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T7 Task Force Climate and Environment

POLICY BRIEF

SCALING CLIMATE GOALS THROUGH THE USE OF TECHNICAL EXPERTS & DIGITAL TECHNICAL KNOWLEDGE COMMONS

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Abstract

Mark Carney, UN Special Envoy for Climate Action and Finance and COP26 Private Finance Advisor to PM Johnson and the former Governor of the Bank of Canada and the Bank of England, states in his book "Value(s) Building a Better World for All", 2021, "There are three technologies needed to solve the climate crisis. First, engineering, where recent progress has been exceptional. … Two other technologies are needed: political and financial."

It is proposed to build a "Digital Technical Knowledge Commons" 'housing all things technical' and data, especially monitoring data, contextualized technology-based solutions, and best practices, relevant to climate change-related goals and sharing this accessible technical knowledge, information and expertise with decision-makers and stakeholders locally, regionally, and globally.

It is expected that extensive use of such a vibrant "Digital Technical Knowledge Commons" will aid significantly in decision-making and monitoring processes and will lead to faster implementation of 'directed change', addressing the requirement for urgent actions as stated in the IPCC reports.

Sustainable implementation of required changes in society and infrastructure will be needed fast and at a global scale to mitigate the most dangerous climate scenarios caused by global warming, while, at the same time, adaptation measures need to be taken. Wide-spread deployment of enabling technology will be critical. This requires engaging a great number of stakeholders around the globe on a local, regional, and global basis. Locally applicable, accessible, contextualized, and expertly vetted technical knowledge and solutions in a practically implementable and readily accessible manner will thus be key; supported by harmonized and aligned measures and coupled with engaging neutral expert technical bodies such as the IEEE, ISOC, and others. At the same, this platform can serve to collect monitoring data, data on the impacts of Climate Change and the impacts of mitigation and adaptation measures taken. With this type and quality of accessible information and expertise as well as monitoring data – housed on the 'Digital Technical Knowledge Commons'- the benefits to sustainable implementations should include improved technical designs, greater aligned outcomes to agreed-upon measures and accelerated levels of scale to be realized. The benefit of such a system is that it offers an opportunity to identify the 'signal through the noise' – a mechanism that supports early warning systems aims and opportunities.

We recommend that the G7 endorse the proposed commons as means to, directly and indirectly, complement a number of existing and new initiatives with the opportunity to realize contextualized success at scale.

(In the references section, a table describing synergistic areas between this proposal and the T7 Task Force Climate and Environment Policy Briefs is shared.)

Challenges

The challenge is for the decision-makers and stakeholders – local, regional, and global – to be well-informed of current technology-based solutions that address climate change-related goals and are relevant for a given context, be it a large city in central Europe, a village in the Andes, a farm in Namibia, a cement plant in … and so on.

Transforming our economies from a fossil-fuel resource base to economies based on renewable, clean, sustainable energy supplies and a circular economy approach is essential to limiting global warming. Deployment of enabling technology-based innovation is critical. As we consider the challenges to progressing our fight against climate change, we need to work together to make real, impactful, and sustainable progress at scale within a short time frame of a few years.

To make this progress requires the ability to close shortcomings and gaps in applied knowledge in a technically precise manner and take into account differing user communities' needs and opportunities. Even more urgent is the need for this information to be provided with a focus on **'ready access to technical information and know-how**, thus enabling the collective stakeholders to work at local, regional, and international levels towards evidence-based sustainable solutions and implementations that meet or exceed identified sustainability and climate change-related, measures and goals.

Proposals

A greater number of stakeholders need to be empowered urgently to deploy sustainable solutions at local and regional levels. A 'digital technical knowledge commons' that provides current vetted technical information and expertise, monitoring data, harmonization amongst collaborative initiatives, and related capacity development initiatives offers natural pathways to scaled and aligned climate change and sustainability measures.

The proposed **Digital Technical Knowledge Commons** consists of:

- Distributed User Communities
- Accessible Shared & Trusted Knowledge, Data
- Engaged Technical Experts
- Partnerships/Cooperation
- A Platform with trusted, stable governance, including clear rules regarding inputs and outputs

Recommendation 1. Enable access to Expert Knowledge.

Engage professional bodies' neutral technical expertise to support local and regional programs and projects. Technical associations and standards bodies, such as IEEE, have deep levels of expertise that could contribute pragmatically to bridging applied knowledge gaps and support implementation aims. For example, efforts focused on renewable, clean energy, and net zero-emission goals might find merit in engaging with technical professional associations such as the IEEE, the Association for Computing Machinery, the International Council on Systems Engineering and the International Association of Privacy Professionals and standards bodies such as the IEEE Standards Association, ISO, IEC, and ITU[1].

The accessible neutral technical knowledge that can aid to solve specific, contextualized problems in a reduced time frame is invaluable. Examples of entities such as IEEE that have an extensive global reach and technical expertise offer the potential to engage an extensive community of experts across their international membership body; a potential pool of neutral practicing technologists that may contribute their expertise to aid vetting and offering implementable knowledge at scale (examples RFI, RFPs, Technical Architectures, Blueprints, Building Blocks, Bill of Materials); and an additional level of support and scale by further engaging their networks of networks and partners.

Recommendation 2. Enable a Digital Technical Knowledge Commons.

It bridges the what with the proven know-how. Packaged in a user-friendly, distributed architecture manner that allows for interoperable and searchable knowledge hubs to be aware and share information increases scale-based opportunities.

The commons would include examples of previous implementations, case studies, tools ,and data that are readily accessible. This should include software tools, e.g., tools that support integrated planning at local and regional levels; life cycle assessment tools, progress and impact monitoring tools and so on. Incorporated here would be the ability to clearly define a proposal flow-through for funding and expertise requests from verified parties. The commons would support integrated incentivization elements to provide ongoing value to this knowledge commons.

Recommendation 3. Increase and incentivize harmonization across key technical sustainability initiatives and cooperation across local and regional stakeholders to progress towards aligned and measured actions.

With constraints of time and changes in the earth's climate affecting humanity in a new way daily, there is an urgent need to determine areas of collective alignment where progress at scale may be made soon in

these identified areas. Integrated systems planning at a local level should be incorporated as an element of the core criterion in this identification process.

The authors of this paper have been engaging technical bodies to help facilitate the realization of the three aforementioned recommendations. The realization of these recommendations can be accelerated with direct G7 support. These recommendations can be found at the end of the Implementation Section.

Implementation

In this brief, the authors share how a dedicated 'digital technical knowledge commons' will offer pragmatic support and function as an accelerant for climate change-related initiatives. It will

- utilize a distributed infrastructure
- offer vetted technical information and know-how, experts, incentives, and reliable data, and be
- coupled with a contextualized semantic search-powered marketplace.

The Commons thereby contributes to speed to scale towards climate goals while enabling sustainable digitalization.

I. **A Digital Technical Knowledge Commons** [2]

To empower at scale requires the ability for each of us to understand the implications of our efforts and also requires how we might best achieve results that support the local, regional and global aims most effectively and pragmatically. A digital technical knowledge commons focused on offering access to neutral technical knowledge and climate change monitoring data unlocks a path towards scaled sustainable outcomes in an aligned fashion. Below we share several priority elements to incorporate.

Infrastructure as a Service A decentralized infrastructure provides a hub-based opportunity for a series of knowledge centers to be added and 'go live. As each hub goes live, it presents an additional set of information to the indexed network. The critical aspect of this approach is that the infrastructure is provided in a box approach based upon open standards and norms. Users engage both from the traditional desktop/laptop devices and mobile devices.

The use of incentivization schemes to encourage local approaches to drive greater use and contribution to the local and regional commons efforts has merit. This is a necessary element to drive ongoing contribution and use of the digital technical knowledge commons from both the demand and supply sides.

Accessible, Available Knowledge & Sustaining Marketplace The quality of the commons increases in provisioned value based on the content. With the type of applied intelligence that can be accessed, it would be fair to assume that at a point the commons information consumer meets an implementation wall. Offering access to proven, neutral expertise is a value add to the ecosystem. Interestingly, the beginnings of a marketplace are presented. Specific opportunities defined by applied expertise seekers may receive bids to support projects at various phases of the effort.

(Every requestor for services, service provider, and funder will receive a weighted score. Over time, this creates a value differential leading to increased use and contribution to the ecosystem.)

Governance, Ethics & Standardized Norms A governing framework that addresses norms, values, technical, and contributions will be key.

Vetted Technical Information Access Contextualized technical information that can be accessed, understood, and applied pragmatically with accurate language translation offers an opportunity to realize a level of accelerated climate change-related goals at scale. Examples of information that would be found include technical blueprints, technical architectures, RFI/RFPs, a Bill of Materials, a List of Experts, a community of those who have worked on a similar problem, and infrastructure and resources (software tools (i.e., project planning tools).

User-friendly Experiences End-user experience is key. Offering a UI that allows the users to easily access, search, identify and take the appropriate next steps provides a natural pathway to encourage usage.

The ability to retain previous proposals in a user-defined locker to manage their content, projects, tokens and net impact provides a direct mechanism for one to see the difference their efforts make towards achieving the local climate change and sustainability-related aims.

Mode of Accessibility & Extensibility Accessibility of information benefits from providing multimedia variations of information. Videos, Apps, Infographics, and stories and experiences all contribute to lowering the barrier to access of contextualized information.

Further, the medium of delivery is important as well. And when coupled with the promise of emerging technologies, there is constant opportunity to decrease the gap between knowledge and application at scale. For example, XR technologies and maps as an overlay to technical architectures and conforming and contextualized measures within standardized ranges expand the level of impact even further.

Community of Technical Experts There are well over a thousand associations in the world today with varying levels of demonstrable and applied expertise. Organizations such as the IEEE and ISOC host a bevy of experienced members across the world. They present an untapped resource that offers an opportunity to provide greater neutral expertise and real-world experiences that can be sourced to vet information and also to contribute to expertise gaps in regions of the world where applied knowledge gaps exist.

For example, technical expert communities such as IEEE (with standards like IEEE 7010-2020 and the new, open to participation IEEE P7010.1 Standards Working Group) can help inform the world at large on how to design and build their products, services, and systems to increasingly produce and/or use clean renewable energy. and thus have their entire business conform to efforts to limit global warming by 2030. In addition, such bodies bring talented pools of experts that offer avenues to engage and better help improve or clarify the required technical knowledge through sustainable digital technical knowledge commons and related targeted requests for information evaluation and review.

More than a clearinghouse, access to verified and credentialed experts is needed. Such identification and access to experts further help to bridge capacity development chasms until local technical skills gaps targets are met.

Ecosystem Partners, The aim to partner with existing commons is key to our proposal. In discussions to date, several commons are interested in working together to leverage strengths. Efforts such as The Coalition for Digital Environmental Sustainability (CODES) represent global efforts with aligned perspectives and present synergies to advance the work of the noted digital technical knowledge commons. Collaboration offers advanced network effects and the potential to scale.

II.   **Integrated Systems Planning aligned with sustainable goals**

History is filled with unintended consequences. To improve the probability of implementation, a collaborative approach with ongoing communications with key stakeholders is important. The merit of this approach is that local implementers and bid-seekers have an increased awareness of the net impact of their solution, intended and unintended impact. And it offers a chance to understand how the lifecycle and end-of-life of any implementation can best be addressed as a function of the local and regional circular economy. Doing so

creates an opportunity to improve localized processes and accelerate a path towards achieving climate change goals from a bottom-up and top-down approach. Further supporting this opportunity to scale is the use of open standards that support the technical design and build of interoperable climate change-impacting solutions.

III.   Sustainability Measures

There is a need for an increased focus on harmonization across climate change, sustainability and ESG measures, data tools and techniques, and contextualization across the assumptions to supporting models continue to be areas of need and interest. As the measures and metrics rolling from the established SDGs as well as from the 2050 net-zero GHG emissions goal will set the tone for many of the resultant outcomes, an exchange helps to set the tone for the acceptability of localized approaches supporting the 'Greater Good'. It provides an opportunity for agency and impact measures to the individual. A few such opportunities to harmonize may include engagement with the World Economic Forum, IEEE's Sustainable ICT Program, and the Carbon Coalition.

We recommend that the G7:

1. Endorse the Sustainability- and Climate Change-focused Digital Technical Knowledge Commons
2. Support the Sustainability- and Climate Change-focused Digital Technical Knowledge Commons through increased visibility of the effort. Doing so increases the awareness and collaborations to support the realization of the commons.
3. Use the Sustainability-focused Digital Technical Knowledge Commons.
4. Encourage similar efforts and others that may benefit from the network to actively contribute and collaborate with the Sustainability-focused Digital Technical Knowledge Commons.

Endnotes

[1] The list of technical bodies shared represents a small sample of a great ecosystem of technical experts. Cooperation amongst these many bodies to identify expert representation across the parties would be important. Developing this element into the commons provides an additional incentivization mechanism to support the longevity and value to all stakeholders.

[2] The authors have identified nearly thirty open commons efforts focused on offering various contributions through their platforms. The focus has ranged from data accessibility and tools to functioning as aggregators of climate related information to provisioning locally relevant or specialized information sets of tools and information coupled with training and capacity building services. In many ways, these efforts have served both to further inspire what is possible and access to a community of experts that have already begun to pave the way to our ambitious vision described here.

Appendix

Identified areas where submitted T7 policy briefs have potential positive linkages to the digital technical knowledge commons (this proposal).

Proposal	Proposing Team	Digital Commons Linkage
Financing A Green Future: The Energy Transition Mechanism (Etm) And The Green Impact Fund For Technology (Gift)	Dina Azhgaliyeva Asian Development Bank Institute, Tokyo, Japan Aidan Hollis, Incentives for Global Health & University of Calgary Thomas Pogge, Incentives for Global Health & Yale University Dil Rahut Asian Development Bank Institute, Tokyo, Japan Yixin Yao Asian Development Bank Institute, Tokyo, Japan	As GIFT succeeds, funded projects can be shared on the Sustainability- and Climate Change-focused Digital Technical Knowledge Commons so others can also learn and replicate sustainable implementations and access real experts.
Community Climate Clubs To Motivate And Create Personal Action For An Equitable World	Professor Sir John Aston, University of Cambridge Ilan Chabay, College of Global Futures Professor Jesus Crespo Cuaresma, Vienna University of Economics and Business Mei Lin Fung, People Centered Internet	Climate Clubs also could function as natural and contextualized problem-solving hubs and measure harmonizers that would help improve the quality of measures, investments and models.
Reform Subsidies Harmful to Nature	The Nature Conservancy Contact: Marcia Toledo, Director Public Institutions Europe Authors: Andrew Deutz, Director Global Policy, Institutions and Conservation Finance, Jack Bobo, Director Global Food and Water Policy, Robert Tansey, Global Policy Lead Degraded Lands and Restoration	As more sustainable practices are identified, a good opportunity to provide those cases on the Sustainability- and Climate Change-focused Digital Technical Knowledge Commons; and further – updating investment criteria to support increased agricultural resilience and incentivize better sustainability implementations.
The Nature Conservancy Contact: Marcia Toledo, Director Public Institutions Europe	Andrew Deutz, Director Global Policy, Institutions, and Conservation Finance, Jack Bobo, Director Global Food and Water Policy, Robert Tansey, Global Policy Lead Degraded Lands, and Restoration	As rollouts are identified, the associated plans (sensitivity maps, implementation plans, etc) may be shared on the Sustainability- and Climate Change-focused Digital Technical Knowledge Commons.
Strengthening the G7's "green revolution that creates jobs" through the SDGs and expanded monitoring	Mark Elder Institute for Global Environmental Strategies (Japan)	As the level of hands on implementers and experts increases, there is a natural opportunity to invite vetted experts to provide their knowledge to help others around the world operationalize environmental targets in a more standardized manner.
The G7 need to step up climate ambition, action and finance	Claire Fyson Climate Analytics Bill Hare Climate Analytics Tabea Lissner Climate Analytics Andrzej Ancygier Climate Analytics Marie-Camille Attard Climate Analytics Jonas Hörsch Climate Analytics	As climate financing solutions are realized, they offer an opportunity to realize proven implementations at scale.
'Food-Climate Nexus: Need for an International Small Holder Farmers' Agribsuiness Consortium'	Hanumankar, H R, StratPol International Advisory Services (OPC) Dil Rahut - Asian Development Bank Institute Dina Azhgaliyeva –Asian Development Bank Ins	As the International Small Holder Farmers' Agribusiness Consortium comes together and achieves its targeted goals; it can then also contribute its findings and use cases towards and utilize the Sustainability- and Climate Change-focused Digital Technical Knowledge Commons.
Creating an Effective, Legally Binding, and Enforceable Climate Club	Rafael Leal-Arcas Singapore Management University	See similar points raised on Climate Club proposal above.
Clean-IT: Policies to Support Energy-Efficient Digital Systems	Christoph Meinel, Director and CEO of Hasso Plattner Institute for Digital Engineering Mei Lin Fung, Chair of the People-Centered Internet Maxim Asjoma, Advisor to the CEO, Hasso Plattner Institute for Digital Engineering	Clean IT certification implementations can be provided on the commons as success criteria to earn investment for projects; as well as raise awareness of certification bodies that may provide the proper assessment expectations by context and use

		case. There is an ability to sync and incentivize sustainability by design implementations.
Towards An Inclusive Climate Alliance with a Balance of Carrots And Sticks	Axel Michaelowa and Philipp Censkowsky (Perspectives Climate Research), Sonja Peterson (Kiel Institute for the World Economy), Michele Stua (Scuola Superiore Sant'Anna), Clara Brandi (German Development Institute), Colin Nolden (University of Oxford and University of Bristol), Tim Banning (German Energy Agency), Mei Lin Fung (People Centered Internet), Ingo Venzke (University of Amsterdam and The New Institute)	A Sustainability- and Climate Change-focused Digital Technical Knowledge Commons offers a resource that can function as a catalyst to support the recommendations regarding incentivization, Net zero membership conditions that are contextualized while meeting the collective 1.5 degree C on a collective basis; incentivization for commitment in action and a roadmap that eventually allows for all to contribute in a cogent, cohesive and consistent manner.
Global Public-Private Digital Utilities for MSME Recovery and Transition	Tamara Singh, People Centered Internet Fung Mei Lin, IEEE Society and Technology, Sustainability Technical Committee Eileen Murray and Anthony Lacavaro, Aquarian Holdings, US Matthew Gamser, SME Finance Forum, World Bank/IFC Brian Omwenga, Tech Innovators Network – ThiNK, University of Nairobi, Kenya Ndemo Bitange, University of Nairobi, Kenya Homi Kharas, The Brookings Institution, US Tamara Singh, People Centered Internet	A Sustainability- and Climate Change-focused Digital Technical Knowledge Commons is a digital manifestation of distributed climate clubs and formal and informal partnerships that can also aid to improve financing and implementation outcomes of programs and projects; while allowing for agency of approach to reside with the implementers.
Food And Agriculture	Pelluchon, Corine, THE NEW INSTITUTE	Via the Sustainability- and Climate Change-focused Digital Technical Knowledge Commons ons the provisioning of tools, plans and financing through the commons to support farmers and ranchers to leverage in towards sustainable implementations could be a useful complement.
Biodiversity Protection through Reward, Technology Transfer, and Improving Governance	Dil Rahut, Dina Azhgaliyeva and Yixin Yao, Asian Development Bank Institute, Tokyo, Japan	As an element of project investment considerations and financing, the Sustainability- and Climate Change-focused Digital Technical Knowledge Commons may include a filter mechanism based on projects and cases where biodiversity is best reflected.
G7 Countries Must Urgently Phase Out Fossil Fuel Subsidies	Agustin Redonda, Council on Economic Policies (CEP) Christian von Haldenwang, German Development Institute (DIE) Ronald Steenblik, International Institute for Sustainable Development (IISD)	A Sustainability- and Climate Change-focused Digital Technical Knowledge Commons may contribute to the visibility of the shared view of fossil fuel use on specific implementations and providing use case and information pertaining to the net impact of the implementation. Longer term, the transparent data sources that emerge can be integrated into the commons to offer better integrated systems capacity planning at local and regional levels.
Safeguarding the Blue Planet – Eight Recommendations to Sustainable Use and Govern the Ocean and its Resources	Mirja Schoderer, German Development Institute (DIE-GDI), Henry Bittig Leibniz Institute for Baltic Sea Research Warnemünde (IOW), Françoise Gaill CNRS Institute for ecology and environment (INEE), Kristina Gjerde Senior High Seas Advisor, IUCN Global Marine and Polar Programme, Sheila JJ Heymans European Marine Board (EMB), Birgit Klein Federal Maritime and Hydrographic Agency (BSH), David Obura CORDIO East Africa, Torsten Thiele Institute for Advanced Sustainability Studies (IASS), Sebastian Unger Institute for Advanced Sustainability Studies (IASS), Martin Visbeck GEOMAR Helmholtz Centre for Ocean Research Kiel, and Anna-Katharina Hornidge German Development Institute (DIE-GDI).	The Sustainability- and Climate Change-focused Digital Technical Knowledge Commons could function as a complementary tool to sync ocean-focused policies with local rules and as a means to access direct use cases and implementations that support the agreed upon aims and expectations. Further, project investments may select such as a criterion of funding to be provably met based on a defined set of standardized or accepted criteria.
Climate Change and Health	Maike Voss German Alliance on Climate Change and Health Sophie Gepp German Alliance on Climate Change and Health Dr. Sabine Baunach German Alliance on Climate Change and Health	The Sustainability- and Climate Change-focused Digital Technical Knowledge Commons could function as a complementary tool to sync health-focused policies with local rules and as a means to access direct use cases and implementations that support the agreed upon aims and expectations. Further, project investments may select such as a criterion of funding to be provably met based on a defined set of standardized or accepted criteria. A dashboard may reflect the projects focused on the identified key health sustainability criteria to offer real-world data and applied information.
Nature-Based Solutions For Climate Change	Brittaney Warren G7 Research Group	Nature-oriented implementations may be shared as a part of the implementations schemes that are made available through the Sustainability- and Climate Change-focused Digital Technical Knowledge Commons. The commons may also help to raise the visibility of the nature-based implementations via use cases, funding project criteria, and search criteria.

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Maike Luiken, PhD, SMIEEE, IEEE-HKN, FEIC, is 2022 IEEE Past Vice President - Member & Geographic Activities. She served as President of IEEE Canada in 2018 – 2019. She is and has been for more than 15 years a very strong supporter of sustainable development.

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Previously, in Sarnia, Canada, she led the Bluewater Sustainability Initiative, 2006 – 2013, and was the founding Director of the Bluewater Technology Access Centre following eight years as Dean at Lambton College. Her strategic leadership in the development of the applied research & innovation capacity and portfolio led to Lambton College becoming one of the three top Research Colleges in Canada.

Her areas of interest and expertise span diverse technical areas from ICT, energy and water to advanced manufacturing and nanotechnologies as well as technology design principles, ethics in design and policy associated with their implementation. She has particular interest in how progress in one area, e.g., in ICT, enables advances in other disciplines and in how deployment of various technologies contributes – or not - to achieving sustainable development.

Maike has experience in the public and private sectors in Canada and has work experience in the USA and Germany.

Alpesh Shah

Alpesh Shah works for a global technology association with a mission to "Advance Technology for Humanity." He has worked at major technology organizations, as a strategy and management consultant and with experts committed to key causes throughout his career. He is committed to supporting the scale and delivery of sustainable solutions.

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