

# Synthetic ester liquid transformer technology

We committed to using safe and modern technology at the West End Substation and, after a thorough review, we have decided to use synthetic ester liquid insulated transformers within this substation.

Transformers are the heart of a substation. They ‘step down’ high voltage electricity to lower voltages that can be used in our homes and business.

Esters are known for their fire-resistant and biodegradable properties, which is why they are used in sensitive locations, and why we believe it’s the right technology for the West End Substation.

## Why is oil used in transformers?

Almost all transformers contain oil, usually mineral oil, which has been in use since the late 1800s.

Transformer insulating fluids have two important functions, they:

1. Help cool transformers – which generate heat as they work, and
2. Insulate the transformer – so that the energized parts of the transformer remain isolated and do not malfunction.

Using oil in transformers helps ensure they work efficiently, reliably, and safely.

## WHAT IS SYNTHETIC ESTER LIQUID?

Synthetic ester – also known as ester liquid – is an insulating fluid. It is a manufactured version of natural ester liquid, which is commonly made from canola and soybean.

Ester liquids are safely in use in transformers and other high-voltage equipment worldwide, including in:

- New York, U.S.A – at substations in environmentally sensitive areas bordering the Hudson River,
- London, UK – at a substation next to row housing and an elementary school, and
- Mexico City, Mexico – in more than 50 transformers serving the capital’s dense, urban population.

The use of ester liquids has increased in North America over the last decade with the development of synthetic esters, which perform particularly well in cold temperatures.

## ARE SYNTHETIC ESTER LIQUIDS SAFE?

Synthetic esters have two main advantages:

- **Improved fire safety**
  - Synthetic esters are considered resistant to ignition and self-extinguishing.
  - They must reach very high temperatures to ignite and cannot sustain the temperature needed to keep burning.
  - The selection of synthetic ester is just one element of our fire protection strategy for the West End Substation, and we are continuing to design other fire protection systems.
- **Improved environmental protection**
  - We take steps to prevent and contain leaks and spills within our substations, but if synthetic ester liquid were to escape, it is readily biodegradable.
  - ‘Readily biodegradable’ substances break down quickly and easily when they are exposed to light, water, and microorganisms.
  - Within 28 days, almost 90% of synthetic ester liquids should biodegrade.

## WHY HAS BC HYDRO DECIDED TO USE SYNTHETIC ESTER LIQUIDS AT THE WEST END SUBSTATION?

When we reviewed available technologies, we decided that the safety and environmental properties of synthetic ester liquid make it the right choice for this location.

BC Hydro safely operates and maintains over 300 substations across British Columbia. Each of these substations contains from one to four or more transformers, depending on the size of the community it serves.

We take a safety-by-design approach for each of our projects, considering the best equipment and methods for use at the specific project location and purpose.

The West End Substation is unique, because it will be built underground, and will operate in one of Vancouver's most densely populated neighbourhoods, close to a school, park and housing.

### Contact us

If you have any questions or comments about this information, please reach out to the project team by email to [westendsub@bchydro.com](mailto:westendsub@bchydro.com) or phone to 604 341 1304.

