|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2017-2020 | | | FG-AI4EE-O-019 | |
| **Focus Group on Environmental Efficiency for AI and other Emerging Technologies** | |
| **Original: English** | |
| **WG(s):** | | N/A | | Virtual meeting, 21 October 2021 | |
| **OUTPUT DOCUMENT** | | | | | |
| **Source:** | | | Co-chairmen FG-AI4EE | | |
| **Title:** | | | Report of the fourth meeting of Focus Group on Environmental Efficiency for AI and other Emerging Technologies (Virtual meeting, 21 October 2021) | | |
| **Purpose:** | | | Admin | | |
| **Contact:** | | | Paolo Gemma Huawei Technologies Co., Ltd. (China) China | | Tel: +393483690185 E-mail: [paolo.gemma@huawei.com](mailto:paolo.gemma@huawei.com) |
| **Contact:** | | | Neil Sahota  University of California  USA | | E-mail: [nsahota@law.uci.edu](mailto:nsahota@law.uci.edu) |

|  |  |
| --- | --- |
| **Keywords:** | Report; FG-AI4EE |
| **Abstract:** | This document contains the report of the fourth meeting of Focus Group on Environmental Efficiency for AI and other Emerging Technologies (FG-AI4EE) held virtually on 21 October 2021. |

Please see below.

**Contents**

[1 Organization of e-meeting 3](#_Toc87958380)

[1.1 Meeting agenda 3](#_Toc87958381)

[1.2 Meeting documents 3](#_Toc87958382)

[2 Key meeting results 3](#_Toc87958383)

[2.1 Key results 3](#_Toc87958384)

[2.2 FG-AI4EE’s approved documents 4](#_Toc87958385)

[3 Summary of discussions 5](#_Toc87958386)

[3.1 Opening session 5](#_Toc87958387)

[3.1.1 Welcome remarks and meeting objective 5](#_Toc87958388)

[3.1.2 Agenda 5](#_Toc87958389)

[3.1.3 IPR call 5](#_Toc87958390)

[3.1.4 Approval of previous meeting report (8 April 2021) 5](#_Toc87958391)

[3.2 Working Group 1: Requirements of AI and other emerging technologies to ensure environmental efficiency 5](#_Toc87958392)

[3.2.1 Presentation of Technical Report D.WG1-11 5](#_Toc87958393)

[3.2.2 Discussions 6](#_Toc87958394)

[3.2.3 Outcomes 6](#_Toc87958395)

[3.2.4 Review of WG1 Workplan 6](#_Toc87958396)

[3.3 Working Group 2: assessment and measurement of the environmental efficiency of AI and emerging technologies 8](#_Toc87958397)

[3.3.1 Presentation of WG2 deliverables for adoption 8](#_Toc87958398)

[3.3.2 Presentation of Technical Report D.WG2-02: 8](#_Toc87958399)

[3.3.3 Presentation of Technical Report D.WG2-06 8](#_Toc87958400)

[3.3.4 Outcomes 9](#_Toc87958401)

[3.3.5 Review of Working Group 2 workplan 9](#_Toc87958402)

[3.4 Working Group 3: implementation guidelines of AI and emerging technologies for environmental efficiency…………………………………10](#_Toc87958403)

[3.4.1 Presentation of WG3 deliverables for approval……………………………10](#_Toc87958404)

[3.4.2 Presentation of Technical Report D.WG3-01……………………………...10](#_Toc87958405)

[3.4.3 Technical Report D.WG3-03………………………………………………11](#_Toc87958406)

[3.4.4 Outcomes…………………………….……………………………………11](#_Toc87958407)

[3.4.5 Review of Working Group 3 workplan…………………………………….11](#_Toc87958408)

[4 Incoming and Outgoing Liaison statements…………………………………………12](#_Toc87958409)

[5 Update on request for extension……………………………………………………..13](#_Toc87958410)

[6 Future Meetings……………………………………………………………………...13](#_Toc87958411)

[7 Closing & acknowledgements……………………………………………………….13](#_Toc87958412)

# Tables

[Table 1: Deliverables Approved at FG-AI4EE Fourth Meeting 4](#_Toc87879514)

[Table 2: Overview of Remaining Working Group 1 Deliverables 7](#_Toc87879515)

[Table 3: Overview of Remaining Working Group 2 Deliverables 10](#_Toc87879516)

[Table 4: Overview of Remaining Working Group 3 Deliverables 12](#_Toc87879517)

**Meeting report**

# 1 Organization of e-meeting

The fourth meeting of FG-AI4EE was held on 21 October 2021, online. The meeting was hosted on ITU remote participation platform, MyMeetings, <https://remote.itu.int>.

The meeting was chaired by Mr Neil Sahota (Technossus, IBM & University of California, USA), and Mr Paolo Gemma (Huawei Technologies Co., Ltd, China), Co-Chairmen of FG-AI4EE, assisted by Ms Charlyne Restivo (TSB, FG-AI4EE Advisor) and Ms Fatime Ahmeti (TSB, FG-AI4EE Assistant).

A total of **62 participants from 30 countries** attended the Focus Group meeting. The list of participants is available in document [[FG-AI4EE-O-018](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/output/FG-AI4EE-O-018.zip)]

The meeting was preceded by an ITU webinar on AI for environmental sustainability, organized on the side-lines of the AI for Good Global Summit. The webinar was attended by over **539 participants from 54 countries**. The speakers’ presentations can be accessed [here](https://aiforgood.itu.int/event/ai-for-environmental-sustainability/), and the recording is available on [YouTube.](https://www.youtube.com/watch?v=OkV4VouFxKg)

## 1.1 Meeting agenda

The agenda was published in document [[FG-AI4EE-I-068-R2](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame.aspx?sourcedoc=%7BC5CD8E14-B701-46F1-A9BA-D9328D17C155%7D&file=FG-AI4EE-I-068-R2.docx&action=default)], and was approved as presented.

## 1.2 Meeting documents

Documents considered at this meeting are listed as part of the agenda. All documents are available on the [SharePoint site](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/SitePages/Home.aspx?InitialTabId=Ribbon%2ERead&VisibilityContext=WSSTabPersistence) accessible from the FG-AI4EE [homepage](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/default.aspx).

# 2 Key meeting results

## 2.1 Key results

1. **Deliverables approval:** The meeting agreed 5 Focus Group deliverables (see 2.2 below). FG-AI4EE subsequently shared those deliverables with its parent group, ITU-T Study Group 5, for consideration at SG5’s virtual meeting on 30 November-10 December 2021 [[FG-AI4EE-I-LS-019](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame.aspx?sourcedoc=%7BC8EB9545-5327-4CE7-B9EC-BF4DDB0AD000%7D&file=FG-AI4EE-I-LS-019.docx&action=default)]
2. **Request of lifetime extension**: The Focus Group agreed to request the extension of its lifetime by one-year (i.e. until December 2022) to ITU-T SG5 to have enough time to complete its remaining deliverables [[FG-AI4EE-O-LS-008](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame.aspx?sourcedoc=%7B6384D765-CF40-40FC-A34D-61A785FAE840%7D&file=FG-AI4EE-O-LS-008.docx&action=default)]. ITU-T FG-AI4EE Working Groups agreed to review and streamline their deliverables to be able to fulfil their mandated activities by December 2022.
3. **Webinar:** The Focus Group ran a successful webinar with over 539 participants and will capitalize on the energy and interest generated by following up with an invitation to contribute to progressing the FG’s deliverables. It has proven useful to partner with the AI for Good Summit to organize FG-AI4EE’s webinars as the Summit supports communication and promotion efforts, provides a modern website interface, and live streams the session on its YouTube channel.
4. **Communication campaign:**  A [LinkedIn event](https://www.linkedin.com/events/aiforenvironmentalsustainabilit6844194788359606272/) was created to promote the webinar on social media, and engage with a new audience to attract new experts to the Focus Group. The LinkedIn event successfully gathered +183 participants, accounting for 19% of all final webinar attendees. LinkedIn is a useful tool for FG-AI4EE’s events communication campaigns, in addition to the Management Team’s support in promoting events and activities to their network.

## 2.2 FG-AI4EE’s approved documents

The documents listed in the table below are the outcome of the fourth FG-AI4EE meeting.

Table 1: Deliverables approved at FG-AI4EE Fourth Meeting

| **Document** | **Type** | **Number** | **Title** | **Description** |
| --- | --- | --- | --- | --- |
| [FG-AI4EE D.WG1-11](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG1.11) | Technical Report | D.WG1-11 | Best Practices for Graphical Digital Twins of Smart Cities | This TR focuses on how emerging technologies solutions can address environmental issues within cities, with a spotlight on graphical digital twin solutions. |
| [FG-AI4EE D.WG2-02](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/output/FG-AI4EE-O-014.zip) | Technical Report | D.WG2-02 | Computer Processing, Data management and Energy perspective | This TR proposes a set of good practices to improve the energy efficiency of cyber-physical system classes and applications – enabled by AI, big data, Internet of things (IoT) and other innovative technologies to enable and support the AI revolution, as well as facilitating its uptake by society. |
| [FG-AI4EE D.WG2-06](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG2.06) | Technical Report | D.WG2-06 | Assessing Environmentally Efficient Data Centre and Cloud Computing in the framework of the UN Sustainable Development Goals (SDGs) | This TR conducts an environmental sustainability assessment to support the development of sustainably efficient data centres and cloud computing services. |
| [FG-AI4EE D.WG3-01](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG3.01) | Technical Report | D.WG3-01 | Guidelines on the implementation of eco-friendly criteria for AI and other emerging technologies | This TR proposes a set of guidelines for organizations to review and assess the impact of the implementation of AI and other emerging technologies on environmental factors. |
| [FG-AI4EE D.WG3-03](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG3.03) | Technical Report | D.WG3-03 | Data center energy saving: Application of Al technology in improving energy efficiency of telecom equipment rooms and internet data center infrastructure | This TR explores how AI-based power management capabilities can assist in analysing power consumption in telecom equipment rooms and internet data centre infrastructure, and aid in making timely adjustments. |

# 3 Summary of discussions

## 3.1 Opening session

### 3.1.1 Welcome remarks and meeting objective

FG-AI4EE Co-Chairman, Mr Neil Sahota, opened the meeting and provided some welcome remarks.

ITU informed that FG-AI4EE Co-Chairman, Mr Paolo Gemma, would join the meeting later.

The main objective of this fourth meeting was to present five deliverables for approval and to agree on the request for extension of the Focus Group’s lifetime.

In his welcome remarks, Mr Sahota indicated that deliverables presented for approval were the results of Working Group discussions. Mr Sahota commended FG-AI4EE experts’ efforts in drafting and in providing inputs and comments to these deliverables, and ITU staff for their coordination. The final drafts of these reports were made available on FG-AI4EE [SharePoint](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/SitePages/Home.aspx?InitialTabId=Ribbon%2ERead&VisibilityContext=WSSTabPersistence) ahead of this meeting.

### 3.1.2 Agenda

The draft agenda was approved [[FG-AI4EE-I-068-R2](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame.aspx?sourcedoc=%7BC5CD8E14-B701-46F1-A9BA-D9328D17C155%7D&file=FG-AI4EE-I-068-R2.docx&action=default)].

### 3.1.3 IPR call

Mr Sahota presented the ITU Intellectual Property Rights (IPR) policy and read out the IPR call. There were no requests or objections from the floor in response to the IPR call contained in document [[FG-AI4EE-I-069](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame.aspx?sourcedoc=%7BB2917C1E-6B4B-470E-A778-7A9EBAFDAFDF%7D&file=FG-AI4EE-I-069.docx&action=default)].

### 3.1.4 Approval of previous meeting report (8 April 2021)

The report of the third Focus Group meeting (virtual, 8 April 2021) was approved as contained in document [[](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame.aspx?sourcedoc=%7B111E60E9-0339-4D29-BC3D-157FA2F70ED1%7D&file=AI4EE-O-001.docx&action=default)[FG-AI4EE-O-012](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame.aspx?sourcedoc=%7B9B04E179-CFAF-47F8-B7F3-2260FD59514A%7D&file=FG-AI4EE-O-012.docx&action=default)]

## 3.2 Working Group 1: Requirements of AI and other emerging technologies to ensure environmental efficiency

This session was chaired by Mr Pierre Major, AugmentCity AS, Norway, on behalf of Working Group 1 Co-Chair, Mr Joel Alexander Mills, AugmentCity AS, Norway.

Working Group 1 presented the following deliverable for approval of the meeting:

### 3.2.1 Presentation of Technical Report D.WG1-11

* [[FG-AI4EE D.WG1-11](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG1.11)] Technical Report D.WG1-11 – “Best Practices for Graphical Digital Twins of Smart Cities”
* Co-editor, Pierre Major, presented the final version of the Technical Report which is the outcome of WG1 discussions.
* This document focuses on how emerging technologies solutions can address environmental issues within cities, with a spotlight graphical digital twin solution. The document gives an overview of how graphical digital twins can be used as a visualisation tool to assess the sustainability of smart cities in a way that priorities can be identified and anchored at all decision-making levels, and best practices can be scaled-up and replicated to other cities to address air pollution, climate change and other major environmental issues.

### 3.2.2 Discussions

* Following his presentation on the document, Mr Major opened the floor for comments and questions.
* There were no specific comments on the main body of the document however the following question was raised from the floor:
  + When asked about how city councils could integrate data into environmental requirements, and how environmental simulations using Digital Twins can be operated, Mr. Major answered that Digital Twins allow to address a wide range of urban issues in a most innovative manner. Because data is gathered both from top-down and bottom up approach, this tool can help cities decease their energy consumption by allowing them to easily identify environmental issues, inequalities and other urban social issues.
* ITU suggested that this deliverable be considered for inclusion in the Collaboration on ITS Communication Standards (CITS) online database as it contains some information on how AI technologies can be used to monitor traffic planning (see LS [[FG-AI4EE-I-LS-020](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/liaison/FG-AI4EE-I-LS-020.zip)]).

### 3.2.3 Outcomes

Based on the discussion results, the meeting agreed by consensus to the following Working Group 1 deliverable:

* [[FG-AI4EE D.WG1-11](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG1.11)] Technical Report D.WG1-11 – “Best Practices for Graphical Digital Twins of Smart Cities”

### 3.2.4 Review of WG1 Workplan

Mr Major provided an overview of WG1 activities. Please see the presentation contained in document [[FG-AI4EE-I-079](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/input/FG-AI4EE-I-079.zip)]

WG1 was mandated to work on a total of 11 deliverables, the details of which details can be found [online](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/WG1deliverables.aspx.).

Two of these deliverables were approved at the past April 2021 meeting [see document [FG-AI4EE D.WG1-04](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG1.04) & [FG-AI4EE D.WG1-09](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG1.09)].

Upon decision of ITU-T SG5 (May 2021 virtual meeting), TS D.WG1-04 and TR D.WG1-09 were sent to ITU-T SG20 for their consideration as the scope of these work items are more related to ITU-T SG20’s mandate.

Mr Major presented the timeline of activities and called for volunteer contributors to help complete the remaining deliverables. The table below is updated based on FG-AI4EE 4th meeting discussions, and management team discussions held after the 4th meeting:

Table 2: Overview of remaining Working Group 1 Deliverables

| **#** | **Type** | **Deliverable title** | **Timeline** | **Leader** | **Volunteer Contributors** |
| --- | --- | --- | --- | --- | --- |
| D.WG1-01 | TR | Standardized Glossary of Terms | Starts Q4 2021 | Neil Sahota | Malcom Mason |
| D.WG1-02 | TR | Scorecard to identify enhanced eco-friendly business processes | Starts Q4 2021  *Possible merge with 03 (TBD)* | Neil Sahota | Daniela Tulone  Malcom Mason |
| D.WG1-03 | TR | Solution scorecard on environmental behavioral influencers | Starts Q4 2021  *Possible merge with 03 (TBD)* | Neil Sahota | Veronica Kecki |
| D.WG1-05 | TS | Reporting templates on AI, AR and ML | Starts Q4 2021 | Annik Magerholm Fet | Malcom Mason |
| D.WG1-06 | TS | High-Level Qualitative Impact Matrix of AI and Blockchain on Sustainable Development Goals (SDGs) and on environmental efficiency | In progress *To merge with 07* | Barbara Kolm |  |
| D.WG1-07 | TR | Visions of Best Practices on AI and Blockchain in 2025 | *To merge with 06* | Barbara Kolm |  |
| D.WG1-08 | TR | Connecting Environmental Efficiency of Digital Technologies to the UN SDGs | Starts Q4 2021 | Paolo Gemma | Claudio Bianco to support Paolo Gemma   Daniela Tulone |
| D.WG1-10 | TR | Guidelines on applying U4SSC KPIs in a digital twin city using ML, AR & AI ​for better climate mitigation solutions | In progress | Joel Alexander Mills & Pierre Major |  |

* D.WG1-02 and 03: Mr Neil Sahota suggested to keep those two items separate for the moment, with a possibility to combine them later, should it be necessary.
* D.WG1-06 and D.WG1-07: Prof. Rüdiger Stix, Sigmund Freud University, Austria, provided an update on the status of these two deliverables, on behalf of Ms Barbara Kolm, deliverable leader and FG-AI4EE Vice-Chairman, absent from the meeting with regrets. Prof. Stix referred to the matrix and research on AI [[FG-AI4EE-I-048](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame.aspx?sourcedoc=%7B806E1452-36C6-4C62-AC23-BD40C7F9A005%7D&file=FG-AI4EE-I-048.docx&action=default)] which will serve as a base for those documents. Prof. Stix indicated that the matrix will need to be updated following recent developments and discussions of the European level. Prof. Stix further proposed that these two items be merged to streamline WG1 deliverables. The expected delivery for this new merged item would be April 2022.
* D.WG1-08: Mr Claudio Bianco, FG-AI4EE Vice-Chairmen, presented a status update on this item on behalf of Mr Paolo Gemma: this item has not started yet, but Mr Bianco confirmed he would provide support and follow-up with Mr Gemma on this item.

*Decisions:*

* WG1 agreed to review, streamline and merge some of its remaining deliverables: It was agreed to keep D.WG1-02 and 03 as two separate items for the moment. It was agreed merge D.WG1-06 and D.WG1-07.
* Mr Bianco to support Mr Gemma as leader of D.WG1-08 and initiate this item in 2021 Q4.

## 3.3 Working Group 2: assessment and measurement of the environmental efficiency of AI and emerging technologies

### 3.3.1 Presentation of WG2 deliverables for adoption

Mr Stefano Nativi, Working Group 3 co-Chair, accepted to exceptionally chair this session on behalf of Mr Paolo Gemma, Working Group 2 Co-Chairmen, who was momentarily absent from the virtual meeting.

Mr Stefano Nativi introduced two deliverables for approval of the meeting

### 3.3.2 Presentation of Technical Report D.WG2-02:

*Presentation*

* [[FG-AI4EE D.WG2-02](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Documents/FG-AI4EE-O-014_Att1_FG-AI4EE-TR-D.WG2-02.pdf)] Technical Report -D.WG2-02 Computer Processing, Data management and Energy perspective
* Editor, Mr Stefano Nativi, presented the final version of the Technical Report which is the outcome of WG2 discussions and e-meetings.
* This document proposes a set of good practices, enabled by AI big data, IoT and other innovative technologies such as Digital Twins, to improve the energy efficiency of cyber-physical system classes and applications. It discusses energy efficiency practices by adopting a circular value-chain model and concludes with a set of recommended practices related to each component of the end-to-end use case typologies.

*Discussions*

* Experts commented that this document was very comprehensive. There one suggestion to separate ML from Deep Learning (DL). For example, basic ML algorithms use very little power during training. However, DL models are draw huge requirements.

### 3.3.3 Presentation of Technical Report D.WG2-06

*Presentation*

* [[FG-AI4EE D.WG2-06](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG2.06)] Technical Report D.WG2-06 Assessing Environmentally Efficient Data Centre and Cloud Computing in the framework of the UN SDGs
  + Editor Mr Paolo Bertoldi, European Commission – JRC, gave the floor to Co-Editor, Mr Tiago Serrenho, European Commission – JRC, to present the final version of the Technical Report which is the result of WG2 discussions and e-meetings.
  + This document conducts an environmental sustainability assessment to support the development of sustainably efficient data centres and cloud computing services.

*Discussions*

* There were no specific comments on the main body of the document.

### 3.3.4 Outcomes

Based on the discussion results and resolutions, the meeting agreed by consensus to the following Working Group 2 deliverables:

* [[FG-AI4EE D.WG2-02](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Documents/FG-AI4EE-O-014_Att1_FG-AI4EE-TR-D.WG2-02.pdf)] Technical Report D.WG2-02 – “Computer Processing, Data management and Energy perspective”
* [[FG-AI4EE D.WG2-06](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG2.06)] Technical Report D.WG2-06 – “Assessing Environmentally Efficient Data Centre and Cloud Computing in the framework of the UN Sustainable Development Goals (SDGs)”

### 3.3.5 Review of Working Group 2 workplan

Please see the presentation contained in document [[FG-AI4EE-I-080](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/input/FG-AI4EE-I-080.zip)].

WG2 was mandated to work on a total of 6 deliverables which details can be found [online](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/WG2deliverables.aspx.).

Two of these deliverables were approved at the past April 2021 meeting [see document [FG-AI4EE D.WG2-03](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG2.03) & [FG-AI4EE D.WG2-05](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG2.05)], and were subsequently incorporated to ITU-T’s Standardization work:

* + TR D.WG2-03 was adopted as a draft Supplement and agreed at ITU-T SG5 May 2021 virtual meeting ([TD1838](https://www.itu.int/md/T17-SG05-210511-TD-GEN-1838/en)).
  + TS D.WG2-05 adopted as a draft Recommendation and consented at ITU-T SG5 May 2021 virtual meeting ([TD1883-R1](https://www.itu.int/md/T17-SG05-210511-TD-GEN-1883/en)).

Table 3: Overview of remaining Working Group 2 Deliverables

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Type** | **Deliverable title** | **Timeline** | **Leader** |
| D.WG2-01 | TS | ​Environmental Impact self-check assessment | Starts Q2 2022  *after D.WG1-02 and D.WG1-03 are completed* | ​Neil Sahota |
| D.WG2-04 | TS | Guidelines on Evaluating and Measuring the Impacts of AI and Blockchain on Environmental Efficiency | Starts Q2 2022 *after new merge item [D.WG1-06 + D.WG1-07] is completed* | ​Barbara Kolm |

## 3.4 Working Group 3: implementation guidelines of AI and emerging technologies for environmental efficiency

Working Group 3 Co-Chair, Mr Stefano Nativi, European Commission – JRC, chaired this session introduced two deliverables for approval of the meeting.

### 3.4.1 Presentation of WG3 deliverables for approval

### 3.4.2 Presentation of Technical Report D.WG3-01

*Presentation*

[[FG-AI4EE D.WG3-01](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG3.01)] Technical Report D.WG3-01 " Guidelines on the implementation of eco-friendly criteria for AI and other emerging technologies"

* Editor, Ms Bosen Liu, Ladder Education Group, China, presented the final version of this Technical Report which is the result of WG3 discussions and e-meetings. The presentation given at the meeting can be found in document [[FG-AI4EE-I-082](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/input/FG-AI4EE-I-082.zip)]
* This document proposes a set of guidelines for organizations to review and assess the impact of the implementation of AI and other emerging technologies on environmental factors, including materials used, energy and water consumed, and generated waste. These guidelines are to serve as common factors to consider when designing and building any piece of technology.

*Discussions*

* Mr. Kishor Narang, Ministry of Communications, India, suggested that this report may not focus enough on the carbon footprint of AI. How to measure the efficiency of algorithms? Mr Kishor proposed the idea of an additional deliverable – a comprehensive document on the aspect of the impact of AI on the environment or suggested it could be supplementing this report.
* Mr. Gemma suggesting that this could be the subject of a Technical Specification, and invited Mr Narang Kishor to submit a contribution on the topic of AI environmental footprint and make a presentation at the next Focus Group meeting.
* Recognising the relevance of the points, Mr Nativi added that these are addressed in the various reports of the three working groups.
* In conclusion, experts recommended a deeper assessment by the Focus Group on the impact of AI, using it as a general thread throughout the deliverables.

### 3.4.3 Technical Report D.WG3-03

*Presentation*

[[FG-AI4EE D.WG3-03](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG3.03)] Technical Report Technical Report D.WG3-03 “Data center energy saving: Application of Al technology in improving energy efficiency of telecom equipment rooms and internet data center infrastructure”

* Co-editor, Ms Shi Ying, China Telecom, China, presented the final version of this Technical Report which is the result of WG3 discussions.
* This report explores how AI-based power management capabilities can assist in analysing power consumption in telecom equipment rooms and internet data centre infrastructure, and aid in making timely adjustments. It covers how such power management capabilities can collect data on consumption in telecom equipment rooms and IDC infrastructure, analyse their historical power consumption, train an intelligent model, and aid in achieving energy saving in them

*Discussions*

* Prof. Abdelaal Abdelnasser, King Faisal University, Saudi Arabia, provided some general editorial comments on the deliverables and suggested to narrow down the number of technologies, use different levels of analysis, and categories (such as for small-and-medium and large enterprises). Prof. Abdelnasser also pointed out that there is not enough talk of algorithms throughout the deliverables, especially on the power necessary for training models, stressing the need to dedicate greater focus to consumption of algorithms. Prof. Abdelnasser offered to write a contribution for consideration of the Focus Group.

### 3.4.4 Outcomes

Based on the discussion results and resolutions, the meeting agreed by consensus to the following Working Group 3 deliverables:

* [[FG-AI4EE D.WG3-01](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG3.01)] Technical Report D.WG3-01 " Guidelines on the implementation of eco-friendly criteria for AI and other emerging technologies"
* [[FG-AI4EE D.WG3-03](https://www.itu.int/pub/T-FG-AI4EE-2021-D.WG3.03)] Technical Report D.WG3-03 “Data center energy saving: Application of Al technology in improving energy efficiency of telecom equipment rooms and internet data center infrastructure”

### 3.4.5 Review of Working Group 3 workplan

Please see the presentation contained in document [[FG-AI4EE-I-081](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/input/FG-AI4EE-I-081.zip)].

Working Group 3 was mandated to produce 7 deliverables which details found [online](https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/WG3deliverables.aspx.)

Two of these deliverables were approved at the past April 2021 meeting, and were subsequently incorporated in to ITU-T’s Standardization work:

* TR D.WG3-02 was adopted as a draft Supplement and agreed at ITU-T SG5 May 2021 virtual meeting ([TD1865-R1](https://www.itu.int/md/T17-SG05-210511-TD-GEN-1865/en)).
* TR D.WG3-07 was adopted as a draft Supplement and agreed at ITU-T SG5 May 2021 virtual meeting ([TD1859](https://www.itu.int/md/T17-SG05-210511-TD-GEN-1859/en))

Table 4: Overview of remaining Working Group 3 Deliverables

| **#** | **Type** | **Deliverable title** | **Timeline** | **Leader** |
| --- | --- | --- | --- | --- |
| D.WG3-04 | TS | ​Methodology for Supporting the Implementation of AI & Blockchain Solutions at the Government Level | Starts Q2 2022 | Barbara Kolm |
| D.WG3-05​ | TS | Best Practice Catalogue on Environmentally Efficient AI & Blockchain Application | Q1 2022 | TBC |
| D.WG3-06 | TR | ​Guidelines on the Environmental Efficiency of 5G Usage in Smart Water Management | Q1 2022 | TBC |

# 4 Incoming and Outgoing Liaison statements

Four (6) liaison statements (LS), for information, were included in the meeting agenda as follows:

1. [[FG-AI4EE-I-LS-016](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/liaison/FG-AI4EE-I-LS-015.docx)] LS/i/r on invitation to review Artificial Intelligence Standardization Roadmap and provide missing or updated information (reply to SG13-LS196) [from ITU-T SG9]
2. [[FG-AI4EE-I-LS-017](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/liaison/FG-AI4EE-I-LS-017.docx)] LS/i/r on invitation to review Artificial Intelligence Standardization Roadmap and provide missing or updated information (reply to SG13-LS196 and SG13-LS174) [from ITU-T SG20]
3. [[FG-AI4EE-I-LS-018](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/liaison/FG-AI4EE-I-LS-018.docx)] LS/i/r on invitation to provide inputs to the roadmap of AI activities for natural disaster management (reply to FG-AI4NDM-LS1) [from ITU-T SG20]
4. [[FG-AI4EE-I-LS-019](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/liaison/FG-AI4EE-I-LS-019.docx)] LS/i/r on six deliverables of ITU-T FG-AI4EE (reply to FG-AI4EE-LS5 and FG-AI4EE-LS6) [from ITU-T SG5]
5. [[FG-AI4EE-I-LS-020](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/liaison/FG-AI4EE-I-LS-020.zip)] LS/i on provision of inputs to the online ITS communication standards database [from CITS].

One outgoing LS was included in the agenda for approval

1. [[FG-AI4EE-O-LS-007](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/liaison/FG-AI4EE-O-LS-007.zip)] LS/o on LS on five deliverables of ITU-T FG-AI4EE [to ITU-T SG5]. The text was agreed with a request from Mr Gemma to include information about the success of the FG-AI4EE webinar organized on 20 October 2021.

*Post meeting note*

The following Liaison Statements were approved by correspondence by the Management Team following FG-AI4EE fourth meeting.

* [[FG-AI4EE-O-LS-007](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/liaison/FG-AI4EE-O-LS-007.zip)] LS on five deliverables of ITU-T FG-AI4EE [to ITU-T SG5 and SG20]. Note: This LS was revised to include the decision from FG-AI4EE management team to send D.WG1-11 to SG20’s for consideration, as the topic of smart cities is extensively studied within SG20.
* [[FG-AI4EE-O-LS-009](https://extranet.itu.int/sites/itu-t/focusgroups/ai4ee/_layouts/15/WopiFrame.aspx?sourcedoc=%7B6C247FE7-3C76-4A8F-9FC4-2FFCC84B8657%7D&file=FG-AI4EE-O-LS-009.docx&action=default)] LS on the progress report of FG-AI4EE to [to ITU-T SG5]

# 5 Update on request for extension

Mr Gemma provided some background information about the request for extension and noted that the Focus Group had been set up for a period of 2 years and that this period was coming to an end in December 2021. For FG-AI4EE to be able to fulfil its mandate and finalize its work on its deliverables, the Focus Group would need to request the extension of its lifetime to ITU-T SG5, at their next meeting on 30 November – 10 December 2021. Mr. Gemma sought approval of the group on this request for extension.

*Outcomes*

* The Group agreed with no objection.

# 6 Future Meetings

Mr Gemma opened the discussions about the date of the fifth Focus Group meeting. ITU suggested to avoid March 2022 because of the World Telecommunication Standardization Assembly (WTSA-20) taking place from 1 to 9 March 2022.

Providing that the request for extension be granted by SG5, Mr Gemma proposed that next Focus Group meeting takes place in **April 2022**. The exact dates will be confirmed later.

Mr Gemma noted that Ms Barbara Kolm, FG-AI4EE Vice-Chairman, had kindly invited to host FG-AI4EE’s fifth meeting in Vienna, Austria.

# 7 Closing & acknowledgements

FG-AI4EE Co-Chairman, Mr Paolo Gemma, provided some closing remarks and congratulated the group on the outcomes of this meeting which led to the approval of five Focus Group deliverables.

FG-AI4EE Co-Chairmen both extended their appreciations to FG-AI4EE Vice-Chairmen, Working Group Co-Chairmen, editors, ITU, and thanked all participants for their active participation, contributions and commitment to advance the work of the Focus Group.

FG-AI4EE Co-Chairmen encouraged participants to pursue their collaboration by joining the Working Groups to progress the remaining deliverables.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_