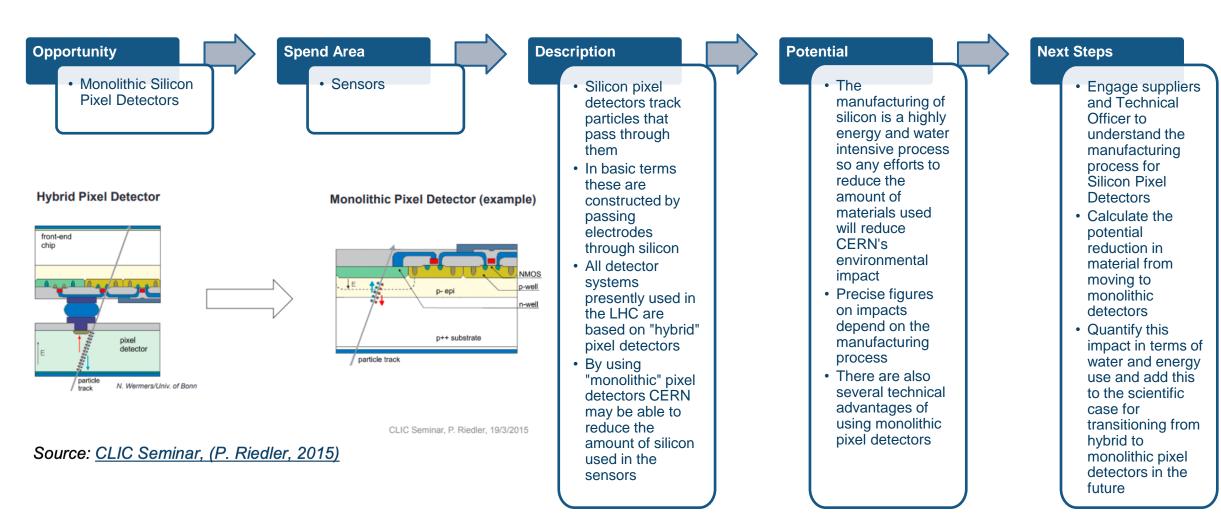
CERP3 Decarbonization Procurement family 07

Particle and Photon Detectors

Current Situation in Procurement family 07 – Particle and Photon Detectors

- Sensors are very specific to CERN's requirements and there are few suppliers that can make these.
- Sensors are typically only bought during Long Shutdown periods so demand is not very consistent.
- Silicon wafers are fragile so require a lot of packaging.
- ► There is additional spend the likes of Taiwan Semiconductors through brokers like IMEC VZW and Global Foundries US2 which is captured in Procurement Family 3: Electronics and Radio Frequency.

Monolithic Pixel Detectors may offer an opportunity to reduce the amount of silicon in sensors and improve the technical performance



Advances in silicon recycling technology from the PV industry could present an opportunity for recycling of composite sensors from particle detectors

• Senor Recycling

Spend Area • Sensors



Source: PV Magazine. Recycling process promises 'better than new' silicon wafers

Description

- At the end of their life sensors are not always recycled because they are constructed using different materials like silicon and electrode wires which can be hard to separate in a cost effective way
- The rapid increase in demand for silicon, particularly from PV solar cells has led to recent advances in recycling technology
- Many new sensors were installed into the LHC during LS2

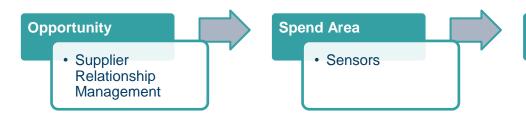
Potential

- The manufacturing of silicon is a highly energy and water intensive process so any efforts to reduce the amount of materials used will reduce CERN's environmental impact
- Precise figures on impacts depend on the manufacturing process
- These materials have a high embodied carbon emissions and monetary value, non-composite sensor materials from the LHC were recently sold for hundreds of thousands of CHF

Next Steps

- Investigate advances in PV solar cell composite silicon component recycling to understand if principles can be applied to CERN sensors
- Collaborate on this challenge with industry and internal innovation initiates like the CERN Green Village

Where CERN have long standing relationships with certain suppliers time can be invested in supplier engagement around Environmental Responsibility



Examples of SRM Activity

- ► Asking suppliers to report on their progress towards measuring emissions
- ► Asking suppliers to set Science Based emissions reduction targets
- ► Asking suppliers about progress towards decarbonisation
- ► Asking suppliers what CERN can do to help the supplier sell goods in a more environmentally responsible way

Description

- There are only 3-4 suppliers that can supply the types of sensors that meet CERN's requirements, therefore, there will likely be longterm relationships with these suppliers
- CERN should communicate the ambition to be a leading environmentally responsibly research laboratory and encourage suppliers to improve the environmental responsibility of their organisation and products

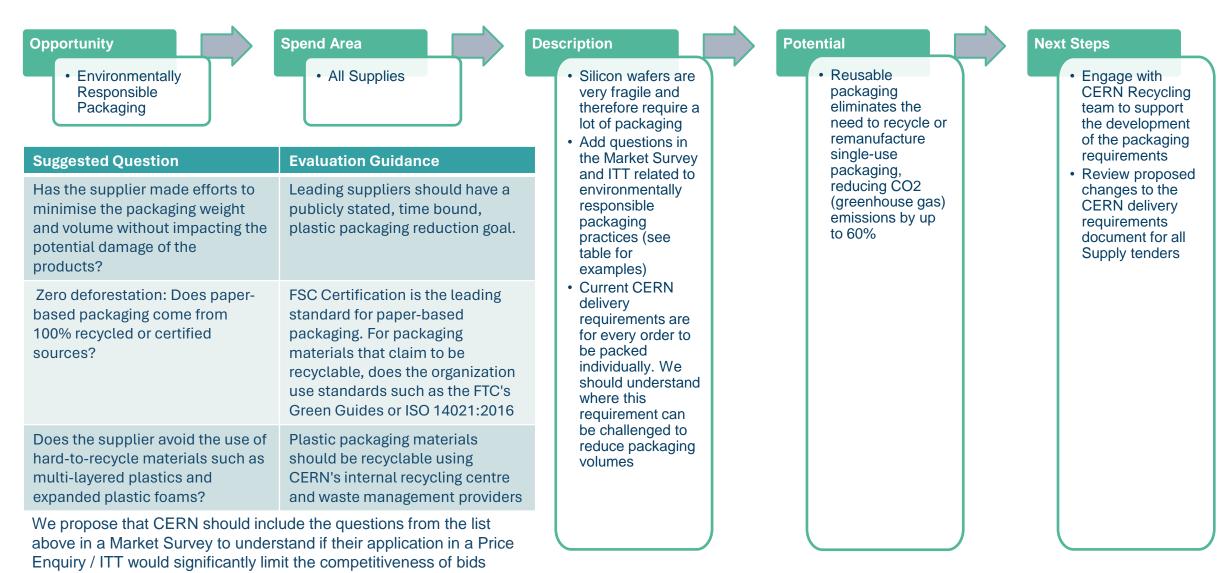
Potential

- High because the manufacturing of silicon is a highly energy and water intensive process
- The largest customers of organisations like Taiwan Semiconductor are Apple and Microsoft who have strong net zero commitments

Next Steps

- Include questions related to Environmental Responsibility in SRM meetings
- Seek
 opportunities to
 collaborate and
 share best
 practises with
 major buyers of
 semiconductors

If packaging volumes cannot be reduced because supplies are fragile then CERN can ask suppliers to use packaging with a good recyclability



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

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 client to the supplier? Development Core Very important client, Very attractive, but currently not a large and very attractive client ಹ is CERN as **Exploitable** Nuisance How attractive Important client, but Not attractive or important client not very attractive How important is CERN activities to the supplier?

Where would suppliers from each Procurement Code place CERN?

- 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.