

## What is LNG?

Liquefied natural gas or LNG is natural gas that has been processed to remove valuable components, like helium, or impurities and then condensed into a liquid by cooling it to approximately -260° Fahrenheit. This process reduces its volume by a factor of more than 600 – similar to reducing the volume of air in a beach ball to a volume of liquid that would fit inside a ping-pong ball. Natural gas is converted to LNG at export facilities called liquefaction plants. LNG is then transported by sea vessels and road tankers specially designed to carry cryogenic (very low temperature) materials. By sea, once it reaches an LNG port facility, LNG is unloaded from ships at import terminals where it is stored in specially designed tanks as a liquid until it is warmed to convert it back to natural gas. The natural gas is then sent through pipelines for distribution to businesses and homeowners.

## LNG storage

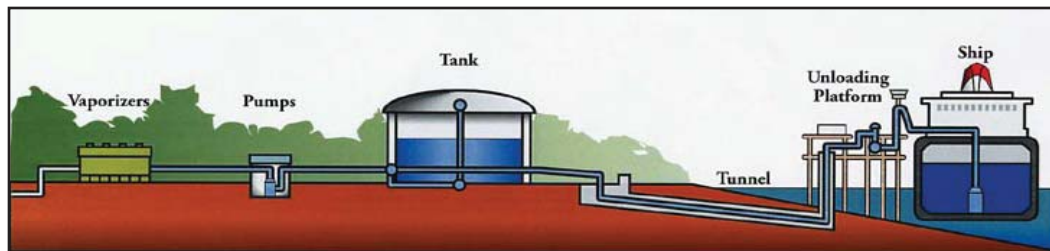
LNG is stored at more than 100 U.S. facilities, typically either for use during periods of peak natural gas demand or as a base load source of natural gas. Most of the existing LNG import facilities in the U.S. were constructed between 1965 and 1975. LNG is stored at very low pressure in double-walled, insulated tanks. The inner tank contains the LNG, while the outer tank contains the insulation and prevents any natural gas vapor from escaping.

## Building and regulation of a LNG import facility

LNG projects are subject to laws and regulations that are administered on the federal level by the Federal Energy Regulatory Commission (FERC), the Environmental Protection Agency, the U.S. Coast Guard/Maritime Administration, the US Army Corps of Engineers and others.

The federal Energy Policy Act of 2005 contains a provision that gives FERC exclusive jurisdiction over LNG import facilities, therefore Oregon Governor Kulongoski has directed certain state agencies to participate in FERC's review of any LNG import terminal applications. At FERC's request, the Governor has also designated the Oregon Department of Energy as the State's lead agency for working with FERC on LNG import terminal safety and security issues, and on proposed projects, including the coordination of state agency comments on any application.

*This graphic illustrates the process where LNG is unloaded from ship to storage facility, then converted to natural gas with a heat exchange vaporizer before being sent through a pipeline.*



*LNG is transported by specially designed ocean-going ships and delivered to import terminals around the world.*



*LNG storage tanks are built like huge insulated bottles to keep the gas liquefied and at a very low temperature.*



*Once LNG is converted back to natural gas, it is transported via pipeline (usually underground) from import facilities to over 100 storage sites across the U.S.*

## FERC is reviewing three potential LNG import facilities:

- Bradwood Landing LNG, located at Bradwood on the Columbia River: [http://www.bradwoodlanding.com/About\\_Northern\\_Star.htm](http://www.bradwoodlanding.com/About_Northern_Star.htm)
- Oregon LNG, located at the Skipanon peninsula on the Columbia River in Warrenton: <http://www.oregonlng.com/contactus.htm>
- Jordan Cove LNG, located on the North Spit of Coos Bay: <http://www.jordancoveenergy.com/>

Learn more about the Federal Energy Regulatory Commission's LNG program at: <http://www.ferc.gov/industries/lng.asp>

Learn more about LNG and the State of Oregon at: <http://www.oregon.gov/ENERGY/SITING/LNGTerminals.shtml>





There are currently 6 import/export facilities in the United States

## Does the State of Oregon consider LNG dangerous/hazardous material?

Yes. The State Fire Marshal's office and The Building Codes Division of the Oregon Department of Consumer & Business Services both consider LNG hazardous. According to FERC, "LNG is not explosive. Although a large amount of energy is stored in LNG, it cannot be released rapidly enough to cause the overpressures associated with an explosion." However, in the event of a leak or rupture of a LNG tank or conveyance system, flammable concentrations of gas may collect in confined spaces that could lead to an explosion.

## Is a LNG facility considered a hazardous facility?

According to Oregon Revised Statute (ORS) 455.447 a "hazardous facility" is defined as any structure housing, supporting or containing sufficient quantities of toxic or explosive substances to be of danger to the safety of the public if released. Regulations do not specify whether LNG facilities are considered hazardous.

Senate Bill 379 passed by the 1995 Legislature placed provisions on the construction of certain types of critical and essential facilities, like LNG storage facilities, within tsunami inundation zones along the coast. The tsunami hazard maps that were produced to help implement Senate Bill 379 limit construction of new essential facilities and special occupancy structures in tsunami flooding zones. The focus of the maps is therefore on implementation of this public safety bill and not on land use or emergency planning.

## How is the Oregon Department of Geology and Mineral Industries involved?

The Oregon Department of Geology (DOGAMI) is a reviewing agency for the Oregon Energy Facility Siting Council (EFSC). DOGAMI and its Governing Board are responsible for some regulation on building certain types of structures within tsunami inundation zones under Oregon Revised Statute (ORS) 455.446 and 455.447 (SB 379). In the case of a proposed LNG storage facility, if the proposed structure fits a category that requires consultation (as determined by local building code officials) then the building applicant contacts DOGAMI to discuss mitigation methods.

## Does the permitting process include critical evaluations of earthquake and tsunami hazards?

FERC regulatory guidelines require extensive studies of geological conditions and earthquake histories to determine the appropriate design loads on critical components of LNG facilities. DOGAMI reviews and comments on the applicant's LNG facility geotechnical reports.

### Online Resources

LNG and the State of Oregon:  
<http://www.oregon.gov/ENERGY/SITING/LNGTerminals.shtml>

The State of Oregon siting process:  
<http://www.oregon.gov/ENERGY/SITING/process.shtml>

The Energy Facility Siting Council:  
<http://www.oregon.gov/ENERGY/SITING/index.shtml>

EFSC's responsibility in overseeing LNG facilities:  
<http://www.oregon.gov/ENERGY/SITING/LNGTerminals.shtml>

The Oregon Department of Geology LNG page:  
<http://oregongeology.org/sub/lng.htm>

Read a discussion of Senate Bill 379:  
<http://www.wsspc.org/tsunami/tsunamilaw.html>

FERC's LNG program:  
<http://www.ferc.gov/industries/lng.asp>

FERC's role in the licensing of LNG terminals:  
<http://www.ferc.gov/industries/lng.asp>

Oregon Revised Statute (ORS) 455.446 and 455.447:  
<http://www.oregonvcs.net/~rbayer/lincoln/ec-misc.htm>

The Center for Liquefied Natural Gas:  
<http://www.lngfacts.org/About-LNG/Overview.asp>

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