SUSTAINABLE TESTING FOR SUSTAINABLE SOFTWARE

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The current environmental footprint of IT

3.3%
of the global energy consumption

4%
of global GHG emissions

11 MtCO2eq
of greenhouse gas emissions[2] and 53.6 million tons of e-waste[3] generated per year

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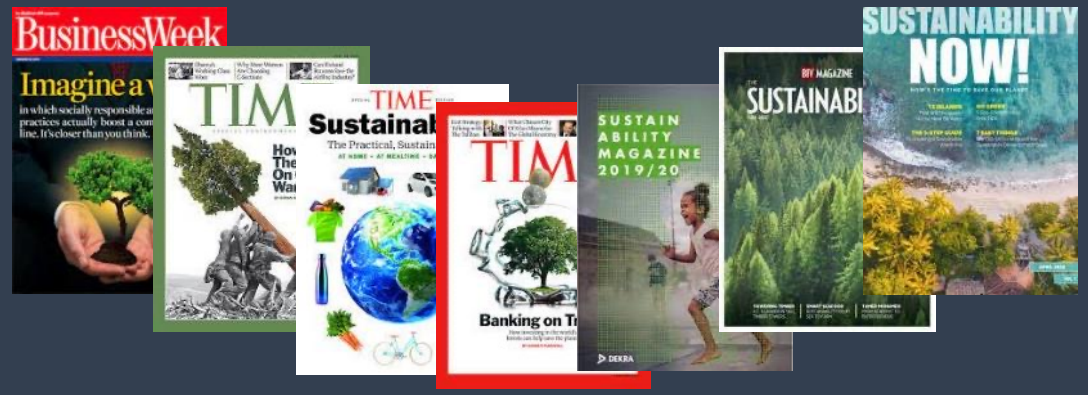
[1]Club Green IT Report, [2]The Shift Project, "Lean ICT–Towards Digital Sobriety", [3]United Nations institute for Training and Research, "GLOBAL E-WASTE SURGING: UP 21 PERCENT IN 5 YEARS," July 2, 2020

The Disconnect between Sustainability and Digital Technology



60%

of the top Fortune Global 200 companies have created a Director, Vice-President or Executive position to **lead the sustainable development program.**

18%

state that they have a comprehensive digital strategy.

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SUSTAINABILITY IN The 2022-23 WORLD QUALITY REPORT

External factors

Societal expectations

Consumers expect corporates to act in keeping with social and environmental questions

Market expectations

Retain and motivate employees who wish to put meaning in their work

Regulatory compliance

Strengthened regulatory context at both European and national levels

Internal factors

Alignment with corporate strategy

Rising awareness and concern about environmental and social impacts of IT operations

Improved operational efficiency

A "lean" approach to facilitate operations with cost-saving

Enhanced product quality

No sustainability without quality

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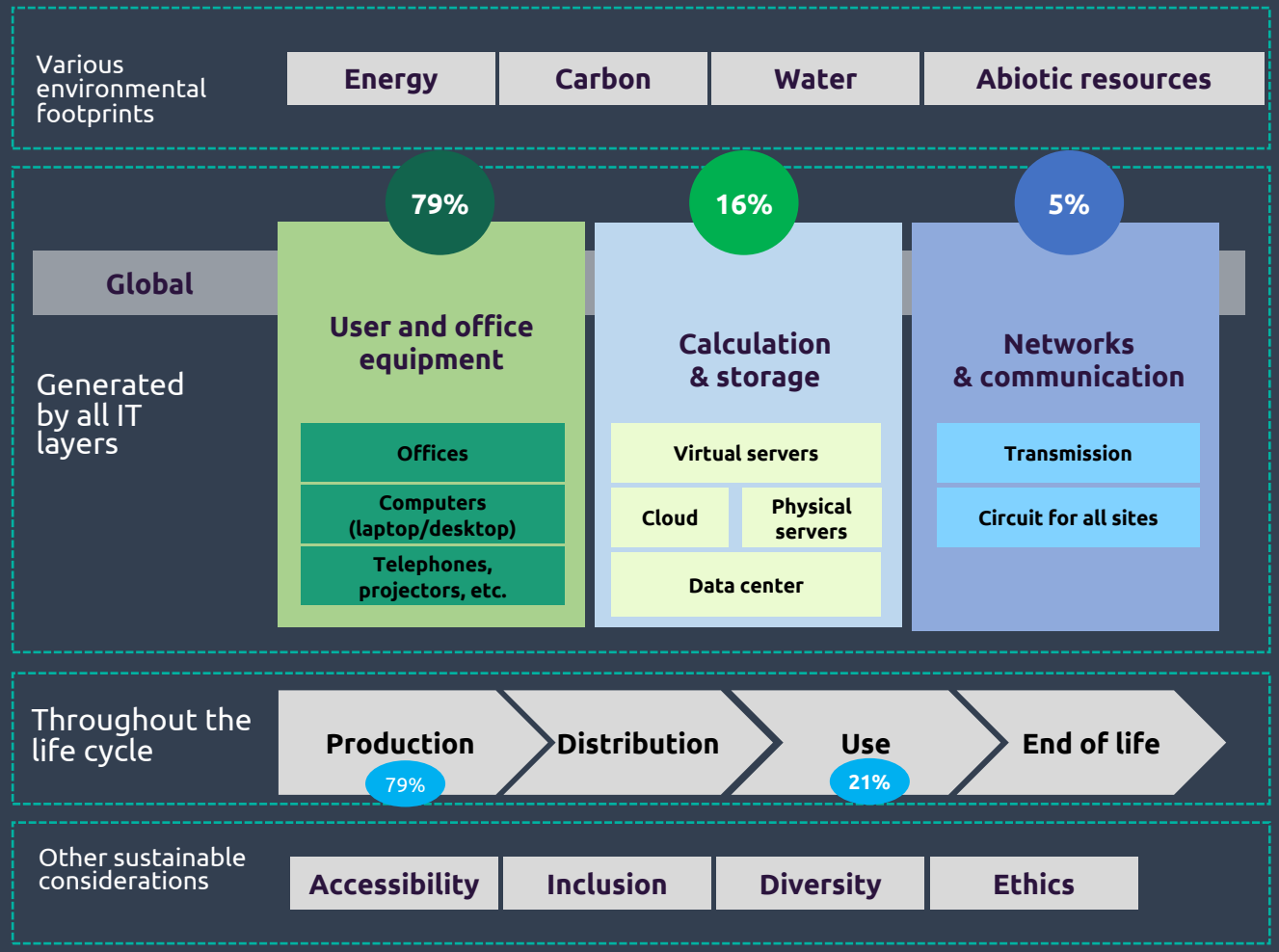
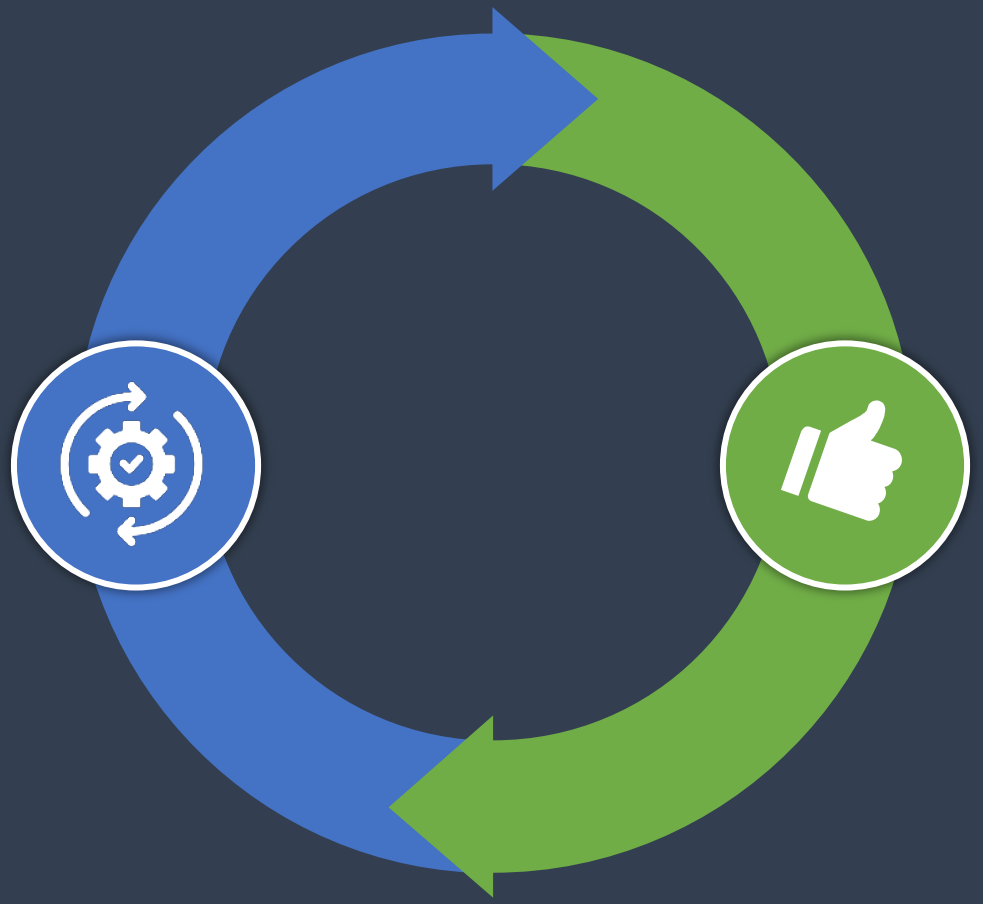
significant environmental footprint across all IT layers



Source : Etude ADEME / ARCEP - https://www.arcep.fr/la-regulation/grands-dossiers-thematiques-transverses/lempreinte-environnementale-du-numerique/etude-ademe-arcep-empreinte-environnemental-numerique-2020-2030-2050.html

The Quality Engineering & Testing perspective

Sustainable testing



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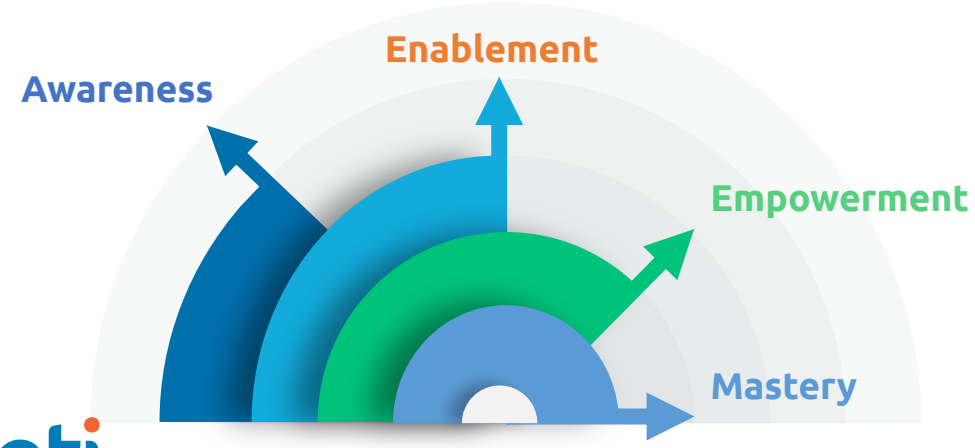
THE SUSTAINABLE TESTING ASSESSMENT

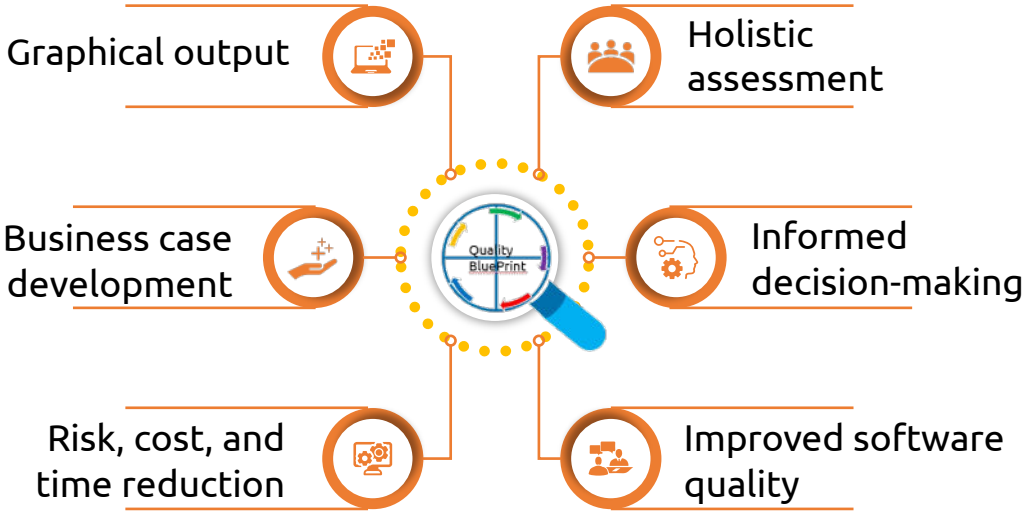
Option 1: Standalone

Short assessment of 70 questions, based on the QB™ methodology, designed to improve the sustainability of Test Process Quality across the whole IT portfolio.



Option 2: part of Quality Blueprint™

Assessment methodology designed to give a thorough overview of the Test Process Quality across the whole IT portfolio.



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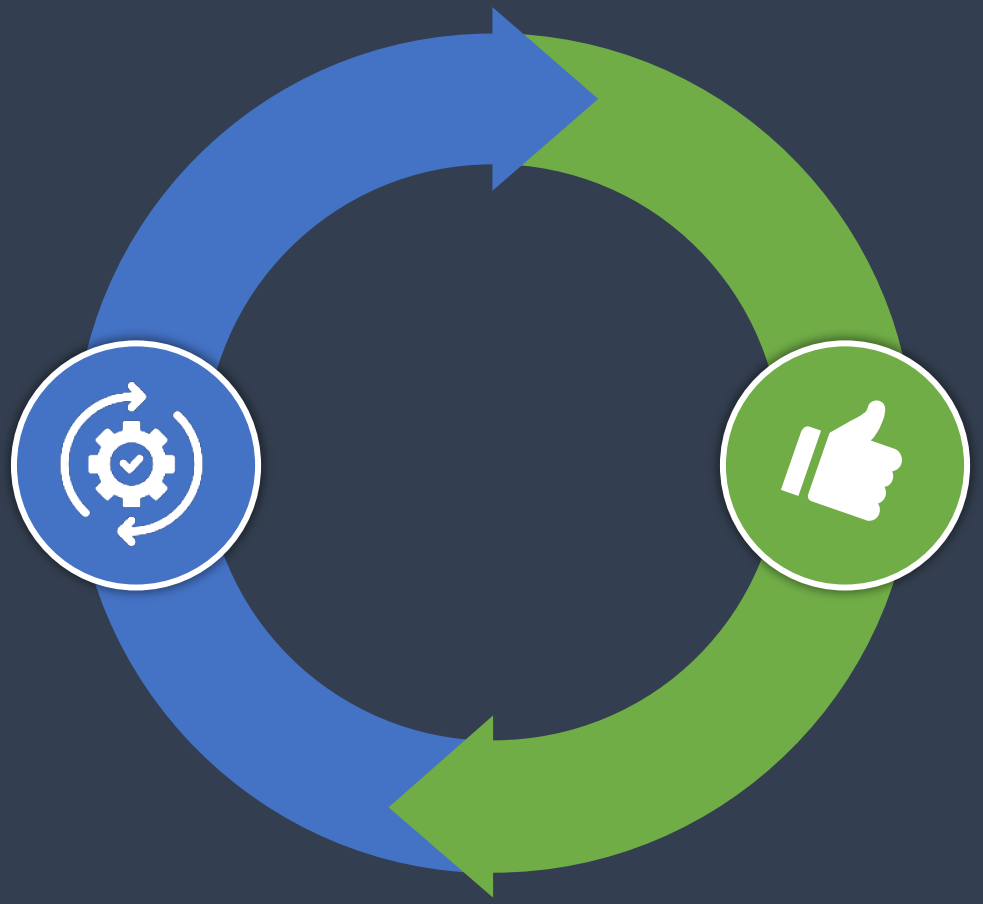
The Quality Engineering & Testing perspective

Sustainable testing



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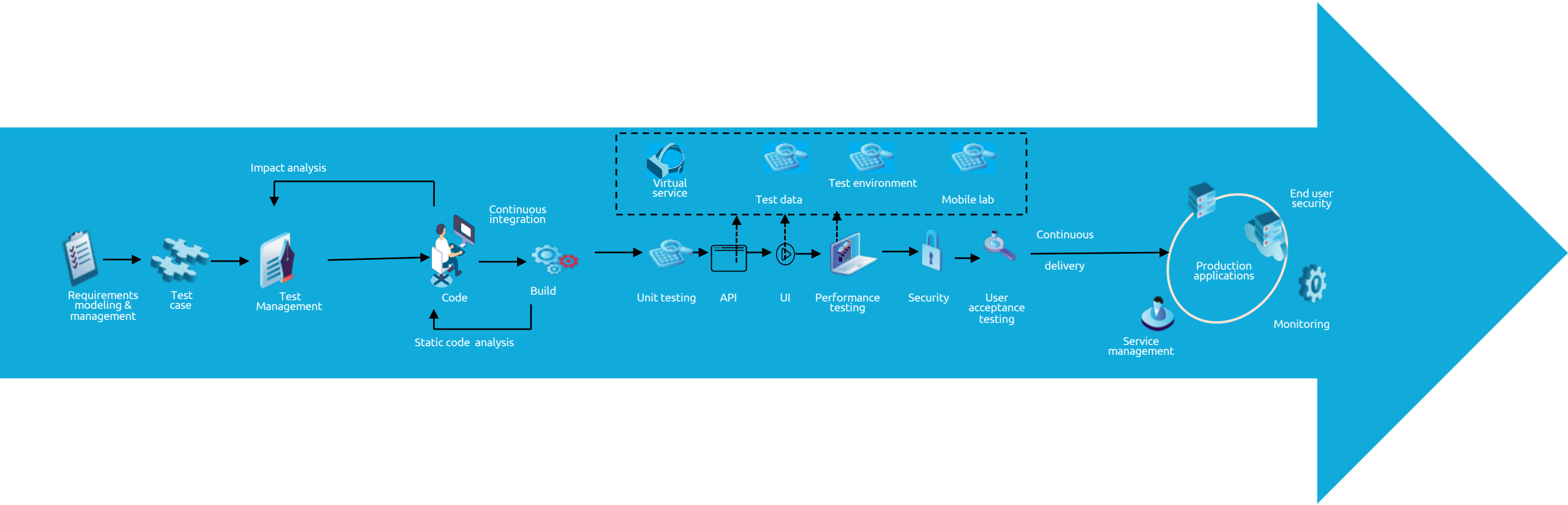
sustainability as a non-functional requirement



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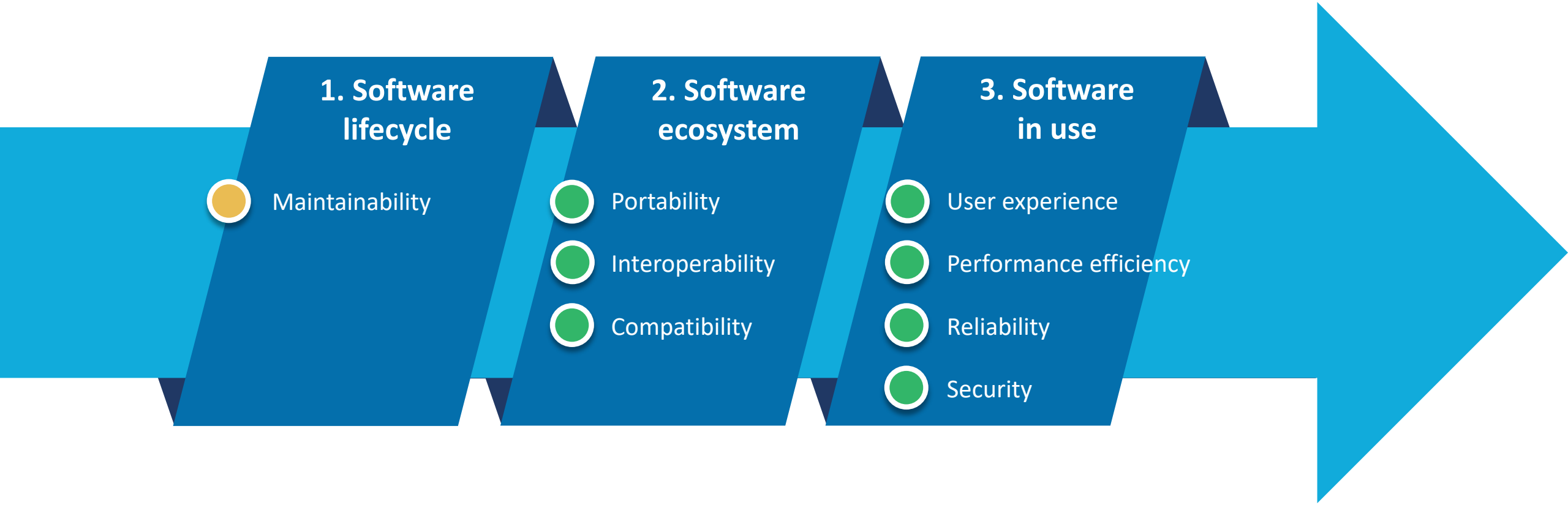

Ability for QE&T to assess and impact

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EXAMPLE : Black versus White background

2,98 mAh

-23%

3,92 mAh

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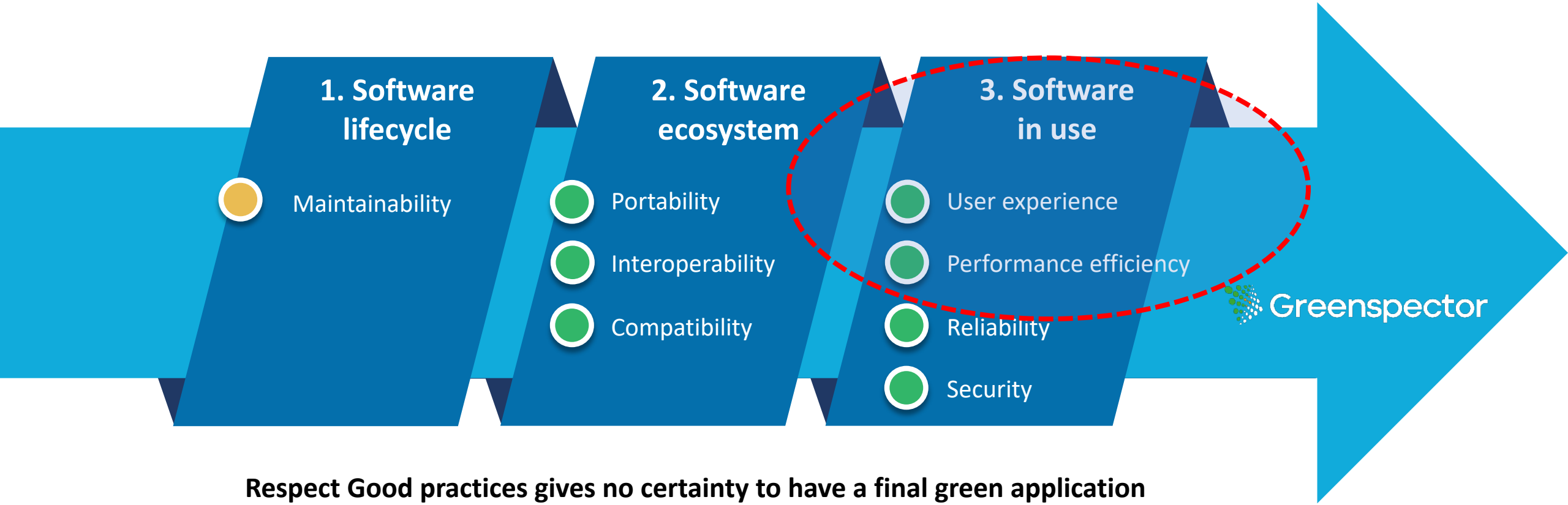
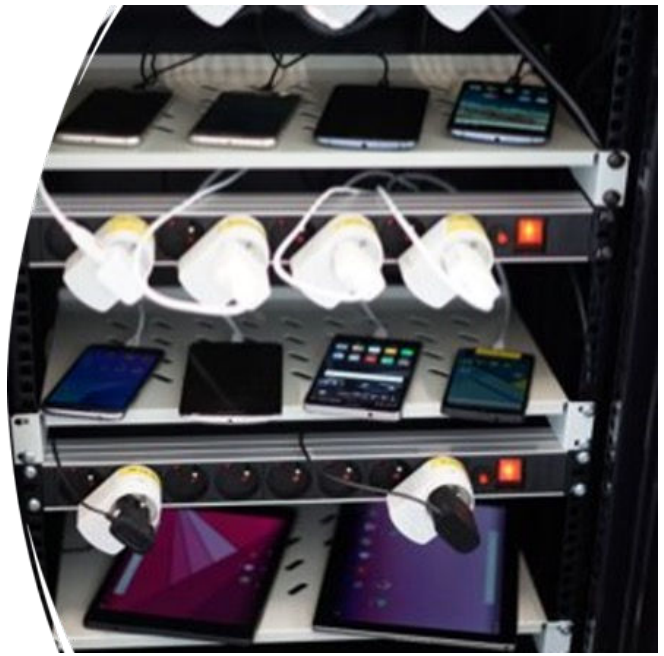
GREENSPECTOR SOLUTION – GREEN TESTING IN USE



Respect Good practices gives no certainty to have a final green application

How to measure & Evaluate software in use ?

Measure what user do with Digital services



To evaluate environmental Impacts,

To load a webpage or download a mobile application **It is not sufficient**

Dynamically : actions, click, reading time, background time, fields filling, graphic elements in action, …

Automatically : to make it again and be confident with measure

Step by step : to analyse overconsumption inside user journey

Close to real conditions : real device, real network, conditions of journey. Not an emulation and not a model, not embedded in application

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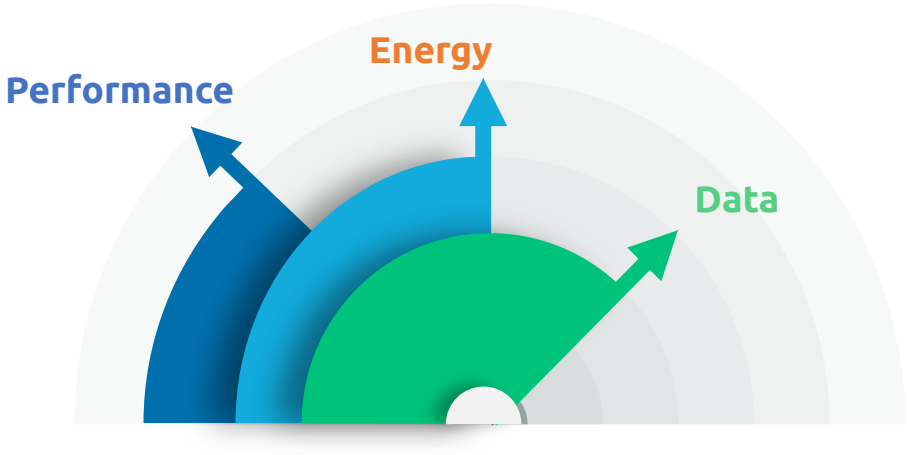
Which metrics for software in use ?

Metrics to collect with operational sense and with capability to be projected for environmental criteria assessment



70 – 80 %

Of the environmental impacts are on the client side

Performance (s) : less time you take for a digital action, better it is (less time of screen, less time of server, less time in network).

Energy (mWh) : on the client side mainly, close to impacts (direct & Indirect impacts), relevant for operational

Data volume (kb) : relevant at the server, network and client sides.

<u>Complexity of Devices</u>

CPU, Data only or DOM elements number are not sufficient

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WHEN TO MESURE for software in use ?

Initialization

Kick-off

- Team Awareness session
- Definition of targets
- Measurement platform setup

Reviews and measures during sprints (x N)

GO sprint
Content transmission

- Design review

Release candidate

- Measures

Share findings

Final assessment

Finale release candidate

- Preparation
- Execution
- Analysis

Report presentation

Project review

Define & shareTargets

Measure / analyse in CI

Overconsumption & solution in backlog

Final Measure

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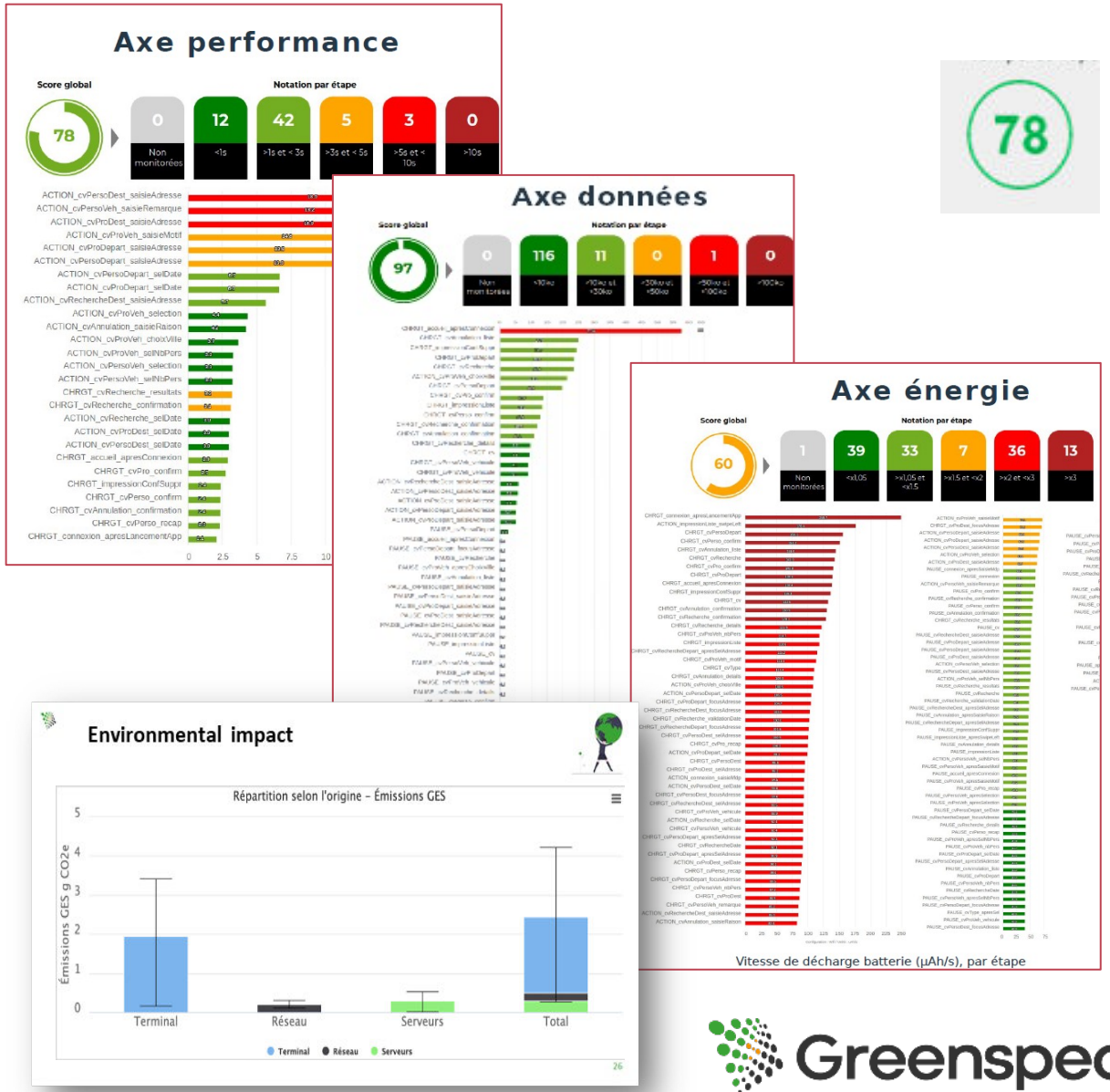
Software in use : Test OF SOBRIETY CERTIFICATE

A standart universal measurement repository (Web, mobile, IoT, etc.)
Where each step contributes to scoring on 3 Metrics. For a final ecoscore out of 100 points, Algebric average of the 3 sub-ecoscores



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