Contribution ID: f4f0e2e7-d405-4c29-b19f-759c08fbaca3
Date: 28/08/2020 10:58:24

Annual Report of the Implementation Plan Working Groups 2020

Fields marked with * are mandatory.

Welcome to the **SET Plan 2020 reporting exercise.**
This survey is designed to monitor the progress made by the Implementation Working Groups (IWG) in achieving the targets and activities set out in the respective Implementation Plans. Each IWG is asked to monitor the progress of activities under the Implementation plans and feed the relevant information to the Strategic Energy Technologies Information System (SETIS).
In order to facilitate the collection of information from the IWG, SETIS has created the following template. The template is based on the 2019 questionnaire (see here the results from 2019) and incorporates the comments provided by the IWGs in April and May 2020.

Please complete the Survey and submit it by ***Friday August 28th***.

The Survey is structured in the following sections:

1. General information on the IWG structure.
2. Implementation Plan and Targets
3. Progress and Prioritisation of activities
4. Ongoing projects (***it includes an excel file to be filled out , which you can find also on the right column here -->***)
5. Synergies with other Implementation plans
6. Synergies beyond the SET Plan
7. Future R&I programme calls
8. Policies and measures
9. Additional suggestions for monitoring

Please note

- The template shared today covers the **14** SET Plan IWGs. Some questions are specific to you IWG, while others are more general.
- A link to the **EU Green Deal** and the **Next Generation EU** Recovery package has been provided. SETIS encourages you to read these documents and see if any revision of your IP/activities may be required in order to align the work of your IWG to the two aforementioned policy frameworks. Relevant links are *also* provided on the right side of the EUSurvey page.
- The Excel file that can be download in section 4 is specific to each IWG. The file contains Macro to ensure that multiple activities could be linked to 1 project.
- Please note that EU survey allows you to save the inputs and edit them at a later time, as well as download a pdf version of your input.
- Should you have any question/doubt, need assistance with a particular area of the reporting activity or see the need to modify/correct the excel file, please contact SETIS (Davide.MAGAGNA@ec.europa.eu).

1 Details on the Implementation Working Group

This section aims at gather information on the innovation landscape associated to the IWG.

1.1 Please select the IWG you are reporting on:

Photovoltaics

Please provide relevant contact points:

* 1.2 Implementation Working Group Contact

200 character(s) maximum

Christoph Hünnekes, Project Management Jülich (PtJ), Germany (IWG PV Chair) and Wim Sinke, TNO - Netherlands Organisation for Applied Scientific Research (IWG PV co-chair)

* 1.3 Email

ch.huennekes@fz-juelich.de

1.4 Website IWG (if any)

200 character(s) maximum

* 1.5 Is there a Technology Innovation Platform associated with the IWG

- (●) Yes
- ( ) No

1.6 If yes, please enter the ETIP contact point

200 character(s) maximum

European Technology & Innovation Platform on Photovoltaics (ETIP-PV), Marko Topic, University of Ljubljana (Chairman)

1.7 Email ETIP contact point

info@etip-pv.eu

1.8 Website ETIP

www.etip-pv.eu

* 1.9 Is there a Coordination Support Action Project associated with the IWG

- (●) Yes
- ( ) No

1.10 If yes, please enter the CSA Project contact point

200 character(s) maximum

EUREC - The Association of European Renewable Energy Research Centres, Andrej Mišech (Project Officer)

1.11 Email of CSA Project contact point

misech@eurec.be

1.12 Website CSA Project

www.pvimpact.eu

* 1.13 Is there a ERA-NET Project associated with the IWG

- (●) Yes
- ( ) No

1.14 If yes, please enter the ERA-NET Project contact point

200 character(s) maximum

SOLAR-ERA.NET c/o NET Nowak Energy & Technology Ltd., St.Ursen, Switzerland

1.15 Email of ERA-NET Project contact point

info@solar-era.net

1.16 Website ERA-NET Project

www.solar-era.net/

* 1.17 Is there an Industrial association linked with the IWG

- ○ Yes
- ◉ No

* 1.21 Is there an additional project/group linked with the IWG (e.g. 2nd ERA-NET project) or other European coordination group.

- ○ Yes
- ◉ No

2 Implementation plan and targets

This section focuses on getting information on the validity and relevance of the Implementation Plan targets.

Implementation Plan

* 2.1 Please confirm whether the implementation plan and its targets are still relevant in its original formulation.

- ◉ Yes
- ○ Needs Revision (full or partial revision required)

Relevance of existing targets

Please confirm whether the IP targets are still relevant in their original formulation, or whether they should be revised. Where there is a need for revision or targets are obsolete, please provide the reasoning and recommendations for changes.

***Please note** in **section 2.15** the IWG will be able to propose new targets in addition to the existing ones.*

2.12 Relevance of targets - Photovoltaics

2.12.1 ***Photovoltaics - Targets.***

Major advances in efficiency of established technologies (Crystalline Silicon and Thin Films) and new concepts.

	Still Relevant	Needs Revision
* Target 1 Increase PV module efficiency by at least 20% by 2020 compared to 2015 levels	◉	○
* Target 2 Increase PV module efficiency by at least 35% by 2030 compared to 2015, including with the introduction of novel PV technologies(>50m) at a maximum distance of 50 km from shore with a LCOE of less than 12 ct€/kWh by 2025	◉	○

2.12.2 Please enter for those *Photovoltaics - Established technologies - Targets* that require revision new value and reasoning.

	New Value of Target **[numbers only]**	Reasoning
Target 1		The upgrade of production lines takes longer than 5 years, in particular taking into account the price competition and limited investment funds of the PV manufacturers in the last five years. Hence the traget of an increase by 20% in 5 years was really ambitious. Tus, the average module efficiency did not increase by 20%, but with the transition to the new PERC Technology one can alreday observe modules in the market which go beyond 20% improvement.
Target 2		Currently, ETIP PV and PV Impact are discussing what technology has to be considered as Standard. Depending on this choice, IWG PV will have to either keep or update 2030 target. A revision for the next reporting period could be possible.

2.12.3 ***Photovoltaics - Targets.***

Reduction of the cost of key technologies.

	Still Relevant	Needs Revision
* Target 3 Reduce turn-key system costs by at least 20% by 2020 as compared to 2015	○	◉
* Target 4 Reduce turn-key system costs by at least 50% by 2030 compared to 2015 with the introduction of novel, potentially very-high-efficiency PV technologies manufactured at large scale	○	◉

2.12.4 Please enter for those *Photovoltaics - Reduction of the cost of key technologies* - Targets that require revision new value and reasoning.

	New Value of Target **[numbers only]**	Reasoning
Target 3	50%	For the turn-key system cost reduction a decrease of 50% from 2015 to 2020 was observed.
Target 4	60%	The initial target is already fullfilled. the concrete new value (60% oer even more) is still under discussion.

2.12.5 ***Photovoltaics - Targets.***

Further enhancement of lifetime, quality and sustainability and hence improving environmental performance.

	Still Relevant	Needs Revision
* Target 5 Maintain proven system energy output per year at least 80% of initial level for 30 years by 2020 and for 35 years by 2025	◉	○
* Target 6 Minimize life-cycle environmental impact along the whole value chain of PV electricity generation, and increase recyclability of system components (in particular: of modules)	◉	○
* Target 7 Perform focused research and apply & progress eco-design requirements in preparation of implementing measures supporting maximum energy yield (kWh /kWp) and lowest life-cycle environmental impact	◉	○

2.12.7 ***Photovoltaics - Targets.***

Enabling mass realization of "(near) Zero Energy Buildings" (NZEB) by Building-Integrated PV (BIPV) through the establishment of structural collaborative innovation efforts between the PV sector and key sectors from the building industry.

	Still Relevant	Needs Revision
* Target 8 Develop BIPV elements, which at least include thermal insulation and water protection, to entirely replace roofs or facades and reduce their additional cost by 50% by 2020, and by 75% by 2030 compared to 2015 levels, including with flexibility in the production process	○	◉
* Target 9 Recognize the importance of aesthetics in the activities of the implementation of NZEB.	◉	○

2.12.8 Please enter for those *Photovoltaics - NZEB and BIPV - Targets* that require revision new value and reasoning.

	New Value of Target **[numbers only]**	Reasoning
Target 8		The 2020 target needs to be checked quantitatively and revised . A quantitative evidence is dissicult to achive due to still not existing mature market. The 2030 target has to checked in the light of this analysis.
Target 9		

2.12.9 ***Photovoltaics - Targets.***

Major advances in manufacturing and installation.

	Still Relevant	Needs Revision
* Target 10 Make available GW-scale manufacturing technologies that reach productivity and cost targets consistent with the capital cost targets for PV systems	◉	○
* Target 11 Develop PV module and system design concepts that enable fast and highly automated installation, to reduce the installation costs of both ground-mounted arrays and PV building renovation solutions, by 2020	○	◉

2.12.10 Please enter for those *Photovoltaics - Major advances in manufacturing and installation* Targets that require revision new value and reasoning.

	New Value of Target **[numbers only]**	Reasoning
Target 10		
Target 11		An assessment of the situation in 2020 is needed and will be performed. Target needs revision at least in time line.

2.15 *Proposal of new targets for the IP*

* 2.15.1 Do you believe, that the Implementation Plan would benefit from defining new targets in addition to the existing ones?
SETIS would like to encourage IWGs to evaluate whether new targets may be required in order to understand whether to align the IP to the **European Green Deal** and/or to the **Next Generation EU** recovery instrument.

More information can be found at the following links:

1. **European Green Deal** - https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf
2. **Next Generation EU** - https://ec.europa.eu/info/sites/info/files/communication-europe-moment-repair-prepare-next-generation.pdf

- ○ Yes (please specify)
- ◉ No, a revision of targets as already specified would suffice.

3 Progress and prioritisation of activities

This section aims at assessing the progression and prioritisation of the R&I activities of the Implementation Plan; and at understanding whether the current set of activities listed are sufficient to meet the IP targets. SETIS would like to encourage IWGs to evaluate whether new activities may be required in order to understand whether to align the IP to the **European Green Deal** and/or to the **Next Generation EU** recover y instrument.

3.12 Photovoltaics

3.12.1 Photovoltaics - Prioritisation of activities

Please list which activities are a priority for the reporting period (2020-2021), and which activities are likely to become activities in the next years.

3.12.1.1 Activities of the Photovoltaics IWG.

	Priority for period 2020 - 2021	Priority for period 2022 - 2025	Priority for period 2025 onward

* 1. PV for BIPV and similar applications	○	◉	○
* 2. Technologies for silicon solar cells and modules with higher quality	◉	○	○
* 3. New Technologies & Materials	◉	○	○
* 4. Operation and diagnosis of photovoltaic plants	○	◉	○
* 5. Manufacturing technologies	◉	○	○
* 6. Cross-sectoral research at lower TRL	○	○	◉

3.12.2 Photovoltaics - Progress of activities

Please provide an assessment for each pf the activities in the Implementation plan, by using a traffic light system:

- **GREEN** - There are projects addressing this activity
- **ORANGE** - Projects addressing this activity are ready to take-off
- **RED** - No project ready yet. Preparatory work

3.12.2.1 Activities of the Photovoltaics IWG.

	Green Projects are addressing this activity	**Orange Projects about to take off**	**Red No progress**
* 1. PV for BIPV and similar applications	◉	○	○
* 2. Technologies for silicon solar cells and modules with higher quality	◉	○	○
* 3. New Technologies & Materials	◉	○	○
* 4. Operation and diagnosis of photovoltaic plants	◉	○	○
* 5. Manufacturing technologies	◉	○	○

* 6. Cross-sectoral research at lower TRL	○	○	◉

3.12.3 Photovoltaics- IWG Review of activities

* 3.12.3.1 Based on the review of the activities provided, do you believe that the activities of the Implementation Plan are still sufficient to meet the IP targets or is there a revision of activities needed?

- ◉ YES - Activities are still valid to meet the IP targets
- ○ NO - Activities require revision to align the plan to ongoing policy development

4 Ongoing Projects

In this section you can download the excel template that will facilitate the reporting on ongoing R&I projects that contribute to achieve the SET Plan targets and activities for your IWG.
Please discuss within your IWG ***which projects should be considered representative*** in the execution of the Implementation Plan (not just budget) and that ***started or were operational from 01/01/2017***
We would like to stress the importance of sharing information on ***National, Regional and Transnational Projects*** in addition to EU funded projects.
Please note: MACROS need to be enabled to enjoy the full functionality of the excel template.

4.12 Click to downlaod the excel template for the IWG - ***Photovoltaics***

Photovoltaics_IWG_2020_reporting.xlsm

4.15 Please upload the file containing the list of representative projects identified by the IWG

Only files of the type xls,xlsx,ods are allowed
6024d640-ee0c-480d-8533-c4f240902be1/Photovoltaics_IWG_2020_reporting_all.xlsx

5 Synergies with other Implementation Working Groups

5.1 Please indicate, by ticking the boxes below, if work undertaken in other Implementation Plans has **relevance and can yield significant** for the advancement and the success of the your Implementation Plan.

Please indicate with cooperation has been established.

	Relevant activities for the success of the Implementation Plan.	Would like to cooperate	Cooperation has been already established
IWG Batteries	☐	☐	☐
IWG CCS-CCU	☐	☐	☐
IWG CSP-STE	☐	☐	☐
IWG Deep Geothermal	☐	☐	☐
IWG EE In Buildings	☑	☐	☑
IWG EE in Industry	☐	☐	☐
IWG Energy Consumers	☐	☐	☐
IWG Energy Systems	☑	☑	☐
IWG Nuclear Safety	☐	☐	☐
IWG Ocean Energy	☐	☐	☐
IWG Offshore Wind	☐	☐	☐
IWG Positive Energy Districts	☐	☐	☐
IWG Renewable Fuels and Bioenergy	☐	☐	☐

5.2 Please indicate the area/areas for collaboration identified ***[Optional].***

	Collaboration area 1	Collaboration area 2	Collaboration area 3
IWG Batteries			
IWG CCS-CCU			
IWG CSP-STE			
IWG Deep Geothermal			
IWG EE in Buildings	Building Integrated PV (BIPV)		
IWG EE in Industry			
IWG Energy Consumers			
IWG Energy Systems	The significant LCoE reduction from PV enables large-scale deployment of integrated PV applications, storage and solar P2X. Implications from this development should be reflected in Energy System strategies.		
IWG Nuclear Safety			
IWG Ocean Energy			
IWG Offshore Wind			
IWG Photovoltaics			
IWG Positive Energy Districts			
IWG Renewable Fuels and Bioenergy			

6.1 Please provide a list of cooperation initiatives that exits beyond the SET Plan community. Please add information on the involvement of Implementation Plan Working Group members and on the relevant activities/targets addressed.
If available provide weblink and start/end year.

	Initiative	Implementation Plan participation	Relevant targets addressed	Web link **[optional]**	Start year **[optional]**	End year **[optional]**
IEA TCP	PVPS	through Member States	Integrated PV (BIPV, VIPV), Operation and diagnosis of photovoltaic plants	www.iea-pvps.org		
IRENA						
Mission Innovation						
Clean Energy Ministerial						
Other 1						
Other 2						
Other 3						

7 Future R&I Programme Calls

7.1 Please provide information on forthcoming relevant **National, Regional and Trasnational R&I** project calls in support of the execution of the Implementation Plan.

Please indicate only programme and projects that are specific to your Implementation Plan.
[optional]

	Call name	Funding Body	Type of fund (National, Regional, Transnational)	Expected Start Year	Activities addressed	Budget
					for PV: Priority Area: High Efficiency Solar Technology In this priority, Technology Development Projects between Technology Readiness Levels 2-8 will be supported for hereunder technlogies: 1. c-Si Solar Cells 1a. New generation of high efficient c-Si Solar Cells (HIT: Heterojunction with Intrinsic Thin layer; PERC: Passivated Emitt er Rear Cell; PERT: Passivated Emitter Rear Totally Diffused; IBC: Interdigitated Back Contact Solar Cells; bi-facial	

1	Scientific and Technological Research Projects Funding Program (1001)	TÜBİTAK	national	2020	cells) 1b. Technologies required for low cost c-Si cells production (UMG) Silicon; High P erformance Multicrystalline (HPmc); Thin Slicon) 1c. Multi-junction solar cells: Perovskit/Si, other thin film/Si tandem systems 2. Thin Film Solar Systems 2a: (2a) CdTe, CIGS, and a Si thin film technologies (CdTe: Cadmium Telluride; CIGS: Copper Indium Gallium Selenide; a Si thin film solar cells) 2b: Dye-sensitized solar cells 2c: Perovskit solar cells 2d: Organic solar cells 2e: Copper Zinc Tin Sulfide (CZTS) 2f: Thin film III-V Epitaxial PV cells 3. Silicon material technologies (Si purification, ingot growth) 4. Module technologies and module components (glass, encapsulant, wire / ribbon, etc., rear connection module, glass glass module, multi-		

					wire) 5. Basic research topics for solar cells: up down conversion, light trapping, photonics, plasmonic and nanotechnology; 6. Artificial Leaf Technologies	
					for PV: Priority Area: High Efficiency Solar Technology In this priority, Technology Development Projects between Technology Readiness Levels 2-8 will be supported for hereunder technlogies: 1. c-Si Solar Cells 1a. New generation of high efficient c-Si Solar Cells (HIT: Heterojunction with Intrinsic Thin layer; PERC: Passivated Emitt er Rear Cell; PERT: Passivated Emitter Rear Totally Diffused; IBC: Interdigitated Back Contact Solar Cells; bi-facial cells) 1b. Technologies required for low cost c-Si cells production (UMG) Silicon; High P erformance Multicrystalline (HPmc); Thin Slicon)	

2	Research Technology Development and Innovation Projects in Priority Areas G. P. (1511)	TÜBİTAK	national	2020	1c. Multi-junction solar cells: Perovskit/Si, other thin film/Si tandem systems 2. Thin Film Solar Systems 2a: (2a) CdTe, CIGS, and a Si thin film technologies (CdTe: Cadmium Telluride; CIGS: Copper Indium Gallium Selenide; a Si thin film solar cells) 2b: Dye-sensitized solar cells 2c: Perovskit solar cells 2d: Organic solar cells 2e: Copper Zinc Tin Sulfide (CZTS) 2f: Thin film III-V Epitaxial PV cells 3. Silicon material technologies (Si purification, ingot growth) 4. Module technologies and module components (glass, encapsulant, wire / ribbon, etc., rear connection module, glass glass module, multi-wire) 5. Basic research topics for solar cells: up down conversion, light trapping, photonics, plasmonic and nanotechnology; 6. Artificial Leaf Technologies	

3	7th Energy Research Programme of the German Federal Government / Applied Energy Research	German Federal Ministry of Economic Affairs and Energy (BMWi)	national, transnational not excluded	ongoing	for PV: Development of production technologies, improvement of lifetime and quality assurance at the component and system level, development of alternative PV materials and concepts, development and demonstration of marketable solutions for intelligent sector coupling, solutions for new markets, reduction or avoidance of environmental hazardous materials or scarce resources	
4						
5						
6						
7						

8 R&I Policies and measures

8.1 Please provide information on policies and measures that are conducive to the progress of the Implementation Plan.

These could include specific support to your Implementation Plan as highlighted in the NECPs.

Please consider elements of trans-nationality (e.g. funding/support projects across borders)

[optional]

	Policy Measure	SET Plan Country	Type of support (grants, regulatory, future commitment)	Relevance to Implementation Plan activities	Transnational aspect	Expected start year
1	Clean Energy Transition Partnership	all	Joint programming and funding	high	inherent transnational	2021
2	Solar Manufacturing Accelerator	different	identifying partners and reaching out to financial investors	high as a European PV production is expected to be the prerequisite for an useful utilization of results from R&I efforts	mostly	2020
3						
4						
5						
6						
7						

9 Additional suggestions for monitoring

9.1 Please list any additional aspects relevant to the Implementation Plan that should be monitored and/or any specific metrics to measure progress.

These will taken into account for the next reporting excercise.

Please consider measures that could be implemented across the 14 IWGS.

	Additional aspects to be monitor	Metric	Baseline	Reasoning
1	Key Performance Indicators for each activity of the IP are still under development. Issues are the availability of data and the definition of baselines. IWG PV is supported by PV Impact and EERA.			
2				
3				
4				
5				
6				
7				

Useful links

Green Deal Communication (https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

Next Generation EU (https://ec.europa.eu/info/sites/info/files/communication-europe-moment-repair-prepare-next generation.pdf)

SETIS (https://setis.ec.europa.eu/)

SETIS 2019 Report (https://setis.ec.europa.eu/sites/default/files/setis%20reports/set_plan_report_2019_online.pd

Background Documents

Batteries Projects Excel Template

CCS-CCU Projects Excel Template

CSP-STE Projects Excel Template

Deep Geothermal Projects Excel Template

EE in Buildings Projects Excel Template

EE in Industry Projects Excel Template

Energy Consumers Projects Excel Template

Energy Systems Projects Excel Template

Nuclear Safety Projects Excel Template

Ocean Energy Projects Excel Template

Offshore Wind Projects Excel Template

Photovoltaics Projects Excel Template

Positive Energy Districts Projects Excel Template

Renewable Fuels and Bioenergy Projects Excel Template

Contact

Davide.MAGAGNA@ec.europa.eu