversee the construction or remodeling of homes and buildings. They deal with function, aesthetic, safety, and legal issues. Architects use computer-aided design to create a blueprint and then make sure the structure is built as planned. Sustainable or green architects use sustainable building materials and design buildings that conserve water and energy and manage waste efficiently.

CAREER REQUIREMENTS

- A 5-year Bachelor of Architecture degree from a program accredited by the National Architecture Accreditation Board
- A 3-year paid internship administered by the National Council of Architectural Registration Boards

Certification/Licensing

- Pass the Architect Registration Exam to get licensed (Some states may have additional licensing requirements)
- Licensed architects may become certified by the National Council of Architectural Registration Boards, which makes it easier to get licensed in other states
- Most states require architects to continually update their education to maintain their licenses

Additional requirements to become a green architect:

- Take courses on green building approved by LEED (Leadership in Energy and Environmental Design) or work on a LEED project
- Take LEED courses
- Pass the LEED Green Associate exam

ALASKA TRAINING

- The University of Alaska Anchorage offers an Associates of Applied Science degree in Architectural and Engineering Technology. Please visit https://catalog.uaa.alaska.edu to learn more

ENGINEER

UAF/ACEP photo by Jeff Fisher

Mechanical engineers design and operate power plants and HVAC systems, and plan and oversee construction of gas transmission systems. Electrical engineers design and develop electrical systems and test equipment. Energy engineers design the most efficient, sustainable and cost-effective ways to operate buildings and power plants. They may design plans for wind, solar, hydro, or geothermal electric systems and be involved with the development, monitoring, maintenance, and repair of systems in their specialty area. Environmental engineers plan ways to reduce waste, reduce energy, and recycle materials in manufacturing products. Software engineers develop programs to monitor and report energy, software embedded in clean energy systems, designing renewable energy system models and/or working with information specialists/technicians.

CAREER REQUIREMENTS

- A bachelor's degree in your engineering discipline from an ABET-accredited university
- Pass the Fundamentals of Engineering exam
- Achieve work experience under a registered PE. A minimum of 2 years of responsible charge is required as part of a 4-year mentoring program

Certification/Licensing

- Pass the Professional Engineer exam

ALASKA TRAINING

- The University of Alaska Fairbanks (www.uaf.edu/cem) and Anchorage (www.uaa.alaska.edu/academics/college-of-engineering) both offer engineering degree programs

PROJECT MANAGER

Project managers analyze and coordinate the schedule, timeline, staffing, procurement, and budget of a service or product on a per project basis. They usually lead and monitor the work of technical staff while ensuring projects are completed on time. Project managers assign responsibilities and communicate with personnel to pinpoint and resolve problems. Project managers may communicate with key stakeholders to establish project objectives, requirements, and deadlines. In some situations, project managers may become a point of contact for the customer or client.

CAREER REQUIREMENTS

- A high school diploma or GED
- Work related experience, knowledge, or skill is typically needed

PREFERRED QUALIFICATIONS

- A bachelor's degree or Project Management Professional (PMP) Certification is preferred by most employers

ALASKA TRAINING

- The University of Alaska Anchorage offers project management degrees and certifications (www.uaa.alaska.edu/academics/college-of-engineering/departments/project-management/professional-development.cshtml). Alaska Pacific University (www.alaskapacific.edu/programs/alaska-rural-management/) offers an undergraduate certificate in rural management. The University of Alaska Fairbanks offers a certificate in rural human services (https://uaf.edu/academics/programs/certifcates/rural-human-services.php)

BIOMASS PLANT OPERATOR

Biomass plant operators monitor and control biomass heat plant activities while conducting maintenance as necessary. Operators typically manage biomass wood supply, storage and quality, remove ash, and perform tests to evaluate the water chemistry within boiler systems. Operators for simple cordwood systems load and stoke boilers each morning and monitor temperature throughout the day. Some higher tech positions operate biomass fuel gasification systems for high-pressure steam boilers for electrical cogeneration operations, while ensuring they comply with any specified instructions and regulations.

CAREER REQUIREMENTS

- A high school diploma or GED
- Some work-related experience, knowledge, or skill is typically needed

ALASKA TRAINING

- The University of Alaska Fairbanks Bristol Bay Campus offers courses in biomass energy systems (https://uaf.edu/bbc/academics/sustainable-energy/index.php)

ENERGY MANAGER

UAF/ACEP photo by Jeff Fisher

Energy Managers optimize the energy performance of a facility, building, or industrial plant. They integrate electrical, mechanical, process, and building infrastructure systems, analyzing and implementing solutions to reduce energy consumption in a cost-effective approach. Energy Managers are often team leaders and help to develop and implement their organizations' energy management strategies.

CAREER REQUIREMENTS

- 2 or 4 year degree plus related experience in energy engineering or energy management

Certification/Licensing

- Certified Energy Manager program www.aeecenter.org/certified-energy-manager

ALASKA TRAINING

- A variety of pathways can lead to energy management such as engineering or heating and ventilation. The University of Alaska Fairbanks (www.uaf.edu/cem) and Anchorage (www.uaa.alaska.edu/academics/college-of-engineering) both offer engineering degree programs. Alaska Vocational Technical Center (AVTEC - https://avtec.edu/plumbing-and-heating) offers HVAC classes

COMMUNITY ADMINISTRATOR

Community administrators may work for a borough, city, or village managing a variety of management community projects. Job titles include city clerk, energy coordinator, city utility manager, finance manager, grant writer and others. They provide a critical role in community scale clean energy projects by finding and writing grants or other financing, submitting required paperwork, coordinating with local and state entities, following up with projects after completion, and managing any required reporting to the state and funders.

CAREER REQUIREMENTS

- A high school diploma

Certification/Licensing

- Will vary depending on the job and location, but familiarity with the Microsoft Suite and Quickbooks is common for jobs with financial aspects

ALASKA TRAINING

- The Alaska Small Business Development Center offers QuickBooks classes (https://aksbdc.org/workshops/inroduction-to-quickbooks-online). Alaska Pacific University offers an undergraduate certificate in rural management (www.alaskapacific.edu/programs/alaska-rural-management). The University of Alaska Fairbanks offers a certificate in rural human services (https://uaf.edu/academics/programs/certifcates/rural-human-services.php)

OTHER ENERGY JOBS

Accountants analyze revenue and balance budgets for companies.

Chemists develop new energy sources such as biofuels.

Construction and building inspectors ensure that building codes are met through all phases of construction.

Control and valve technicians install and maintain regulating and controlling equipment for electrical and gas systems.

Customer service workers help customers who use the company's products or services.

Educators plan, communicate, and teach courses or lessons pertaining to educational content for students.

Environmental economists study the financial impacts of how we use natural resources.

Facilities managers maintain and operate the buildings and grounds of a company.

Human resources professionals handle employee benefits, payroll, and hiring.

IT/Security, Educators, & Researchers

Industrial engineers design production processes to use resources more efficiently.

Information Security Analysts plan, implement, monitor, or upgrade security measures for the protection of computer software, networks, and information.

Installation, maintenance, and repair helpers assist with maintaining and repairing equipment.

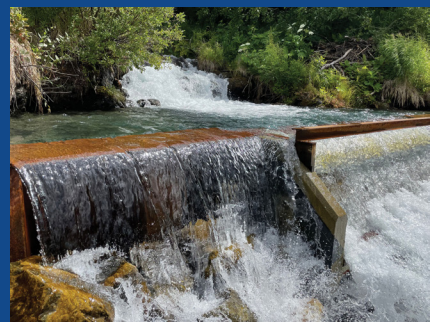
Occupational health and safety specialists maintain a safe and healthy environment for workers.

Pipelayers put together the pipes in sewage or drainage systems.

Powerhouse, substation, and relay electrical repairers check and maintain equipment in power stations, substations, and relay circuits.

Researchers collect, analyze, interpret, and organize data to predict trends, explore issues and solve problems.

Solar sales representatives determine customers' solar needs, suggest systems, and estimate costs.



RESOURCES

- ***Alaska Network for Energy Education & Employment:***

https://aneeeworks.org

- ***University of Alaska Fairbanks Bristol Bay Campus Sustainable Energy Endorsement:***

https://www.uaf.edu/bbc/academics/sustainable-energy

- ***Alaska Housing Finance Corporation:***

https://ahfc.us

- ***Alaska Center for Energy and Power:***

https://acep.uaf.edu

- ***Alaska wage information:***

https://live.laborstats.alaska.gov/wage/index.html

- ***Alaska Vocational Technical Center:***

https://avtec.edu

- ***Rural Utility Business Advisor Program:***

https://www.commerce.alaska.gov/web/dcra/RuralUtilityBusinessAdvisorProgramRUBA.aspx

- ***Renewable Energy Alaska Project:***

https://alaskarenewableenergy.org

- ***US Green Building Council:***

https://green-careers.usgbc.org/careers

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