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 5° 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).
- For most of such technologies:
  - Technical improvements are limited
  - Proper use of low power modes by users can achieve far greater results
- 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".

BENEFITS OF REFURBISHMENT AND REUSE

Refurbishment:

- Saves energy and CO2: by avoiding the production of new equipment, refurbishment contributes to save energy and CO2. DITTA estimates that around 30 MWh can be saved for each ton of refurbished medical devices.
- Prevents waste generation: DITTA estimates that in 2012 around 16.400 tons of used medical devices have been prevented from becoming waste, instead being shipped world-wide for refurbishment and repair.
- Saves resources and raw materials: medical devices make use of many scarce raw materials
- Contributes strongly to increased access to healthcare:
  - 20%-30% reduced cost for healthcare providers, while ensuring safety and high clinical performance.
  - Improvement of the age profile of installed equipment allowing hospitals with limited budget to substitute their old equipment.
  - Increase in quality of healthcare and safety for patients due to the reduction of the obsolescence of installed equipment.
- Contributes to safety of used medical devices which are restored to a point of safety and effectiveness comparable to when the device was new.
- Contributes to growth and economy. The refurbishment of medical equipment accounted for a global revenue of approximately 480 million euros in 2012.

IMPROVING CIRCULARITY: WHAT IS NEEDED

- Index representative of “circularity” *(tested for the model and for future models)*
- Model of the medical imaging device “economy”
- Methodology to measure the index
- Estimation of improvement potentials
- Improvement goal *(if appropriate/possible)*
- Annual data collection

Circularity Index

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

- 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

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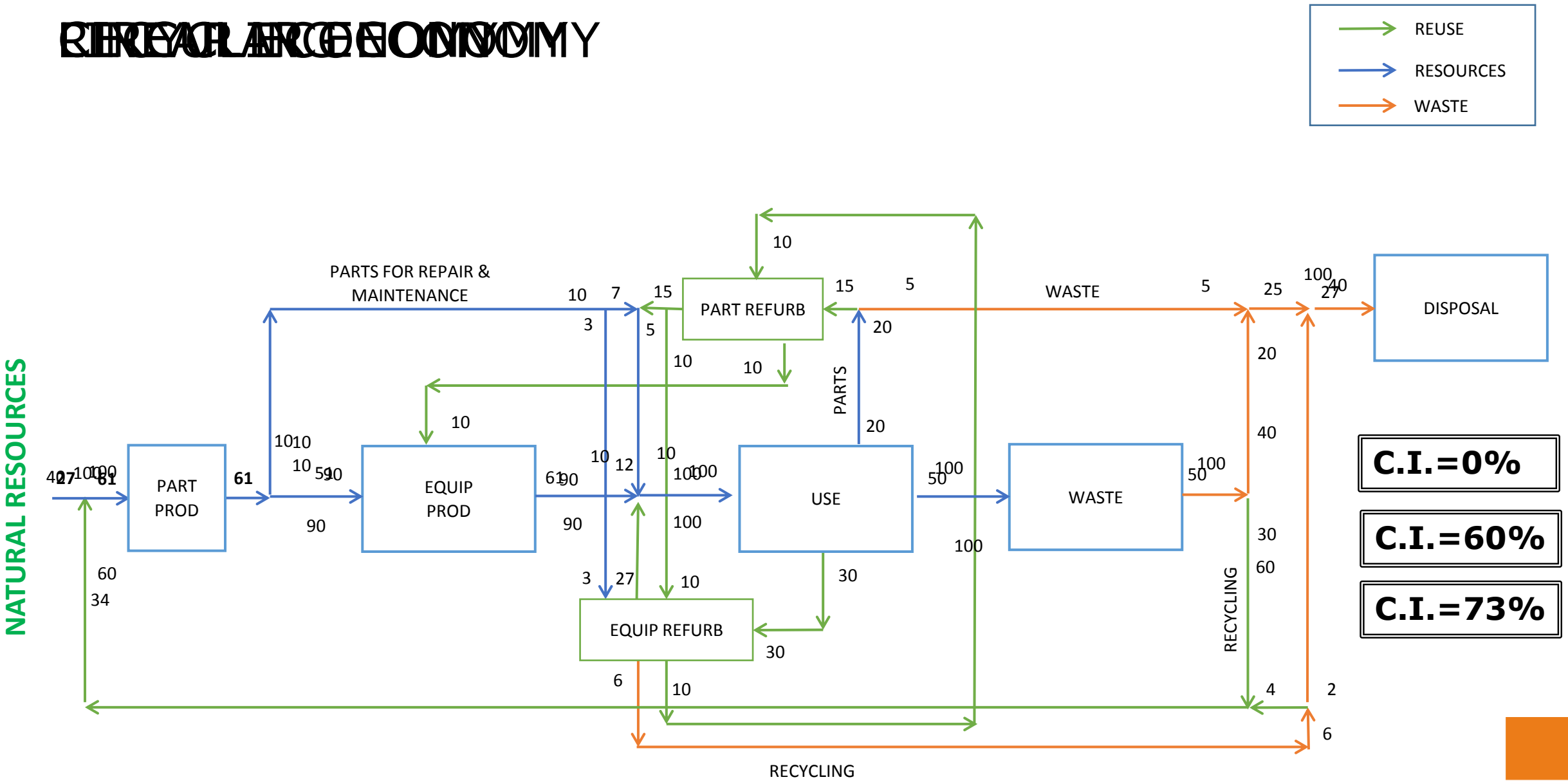
Model of the medical imaging device “economy”

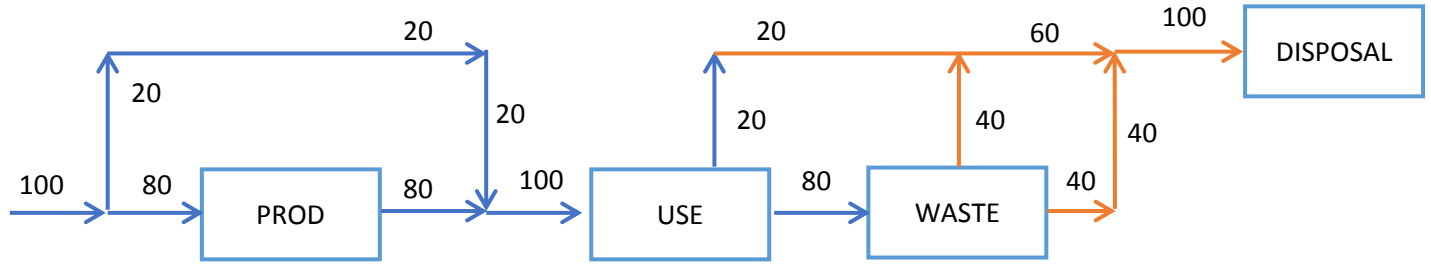
STATIC OR DYNAMIC

- A **static model** represents a situation where the installed base doesn't change with time. For each year the input and the output of the model are equal.
- A **dynamic model** considers the variations in the installed base. For each year the variation is equal to the difference between input and output. Moreover such model could also consider the average life time of medical equipment.
- COCIR knows that the installed base is lightly increasing with each passing year, while sales tends to be rather stable. Nonetheless a dynamic model introduces a lot of complexity which at this stage of the methodology is not really providing any added benefits.
- The adopted model is therefore STATIC. The model will be tested to make sure that durability of products contributes positively to "circularity"

RE-USE IN A CIRCULAR ECONOMY



PERFECT LINEAR ECONOMY

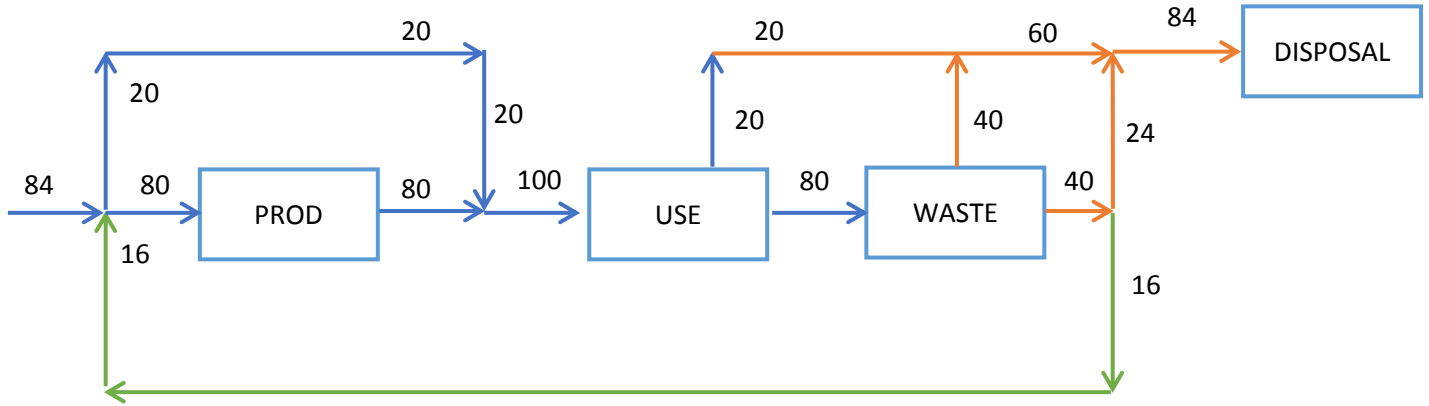


LINEAR ECONOMY
Circularity Index=Tons reused/Tons sold

Waste collection efficiency=50%
Recycling efficiency=40%

C.I.=0/100=0%

LINEAR ECONOMY



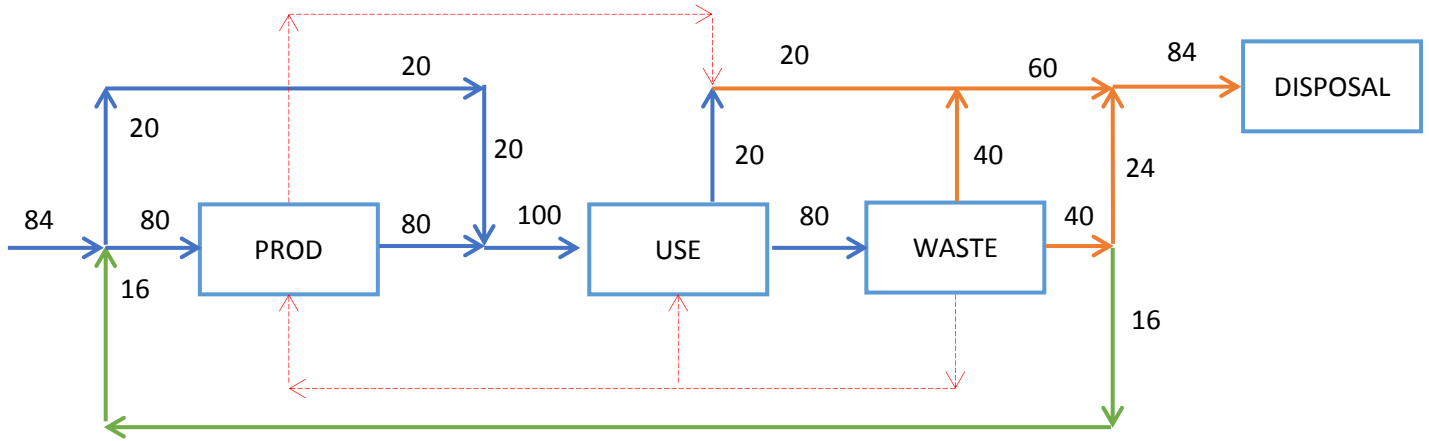
LINEAR ECONOMY
Circularity Index=Tons reused/Tons sold

Waste collection efficiency=50%
Recycling efficiency=40%

C.I.=16/100=16%

WHAT IS MISSING

- Production of waste during manufacturing
- Preparation for reuse

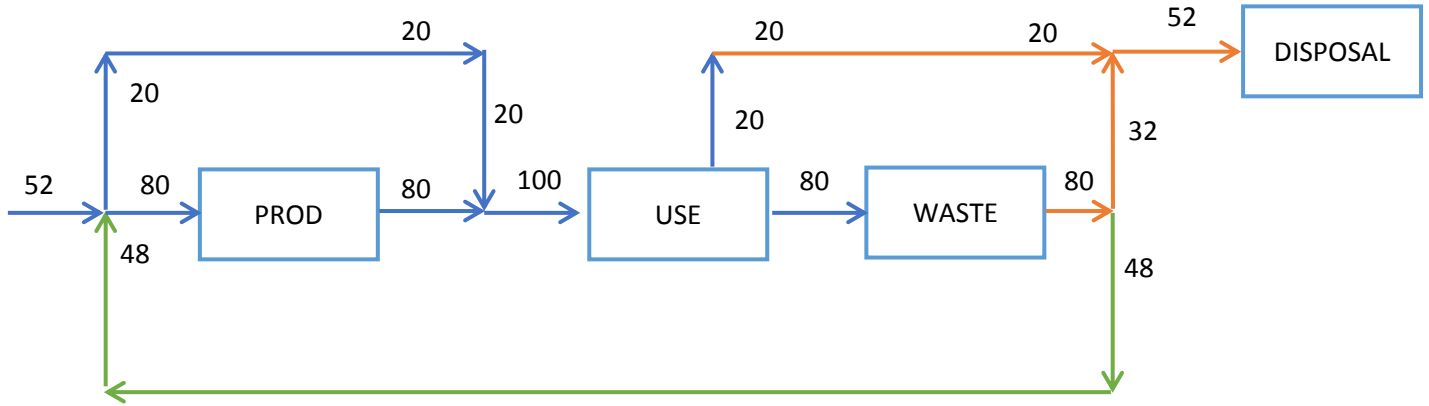


LINEAR ECONOMY
Circularity Index=Tons reused/Tons sold

Waste collection efficiency=50%
Recycling efficiency=40%

C.I.=16/100=16%

PERFECT RECYCLING ECONOMY



RECYCLING ECONOMY
Circularity Index=Tons reused/Tons sold

Waste collection efficiency=100%
Recycling efficiency=60%

C.I.=48/100=48%

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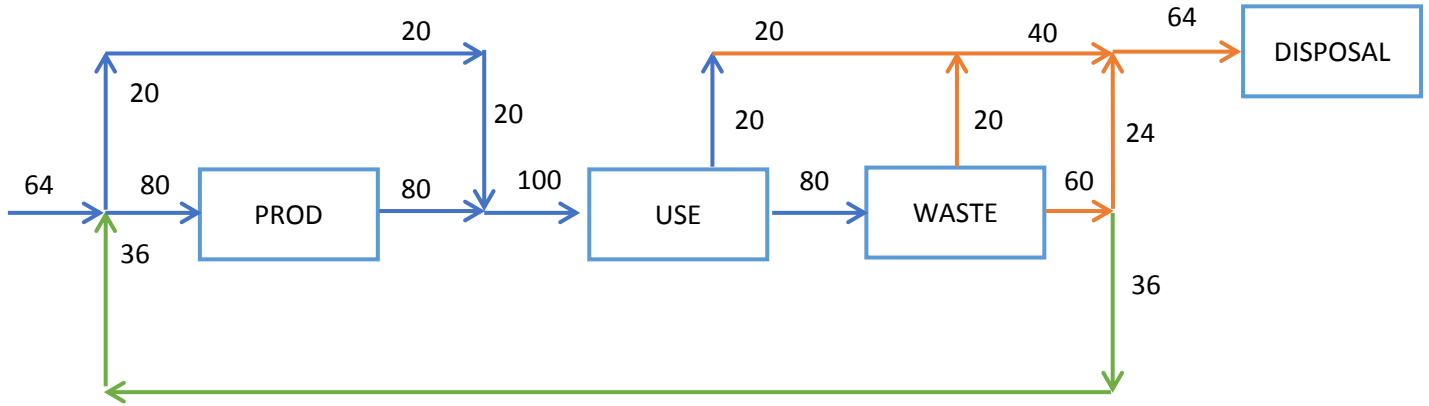
REAL RECYCLING ECONOMY

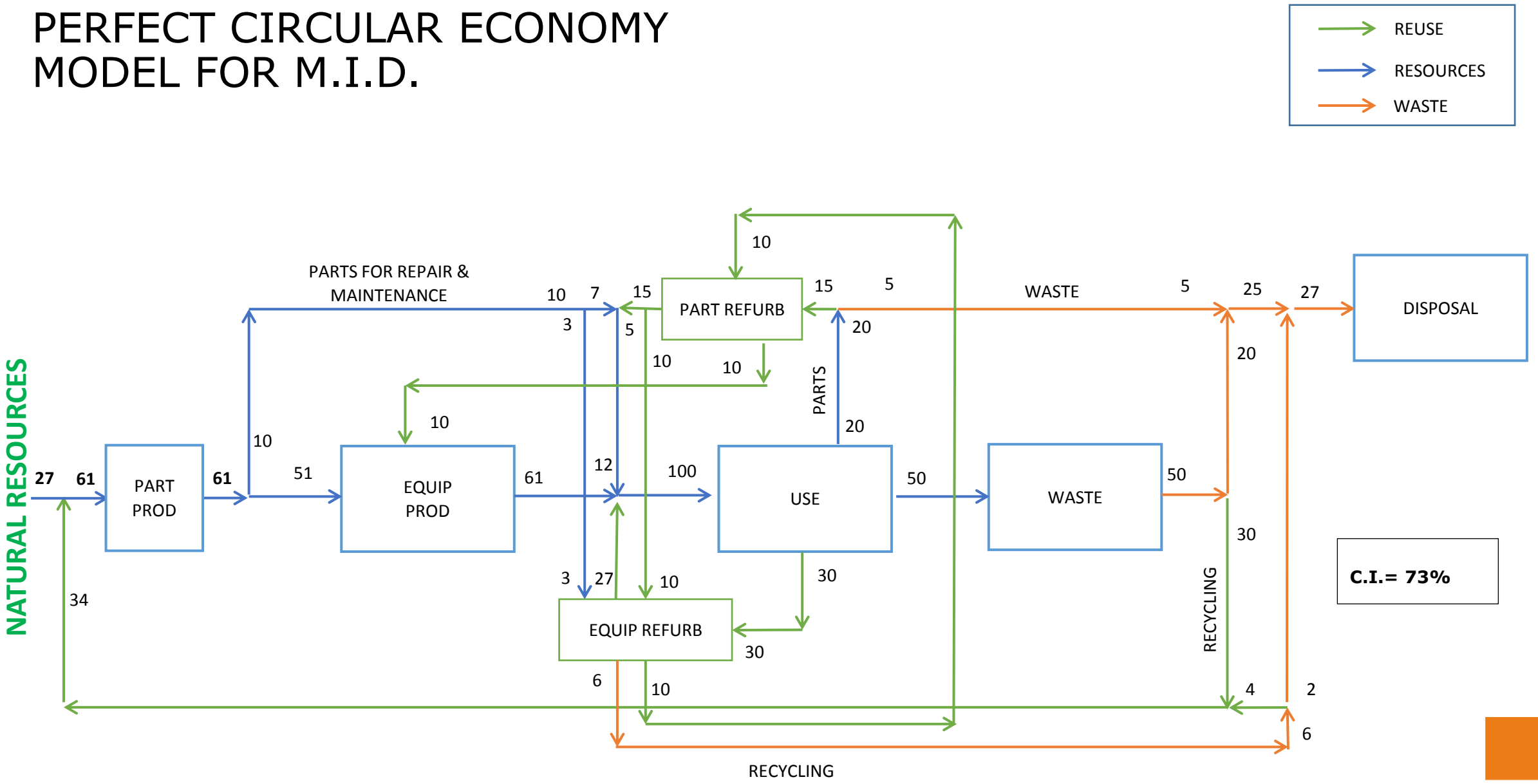


RECYCLING ECONOMY
Circularity Index=Tons reused/Tons sold

Waste collection efficiency=100%
Recycling efficiency=60%

C.I.=36/100=36%

PERFECT CIRCULAR ECONOMY MODEL FOR M.I.D.

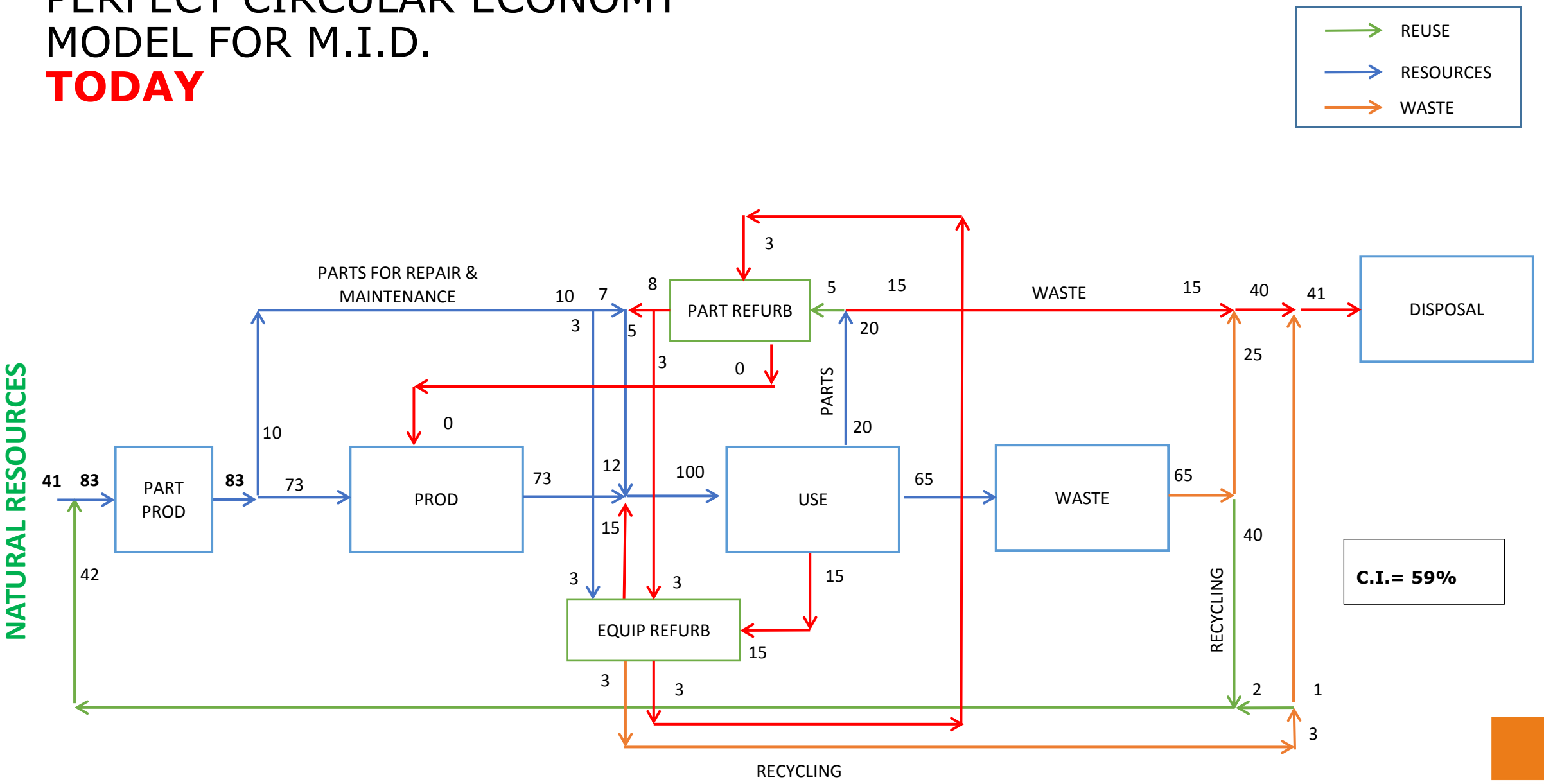


CIRCULAR ECONOMY TODAY

- **EU Legal Barriers**
  - RoHS and the MDD make impossible to import used medical devices for refurbishment
  - Recovered spare parts cannot be used after 2021 unless they are compliant with the new ban of 4 phthalates
  - REACH article 33 requires information on chemicals contained in refurbished equipment
  - REACH Annex XVII restrictions and Annex XIV authorizations do not recognize the “repaired as produced” principle
  - REACH and RoHS forbid the use of recovered parts in the manufacturing of new products
- **International “technical” trade barriers**
  - Eurasian Custom Union RoHS
  - China RoHS and WEEE
  - Korea RoHS and REACH
  - United Arab Emirates RoHS
  - USA chemical policy
  - Canada chemical policy
  - Brazil, Mexico, Peru WEEE-like legislation
  - The Basel Convention Technical Guidance on TBM of e-waste
- **Global market fragmentation**
  - China
  - Argentina
  - Brazil
  - India
  - Turkey
  - Malaysia
  - Thailand
  - Vietnam

PERFECT 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%

MEASURING THE CIRCULARITY INDEX

Under the assumption of a static model

$$C.I. = \frac{\begin{array}{l}\text{Total mass of recycled materials +}\\ \text{Total mass of reused parts in production of new equipment +}\\ \text{Total mass of refurbished equipment placed on the market +}\\ \text{Total mass or refurbished parts used for repair and maintenance of installed base}\end{array}}{\text{total mass of product placed on the market in the same year.}} = \frac{\text{100\% - \% of MDs sent to landfill}}{\text{total mass of product placed on the market in the same year.}}$$

$$= \frac{\text{100\% - (Total mass of waste MDs x (1 - Recycling rate))}}{\text{total mass of product placed on the market in the same year.}}$$

WORKING PLAN

ACTIVITY	YEAR
Index representative of “circularity” *(tested for the model and for future models)*	2016
Model of the medical imaging device “economy”	2016
Methodology to measure the index	2017
Estimation of improvement potentials	2017
Improvement goal *(if appropriate/possible)*	tbc
Annual/Bi-annual data collection	2017/18