CERP3 Decarbonization Procurement family 02

Electrical engineering and Magnets

Current Situation in Procurement family 02 – Electrical Engineering and Magnets

- These include components that are supported by the cryogenic infrastructure like superconducting wires, tapes, coils & magnets.
- Suppliers also provide wires, cables, power supplies, transformers, capacitors, controllers and other electrical equipment to support the accelerators, detectors and other parts of CERN's infrastructure.
- For purchases related to the accelerators and detectors the demand is variable and peaks during a long shutdown or new installation periods. As an example, after the most recent long shutdown it is forecast that only a few tonnes of copper will be ordered in the next 12 months.
- Environmental responsibility has been considered in terms of power efficiency but broadly suppliers have not been challenged to reduce the embodied carbon in the materials, components or equipment they supply.

Support studies to remove redundant Uninterruptible Power Supply (UPS) systems to reduce both environmental impacts and fire risk

Opportunity

- UPS Demand Management

Spend Area

- Industrial Controllers (UPS)

Description

- Uninterumpible Power Supply (UPS) systems keep electronic systems safe and operational during power surges and failures. A UPS provides battery backup power when the flow of electricity drops or stops.
- Technical Officer Vincent Chareyre reports that there are 310 UPS systems on the CERN site. These are Monoblock UPS systems and have lead-acid batteries that have to be replaced every 5 years.
- Vincent believes that some of these UPS systems should be removed as they are not necessary from a technical perspective and is working on a policy to reduce the number of UPS system.

Potential

- Lead-acid batteries have an approximate environmental impact per kWh energy delivered of 2 kgCO20. Depending on the number of UPS systems it is possible to remove this policy could have a significant impact.
- There will also be a commercial benefit if batteries do not need to be replaced every 5 years.
- Lastly, UPS Systems pose a fire risk so from a technical perspective Vincent believes that removing unnecessary UPS systems will reduce this safety risk.

Next Steps

- Support Vincent to carry out his study and create a policy to remove unnecessary UPS systems

Re-visit the study about converting to solid yolk DC magnets to convert them into Pulse Magnets to improve energy efficiency

Opportunity

- DC Current to Pulse Magnet Conversion

Spend Area

- Magnets

Description

- Technical Officer Philip Schwarz led a study that investigated the energy efficiency gains of adding power convertors to solid yolk DC magnets to convert them into Pulse Magnets during a long shutdown
- At the time of the study, the investment required for conversion did not mean that this was a commercially viable project
- Now energy prices are rising, and environmental responsibility is a high priority this study should be revisited

Potential

- (TBC - Philip, are there estimates for energy savings?)
  •Increased energy efficiency would reduce CERN's Scope 2 emissions. There would have to be a consideration of the Scope 3 emissions impacts from any additional equipment required like the power converters and the engineering labour for the project

Next Steps

- Re-visit Philip's study from a commercial and environmental perspective

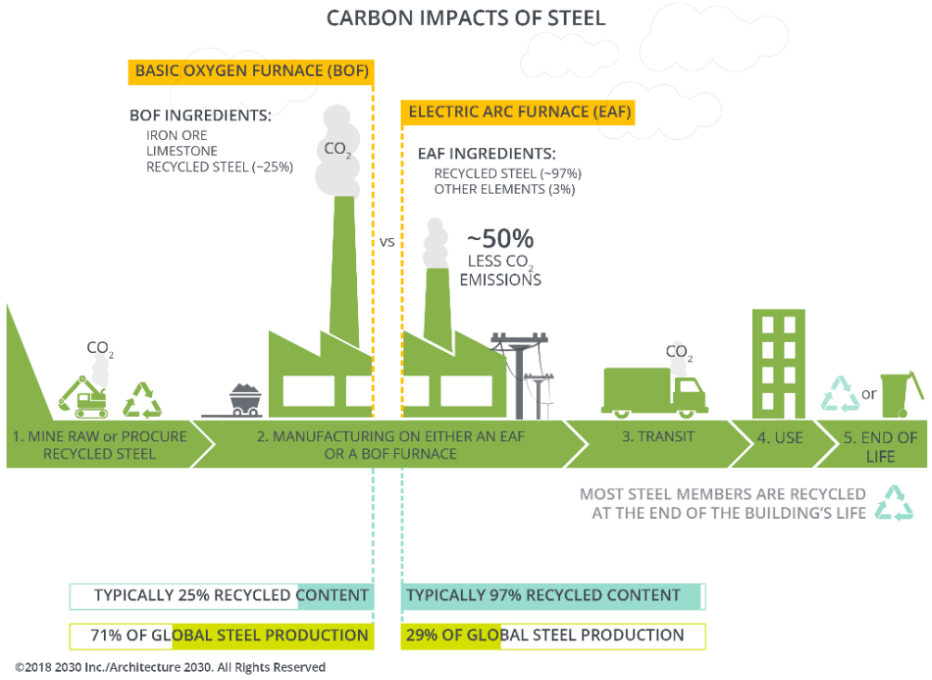
The embodied carbon emissions of Electrical Engineering and Magnetic supplies can be significantly reduced by using recycled materials

Opportunity

- Recycled Materials

Spend Area

- All Supplies



Description

- Recycled materials such as metal, plastics, wood and paper can make a significant difference in the embodied carbon emissions of electrical materials, equipment and packaging
- This is because high levels of energy are required to extract and process virgin materials like metal ores and hydrocarbons. Moreover, recycling bio-materials like wood and paper extends their life before they decompose and release stored CO2

Potential

- As an example, the Electric Arc Furnace production method of steel emits ~50% less emissions than the Basic Oxygen Furnace method, given a significantly higher recycled steel content

Next Steps

- Begin including questions relating to recycled materials in Market Surveys
  - Consider feasibility, pricing differences and potential CO2 reduction through the use of recycled materials
- Include this provision more widely in tender
- documentation if it does not significantly reduce the competitiveness of bids or balanced industrial return for CERN member states

There may be an opportunity to apply circular economy principles by returning superconducting wire spools to suppliers

Opportunity

- Circular Packaging

Spend Area

- Superconducting

Description

- Superconducting wire is delivered to CERN on large spools that are often stored on site for several years and then disposed of
- There may be an opportunity to return the spools to suppliers like Bruker. The supplier should be receptive to this because CERN already specifies how the wire is packaged

Potential

- By re-using the wire spools CERN would avoid the embodied emissions related to the spool
- Depending on where the spool are manufactured and then loaded with wire there may also be a reduction in the emissions from transporting the spools

Next Steps

- Conduct a lifecycle analysis to understand the emissions impact of the wire spools
- Engage with suppliers to understand where spools are manufactured and loaded with wire and any limitations to returning the spools for re-wiring

Working with suppliers to make deliveries with greener vehicles could significantly reduce the emissions that result from materials

Opportunity

- Green Transport

Spend Area

- All Supplies

Description

- Large quantities of materials and equipment procured for Procurement Family 2 are transported to the CERN site
- Presently there are no requirements or encouragement given to suppliers to use less carbon-intensive transport methods like rail or electric vehicles to transport materials to CERN

Potential

- With the proliferation of Electric HGV's in Europe encouraging suppliers to use hauliers with these vehicles in their fleet may be an easy win for reducing the emission in this Procurement Family
- Moreover, the long lifetimes of ships and recent advances in shipping technology mean that some sea freight vessels have a significantly lower environmental impact than others

Next Steps

- Begin including questions relating to less carbon-intensive transport options in Market Surveys
- Include this as a requirement in tenders if it does not significantly reduce the competitiveness of bids or balanced industrial return for CERN member states

Challenge suppliers to reduce the volume of and increase the recyclability of supplies packaging

Opportunity

Environmentally Responsible Packaging

Spend Area

All supplies

Suggested Question	Evaluation Guidance
Has the supplier made efforts to minimise the packaging weight and volume?	Leading suppliers should have a publicly stated, time bound, plastic packaging reduction goal.
Zero deforestation: Does paper-based packaging come from 100% recycled or certified sources?	FSC Certification is the leading standard for paper-based packaging. For packaging materials that claim to be recyclable, does the organization use standards such as the FTC's Green Guides or ISO 14021:2016
Does the supplier avoid the use of hard-to-recycle materials such as multi-layered plastics and expanded plastic foams?	Plastic packaging materials should be recyclable using CERN's internal recycling centre and waste management providers

Description

Add questions in the Market Surveys and ITs related to environmentally responsible packaging practices (see table)

Current CERN delivery requirements are for every order to be packed individually.

Potential

Reusable packaging eliminates the need to recycle or remanufacture single-use packaging, reducing CO_2 emissions up to 60%

Next Steps

Engage with CERN recycling team to support the development of the packaging requirements

Review proposed changes to CERN delivery requirements document for all Supply tenders

For Environmentally Responsible Procurement actions that rely on supplier collaboration CERN should prioritize working with engaged suppliers

Where would suppliers from each Procurement Code place CERN?

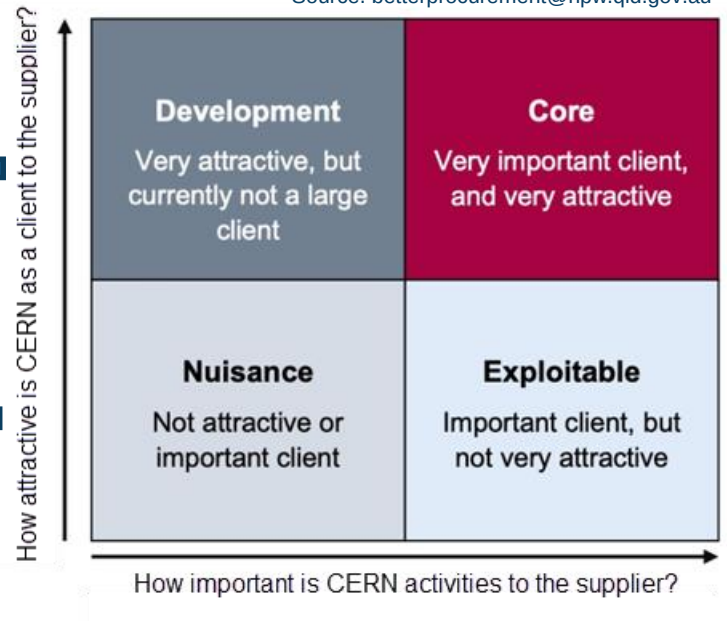
Supplier seeking to grow their business with CERN are more receptive to sustainability requests.

Opportunity for supplier in the development in terms of sustainability and innovation.

Low potential to drive sustainability issues.

If possible consider changing the supply base.

Source. betterprocurement@hpw.qld.gov.au



- *Open to change and to sustainability requests.*
- *Focus on driving sustainability objectives and influencing the supply market.*

- *Focus on improving CERN relationship with the supplier.*
- *Potential in pushing sustainability agenda through building attractiveness as a client.*