



COCIR

SUSTAINABLE COMPETENCE IN ADVANCING HEALTHCARE

European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry

CIRCULAR ECONOMY IN THE MEDICAL IMAGING SECTOR

COCIR 6° ANNUAL FORUM

ON THE SELF-REGULATORY INITIATIVE FOR MEDICAL IMAGING DEVICES

FROM IMPROVING ENERGY EFFICIENCY TO IMPROVING CIRCULARITY

- Companies in the COCIR SRI have been looking into energy “efficiency” since 2009/2010 applying the COCIR SRI methodology to the 5 modalities (MRI, CT, X-ray, NI, U/S).
- Reuse of resources and components can bring environmental benefits but also social and economic ones, in line with the EC/EU Circular Economy Package and Agenda.
- To improve “circularity” of the business model we need to be able to measure “circularity”.



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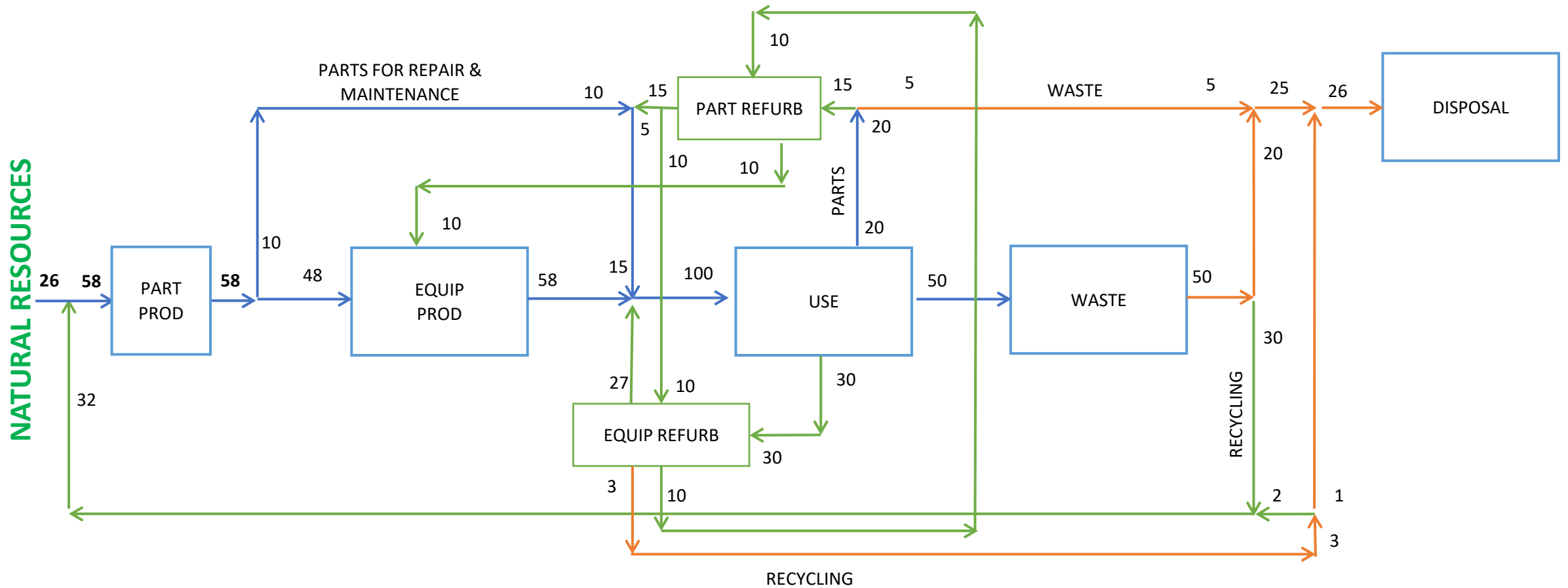
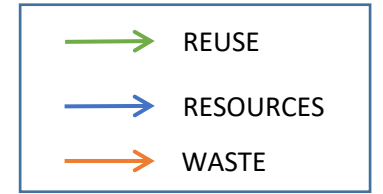
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2015 STATUS REPORT CIRCULARITY INDEX

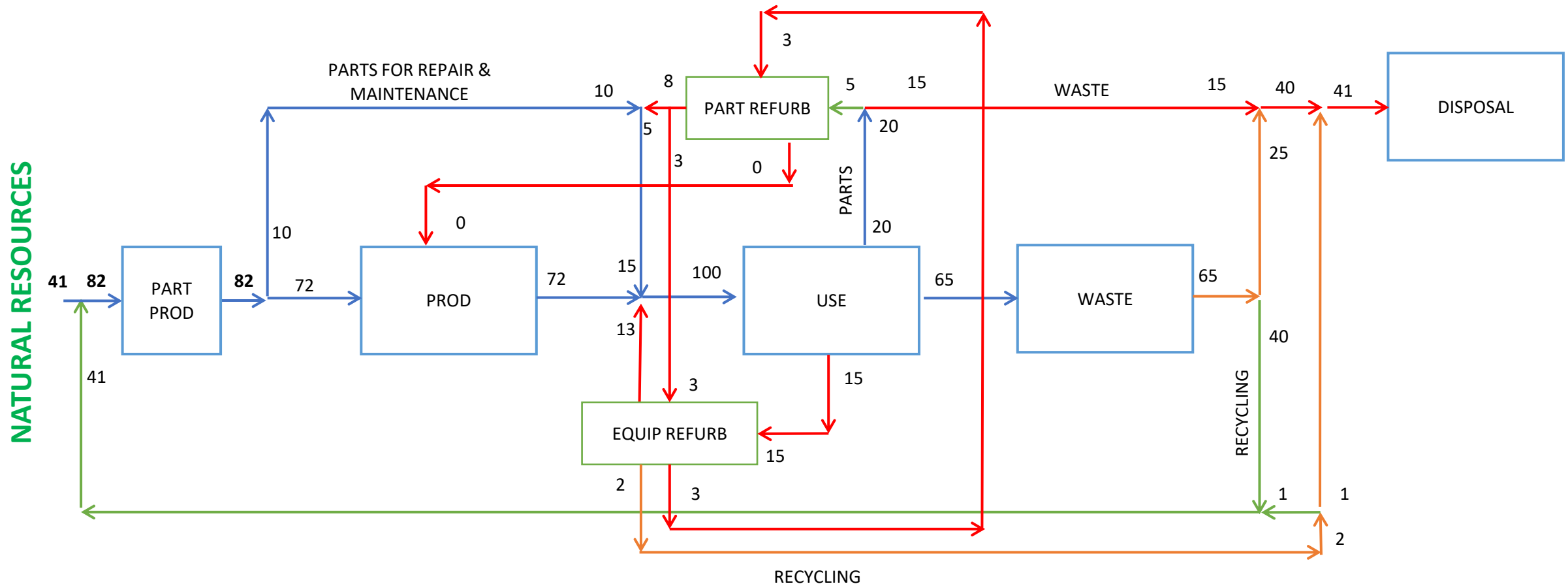
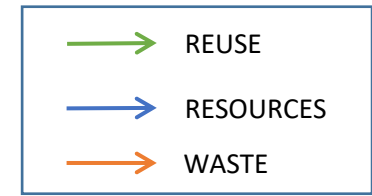
$$\text{C.I.} = \frac{\text{Tons of Reused MDs}}{\text{Tons of MDs placed on the market}}$$

- The index defines the ratio between the quantity of reused equipment and parts and the total quantity of used resources.
 - The index is 100% for a perfect circular economy
 - The index is 0 for a perfect linear economy

CIRCULAR ECONOMY MODEL FOR M.I.D.



CIRCULAR ECONOMY MODEL FOR M.I.D. TODAY



CIRCULARITY INDEXES

• PERFECT LINEAR ECONOMY	0%
• LINEAR ECONOMY	16%
• RECYCLING ECONOMY	36%
• PERFECT RECYCLING ECONOMY	48%
• CIRCULAR ECONOMY TODAY	59%
• CIRCULAR ECONOMY	73%
• PERFECT CIRCULAR ECONOMY	100%



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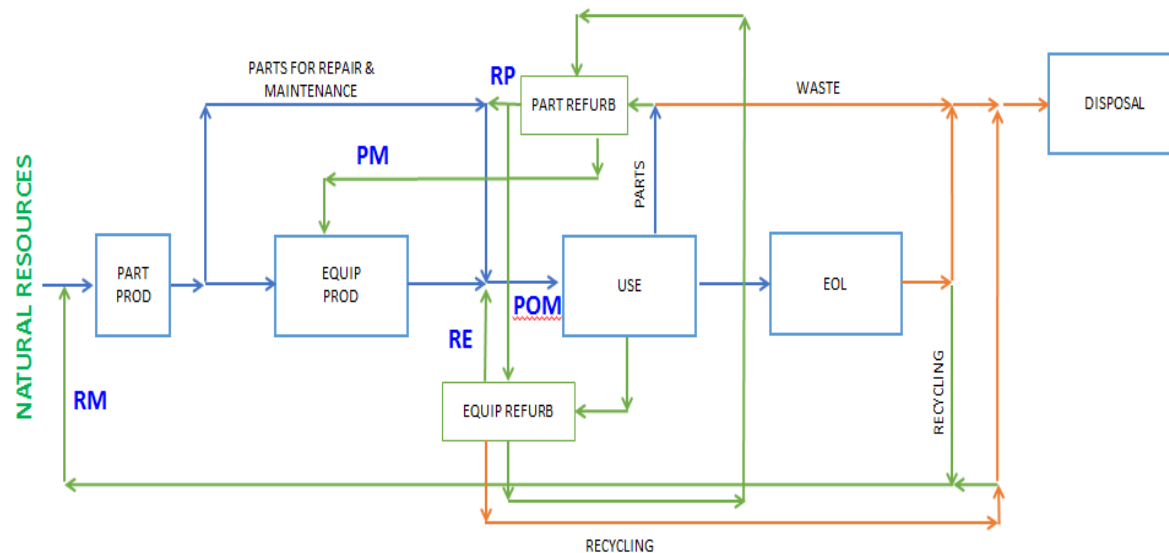
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2016 FEASIBILITY ASSESSMENT

FEASIBILITY OF DATA COLLECTION

In 2016 the SRI SC launched a project to evaluate the feasibility of determining or estimating the data required to calculate the Circularity Index defined in 2016. A questionnaire was sent to all companies in the refurbishment business.



$$C.I. = \frac{RM + PM + RE + RP}{POM} * 100$$

Where:

- RM: Mass of recycled materials
- PM: Mass of parts re-used in manufacturing of new equipment
- RE: Mass of refurbished equipment
- RP: Mass of reused parts in repair and maintenance
- POM: Mass of new products and parts placed on the market

FEASIBILITY

Y: Available

N: Not available

C: Can be estimated



RM: Mass of recycled materials	Feasibility EU	Feasibility Global
Equipment sent to recycling per year	Y	Y
Waste from refurbishment and other activities per year	Y	Y
Recycling rate	C	C

RP: Mass of reused parts in repair and maintenance	Feasibility EU	Feasibility Global
Total Mass of recovered/refurbished (R/R) spare parts per year	C	C
Mass of (R/R) parts used for refurbishment of used MDs per year	C	C
Mass of (R/R) parts used in other activities per year	C	C

FEASIBILITY

Y: Available

N: Not available

C: Can be estimated



RE: Total mass of refurbished equipment placed on the market	Feasibility EU	Feasibility Global
Units of recovered/refurbished equipment placed on the market	Y	Y
Average Weight	C	C

POM: Total Mass of new equipment and new parts placed on the market	Feasibility EU	Feasibility Global
Total Mass of new equipment placed on the market per year	Y	Y
Total mass of new parts used for refurbishment	C/N	C/N
Total mass of new parts used for repair or other activities	C/N	C/N

INTERESTING ELEMENTS

- Note: While it may be possible to estimate the number of parts used in repair and maintenance of the installed base it is more difficult to know the mass as the weight of parts is not necessarily recorded and due to the heterogeneity, an average weight is meaningless.
- For parts discarded as waste, the weight should be known. The complexity is represented by the numerous service providers who normally take care of installed equipment and which, sometimes are not related to the OEM
- **Total mass of reused parts in production of new equipment:** Since July 2014 and with the expiration of exemption 31 on 6 November 2017 (substituted by exemption 31a), this activity will be mostly forbidden and therefore close to zero (with the exception of RoHS compliant spare parts).

SUB-INDEXES

- The results of the feasibility study prove that certain data required to calculate the index would require additional work to be estimated. For this reason, the SRI SC decided to launch in 2016/2017 a data collection for the definition of sub-indexes.

$$C.I. = \frac{RM + PM + RE + RP}{POM} * 100 \quad \longrightarrow \quad C.I. = \frac{RE + PM + RM + RP}{POM_e + POM_p} * 100$$

Where:

RM: Mass of recycled materials

PM: Mass of parts re-used in manufacturing of new equipment

RE: Mass of refurbished equipment

RP: Mass of reused parts in repair and maintenance

POM: Mass of new products and parts placed on the market

RE/POMe : REFURBISHED/NEW

- Assuming the average weight of new equipment and refurbished ones to be the same, the RE/POMe ratio can be calculated using the units as the average weights delete each other.
- Considering that the two percentages are virtually the same it is possible to assume the total ratio even if the average weight for CT, MRI and X-RAY is different.

2016	UNITS SOLD	UNITS REFURB	RE/POMe %
MRI	871	46	5,3%
CT	993	52	5,2%
X-RAY	2942	152	5,1%
TOTAL			5,2%

RP/POMp: REFURBISHED PARTS/NEW PARTS

- Data collection on parts collected and repaired/refurbished still incomplete.
- Extrapolating the data collected so far, COCIR companies collect and repair/refurbish around 6400 metric tons per year globally.
- The weight of refurbished equipment (MRI+CT+X-RAY+Ultrasound) accounts for less than 1000 tonnes per year in EU (estimated 2900 globally).
- This shows that reuse of parts is one of the main elements of circular economy in the medical imaging devices sector