

*FETPROACT*  
*Research and Innovation actions Future and Emerging Technologies*

## MAGnetic nanoparticle based liquid ENergy materials for Thermoelectric device Applications

# MAGENTA

### Project Management Plan

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<b>Coordinator</b>	Dr Sawako NAKAMAE		
<b>Project Manager</b>	Mrs Dijana SAMSON		
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## PROJECT MANAGEMENT PLAN APPROACH

### *INTRODUCTION*

During the course of the project, MAGENTA will generate data in a wide range of R&D activities from materials synthesis (ionic liquids, magnetic nanoparticles and ferrofluids), MTE property analysis, to device testing and validation. Since the MAGENTA technology is at an early stage, it is important that timely dissemination of these findings (data, publications, trial results) are open for scrutiny by other researchers, potential future partners and the wider research and regulatory community.

**The Project Management Plan** describes the management structure of the MAGENTA project and general decisions taking procedures to ensure the quality of day to day project's management.

All members of the MAGENTA project will play a role in quality management. It is imperative that the team ensures that work is completed at an adequate level of quality from individual work packages to the final project deliverable.

### *PROJECT SCOPE*

MAGENTA is a 4 year research & innovation project (2017-2020) that aims to bring a paradigm change in TE-technology by exploiting the magneto-thermoelectric (MTE) property of ionic-liquid based ferrofluids.

MAGENTA's technology is built upon a bottom-up approach, taking advantage of the unique and tunable properties of magnetic nanoparticles, ionic liquids and their interactions.

The use of IL-based ferrofluids is arguably the single most important feature that distinguishes MAGENTA from all other existing TE-technologies that heavily focus on improving the materials' efficiency via nanostructuration. The identification of physico-chemical and electro-chemical principles controlling the colloidal stability and the observation of the TE-phenomena in ferrofluids are quite recent.

**The project is divided into three main phases each containing one or more WPs** (cf Annexe 2):

- 1) Materials synthesis (WP2, WP3 and WP6)
- 2) Magneto-thermoelectric & thermodiffusion Investigations (WP4, WP5 and WP6)
- 3) Prototype and Dissemination (WP7, WP8)

**The primary objectives are to:**

- 1) Provide founding knowledge of novel MTE phenomena in ferrofluids ;
- 2) Build application-specific MTE prototypes for their use in targeted industrial sectors (cars and portable electronics) ;
- 3) Build an innovation ecosystem around the novel MTE technology in the field of waste-heat recovery research and development.

The end-products of MAGENTA, application specific magneto-thermoelectric materials and devices, will provide innovation leadership to European companies in waste-heat recovery industries. The lead-user industries targeted by MAGENTA are automobile and microelectronic sectors, but demonstration-type thermoelectric generators will also be produced for public outreach actions on renewable energy.

## MANAGEMENT STRUCTURE

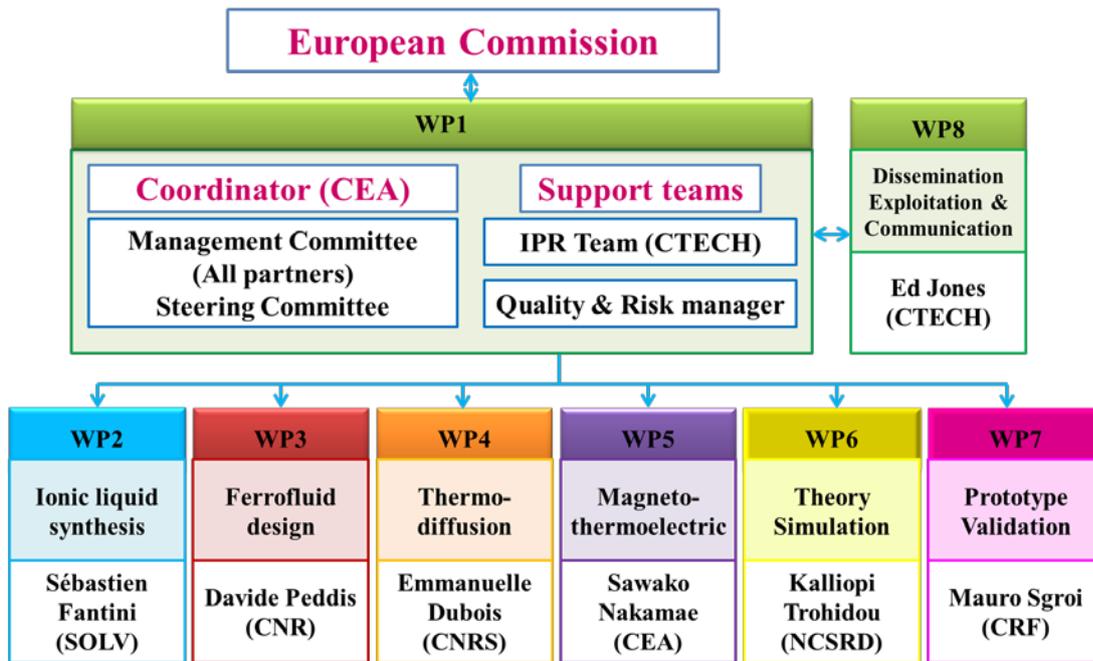
The General Assembly is the ultimate decision body. It is composed by one representative for each Partner. The management scheme is divided into three levels: Technical WPs, Management & Coordination, and Dissemination-Exploitation project interface.

The Coordinator will be assisted in Management tasks and decision making by:

- Management Committee
- Management Support Team.

Also will be involved the Dissemination, Exploitation & Communications activities of WP8.

The Project Officer of MAGENTA for the European Commission is Dr Pascal Drabik.



### *Management Committee and Management Support Teams*

**The Management Committee refers to the General Assembly of the Consortium Agreement.** It shall consist of one representative of each Party.

**The Management Support Teams consist in:**

The Steering Committee, the IPR Team, and the Quality & Risk Management team.

The Steering Committee will be composed of WP leaders (or task leaders), the Coordinator and the Project Managers.

The Steering Committee shall collect information at least every 6 months on the progress of the Project, examine that information to assess the compliance of the Project with the Consortium Plan and, if necessary, propose modifications of the Consortium Plan to the General Assembly.

An **External Expert Advisory Board (EEAB)**, composed of Technology leaders and Scientific experts, may be appointed by the General Assembly and steered by the Steering Committee.

When needed, the EEAB may provide advice to the Steering Committee while dissemination and exploitation plans targets the industrial sector.

**The Quality & Risk Management team** will be composed of the Coordinator, the Project Manager and Work Package (WP) leaders. WP leaders will provide the Coordinator and the Project Manager with relevant information for the identified risks on a basis of monthly video meetings.

**The IPR team** will be composed of the Coordinator, the Project Manager, the WP leader CTECH and a member of CEA Technological Transfer department.

## ***Tasks and Roles***

### ***The Coordinator***

CEA is the coordinator of MAGENTA project, FETPROACT-2016 grant number 731976, and will ensure efficient technical, administrative and financial project management.

Dr Sawako NAKAMAE is the Scientific Project Coordinator. She is responsible for the long term strategy, scientific and technical orientations of the project.

The Coordinator will:

- be the interlocutor between the EC and the project partners;
- manage the generated knowledge and the activities for the innovation exploitations.

### ***The Project Manager***

Mrs Dijana SAMSON is CEA administrative Project Manager.

She is responsible for:

- overseeing the financial and contractual managements;
- the organization, planning and control of the project.

Project Manager will organize General Assembly meetings, video meetings among board members for project review, conflict mitigation, etc.

***The Work Package leaders*** are responsible for:

- the execution of the overall technical objectives of its WP during the project lifetime;
- the respect of time schedules, all necessary progress reports and WP deliverables.

***The Task leaders*** are responsible for:

- Implementing tasks at an adequate level of quality;
- Report to the WP leader on technical progress.

## **PROJECT IMPLEMENTATION**

The Project Manager and the Coordinator shall assess the project progress and the resource consumption information from all partners according to information provided on the MAGENTA SharePoint site and organizing monthly video conferences between Management support Team, IPR and Quality and Risk management team (WP & task leaders when relevant).

### ***Meetings, Reports and Reviews***

A General Assembly will be held at least once a year, but extraordinary meeting may be organized upon written request of the Steering Committee or 1/3 of the Members of the General Assembly

The Project Manager (or the Project Coordinator) will distribute a meeting agenda at least 2 days prior to any scheduled meeting and all participants are expected to review the agenda prior to the meeting.

Meeting minutes will be distributed no later than 10 days after each meeting is completed.

Meeting	Description	Frequency	Format	Participants	Deliverable	Owner
Kick off meeting	Start of the project	Beginning	Meeting	Consortium, tasks participants	Meeting minutes	Project Manager / Coordinator
Project Monthly Review (PMR)	Project Technical review	Monthly	Video conference	WP leaders, Q&R team	Updated Action Register	Project Manager/ Coordinator
Steering Committee	Project implementation review	Bi-annual	Meeting	Management committee, WP & tasks leaders	Meeting minutes	Project Manager/ Coordinator
General Assembly	Decision making body	Annual	Meeting	Each partner	Meeting minutes	Project Manager/ Coordinator
IPR meeting	IPR review	Annual	Meeting/video conference	IPR team	Meeting minutes	Project Manager/ Coordinator

## Reports & Reviews

- Quarterly WP status reports on the advancement of tasks will be made by WP leaders for internal review (Monthly Q&R management meetings and Steering committee meetings).
- Formal reports on the project advancements to the European Commission will be made by the coordinator and the management committee according to the tentative reporting schedule indicated in the Grant Agreement:

Review 1: Month 12, full review. Location: Brussels

Review 2: Month 21, technical Rev. Location: Brussels

Review 3: Month 30, full review. Location: Brussels

Review 4: Month 48, full review. Location: Brussels

## Decisions

The coordinator take decisions for corrective measures when needed, on the basis of a day to day scientific and technical orientations of the project, unless it modifies substantially project implementation as defined in the Grant Agreement.

In this case and following rules established in the Consortium Agreement, the General Assembly, who is the ultimate decision-making body of the consortium, shall take the decision by a majority of two-thirds (2/3).

## Cost Management Plan

CEA will distribute funds according to the Grant Agreement, coordinate and follow-up cost statements by all beneficiaries.

All beneficiaries must — for a period of three years after the balance is paid — keep adequate records and other supporting documentation to prove that the corresponding tasks or part of the action as described in the Grant Agreement, have been implemented properly.

At the end of each reporting period, each partner will fill the Financial Statement (Form C of the Grant Agreement) and send it to the project coordinator. The financial statement should be accompanied by certificates when it is appropriate.

Working within the cost management guidelines is imperative for all project team members to ensure successful completion of the project.



## Quality & Risk Management

Every effort will be made by WP leaders and Q&R Management team to proactively identify risks ahead of time, in order to implement a mitigation strategy to take the necessary steps to implement the mitigation response at the appropriate time during the schedule.

The Coordinator and the Project Manager will follow and assess the progress of the project implementation on the basis of information provided on the private SharePoint storage and upon monthly video meetings with WP leaders and/or WP representatives.

Each task leader monitor and validate progress on tasks and deliverables through the online private repository dedicated to the project. Any issues, concerns, or updates that arise from informal discussion between team members must be communicated to the Project Manager so the appropriate action may be taken.

WP leaders report quarterly with a synthetic report on the work done by task leaders and send it to the Project Manager-(see rules on Communication / Documentation of the present PMP), or immediately in case of urgent actions needed. One week prior to monthly video conferences, WP leaders validate work monitored by Task leaders on the MAGENTA SharePoint.

This will allow the early detection of problems and the timely execution of corrective measures.

The below chart lists the major technical risks identified for the MAGENTA project.

Risk number	Description of risk	WP Number	Proposed risk-mitigation measures
1	Difficulty in IL and FF synthesis with optimal theoretical parameters due to electrochemical reaction between constituents.	WP2, WP3	Existing (EAN based) and other synthesizable IL-FF's will be used. Among them, the most promising will be optimized through fine tuning of parameters such as MNPs' size, charge, etc., to produce the prototype thermocells.
2	Difficulty in Redox couple/ FF/IL compatibility leading to destabilization of MNP dispersion	WP3, WP5	Focus on stable IL-FFs and control TE performance via redox-concentration effects (rather than redox-types). Emphasize more research effort in TCS (thermally chargeable supercapacitor) development.
3	Incompatibility between thermocell materials' property and their use at high-temperature.	WP7	Several prototypes for separate temperature ranges; low (below 80°C), medium (below 160°C) and high (above 160°C), will be constructed for different applications.

## Schedule

Project schedules for the MAGENTA Project will be created using MS Project 2016 starting with the deliverables identified in the project's Grant Agreement. Activity definition will identify the specific work packages which must be performed to complete each deliverable.

Each WP leader will update the progress of tasks within the WP he is in charge of, through the private website linked to a SharePoint. WP leaders shall organize regular WP status meetings with tasks leaders on the progress of tasks realization and send to the Project Manager minutes of the WP meeting (Status report).

Once a preliminary schedule has been developed, it will be reviewed monthly by the project coordinator and the IPR team and main resources assigned to project tasks.

The control of time is carried out through the major milestones of the project. An indicator, concerning the respect of the milestones and of the closing date of the deliverables, will allow registering the progress of the project.

If there are any scheduling delays which may impact a milestone or delivery date, the project manager must be notified immediately so proactive measures may be taken to mitigate slips in dates after approval of the Project Coordinator. Any approved changes to these milestones or dates will be communicated to the project WP team by the project manager.



## ***Control of Deliverables***

Each partner should deliver on time, to the Project Manager deliverables which he is responsible for. The internal approval of the deliverables is considered done after the successful completion of the quality control, which is performed by the respective WP leader, the Project Manager and the Project Coordinator. The Project Coordinator submits the deliverables to the European Commission after its internal approval.

The below chart lists the deliverables and the milestones of the Magenta Project.

<b>Del. N°</b>	<b>Deliverable name</b>	<b>WP n°</b>	<b>Lead partner</b>	<b>Type</b>	<b>Dissem. Level</b>	<b>Delivery date</b>
1.1	Project management plan	1	CEA	OTHER	PU	M2
8.1	Website development the project logo	8	CTECH	DEC	PU/CO	M2
8.2	Data Management Plan	8	CEA	R	PU	M6
7.1	Mock-up thermocell	7	CTECH	DEM	CO	M12
6.1	Report on single MNPs/FF structures (numerical)	6	NCSR	OTHER	PU	M24
2.1	Synthesis of ILs (1 <sup>st</sup> and 2 <sup>nd</sup> generations)	2	SOLV	OTHER	CO	M24
6.2	'Molecular descriptors' database for IL/ IL-FFs	6	GUT	R	PU	M30
4.1	High temperature MTD measurements	4	PHNX	DEM	PU	M15
3.1	Synthesis of 'promising' IL- FFs	3	PHNX	OTHER	PU/CO	M30
7.2	Feasibility analysis for ICE prototype	7	GEM	OTHER	CO	M24
5.1	Database on MTE performance	5	CEA	R	PU	M30
4.2	Database on MTD property in IL-FFs	4	PHNX	R	PU	M30
5.2	Database on TCS performance	4	CEA	R	PU	M30
8.3	Workshop/Technical day	7	CNR	DEC	PU	M30
7.3	Demonstration Prototype	6	CTECH	DEM	CO	M36
7.4	Micro-TE Prototype	6	HES-SO	DEM	CO	M36
6.3	Analytical model on TE and TD effects	5	NCSR	R	PU	M36
8.4	Technology showcase	7	CTECH	DEC	PU	M48
2.2	Scale up IL production	1	SOLV	DEM	CO	M45
3.2	Novel IL-FF synthesis protocols	2	CNR	R	PU	M42
7.5	Prototype for ICE cars	6	CRF	DEM	CO	M45
8.5	Public engagement actions	7	CNR	DEC	PU	M48

N°	Milestone title	WP	Date	Means of verification
M1	Novel thermoelectric IL-FFs	2/3/4/5	M18	Production of several novel IL-FFs and their electrochemical thermoelectric and thermodiffusion properties (publications in peer reviewed journals)
M2	IL-FF design	3/5/6	M36	Prediction of IL and IL-FF's performance confirmed by experiments. (Numerical codes (Open access))
M3	Fundamental knowledge	5/6	M36	Numerical and analytical models describing the physical origins of MTE effects in IL-FFs. (Publications in peer-reviewed journals)
M4	IL-FFs with superior MTE property	4/5	M36	Observation of ZT values that surpass existing liquid electrolytes (e.g. ZT ~ 0.1-1) or Seebeck coefficients of the order of 10mV/K in newly synthesized IL-FFs. (Publications and/or Patents)
M5	Prototypes validation	7	M45	Quantification of power-output of prototype thermocells ready for trial by lead-user industries. (Patents, presentations at technology showcase, etc.)

## COMMUNICATION

### *EU / Internal communications*

The coordinator communicates with the Project officer in charge of MAGENTA project.

Internal communication between Coordinator and project partners will be established by Email exchange, telephone or video conferences, labs meetings...

A web-based data sharing space (SharePoint) for internal data and information sharing has been created for MAGENTA.

A Project team directory will be dedicated to all communications and will be available on the private SharePoint dedicated to MAGENTA project.

### *Documentation management*

The reference number of the documents issued by the partners during the project follows the rules described here-after:

- Each WP has its own database for the reference numbers of the documents issued in the framework of the WP;
- The database of the reference numbers of each WP must present at a minimum the here-after information:

Type of document	Reference number	Issue	Designation	Writer (company)	Emission date

Each WP leader is in charge of giving the reference number for all the documents issued in the framework of his WP and is responsible for maintaining updated the database of the reference numbers of the documents issued in the framework of his WP.

The definition of the type of document and reference number is given here after:

Type of document:

IPR = IPR team document

MM = Minutes of Meeting

TR = Technical Report

TPR = Technical progress report

RM = Risk Management document

Reference of the WPx / Issue: 00 chronological number

## DISSEMINATION AND EXPLOITATION OF RESULTS

Prior notice of any planned publication or data publication shall be given to the other Parties at least 45 calendar days before the submission. Any objection to the planned publication shall be made in accordance with the Grant Agreement in writing to the Coordinator and to the Party or Parties proposing the dissemination within 30 calendar days after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted. In any case, the delay length is subject to change according to possible future modifications in the Consortium Agreement.

In case of objection, the request will be submitted to the General Assembly for decision. Dissemination and exploitation actions will be taken in charge by CTECH (WP8).

### *Decision making scheme:*



Each partner will be responsible for their own IP and the overall project IP portfolio will be coordinated by the Management Committee.

### *Open access to MAGENTA data and publications*

#### *Data Management Plan & IPR policy*

MAGENTA adhere to Open Research Data pilot, and thus all generated data will be made publicly available, provided that such data do not represent any economic risk, or if partners cannot give critical information on the project's progress to any concurrent entities, public or private.

A Data Management Plan (DMP) will be created to describe how MAGENTA will collect, process, share and protect the data produced by the project partners. DMP will be consistent with the intellectual property right (IPR) policy (i.e., IP, confidentiality and publication provisions) and updated as any changes occur in the consortium policies.

The types of data to be generated are: material (IL-FF) property characterization, experimental procedures, simulation results, prototype specifications, novel IL synthesis protocols, etc.

Data to be included in the DMP will be collected through a dedicated private SharePoint repository.

Each partner shall communicate to the Project Coordinator and Project Manager on data to be stored and shared within the DMP. The Management Committee will be in charge to take the relevant decisions.

For all other data, partners will be required to use an open access repository (such as ZENODO <https://www.zenodo.org/about>), connected to the tools proposed by the EC (e.g. openAIRE... <https://www.openaire.eu/>) to grant access to the publications and to a bibliographic metadata in a standard format including information requested by the EC.

### ***Publications***

“Green” open access model will be adopted for peer-reviewed scientific publications, where individual partners/researchers will deposit manuscripts in an online repository (e.g., arXiv.org).

If it is decided that the scientific research will not be protected through Intellectual property Rights (IPR), but will rather be published directly, then the project is aware that Open Access must be granted to all scientific publications resulting from Horizon 2020.

A dedicated repository space has been created on ‘HAL for MAGENTA project publications: <https://hal-cea.archives-ouvertes.fr/HAL-MAGENTA/>

It will contain project’s publications and the links to partners’ institutional repositories as well as the link of MAGENTA website.

The following acknowledgement of EC support for all publications and other dissemination relating to MAGENTA project research shall be included in all project external communications:

*“MAGENTA project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 731976.”*

### ***Website***

The MAGENTA website [www.magenta-H2020.eu](http://www.magenta-H2020.eu) will contain a private and a public access, for material contributed by all partners.

It will be updated by CTECH to continuously communicate on the progress of the project for a general public audience (press releases, and media coverage). E-newsletters will be available every 6-9 months (synchronized with consortium meetings).

The public website will inform the wider community of the aims of MAGENTA and will include dissemination material. It will contain the project description (e.g., objectives, partners, the funding source, etc.), any published articles and work-in-progress.

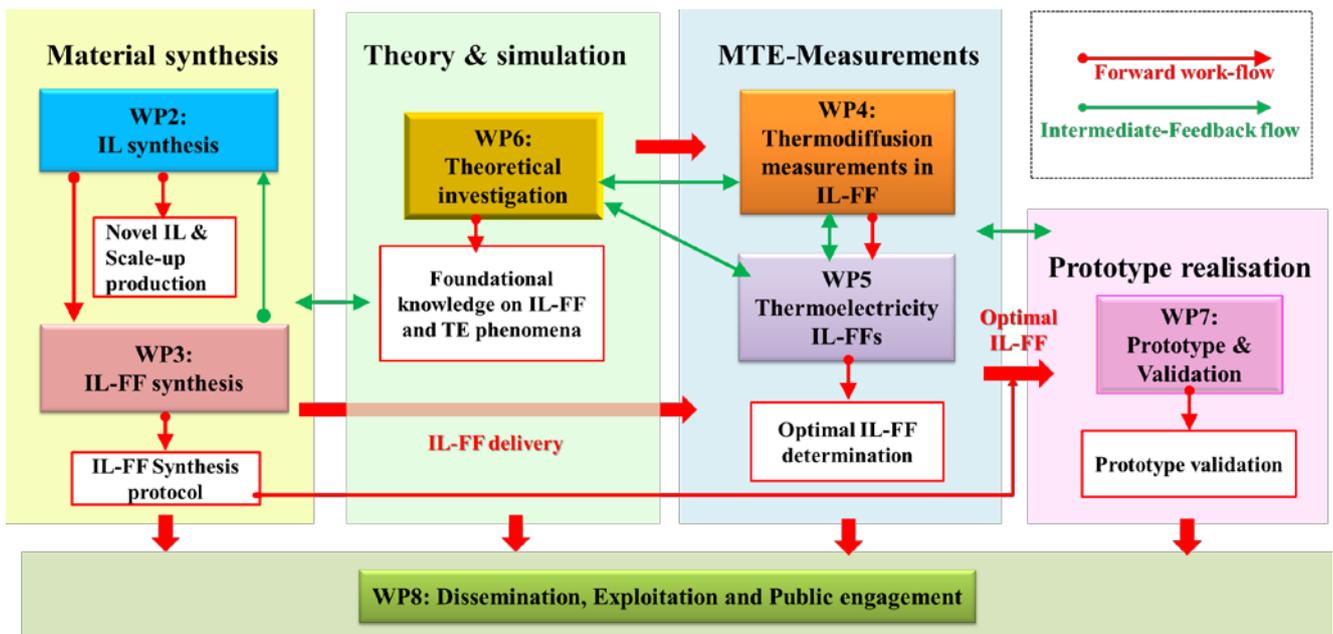
The private section of the website will be accessible only to the project partners and be used for update and exchange. This private website will be part of the DMP, dedicated to managing the internal flow of information as a part of management tool and to build a body of data to be used in the post-project exploitation phase.

**ANNEXES:**

**Annexe 1 - List of Work Packages**

WP	Work package title	Lead beneficiary
WP1	Management and coordination	1 - CEA
WP2	Ionic liquid synthesis	5 - SOLVIONIC SA
WP3	Ionic liquid based ferrofluid design	2 - CNR
WP4	Magneto-Thermodiffusion	3 - CNRS
WP5	Magneto-Thermoelectric properties	1 - CEA
WP6	Theory and numerical simulations	4 - NCSR
WP7	Prototype conception, design and validation	7 - CRF
WP8	Dissemination, exploitation & communication	6 - CTECH

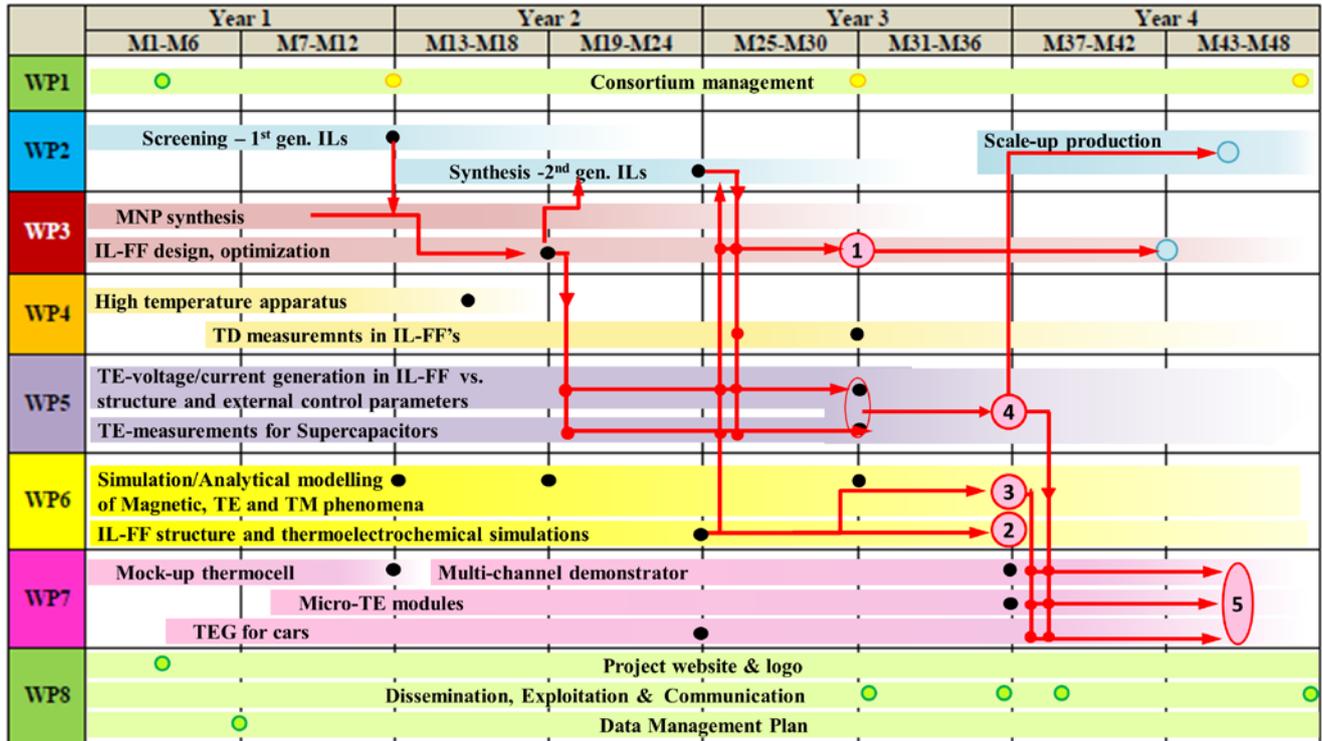
**Annexe 2 - Workplan and inter-relation among different WP components**



Red and green arrows indicate project's forward workflows and intermediate feedback flows, respectively, describing the inter-relation among different WPs. The thick red arrows indicate the project's "critical path" connecting different blocks. The milestones are indicated in the red boxes.

### Annexe 3: Implementation

The timing of different work packages and their components:



Coloured dots indicate: Administrative deliverables (green), Technical deliverables (black, see Table 3.1c above), Periodic reports (yellow, not deliverables), Milestones (magenta, see Table 3.2.a) and Final objectives (blue), respectively. Red arrows indicate only the critical work flow of MAGENTA. N.B.: Milestones 5 and 3 are also final objectives of the project.