# Energy Innovation Basecamp 2026
# Problem Statement EIP152

# Retrofitting Fluid-Filled Cables to Prevent Environmental Leaks

**The following problem statement has been developed by the innovation teams within the UK's Gas and Electricity Networks for the 2026 Energy Innovation Basecamp.**

**Theme:** Maximise the use of existing infrastructure

**Network Areas: Electricity Distribution, Electricity Transmission**

**What is the problem?**

FFCs are present throughout Great Britain (GB) distribution networks as legacy assets. They are insulated with a layer of cellulosic paper (or PPLP) impregnated with an insulating low viscosity dielectric oil, such as dodecylbenzene or T3788. To prevent void formation the cable is held under a positive fluid pressure (typically between 3-8 bar); as a result, any damage to the cable sheath or accessories will result in fluid leaking into the surrounding environment. This has an impact on the environment as well as asset integrity. Although the lost fluid can be replaced, leaks represent an environmental hazard, particularly if the cable is sited within an environmentally sensitive region or close to groundwater. In cases where an FFC is located close to groundwater, the leaks may also cause environmental contamination which is of concern to the public, water authorities, and the Environment Agency that could enforce the closure of cable circuits or impose limits on their operation. As the FFC network ages further, it is anticipated that the severity of the leaks will worsen due to continued ageing and degradation of the cable sheaths and joints.

While network operators have implemented monitoring, leak detection, and containment measures, current mitigation approaches are reactive and do not address the root cause: the continued reliance on oil-based insulation systems. Full cable replacement is technically effective but often prohibitively expensive, disruptive, and resource-intensive, particularly in densely populated or environmentally sensitive areas.

**What are we looking for?**

How might we retrofit existing fluid-filled cables to eliminate or neutralise their dependence on oil, while maintaining electrical performance, reliability, and safety, at a lower cost and with less disruption than full replacement?

Developing such a retrofit solution /process could transform environmental risk management for legacy underground cables, reduce pollution incidents to zero, and accelerate progress towards net-zero environmental harm across the electricity networks not just in the UK but globally.

There are multiple factors that require innovation/research with respect to:

1. the technique of retrofitting
2. A chemical with appropriate physical and chemical properties to replace the oil; and
3. Consideration of cost benefit analysis for points 1 and 2.

**What are the constraints?**

Ideally the solution would remove all fluid from the cable and reduce environmental risk to zero. The solution must maintain electrical integrity and rating of the cable to the same level as the FFC. Access to the cable would only be at existing fluid pumping points and should remove risk along entire hydraulic sections. The solution would ideally work across all cable voltages, types and materials.

**Who are the key players?**

- The key stakeholders are the energy network operators, Environment Agency, Ofgem, and society and nature at large.
- It will be adopted by the energy network operators in the UK and potentially further afield.
- If it is managed, this will reduce oil seeping into the ecosystem from FFCs leakage. This will benefit society and nature at large. It will remove a environmental pollutant from legacy assets.
- We are looking for any type of innovator who can solve this complex issue.

**Does this problem statement build on existing or anticipated infrastructure, policy decisions, or previous innovation projects?**

The parts of the networks which have FFCs.

**What else do you need to know?**

There is the FFCs section of the ENA website which may be useful
https://www.energynetworks.org/work/environment

Also, DNO and TO's AERs.

**Innovator submissions to this problem statement will be open on the Smarter Networks Portal from 4th February to the 13th March, but we encourage you to submit your response as early as possible, as networks will be able to review submissions as soon as they come in.**

**You can also use the virtual Q&A on the Smarter Networks Portal to ask for more information about this problem statement. Questions may be answered online or at the ENA Problem Statement Launch on 4th February 2026. More information on last year's Basecamp programme can be found on the Smarter Networks Portal.**