

Scaling EPD Production with Digital Tools

How OpenEPD can be the tool

September 13, 2025

William Paddock

Co-Founder and CEO

william@wapsustainability.com



THE INTERNATIONAL EPD SYSTEM

Data structure intended for machine readability



EPD

ENVIRONMENTAL PRODUCT DECLARATION

READY MIX CONCRETE PRODUCED BY:OZINGA

FACILITY: Chicago Chinatown

STRENGTH: 6000 psi @ 28 days

MIX NAME: 4715X

IMPACT INDICATOR		PER YD3	PER M3
Global Warming Potential	kg CO ₂ e	445.81	583.10
Ozone Depletion	kg CFC11e	8.58E-0	1.12E-0
Acidification	kg SO ₂ e	4.19	5.48
Eutrophication	kg NE	0.58	0.76
SFP (Smog)	kg O ₃ e	115.13	150.58
Non-renew. energy	MJ, NCV	3883.82	5079.85

GENERAL INFORMATION

Declared Product	Ready-mixed concrete produced by Ozinga	
Date of Issue	June 18, 2025	
Period of Validity	August 13th, 2025	
EPD Holder	Ozinga Bros., Inc. 19001 Old LaGrange Road Mokena, IL 60448 www.ozinga.com	
Program Operator	ASTM International 100 Bar Harbor Drive West Conshohocken, PA 19428-2959, US/	 ASTM INTERNATIONAL Helping our world work better
LCA and EPD Developer	WAP Sustainability Consulting 1701 Market Street Chattanooga, TN 37408	 WAP SUSTAINABILITY CONSULTING
Core PCR	ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products	
Sub-category PCR	NSF International Product Category Rule (PCR) for Concrete Version 2.3 (February 2024), Reviewed by Thomas P. Gloria, Bill Stough, and Michael Overcash.	
Independent LCA Reviewer and EPD Verifier	Independent verification of the declaration and data, according to ISO 21930:2017 and ISO 14025:2006 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External Thomas P. Gloria, Ph.D., Industrial Ecology Consultants	
For Additional Explanatory Material	Manufacturer Representative: Ryan Cialdella (ryancialdella@ozinga.com) Software Tool: Theta by WAP Sustainability Consulting V.1.0.	

The declared product meets the following product specifications:

- ACI 211: Standard Practice for Proportions for Normal, Heavyweight, and Mass Concrete.
- ACI 318: Building Code Requirements for Structural Concrete.
- ASTM C94 Standard Specification for Ready-Mixed Concrete.
- CSI Masterformat Division 03-30-00: Cast-in-Place Concrete.

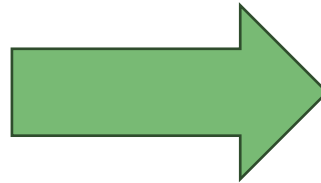
UNSPSC Code 30111500: Ready Mix

Disclaimer:

EPDs are comparable only if they comply with this document, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.

This EPD was calculated using industry average cement data. Cement LCA impacts can vary depending upon manufacturing process, efficiency and fuel source by as much as 50% for some environmental impact categories. Cement accounts for as much as 90% of the impacts of the concrete mixes included in this EPD and thus manufacturer specific cement impacts could result in variation of as much as 45%.

OZINGA | ENVIRONMENTAL PRODUCT DECLARATION



OPENEPD JSON

```

- ext: Object {"ec3": "uaGWP_a1a2a3_traci21":638.2491703949438,"uaGWP_a1a2a3_ar5":640.1805022308292,"category": "Concrete", "doctype": "openEPD",
  openepd_version: "0.1",
  id: "EC3PG80W",
  date_of_issue: "2025-06-18T00:00:00+00:00",
  valid_until: "2029-06-27T00:00:00+00:00",
  version: 63816
- declared_unit: Object {"qty":1,"unit":"m3"}
- kg_per_declared_unit: Object {"qty":1789.85342,"unit":"kg"}
- compliance: Array[0] []
- product_classes: Object {"EC3":"Concrete >> ReadyMix","io.cqd.ec3":"Concrete >> ReadyMix"}
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  private: false
- pcr: Object {"ext":{"functional_unit":{"functional_units":[]},"attachments":null,"id":"EC3N3H3T","issuer":{"ext":{"lca_discussion": null
  product_image_small: null
  product_image: null
  declaration_url: "https://concrete.thetaepd.com/public?guid=08054c4b-0012-4923-98e0-5806a68fde9a"
  kg_C_per_declared_unit: null
  product_service_life_years: null
- alt_ids: Object {}
- third_party_verifier: Object {"ext":null,"web_domain":"industrial-ecology.com","name":"Industrial Ecology Consu
  third_party_verification_url: null
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  third_party_verifier_name: null
- epd_developer: Object {"ext":null,"web_domain":"wapsustainability.com","name":"WAP Sustainability","ref":"https
  epd_developer_email: null
- program_operator: Object {"ext":null,"web_domain":"astm.org","name":"ASTM International","ref":"https://openepd
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  product_sku: null
  product_description: " - "
- manufacturer: Object {"ext":null,"web_domain":"ozinga.com","name":"Ozinga","ref":"https://openepd.epd.world/api
- plants: Array[1] [{"alt_ids":null,"attachments":null,"ext":null,"id":"86HJV924+XX.ozinga.com","name":"Chicago C
- applicable_in: Array[1] ["001"]
  product_usage_description: null
  product_usage_image: null
  manufacturing_description: null
  manufacturing_image: null
- specs: Object {"ext_version":"1.0","Concrete":{"ext_version":"1.1","lightweight":false,"strength_28d":"41.36856
- includes: Array[0] []
- ec3: Object {"uaGWP_a1a2a3_traci21":638.2491703949438,"uaGWP_a1a2a3_ar5":640.1805022308292,"category": "Concrete

```

DOWNLOAD

SCRATCH THAT!

Let's start with a story instead.

The Story starts in 2021



Acquire LCA and EPD Software Companies



Data Structure #1



Data Structure #2



Logic would tell us the data structures would be similar, built from the same ISO standards, on PCRs, for LCAs & EPDs....

but they were really different.
Leading us to ask, which one was “right”



The story complicated itself.

Data Structure #1



Data Structure #2

Customers of Coldsteam and regulators started to show favor toward the EC3 database, meaning digital EPDs needed to be created to align with the EC3 data structure.

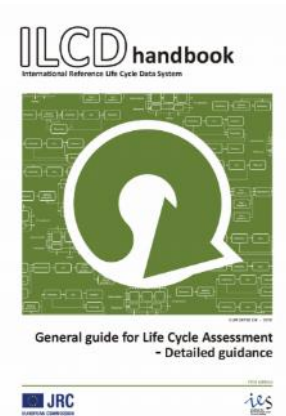


The story complicated itself.

Data Structure #1



Data Structure #2



But then we had Customers of Trisight starting to show favor toward the ILCD+EPD format.

Which led to questioning what is different between EC3's openEPD and ILCD+EPD?

4 Data Structures and Counting.

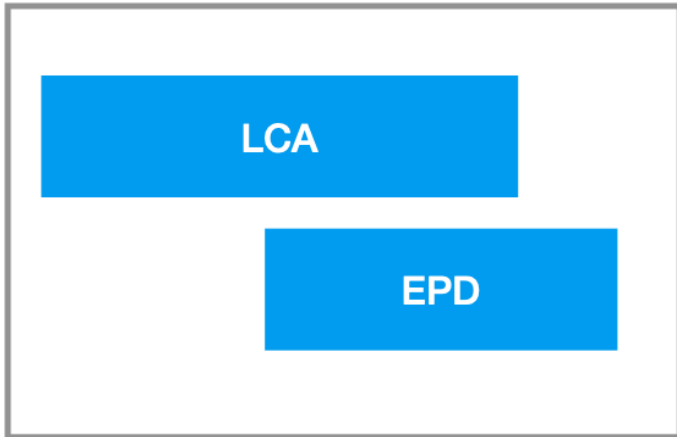
0%

LCA

= A+B+C+D

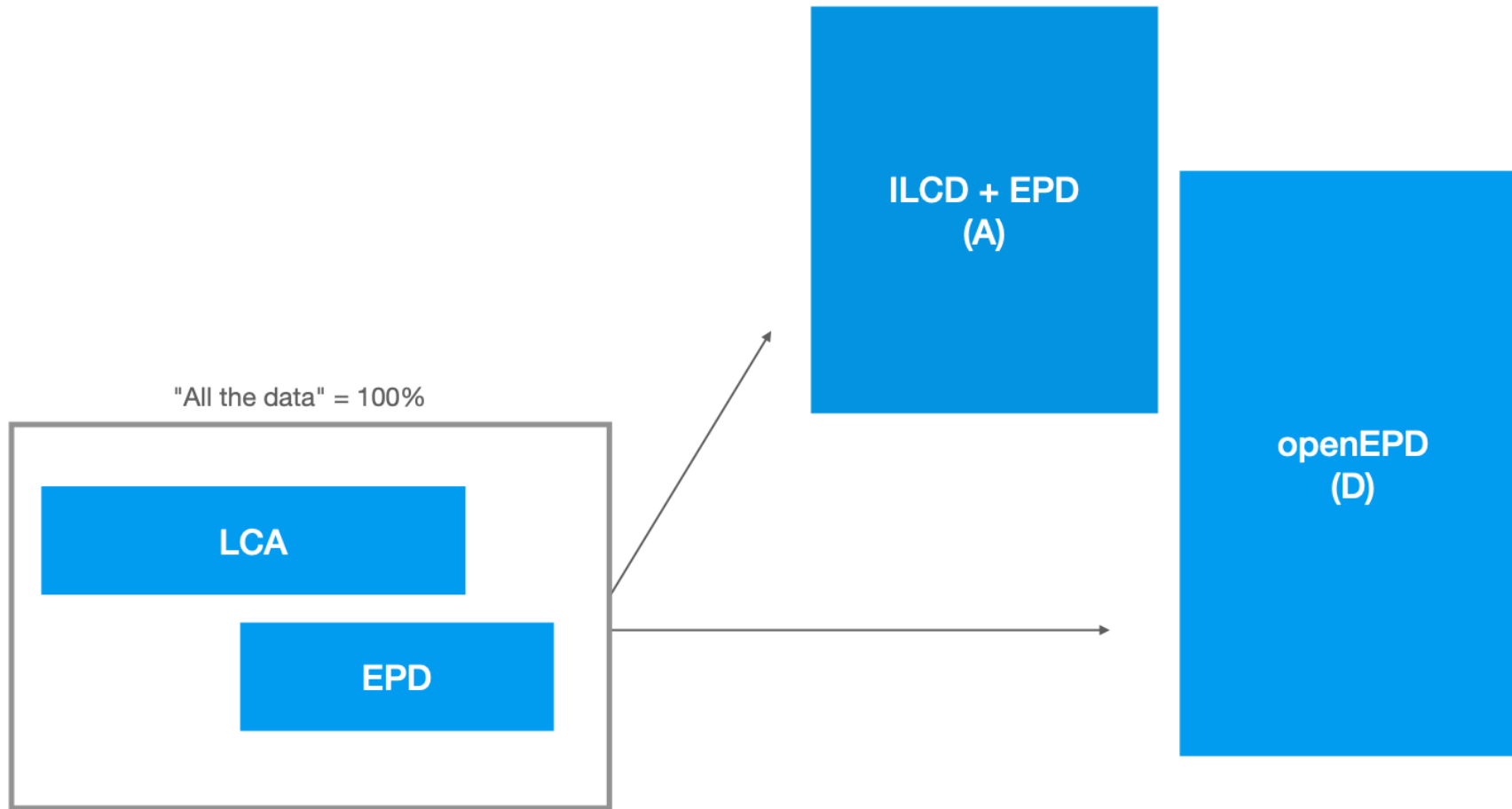
100%

"All the data" = 100%

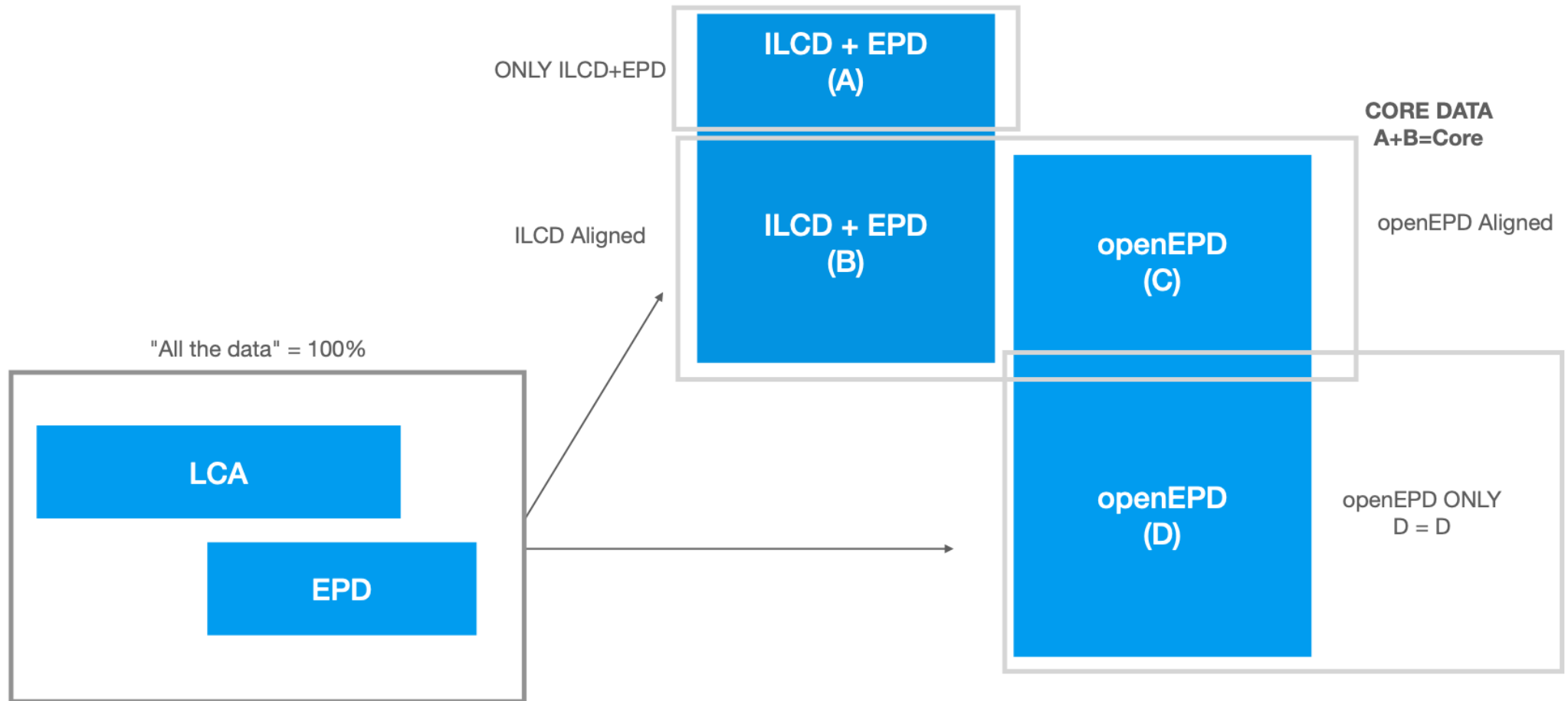


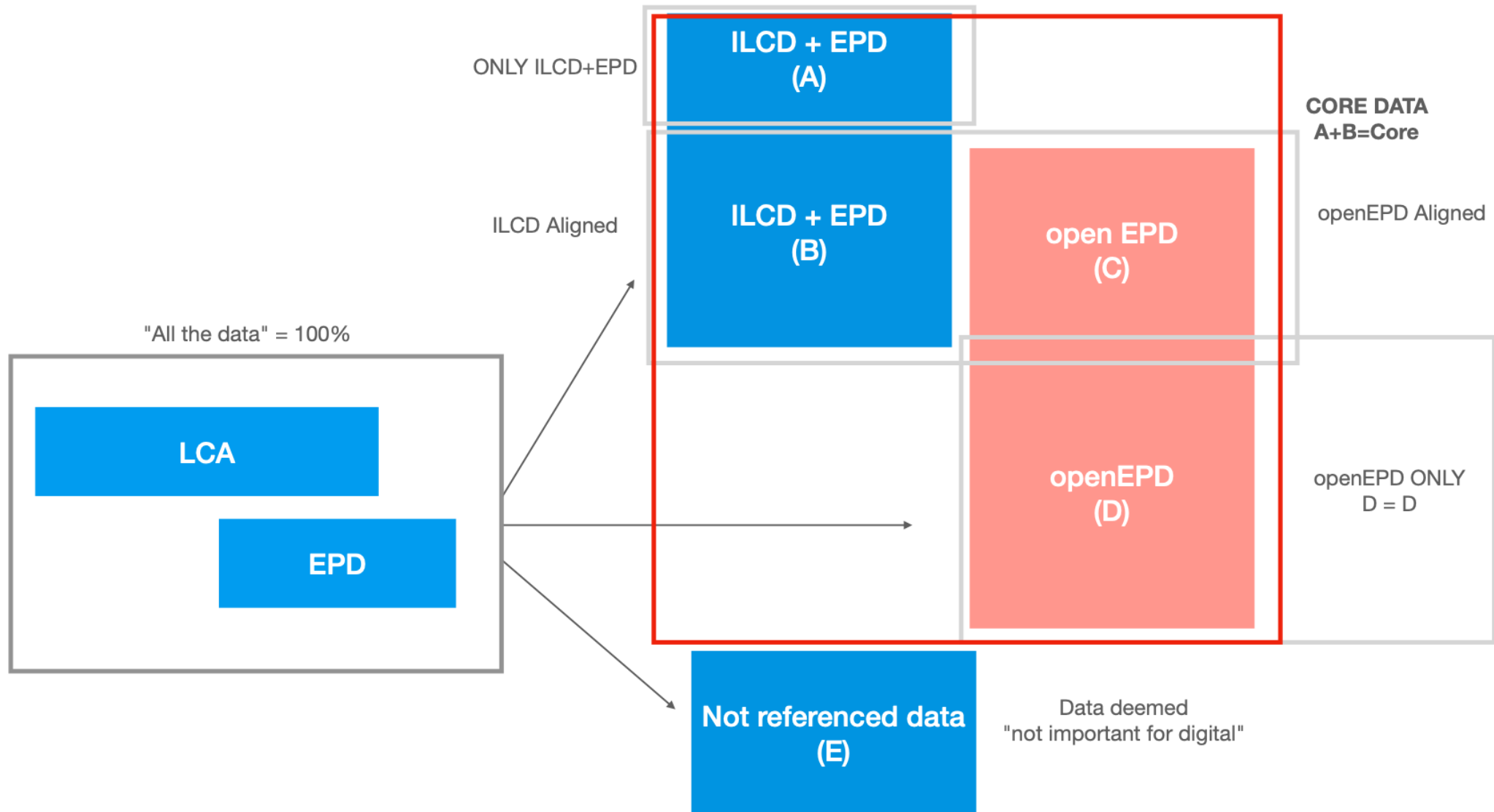
= A+B+C+D

100%



= A+B+C+D


$$= A+B+C+D$$



0%

100%

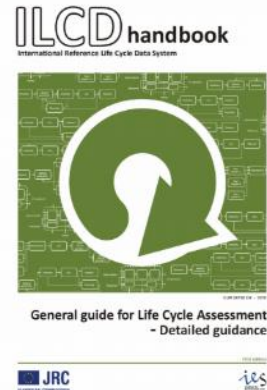
This prompted two critical questions.

What data do we want?

What data do we need?



Other formats emerged.
Other tools emerged.



Insert Logos of all LCA & EPD software,
who created their own data structures
just like Trisight and Coldstream.

Assumed to be 60-80 platforms

~86 Data Structures and Counting

This prompted two critical questions.

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What data do we need?



Roundtable for the purposes of figuring out how to collaborate on a single digital format?



What data do we want?

What data do we need?

Left unanswered. So what?

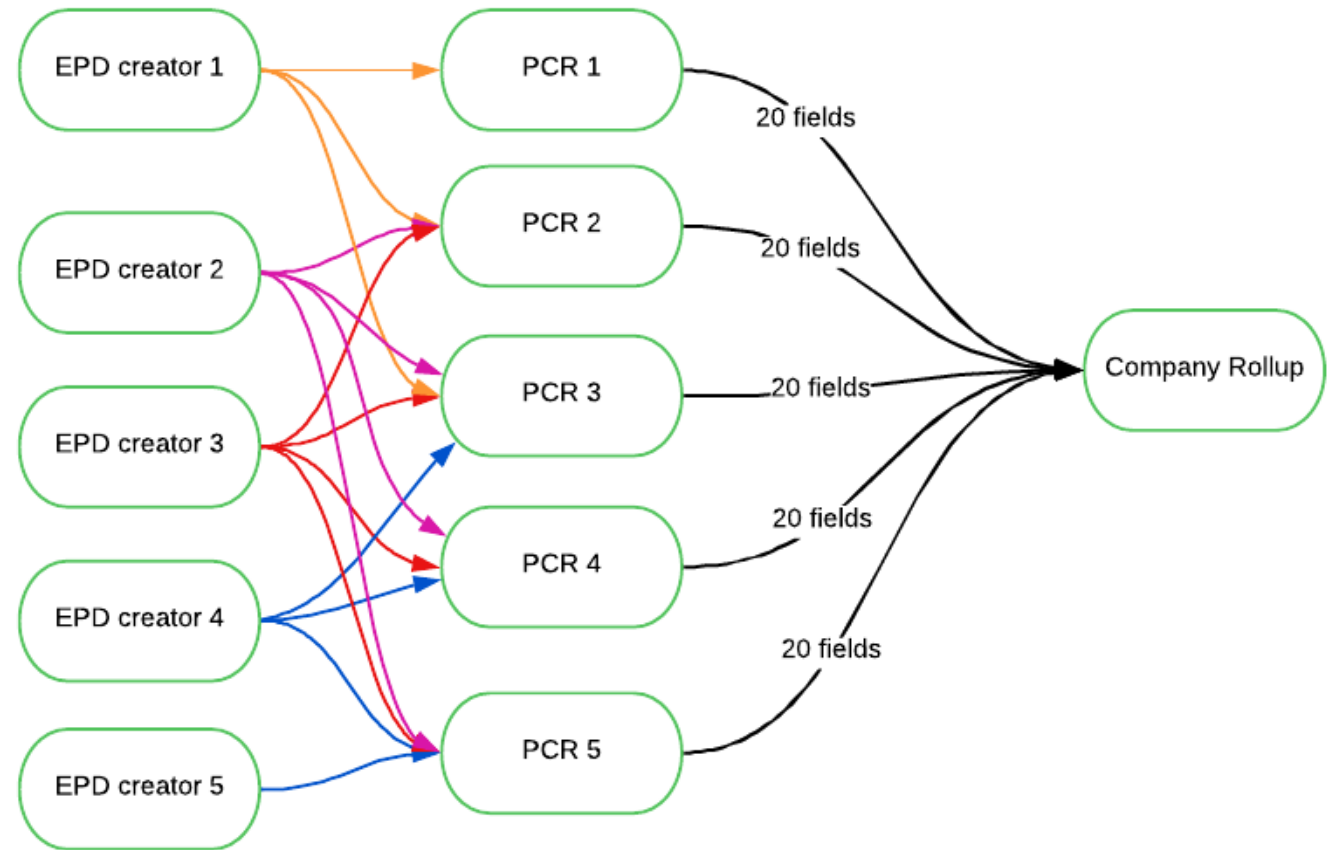
5 data providers with 20 EPD fields =
100 chances to be incompatible

... even if 95% of the entries are compatible

5 errors on average destroys a data ingest


... and then let's add 5 PCRs

* The issues scale to a $4 \times 3 \times 2 \times 20 = 480$, but we'll leave
combinatorics for another day



Compounding Digital Issues

Turns out, scaling digital EPDs is hard work



Martina Prox • 2nd
Director Sustainability Strategy @iPoint, we connect prod...
[View my services](#)
2w •

One of the biggest trade-offs in product carbon footprinting is accuracy versus comparability.

100% comparability without prescribed datasets is almost impossible. Even with the same software, user choices lead to different results.

Here's what I mean:


Standards often allow flexibility. For example, you might be allowed to use either a European dataset or a German dataset for the same calculation.



Fabian Diaz • 1st
LCA & True Sustainability - LinkedIn Top Green Voice | Enviro...
1w •

I've written about the types of EPDs before, but today I want to share a different way of looking at them. ...more

COMPLIANCE EPDs	HIGH-QUALITY EPDs
<ul style="list-style-type: none">Based on screening LCAMainly uses secondary dataNo customized inventory	<ul style="list-style-type: none">Based on solid LCAPrioritise primary dataCustomized inventory



Anna Lasso • 1st
Founder + CEO @ SmartEPD
2mo •

The LCA and EPD ecosystem is complex.

But complexity doesn't excuse shying away because it's hard to define. In any profession, medicine, engineering, law, quality is measured continuously improved. LCA should be no exception.

ISO standards, PEF, and regional PCRs do not provide system boundary justification, and methods are not subjective, even if there's room for interpretation.

I don't believe malicious actors are the biggest problem in the ecosystem (at least not right now). The real issue is that technical assumptions are often not disclosed, and procurement is not always realistic.

One school of thought is that we must remain laser focused on LCA perfectionism above all else. The other is that we must democratise EPDs so more people can do them and use them even before they can all be perfect.

I fall more into the latter camp and see it as the best way to raise quality too.

To be fair though, it's good to have people pulling in both directions in order to make the most progress. I love these debates.

There are lots of ideas about raising EPD quality, many focusing on louder public criticism. This isn't a bad idea for challenging bad actors.

But most people making mistakes with EPDs are well-intentioned and eager to learn more. Let's lift them up, not tear them down.

And let's not be too inward focused.

Enabling mechanisms for low-quality and suspicious EPDs

I've finally published the article I promised, a look at the systemic issues enabling questionable and low-quality EPDs to enter the market.


Based on real cases from published EPDs and verifiable input from across the #EPD landscape, I identify a set of mechanisms that might quietly but significantly undermine trust in environmental declarations.

In the main article, I outline how these mechanisms emerge, why we need to focus our attention moving forward.

Scarlett Li • 2nd
Focused on LCA & ESG | Advancing Sustainability
1w •

product, same year, different results—simply because of database issues. Our analysis of 500+ EPDs shows how version gaps in input and HiQLCD can shift carbon footprint results by up to 20%. What's about the hidden "version trap"? Read on.

base Versions in LCA: The Hidden Trap in EPDs



Anna Lasso • 1st
Founder + CEO @ SmartEPD

EPDs created from "EPD Tools" work the same way:

and the PCR. tool, along with how it is completeness, representativeness, and conformity with the PCR (just as you wouldn't use suspect ingredients when following a Michelin-worthy recipe!)

All this to say -- Not all EPDs are the same!

Some are third-party verified, meaning both the tool and the data have been reviewed by a third party independent verifier.

Others are internally verified, meaning the tool (step 1) has been checked by a third party but the data (step 2) has not.

Both levels of verification can have value. Internally verified EPDs can be quick and useful for Third-party verified EPD certification, or procurement.



Fabian Diaz • 1st
LCA & True Sustainability - LinkedIn Top Green Voice | Enviro...
4w •

Before that, some basic context from a top-down approach.

ISO 14025 demands for "independent verification of data from LCA, LCI and information modules..." Such independent verification can be either internal or external, or third-party.

EN 15804 states basically the same. Then, we have the ECO Platform Verification guidelines, which go beyond and demand only third-party verification.

However, some Program Operators allow other types of verification, which seem to be, at least to me, a bit confusing: 'verification of process/procedure'.

As explained by an EPD tool provider, publishing in EPD Norge, the activity data is not third-party verified. A different approach is used where "Advanced user of the tool have third party verified procedures for data input rather than third party verification of data input". But clearly, verifying a procedure is not the same as verifying data.

Many opinions, many smart people, ambiguity in standards. Rooms like this one, built the current EPD ecosystem.

where do we want to be in 5/10 years?



Data Structure #1



Super Data Format

Data Structure #2

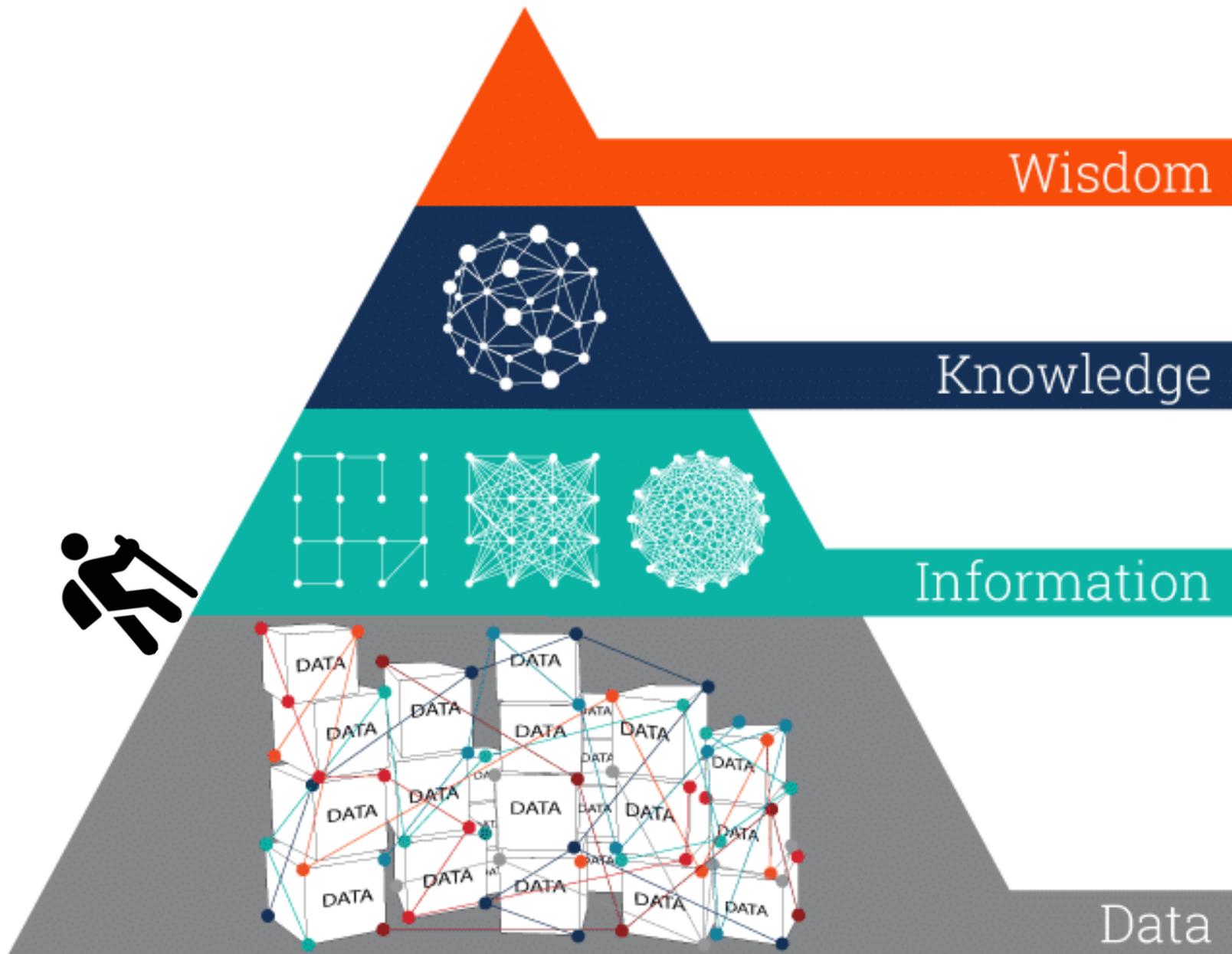


To finish the story of my journey through Digital EPDs and Digital EPD formats, WAP acquired C-Change Labs in October 2024.

“Scaling is about moving from one set of problems to another, bigger set of problems.”

Ben Horowitz, HBR

This is where we see openEPD



Information,
Knowledge and
Wisdom come
from a more open
system.

It's how we
protect the EPD.

DIKW Pyramid, Robert W. Lucky

“To protect the EPD, we need to make it easier for people to use the EPD”.

William Paddock, WAP

The Vision:



One Global Digital EPD Format to Power Knowledge, Trust, and Action



Trust & Transparency

Quality markers to show verification & rigor
Transparency for mass balance, biogenic carbon, PCRs
Clear differentiation of credibility levels



Interoperability & Usability

Globally harmonized EPD & LCA format
Seamless integration across tools & regulators
Flexible design for evolving methods & laws
Unlocks benchmarking, insight & innovation



Governance & Stewardship

Neutral convening body for oversight
Transparent expansion of data typologies
Collaboration across tools, regulators & markets
Future-proof governance for global adoption

Three openEPD Priorities

Governance:

OpenEPD was the original DB structure behind EC3, but it lacked governance, advocacy, financial sustainability, and market integration needed to scale. We are working on Governance models to build a global, trusted digital EPD format.

Process:

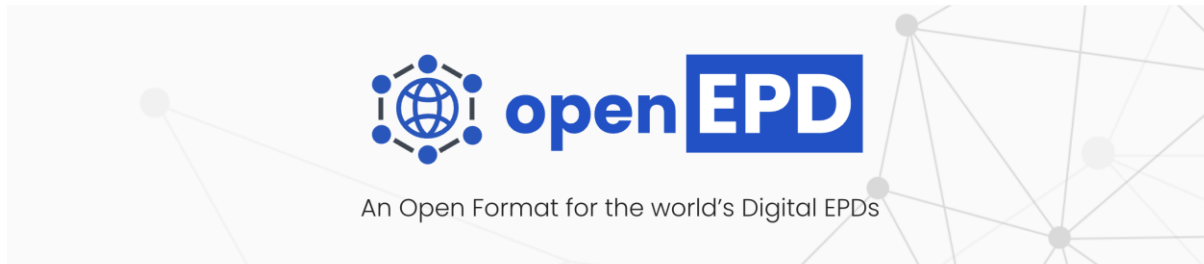
No convening body existed to steward the format, resolve conflicts, or build consensus across industries. We need a process for updates, additions, solutions and revisions. This will be defined through governance.

Format:

We need to answer the questions of what data do we want and what data do we need. We need stakeholder engagement and buy-in at a global level. Our digital EPD format should reflect what data we need and want.

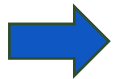
Stewardship and Governance

We are committed to openEPD as a public good



openEPD is an open data format for passing digital third-party verified Environmental Product Declarations (EPDs) among Program Operators, EPD Databases, Life Cycle Analysis tools, design tools, reporting, and procurement.

Unlike print or PDF EPDs, openEPD provides a shared and precise format to express and refer to EPDs in ways that modern databases can use. openEPD can be used alongside a printable document, or can generate printable EPDs.



Contact me about

openEPD news & updates

openEPD standards calls

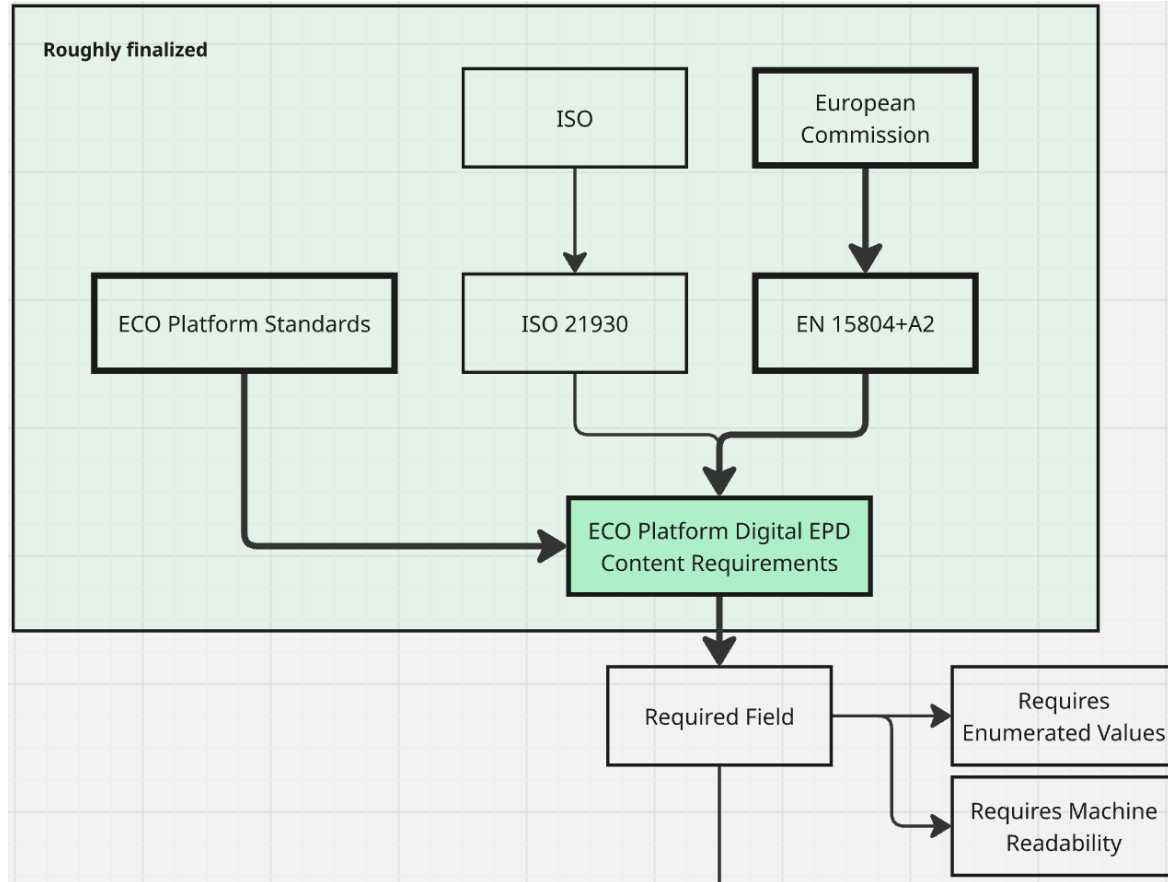
Accessing EPDs via openEPD

Publishing EPDs via openEPD

- WAP is developing an openEPD governance model
- Prior efforts: openEPD Forum
 - Government, LCA practitioner, software developer engagement
- Shared responsibility for evolving content
- Global responsibility to NA, EU, RoW
 - Opportunities for alignment
- Collaboration with Global Regulators, Consortia, and Industry associations
- **Noncompetitive**

Process: ECO Platform DDR v2.0 (2026)

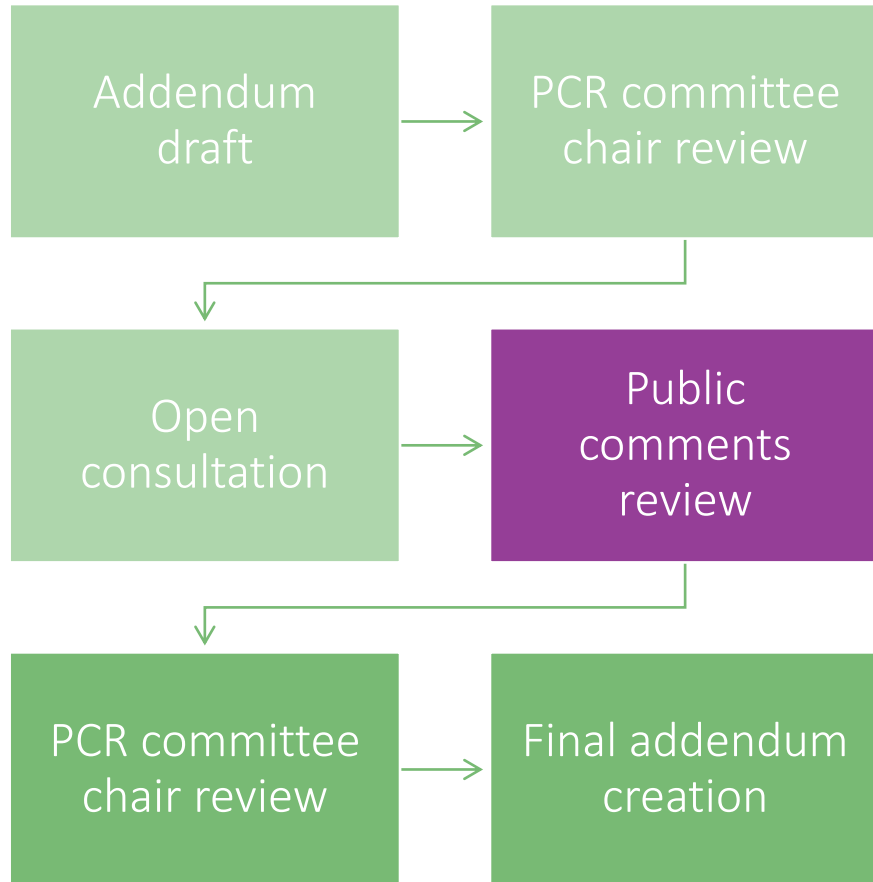
Opening and refining digital requirements in Europe



- Format agnostic
- Focus on EN15804+A2
- Checklist for adopting formats
- Eliminating need for PDF
- Start digitalization of EPD ecosystem
- Increase machine readability
- Future work to include tools, databasing, verification, etc.

Process: ACLCA Digital EPD Guidance

Creating and defining digital requirements in North America



- Addendum in development to further **aid in harmonizing PCRs and digital EPDs.**
- Working group members from:
 - Industry
 - Program Operators
 - Consulting
 - Governmental

Process: Future Change Management

For those using openEPD to create digital EPDs, how do we manage updates and improvements?

OpenEPD Digital Format — Change Management Process



Proposal

Stakeholders submit change requests to governing body.



Review & Consensus

Working group evaluates proposals and builds agreement.



Version Release

New version published with changelog & migration guidance.



Developer Communication

Software providers notified with docs, tools, & webinars.



Adoption & Feedback

Providers update systems, feedback loops into proposals.

Format: Socializing what we need Digital EPDs to do?

(Apart from complying with the PCR)

- Be based on a core data structure
- Document a single product's impact or compliance - *PDF is good enough*
- Combine with 100 other products in a building or project profile
- Combine with 1000 other products to build a company profile
- Help make procurement decisions
- Analyze in bulk to find errors and patterns
- Help designers make design decisions in a CAD tool

Therefore, we need:

- **Open** formats that anyone can produce
- **Interoperable** formats that any system can read
- **Extensible** to meet PCR and stakeholder requirements



Case Study: 'Wifi' or 'USB'

Format: Socializing Digital as EPD creation vs. Representation.

Goal: The digital file becomes the document of record

Digital First Creation

Must be able to pass verification

Must be able to create a compliant PDF document

Must be made compatible with target standards & PCRs

Should provide consistency guarantees

Capable of sharing key attribute data

Format: Socializing Digital EPDs as the Future

However, ...

- EPDs vary by region, program operator, and PCR
- The market still likes the PDF - for example LEED still requires the PDF
- EPDs from multiple sources need to be readable into tools and databases
- Companies likely will need to publish to multiple digital formats
- Other formats are added over time (e.g., PACT) that will overlap
- Most Regulators don't call out that Digital is Acceptable (USEPA did)

Therefore, we need:

- Adaptable, open formats
- Easily referenceable
- Secure data exchange

**And we still have much
to solve together!**

Format: Socializing Digital EPDs as the Future

What data do we want?

What data do we need?

openEPD



Data structure intended for machine readability and openEPD creation via epd.world

- JSON-based
- OpenAPI 3.0 compatible
- Extension system
- Broad adoption

[README](#) [Apache-2.0 license](#)

Python Library to work with OpenEPD format

LICENSE	APACHE-2.0	PYTHON	3.11 3.12 3.13	CODE STYLE	BLACK	PYPI	V7.9.0
DOWNLOADS		2.1K/MONTH					
BUILD	PASSING	LAST COMMIT	TODAY	RELEASE DATE	TODAY	RELEASE	V6.27.0

This library is a Python library to work with OpenEPD format.

OPENEPD.JSON

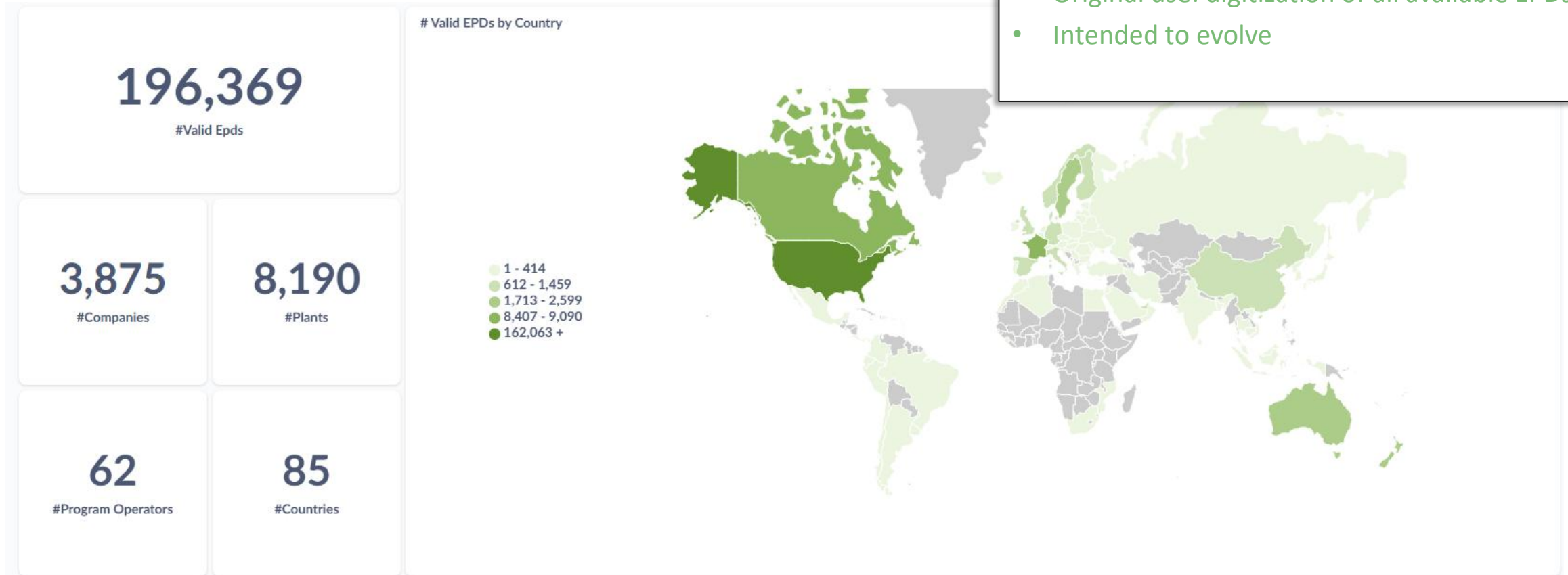
```
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```

DOWNLOAD

Standards and Compatibility

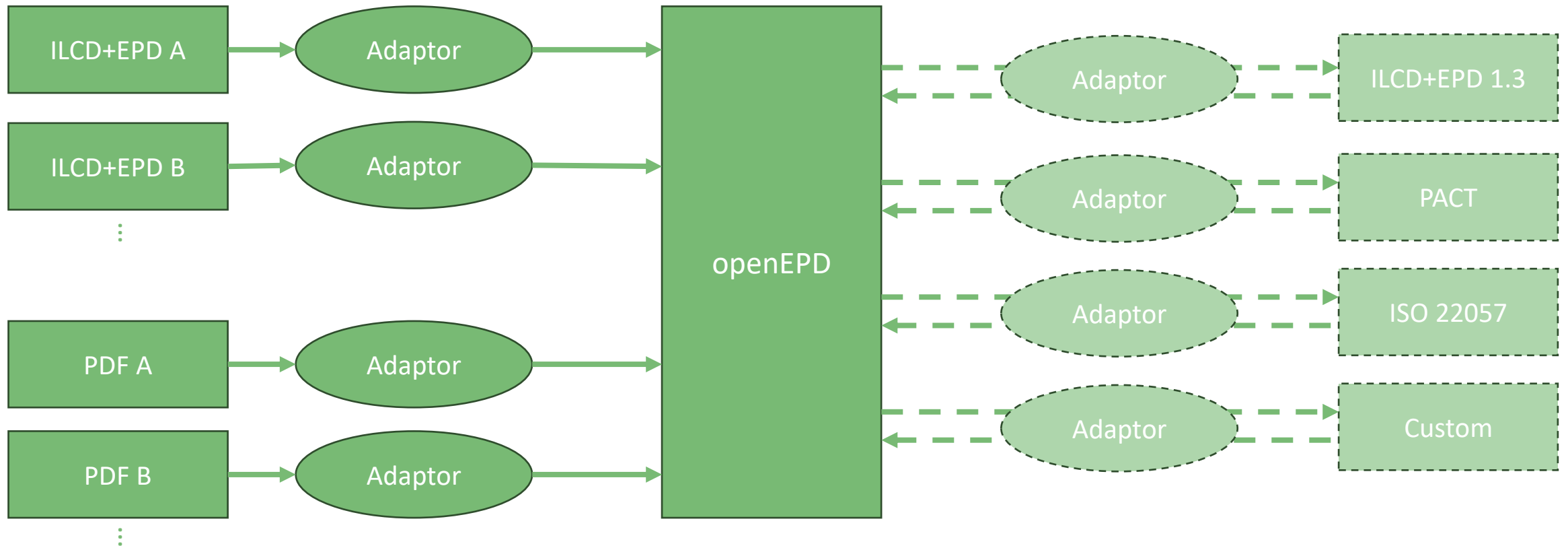
OpenEPD is built. It just needs to be supported.

- Designed to be compatible with ISO 14025, EN 15804, ISO 21930
- Original use: digitization of all available EPDs
- Intended to evolve



openEPD: Proven compatibility

196,000 EPDs and counting

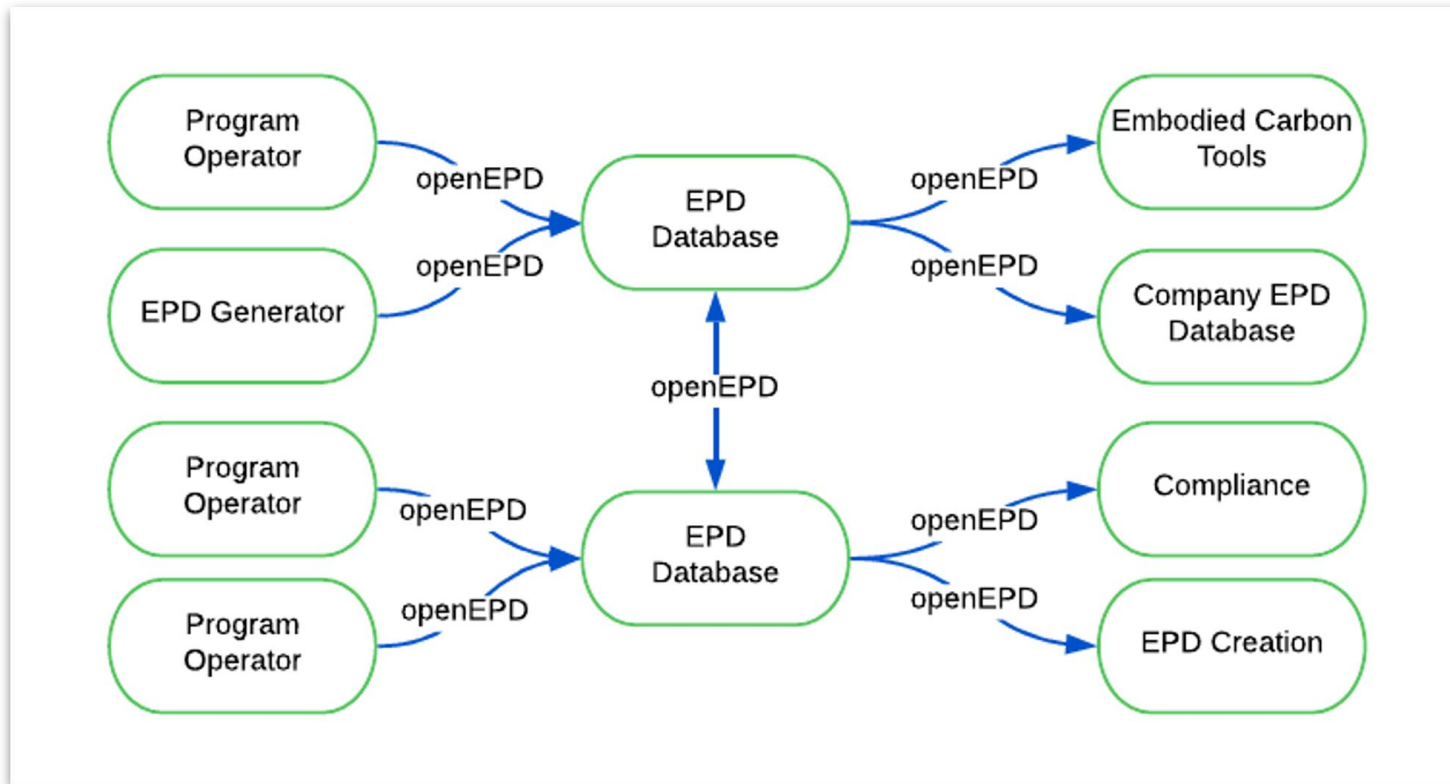


The ability to standardize has been proven

Standard interchange is possible!

Goal: Data Interoperability

Create data flows throughout the ecosystem to support Digital EPD Infrastructure



- OpenAPI 3.0 compliant
- Lightweight, ~10kb per EPD
- Reference implementation
 - Python based
 - Open-source
 - Type checking
 - Reference API

A common interface will allow for easy communication of data.

Licensing

Open-source, free-to-use



The technical specifications are freely and openly licensed under the Apache License 2.0.

The name and logo may be used to refer to openEPD compliant systems, to the openEPD specification, and to the open-epd-forum.org website.

Further governance, membership and revenue models are being explored, collaborated, and likely something for the future. We want to build this with others.

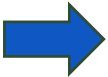
Thank you!

Maintaining openEPD as a public good



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Contact me about

openEPD news & updates

openEPD standards calls

Accessing EPDs via openEPD

Publishing EPDs via openEPD

Ben Ciavola, Ph.D.

Managing Director, Software & Data
ben@wapsustainability.com

William Paddock

Co-Founder & CEO
william@wapsustainability.com