

IEEE STANDARDS ASSOCIATION

RAISING THE WORLD'S STANDARDS

Digital Product Passport

Maike Luiken

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Co-Chair, IEEE SusTech Initiative

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ADVANCING TECHNOLOGY FOR HUMANITY

ABOUT IEEE

- World's largest technical professional organization
- Trusted voice for engineering, computing and technology information around the globe
- Over 420,000 members in 190+ countries
- Inspiring a global community through its
 - Cited publications
 - Humanitarian work
 - Technical standards
 - **2,000+** Annual Conferences
 - **5M+** Technical Documents
 - **200+** Periodicals
 - **1,200+** Active Standards
 - **Global Public Policy**
 - **Global Humanitarian Efforts**
 - **Continuing Education & Certification**
 - **Ethics in Technology**



IMAGINE THE FUTURE WE CAN BUILD TOGETHER



Our Two “Impossible” Goals

Transform society and infrastructure to achieve Planet Positivity.

Identify the technological solutions we need to design, innovate and deploy to reach Planet Positive 2030.

Our Planet Positive 2030 Projects



Planet Positive 2030 Compendium:
Strong Sustainability by Design



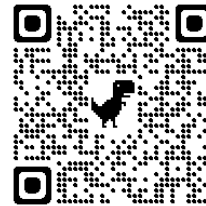
Impact Accountability / Assessment Framework:
Accountable Sustainability by Design

-> Change how technology and standards are designed and created to prioritize planet and people first

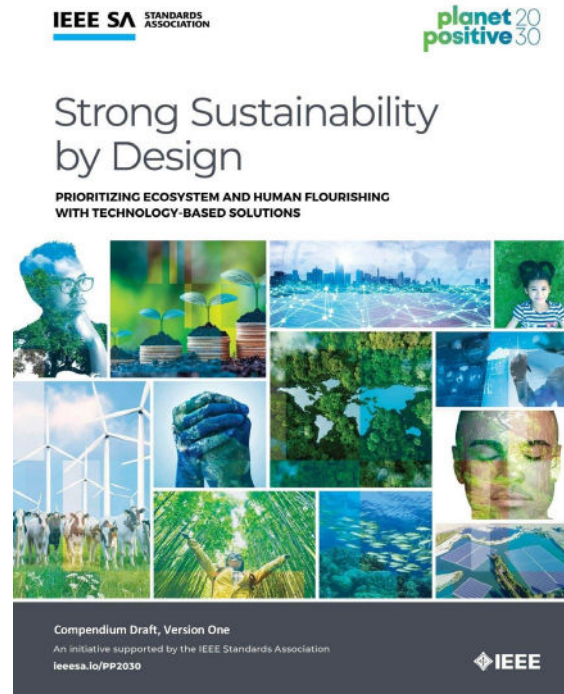
Chair: Maike Luiken
IEEE SA Staff Lead: John C. Havens



Planet Positive 2030 Compendium: *Strong Sustainability by Design*



- Guiding Principles
- Metrics / Indicators
- Economics / Regulation
- Global Methodologies
- Ecosystems:
 - Forests and Trees
 - Rivers and Lakes
 - Towns and Cities
 - Ocean and Coasts
 - Farmlands and Grasslands, Mountains and Peatlands



Impact Accountability / Assessment Framework: *Accountable Sustainability by Design*

Measuring What Matters

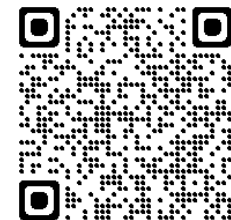
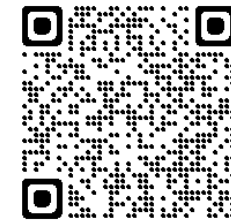
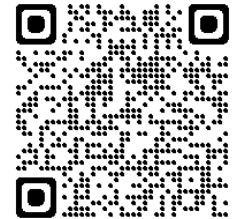
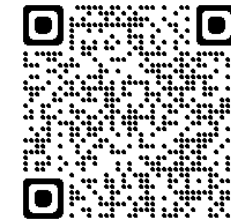
- Utilizing **metrics** such as the UN SDGs and/or ESG metrics is how to best **measure progress** towards PP2030 goals.
- IEEE 7010™-2020 Standard - Wellbeing Impact Assessment (used in conjunction with tools like Basic Sustainability Assessment Tool (BSAT))”.

Impact Assessment Framework

- The Impact Assessment Framework will complement the Strong Sustainability by Design compendium and will be based on UN SDGs, ESGs and/or other available Impact Assessment tools (environmental, infrastructure, climate, ...) and reporting systems / templates.

Outcomes: Standards Development - Examples

- **P7800** Recommended Practice for Addressing Sustainability, Environmental Stewardship and Climate Change Challenges in Professional Practice:
<https://standards.ieee.org/ieee/7800/11039/>
- **P7801** Recommended Practice for Technical Knowledge Commons Initiatives and Platforms: <https://standards.ieee.org/ieee/7801/11197/>
- **P7802** Standard for Measurement and Verification of Reduction of Greenhouse Gases for Climate Action Projects and Solutions:
<https://standards.ieee.org/ieee/7802/11238>
- **P7803** Recommended Practice for Inclusive Sustainable Smart Cities:
<https://standards.ieee.org/ieee/7803/11412/>



You are invited to participate! Interested? Please contact: maike.luiken@ieee.org

IEEE SusTech Initiative

Sustainability Through Technology

The **IEEE SusTech Initiative** seeks to contribute technical expertise and solutions to address sustainability challenges, including climate change. This initiative is growing rapidly and new volunteers are always welcome.

In-person and virtual workshops are offered free of charge throughout the year. These fascinating, interactive workshops engage technical professionals and academics from around the world to map technology development needs according to gaps identified by the work of the Planet Positive 2030 Compendium.



Graphic credit Maïke Luiken

- In-person and virtual workshops to identify gaps between needs and available technologies
- White papers and technology roadmapping focus in 2023

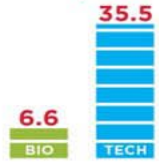


Sign-up today!
c.graas@ieee.org

Carbon is essential for life – too much greenhouse gas in the atmosphere is catastrophic to life!

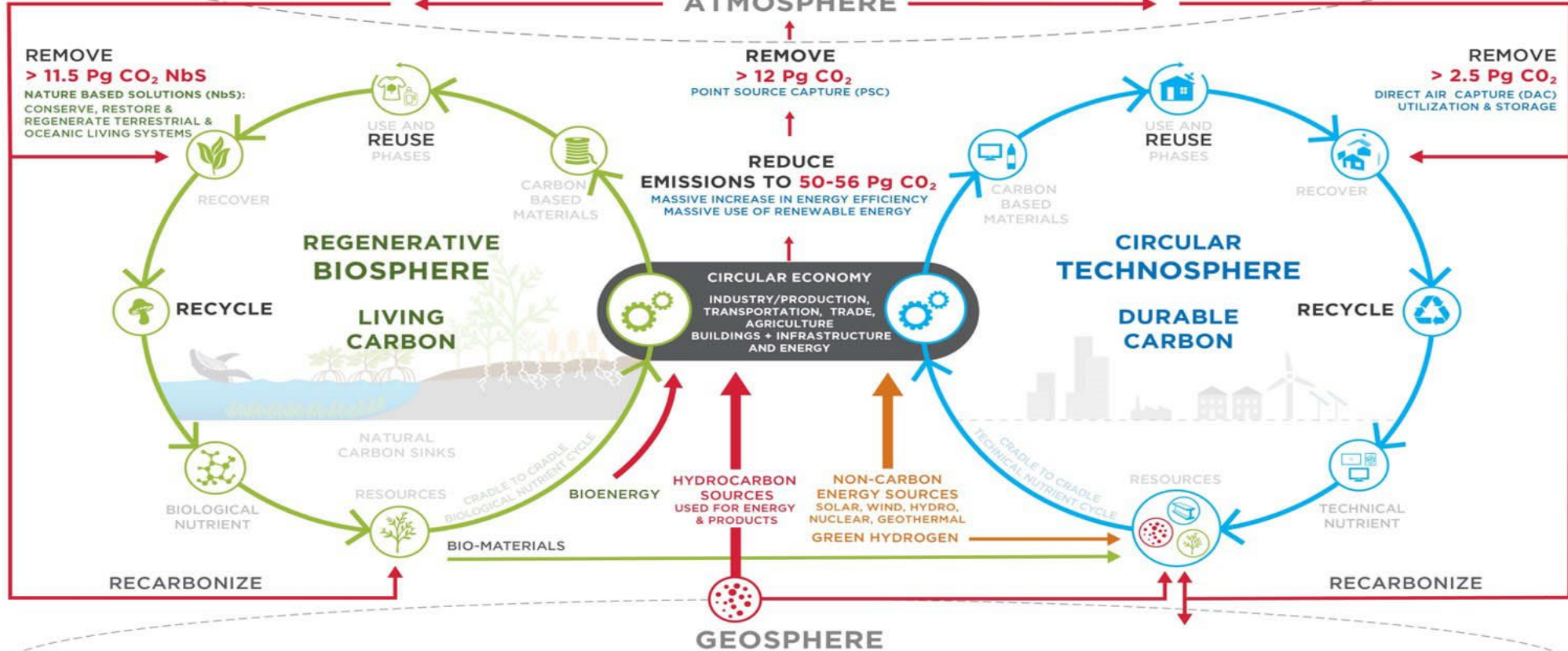
LIMIT GHG EMISSIONS TO ACHIEVE PARIS AGREEMENT CLIMATE GOALS: 1.5°-2°C

2019
FUGITIVE CO₂:
42.1 Pg CO₂



2030 GOAL:
NET FUGITIVE CO₂: < 24 Pg CO₂

ATMOSPHERE



2050 GOAL:
NET-ZERO EMISSIONS



©2020-2021 McDONOUGH INNOVATION, LLC – ORIGINAL CONCEPT: FEBRUARY 2020
THIS VERSION: MARCH 2021 – WILLIAM McDONOUGH WITH CARLOS DUARTE

circular carbon economy

design for the regenerative biosphere and circular technosphere

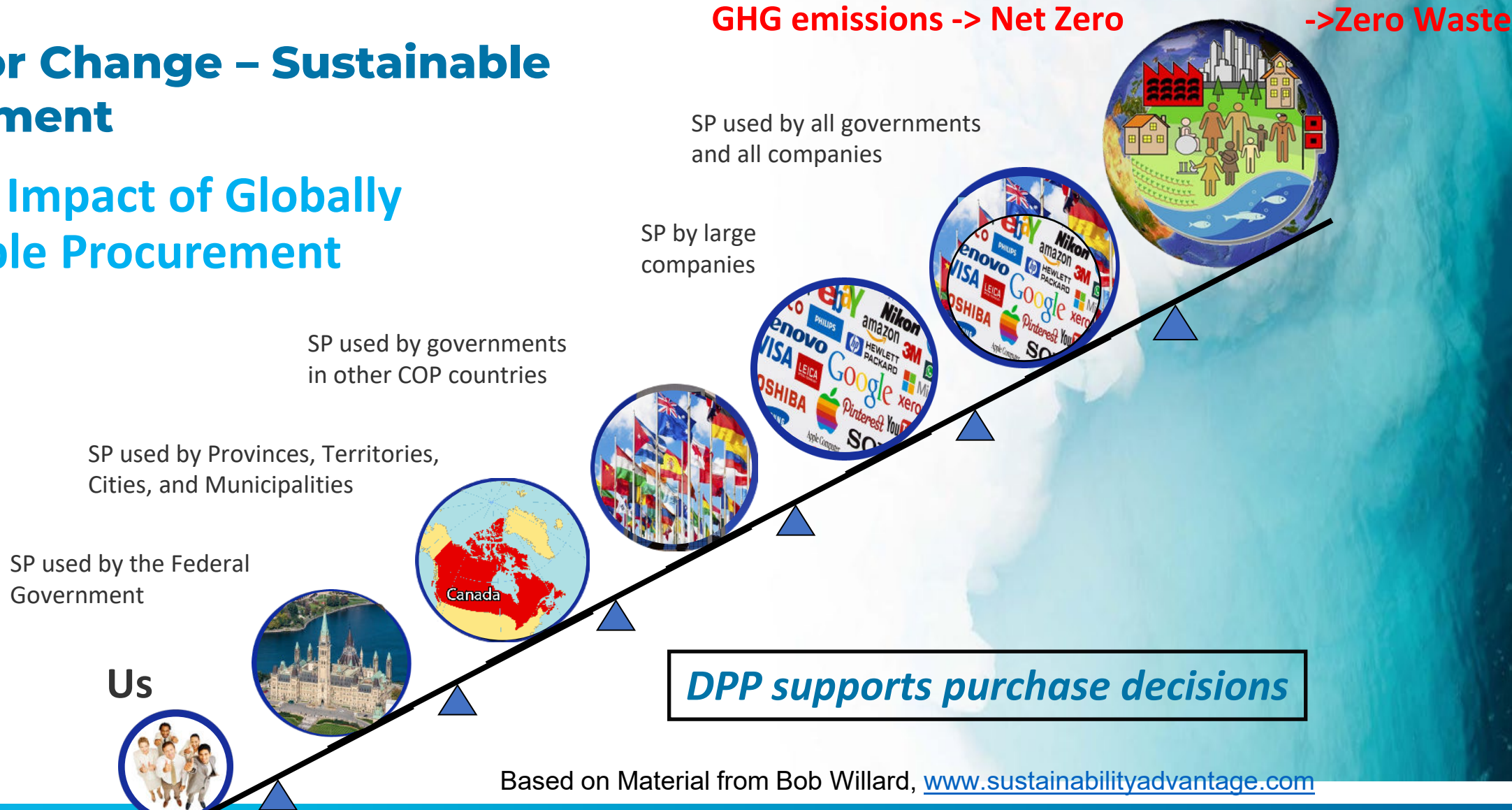
Many ways to change the way we handle 'permanent' or Techno Carbon and other materials - *DPP supports decision making*

Smarter product use and manufacture	R0	Refuse	Make product redundant by abandoning its function or by offering the same function with a radically different product
	R1	Rethink	Make product use more intensive (e.g. through sharing products or by putting multi-functional products on market).
	R2	Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources
Extend lifespan of product and its parts	R3	Reuse	Re-use by another consumer of discarded product which is still in good condition and fulfils its original function
	R4	Repair	Repair and maintenance of defective product so it can be used with its original function
	R5	Refurbish	Restore an old product and bring it up to date
	R6	Remanufacture	Use parts of discarded product in a new product with the same function
	R7	Repurpose	Use discarded products or its part in a new product with a different function
Useful application of materials	R8	Recycle	Process materials to obtain the same (high grade) or lower (low grade) quality
	R9	Recovery	Incineration of material with energy recovery

Morseletto, P. (2020). Targets for a circular economy. *Resources, Conservation and Recycling*, 153, 104553. <https://doi.org/10.1016/j.resconrec.2019.104553>

Driver for Change – Sustainable Procurement

Potential Impact of Globally Sustainable Procurement



IEEE SA Portfolio of Programs

Industry Connections

Exploring and incubating new technology and its use

Standardization

Creating markets and protecting public safety through standards development

Membership

Getting connected to experts and resources and enabling advanced participation options

Conformity Assessment & Certification

Providing confidence and assurance and accelerating market adoption

IEEE SA Open

Providing a community-powered platform to support open source projects

Alliance Management Services

Providing program support to alliances and trade associations

Registries

Providing and administering unique identifiers for electronic equipment to support global interoperability

Industry Affiliate Network

Assisting industry organizations in accelerating development and adoption of global standards

Training & Development

Empowering volunteers with the knowledge they need to help ensure their success.

Policy Engagement

Working with government bodies and policy makers on standards, policy & regulation matters

- IEEE Government Engagement Program on Standards (GEPS)
- IEEE SA Standards fellowship Program

INDUSTRY CONNECTIONS - *support DPP development*

Incubating pre-standards activity and related products and services by facilitating collaboration among organizations and individuals as they hone and refine their thinking on rapidly changing technologies.

OVERVIEW

Over 60 programs in a broad range of areas—including AI, Blockchain, Big Data, Digital Inclusion, Information Security, Networking and more.

PRODUCING

- Standards Roadmaps
- New Standards Proposals
- Workshops and Events
- White Papers
- Technical Specifications
- Databases and Registries

FEATURING

- Responsible Innovation of AI and Life Sciences
- Meta Issues in Cybersecurity
- Blockchain
- Children’s Online Safety
- Smart Cities and Electric Vehicles

STANDARDIZATION - *support DPP – agile & global reach & ethics x DPP*

Creating markets and protecting public safety and well-being through standards development.

OVERVIEW

2100+ standards in a broad range of industries—artificial intelligence systems, power and energy, consumer electronics, biomedical and healthcare, information technology, telecommunications, transportation, and more.

- Over 35,000 participants from over 160 countries

PROVIDING

- Development of globally open, market-driven standards that are voluntarily adopted, based on merit
- Collaboration and consensus- building platforms that adhere to fair and equitable practices, proven policies and procedures
- Two methods of standards development:
 - Individual
 - Corporate

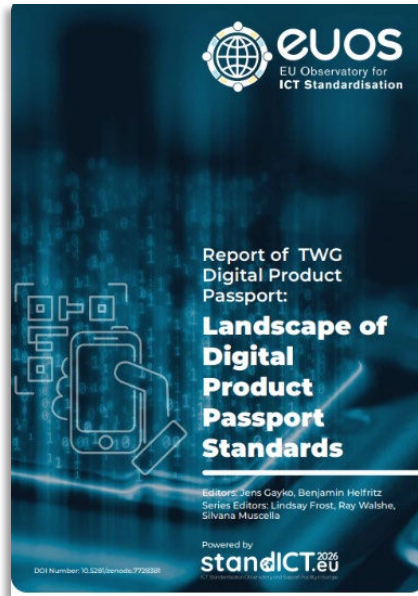
SOME EXAMPLES

- Distributed Energy Resources—IEEE 1547™ enabling smart interconnection and interoperability with the electricity grid
- Ethernet & WIFI—IEEE 802® standards keeping the world connected
- AI Systems—IEEE 7000™ standards addressing ways to **protect personal data and ensure safety** in AI systems

Standardization in Digital Product Passport - StandICT

Figure 1 Architectural overview and areas of standardization for the DPP (Source: Dr. S.Guth-Orlowski)

Standards areas for the Digital Product Passport



Legend / Interoperability Levels

-  Data carriers including the unique identifier of the product, link, and look-up mechanism
-  Unique identifiers for products, companies, parcels, people, etc. and their verification
-  Access Rights Management, Access Control Mechanisms, Rights Languages
-  DPP (Third Party Product Information) Semantic standards (taxonomies) for product information, standards for data formats
-  Data Processing, Data Exchange Protocols
-  (Decentral) data storage, data persistence
-  Data authentication, reliability, integrity, security and privacy

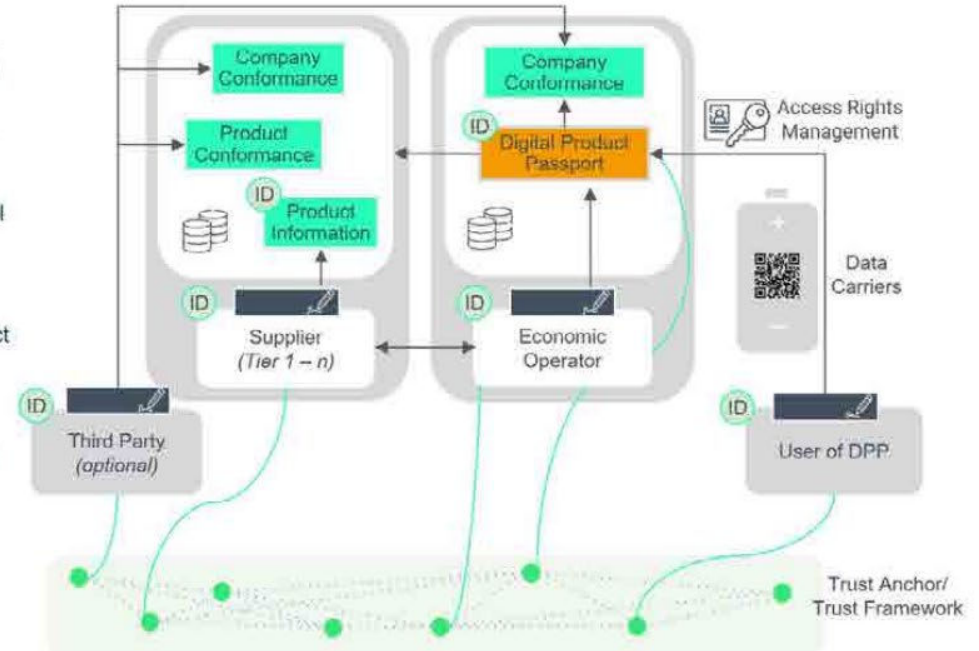




Figure 2: Overview of open topics in the DPP regulation and option space

	Open topics	Key questions	Option space
Scope	1 Product groups	Which industries/product groups should be prioritized and why?	Product group by product group Industry by industry
	2 Company size	Should requirements differ by company size?	Across all companies Large corporations first Large corporations only
	3 Application level ¹	What level should DPPs be applied at?	Item Batch Product model
Tech	4 Data storage	1 Who should store and manage data? 2 How should data be stored?	1 EU-managed Company-managed 2 Centralized Decentralized
	5 Data carrier	What data carrier should be used?	QR code Barcode RFID Watermark NFC Bluetooth tags
	6 Access/security	How should access to the data be allowed?	Full access Minimum access Differentiated access
Data	7 Data requirements	What information/data will be included in the DPP at what degree of standardization?	Standardization of data requirements Specification for each product group Combination
	8 Governance	Who provides and updates the data? How is the DPP data verified?	No assurance Limited assurance Reasonable assurance

Non-exhaustive

Degree of maturity in EU DPP regulation²
 EU Proposal

1. EC plans to decide application level product group by product group rather than overarchinglv

CONFORMITY ASSESSMENT & CERTIFICATION PROGRAM - *DPP*

Accelerating market adoption and streamlining implementation through the development of assessment programs that **verify and certify the adherence** of products and services to **IEEE standards and established industry criteria**.

OVERVIEW

Partner with IEEE Standards Working Groups, test laboratories, and other key stakeholders, such as utilities, telecom operators, and manufacturers to develop industry conformity assessment programs through well-defined processes and procedures.

PRODUCING

- Oversight of testing and certification activities to provide confidence that a product or service conforms to IEEE or industry standard
- Certificate issuance
- Test plans, suites and certification scheme development to reduce testing burden on manufacturers
- Test lab assessment and authorization

EXAMPLES

- Sensors Certification—IEEE 2510
- Phasor Measurement—IEEE C37.118
- Electric Vehicle Charging—IEEE 2030.1.1
- Distributed Energy Resources Interconnection—IEEE 1547-2018
- Precision Time Protocol Power Profile —IEEE 1588
- Camera Phone Image Quality—IEEE 185
- Nuclear Power Electrical Equipment —IEEE 60780-323-2016

ALLIANCE MANAGEMENT SERVICES

Providing industry alliances and trade associations worldwide with turnkey **governance and operational support**.

OVERVIEW

Partner with the **IEEE Industry Standards and Technology Organization (ISTO)** to manage the day-to-day activities of industry groups, allowing consortia leadership to focus on their missions, objectives, and goals.

PROVIDING

- Consortia Management Solutions
- Consortia governance Solutions
- Consortia Operational Solutions
- Consortia Event and Meeting Solutions

FEATURING

- VoiceXML Forum
- Wireless Power Consortium
- MIPI Alliance
- UPTANE, and more

REGISTRIES - Registries for DPP

Giving products within a specific category, such as mobile or personal health devices, **create definitive, unique identifiers** that give them the **ability to recognize and communicate** with each other without conflict.

IEEE Registration Authority

17 standards-related registries

PROVIDING

- Registry Management Solutions
- Custom Registry Solutions
- Manufacturer Identifier Solutions

FEATURING

- MAC Address Large (MA-L)
- Manufacturer IDs
- EtherType Values
- Standard Group MAC Addresses
- Provider Service Identifier (PSID)

IEEE Conformity Assessment

Supporting IEEE ICAP programs that list products services that undergone testing and/or certification (e.g. CertifAIEd; Power Profile certification Telecom Certification etc)

INDUSTRY AFFILIATE NETWORK: *an efficient way for a timely DPP implementation*

Broad-based growth platform focused on bringing together consortia, industry alliances and other industry organizations seeking to rapidly evolve their specifications into global IEEE standards.

OVERVIEW

Built upon IEEE consensus processes to achieve open and accepted standards, multi-stakeholder industry organizations use the network to quickly evolve their existing market-relevant specifications into IEEE standards—leveraging IEEE SA’s proven capabilities for global distribution, publishing, branding and marketing.

PROVIDING

An **open and strategic framework** to identify and engage organizations to:

- Drive global market visibility and acceptance
- Enable the creation and release of new market-relevant standards
- Accelerate paths from specifications to standards development

IN THE NETWORK

- MIPI Alliance
- Acellera System Initiative
- Accord Project
- Data Trading Alliance
- OpenFog Consortium

POLICY ENGAGEMENT

- Contributing to global discussions at the intersection of technology, standards, policy and regulation.
- Helping Policymakers, Government Officials and National Standards Bodies stay current of the latest developments in IEEE standardization.



THANK YOU

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[linkedin.com/company/ieee-sa-ieee-standards-association](https://www.linkedin.com/company/ieee-sa-ieee-standards-association)



twitter.com/ieeesa



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Addendum

Stages in the IEEE Standardization Process

Working with a framework of open participation and diversity, IEEE’s unique, borderless standardization paradigm espouses competition and at the same time collaboration among a wide variety of stakeholders to create standards that drive innovation and national and global growth.

2. PROPOSAL

The group submits a proposal for a standard. If approved, the project moves forward and a Working Group is formed.



4. VOTING

A diverse group of individuals or entities with an interest in the standard votes to approve/disapprove the draft standard. Broad consensus must be obtained. If approved, the IEEE Standards Board votes on it.



1. IDEATION

A diverse group of expert individuals or organizations sees a need for a standard—e.g., to grow the market, ensure interoperability, spread adoption of a promising technology—and comes together to develop it.

3. DRAFTING

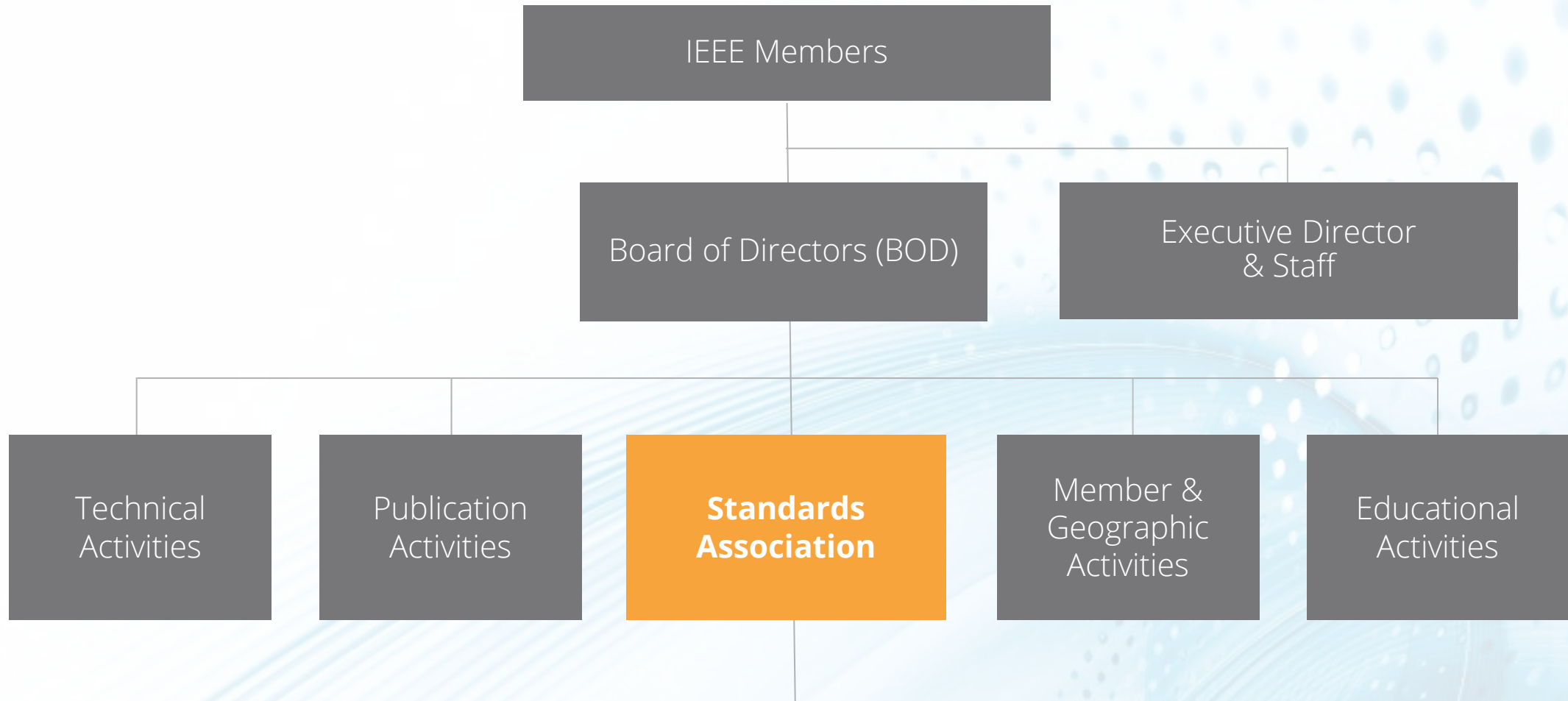
The Working Group makes agreements and compromises to create the standard with its technical specifications, often using existing technology/documentation contributed by one or more members of the group.

5. PUBLICATION and MAINTENANCE

Once the standard is approved, it is available for use around the world. Updates are made as needed during the lifetime of the standard.

IEEE STANDARDS ASSOCIATION

AN OU INSIDE OF IEEE



IEEE SA STANDARDS DEVELOPMENT

- Cultivate **collaboration** and mobilize people from **diverse backgrounds and industry sectors** in a unique borderless standardization paradigm to develop **market relevant open standards and solutions** that go **beyond standards**.
- Encourage **bottom-up, market-driven, and inclusive standards** development paradigm to help ensure strong integration, interoperability and increased synergies along the innovation chain.
- Work within a framework of **open participation and diversity**, enabling **competition and collaboration** among stakeholders to **drive innovation** and national and global growth.



OUR PRINCIPLES

Direct
participation

Due process

Broad
consensus

Balance

Transparency

Openness

Public comment

Development
dimension

These principles ensure:

- Collaboration and community building
- Global reach and timely market relevance
- Technical integrity and excellence by everyone that participates in our process

COLLABORATION & COORDINATION

Coordinate with bodies and organizations from around the world through flexible frameworks to:

- **Improve** mutual understanding of standardization and related priorities
- **Increase** coordination on standards issues
- **Strengthen** ability to promote the development of impactful consensus-based standards
- **Identify** opportunities to collectively advance solutions



COLLABORATION & COORDINATION

Our collaborations and coordination are through memberships, technical group liaisons and agreements that:

- **Promote** adoption and distribution of standards in different regions or countries
- **Facilitate** coordination and collaboration between technical communities
- **Exchange** information
- **Enable** joint development of standards
- **Foster** collaboration on joint initiatives
- **Encourage** participants from around the world to participate in our standards development process



NATIONAL ADOPTION PROGRAM

Agreements for national adoption of IEEE standards:

- National Standards Bodies (NSB) can adopt existing IEEE standards and market those within their country
- Ability to translate if needed
- A staff contact will serve as the liaison to the organization to facilitate the process
- Other collaborative activities are also possible



I am Committed to a Better World for All

Maïke Luiken, Ph.D.

- Chair, IEEE Planet Positive 2030, IEEE SA
- Co-Chair, IEEE SusTech Initiative - FDC
- Chair, IEEE P7800 Standards Working Group
- Vice-Chair, IEEE P7801 Standards Working Group
- IEEE Vice President - MGA, 2021
- IEEE Canada President, 2018 -19
- Managing Director - R&D, Carovate Development Corp.
- Adjunct Research Professor, Western University, London, Canada
- Senior Member, HKN, IEEE
- Fellow, Engineering Institute of Canada
- Editorial Focus Advisor & Associate Editor, IEEE Canadian Review
- Member, IEEE Canadian Foundation Board of Directors

*Education is the Catalyst of Sustainability
Interaction is the Catalyst of Innovation*



I live and work in Sarnia, Ontario, Canada A community that continually transforms itself.

Sarnia-Lambton brings together Natural Beauty, Education, Industry and Agriculture on the shore of Lake Huron with easy access to the Canadian and US markets.

