



# **M-ERA.NET Call 2016**

## **Guide for Proposers**

**15 March 2016**

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## 1. What is M-ERA.NET

M-ERA.NET is an EU funded network which has been established in 2012 to support and increase the coordination of European research and innovation programmes and related funding in materials science and engineering. Between 2016 and 2021, the M-ERA.NET consortium will continue to contribute to the restructuring of the European Research Area (ERA) by operating a single innovative and flexible network of national and regional funding organisations. M-ERA.NET contributes to EU policies and is complementary to funding schemes at regional, national and European levels, supporting the exploitation of knowledge along the whole innovation chain from basic research to applied research and innovation. By stimulating scientific excellence and the creation of a new innovation oriented economy, M-ERA.NET will deliver lasting impact and significant breakthroughs. M-ERA.NET aims to develop a long-term cooperation between funding organisations from countries and regions across Europe and beyond.

### **What we offer:**

M-ERA.NET provides a central forum where substantial pan-European research funding programmes can be aligned to support the European RTD community. M-ERA.NET aims to address societal challenges and technological needs with an interdisciplinary approach, providing a flexible umbrella structure to cover emerging topics in materials research and innovation, including materials for low carbon energy technologies and related production technologies. As a core activity, a series of joint calls for transnational RTD projects will be implemented. These calls will offer the European RTD community an opportunity to access coordinated funding across Europe and to gain access to leading knowledge world-wide. Over five years, the M-ERA.NET consortium aims to mobilise substantial national and regional public funding as well as EU funding.

### **Why?**

Advanced materials technologies have been classified as Key Enabling Technologies (KET) with a wide range of product applications such as developing low carbon energy technologies and improving energy and resource efficiency. They have huge potential to fuel economic growth and provide jobs. In recent years, significant efforts have been made to ensure industry can meet the challenges it currently faces, in terms of the new materials being introduced and the stronger integration of products and processes required. Europe has a wealth of academic and industrial expertise and to ensure it stays at the forefront of developments it is crucial to have a strategic programme that helps to develop projects with impact on a global scale.

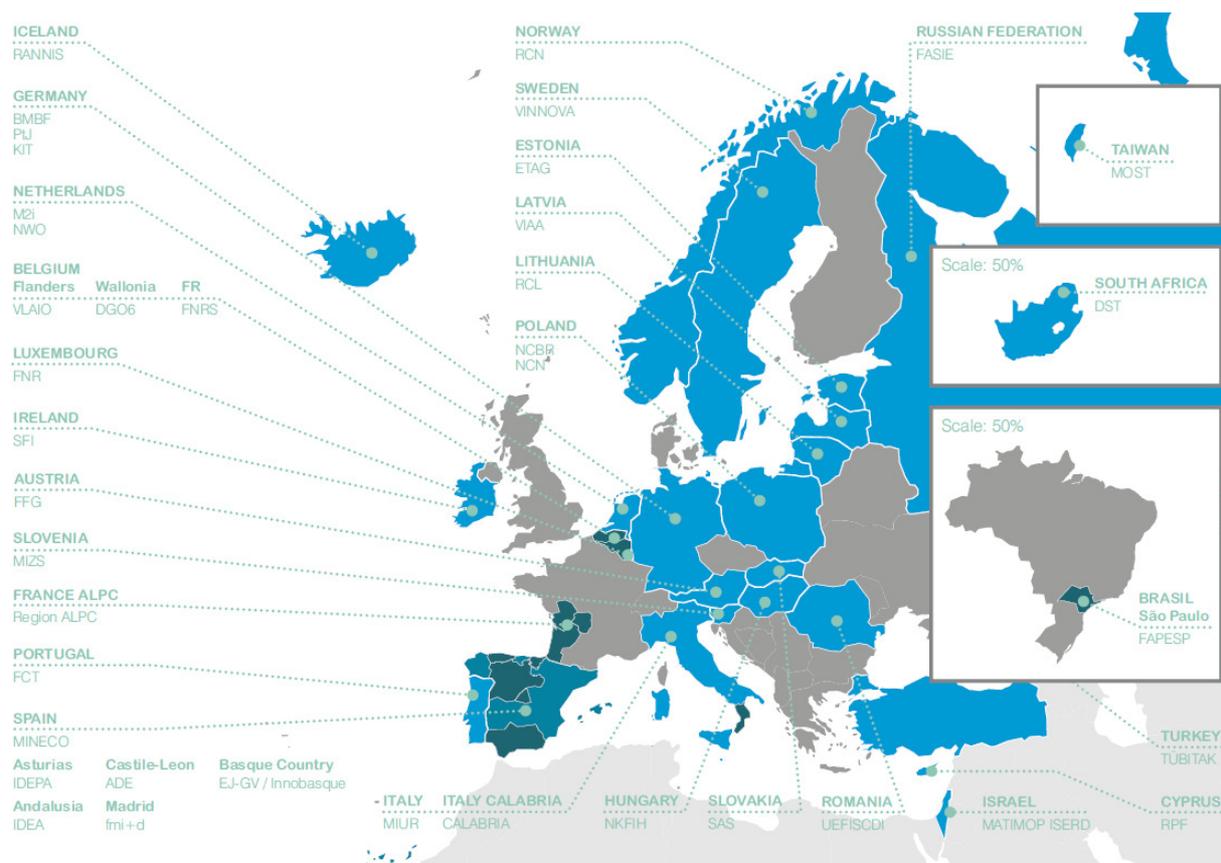
### **Strategic impact**

M-ERA.NET is a large network and a powerful tool to tackle European and global challenges in materials research. Improving the coordination and cooperation of national and regional

programmes will reduce the fragmentation of public funding across Europe and align programme strategies for transnational collaboration, eliminating programme duplication and a wasteful use of resources. M-ERA.NET will enable collaboration between leading academic and industrial research partners from European and non-European countries and regions and will facilitate access to previously inaccessible new markets. The joint calls for transnational RTD cooperation will mobilise a critical mass of public funding to support key players in materials research to intensify pan-European partnerships and to encourage newcomers to transnational RTD cooperation to realise innovative RTD projects.

## The M-ERA.NET Consortium

M-ERA.NET started in 2012 under the FP7 scheme and continues from 2016 to 2021 under the Horizon 2020 scheme as a network of 41 public funding organisations from 28 different countries, including 29 national, 12 regional and 4 international organisations. M-ERA.NET aims to identify further relevant materials research programmes and to establish cooperation with funding organisations from Europe and beyond.



## 2. Structure of the M-ERA.NET Call 2016

The objective of the M-ERA.NET Call 2016 is to enable transnational R&D projects between partners receiving funding from regional/national programmes and in some cases projects are topped up by EU funding.

M-ERA.NET will implement the Call 2016 as a two-step procedure (a Pre-Proposal and a Full-Proposal step). The Pre-Proposal stage will be used to ensure that only high quality proposals which are in line with national/regional requirements are invited to the Full-Proposal stage, targeting a reasonable balance of requested and available national/regional budgets. The Full-Proposal evaluation will be organised according to the EC rules for ERA-NET COFUND. The M-ERA.NET ranking list of recommended projects is based on the evaluators' scoring.

At the M-ERA.NET selection meeting, proposals will be selected for funding following the M-ERA.NET ranking list and based on the available national/regional funding.

Figure 1 shows the schematic workflow of the Call 2016. Benefits are combined in one approach: On the one hand the regional/national funding organisations apply their own well-established funding rules and procedures known to their applicants, and on the other hand the M-ERA.NET provides transnational coordination expertise:

- The announcement and dissemination activities of the call are performed by the M-ERA.NET network.
- The eligibility of funding applications will be checked by national/regional funding organisations according to the rules defined by their respective funding programmes, targeting a reasonable balance of requested and available national/regional budgets.
- There will be a centralised evaluation performed by independent international evaluators that provide a ranking list.
- The ranking list must be followed.
- The coordination of the evaluation and funding decisions is performed by the M-ERA.NET Steering Board at the Selection Meeting.

### 3. Call Announcement

#### 3.1. Objectives and Topics

The aim is to fund ambitious transnational RTD projects addressing materials research and innovation including materials for low carbon energy technologies and related production technologies.

This call supports the following topics:

1. Integrated computational materials engineering
2. Innovative surfaces, coatings and interfaces
3. High performance synthetic and biobased composites
4. Functional materials
5. Interfaces between materials and biological hosts for health applications
6. Materials for additive manufacturing

M-ERA.NET will support the research and innovation chain described through the Technology Readiness Levels (TRL). **A more detailed description of the topics and TRLs is available in Annex 2.**

The individual national/regional thematic programme focus and funding rules (3.2.) must be taken into account.

#### 3.2. Funding rules

Each project partner has to apply individually for regional/national funding. For each project partner the funding rules of the respective regional/national programmes apply. This means that depending on the respective national/regional funding rules some project partners have to submit additional national/regional proposals or information on national/regional level.

To obtain detailed information about the specific funding rules and programme priorities we strongly recommend contacting the respective national/regional funding organisations (see Annex 3 for details).

#### 3.3. Eligible project structure

- Project consortia consisting of a minimum of 3 partners (all requesting funding) from at least 2 different countries (at least 2 independent entities from 2 different EU member states or associated countries) participating in the M-ERA.NET Call 2016 (see Annex 3 for details) can apply. The consortia may involve as many partners as necessary.
- All project partners must belong to a country/region participating in the M-ERA.NET Call 2016. Consortia cannot include partners from countries/regions not participating in the Call 2016.

- Project addresses appropriate TRLs for selected M-ERA.NET Call 2016 topics
- Proposal is recommended for Full-Proposal submission by M-ERA.NET after Pre-Proposal stage.
- SMEs, large companies, academic research groups, universities, public research organisations or other research organisations may also participate according to their national/regional financing regulations.

Small to medium sized projects (4 or 5 partners on average) are expected. The roles of each partner within the consortium should clearly add value to the objectives of the proposed project.

Depending on the nature of the project each partner in the consortium must demonstrate how it will exploit the expected results.

National/regional funding rules apply. Therefore in some cases only certain topics, TRLs or types of organisations are eligible (e.g. some national/regional programmes fund only industrial but no academic partners, low/high TRLs).

A consortium agreement between the project partners is required for funding (after the final funding decision), although the principles of the agreement should be clear in the application form. The purpose of the consortium agreement is to clarify:

- the responsibilities of the partners;
- decision processes inside the project;
- management of any change of partners;
- how to exploit and/or commercialise the results (for each partner);
- IPR issues

A template for the consortium agreement can be found at: [www.iprhelpdesk.eu](http://www.iprhelpdesk.eu)

### **3.4. Project budget**

No overall limits have been defined on M-ERA.NET level but national/regional limits regarding the available funding will apply.

### **3.5. Project duration**

The maximum project duration cannot exceed 36 months. National/regional limits regarding the duration of projects will apply. **For the M-ERANET 2 Call 2016 no extension of the project duration is possible!**

### 3.6. Draft dates and deadlines

Date	Step	Place
15 March 2016	Publication of the M-ERA.NET Call 2016	
14 June 2016 12:00 noon Brussels time	Deadline for submission of Pre-Proposals a) Pre-Proposals and b) National/regional Funding Applications, if necessary*	a) Online (via IT tool) b) National/Regional funding organisations
Mid-September 2016	Feedback to applicants	
10 November 2016 12:00 noon Brussels time	Deadline for submission of: a) Full-Proposals and b) National/regional Funding Applications, if necessary*	a) Online (via IT tool) b) National/Regional funding organisation
January 2017	M-ERA.NET feedback to applicants	
March 2017	Contract negotiations for selected proposals on national/regional level	National/ Regional funding organisations
Spring 2017	Start of funded projects	

*\* contact your national/regional funding organisation*

## 4. Application process

The M-ERA.NET application process will be a 2-step procedure: Pre-Proposal and Full-Proposal.

1. Before submitting a proposal, all project partners must contact their respective national/regional programme funding organisations in order to discuss the project line-up and the funding conditions.
2. **A Pre-Proposal is mandatory.** It has to be submitted by the coordinator through an online application form available at [www.m-era.net](http://www.m-era.net). At the same time national/regional funding applications must be submitted to each of the involved funding organisation according to their specific rules (if applicable).
3. National/regional funding organisations will carry out their own eligibility check and evaluation based on the Pre-Proposal and the respective national/regional funding application. The Pre-Proposal stage will be used to ensure that only high quality proposals which are in line with national requirements are invited to the Full-Proposal stage. Funding organisations must ensure a reasonable balance of requested and available national/regional budgets. Applicants will be provided with feedback after the review of their Pre-Proposal, including a recommendation to submit (or not) a Full-Proposal.
4. A proposal has to be recommended for Full-Proposal submission by M-ERA.NET after Pre-Proposal stage to be eligible.
5. A Full-Proposal must be submitted by the project coordinator through an online application form available at [www.m-era.net](http://www.m-era.net). At the same time national/regional funding applications must be submitted to each of the involved funding organisation according to their specific rules.
6. In the second stage Full-Proposals will be subject to a central evaluation. The centralised evaluation is performed by independent international evaluators according to the EC rules for ERA-NET COFUND, including the appropriate evaluation criteria. The M-ERA.NET ranking list of recommended projects is based on the evaluators' scoring. At the M-ERA.NET selection meeting proposals will be selected for funding based on the M-ERA.NET ranking list, the national/regional funding commitment and the available EU top-up. The consortium is fully aware that the ranking list of the co-funded call has to be strictly followed.

### 4.1. Stage 1: M-ERA.NET Pre-Proposal

The Pre-Proposal gives an overview on the whole project. It is mandatory and has to be submitted in English by the project coordinator through an online application form available at [www.m-era.net](http://www.m-era.net). In addition to the Pre-Proposal (online submission) the corresponding

national/regional funding application form may be requested by the respective funding organisation according to their respective programme rules.

After eligibility check and evaluation of Pre-Proposals M-ERA.NET gives advice to the project coordinators and recommends/does not recommend the submission of Full-Proposals.

## 4.2. Stage 2: M-ERA.NET Full-Proposal (and national/regional funding applications)

- ▶ *Project objectives stated in the Pre-Proposal cannot be changed.*
- ▶ *Other changes from Pre- to Full-Proposal should be avoided. In any case, changes from Pre- to Full-Proposal stage have to be coordinated with all involved funding organisations by the consortium leader! It is not possible to add new countries to the consortium, i.e. only new partners from countries already participating in the proposal can be added after the Pre-Proposal stage-*

*This means that changes regarding partners, content, costs, funding or consortium have to be communicated to all involved funding organisations. The consortium leader is responsible to coordinate and ensure the acceptance of these changes by the involved funding organisations.*

The Full-Proposal gives an overview of the whole project and describes all national project parts. To receive funding, the national parts of the project must fulfil their national/regional criteria. This will create different submission and financing situations for partners from different countries.

## 4.3. Confidentiality

Proposals and any information relating to them (including the names of the evaluators) will be kept confidential and only be accessible to the organisations involved in the funding. Proposals will not be used for any purpose other than the evaluation of the applications, making funding decisions and monitoring of the project. International experts are required to sign a confidentiality agreement prior to evaluating proposals.

## 5. Evaluation

M-ERA.NET aims at providing a transparent, fast and straight forward assessment of the submitted project proposals.

### 5.1. Pre-Proposal:

#### 5.1.1 Eligibility check and evaluation criteria:

##### At M-ERA.NET level:

- Pre-Proposal submitted on or before deadline.
- Presence of requested M-ERA.NET Pre-Proposal form in English.
- Minimum of 3 partners (all requesting funding) from at least 2 different countries (at least 2 independent entities from 2 different EU member states or associated countries) participating in the M-ERA.NET Call 2016.
- Consortia cannot include partners from countries/regions not participating in the Call 2016.
- TRLs are in line with the call topic.
- Maximum project duration of 3 months years (no extension possible)
- Pre-Proposal is recommended for submission for a Full-Proposal by at least 2 funding organisations from the countries/regions involved.

##### At National/regional level:

- Presence of requested national/regional Pre-Proposal forms (if applicable).
- Minimum number of eligible, independent partners (if applicable, criteria of involved funding programmes apply).
- Relevance to funding programme (if applicable, criteria of involved funding programmes apply).
- Financial status of applicants, especially industrial applicants.

#### 5.1.2. Result of Pre-Proposal assessment:

At national/ regional level the assessment of Pre-Proposal results in one of the recommendations, to be communicated to the applicants:

- *Recommended for submitting the Full-Proposal (including requirements and/or potential comments for improvement).*
- *Not recommended (motivated - mandatory comments).*

## 5.2. Full-Proposal:

### 5.2.1 Eligibility check:

Eligibility checks of the Full-Proposal are done before the central evaluation.

#### At M-ERA.NET level:

- Full Proposal submitted on or before deadline.
- Presence of requested M-ERA.NET Full-Proposal form and Annex 1 to the Full-Proposal form in English.
- Minimum of 3 partners (all requesting M-ERA.NET funding) from at least 2 different countries (at least 2 independent entities from 2 different EU member states or associated countries) participating in the M-ERA.NET Call 2016.
- Consortia cannot include partners from countries/regions not participating in the Call 2016.
- TRLs are in line with the call topic.
- Maximum project duration of 3 years (no extension possible).
- Only in exceptional cases changes from Pre-Proposal to Full-Proposal are allowed.
- Proposal is recommended for funding by at least 2 funding organisations from the countries/regions involved after the Pre-Proposal assessment.

#### At National/regional level:

- Recommendations given in the Pre-Proposal stage are fulfilled.

### 5.2.2. Result of Full-Proposal eligibility check:

At national/regional level the eligibility check of Full-Proposals results in a preliminary **binding commitment** to the Full-Proposal, depending the outcome of the central evaluation.

### 5.2.3. Evaluation of Full-Proposal:

The Full-Proposal evaluation is carried out as a central evaluation by independent experts.

#### The M-ERA.NET Call 2016 Evaluation Procedure:

- *Individual written assessments: 3 individual and independent written assessments including scoring for each Full-Proposal provided by selected and agreed experts.*
- *Compilation of individual assessments: 3 individual assessments are compiled by one of the 3 experts (= rapporteur). The compilation consists of peer review report and scoring. All experts who provided individual written assessments confirm the compilation and consistency of peer review report and scoring.*
- *A binding ranking list of recommended projects is based on the scoring.*

- *All of the involved funding organisations meet for a selection meeting. Proposals will be selected for funding based on the M-ERA.NET ranking list, the national/regional funding commitment and the available EU top-up. The consortium is fully aware that the ranking list of the co-funded call has to be strictly followed.*
- *If there are big differences in the Full-Proposal compared to the recommended Pre-Proposal and/or the eligibility criteria are not fulfilled the Full-Proposal may be rejected without evaluation.*
- *The names of the independent experts will be kept confidential.*

**The M-ERA.NET Call 2016 Evaluation Criteria for Full-Proposal:**

The Full-Proposals will be evaluated according to the following criteria:

- **Excellence**
- **Impact**
- **Quality and efficiency of the implementation**

Evaluation criteria, scoring and thresholds are described in **Annex 4**.

## **6. Decision**

### **6.1. Decision process**

The ranking list has to be followed. The final funding decision for the projects will be taken by the involved funding organisations. After the selection meeting M-ERA.NET informs the project coordinator (applicants) about the funding recommendation.

### **6.2. Funding**

#### **6.2.1. Contract**

Funding contracts are signed directly between the project partners and their national/regional funding organisations.

#### **6.2.2. Payments and Start of projects**

Depending on the national/regional regulations, a pre-condition for transferring the first funding instalments might be the existence of a consortium agreement that also includes IPR related issues.

It is highly recommended that the project starting and finishing dates are the same for all project parties. As the national funding contracts may not all become effective at the same time, the project parties:

- Usually do not receive the instalments at the same time,
- Usually are not reviewed/monitored on national/regional level at exactly the same time however, the M-ERA.NET consortium will help to minimise these gaps.

## **7. Monitoring**

### **7.1. National/regional project review**

The progress of each individual contract will be monitored by the respective national/regional funding organisation through specific project review processes.

### **7.2. M-ERA.NET reporting**

Apart from the national/regional project review, the transnational cooperation aspects will be monitored on M-ERA.NET level, e.g. by using online questionnaires.

A final report has to be sent to the European Commission.

### **7.3. Change in active projects**

Any substantial change in an on-going project must be reported immediately to the involved funding organisations. The project partners should be aware that changes may affect their funding.

## **8. Dissemination**

A reference to M-ERA.NET is requested in publications, exhibitions, lectures and press information concerning results of the projects.

## **9. Support**

Frequently Asked Questions (FAQ) are listed in the website ([www.m-era.net](http://www.m-era.net)). In addition, all Funding Organisations participating in the call will provide assistance to project proposers in the case of any questions.

## **Annex 1: Thematic priorities for the M-ERA.NET Call 2016**

- 1. Integrated computational materials engineering (ICME)**
- 2. Innovative surfaces, coatings and interfaces**
- 3. High performance synthetic and biobased composites**
- 4. Functional materials**
- 5. Interfaces between materials and biological hosts for health applications**
- 6. Materials for additive manufacturing**

## Topic 1: Integrated computational materials engineering (ICME)

### Technical content/scope

Current developments in combinatorial synthesis and multi-scale modelling together with high throughput or multi-scale experimentation allow for a faster development of materials targeted to both enhanced performance and processability. A skilful combination of these approaches in terms of Integrated Computational Materials Engineering will lead to significant improvements in our ability to design new materials or to assess materials performance already in the product development stage.

The proposals should focus on either of the following model-driven schemes:

- a) Design of new materials with properties targeted for engineering applications, *or*
- b) Tailoring microstructural changes of known materials to obtain new or improved properties, *or*
- c) Creating or improving tools to advance virtual design, virtual testing or virtual processing.

### Objectives

The proposals should address each of the following items:

- 1) **Constitutive modelling and computational simulation:** Use of materials physics-based design principles in a computational environment, bridging the gap between different time and size scales
- 2) **Target properties:** Definition of specific goals to be reached, by defining criteria. For schemes a) and b) the criteria need to be quantitative target properties.
- 3) **Experimental Validation (including Calibration) across multiple length scales.**

The proposals should clearly present the approach taken for relating these three items.

### Expected impact

The proposal should address how it will contribute to the expected impact of the topic :

- Improved predictive power of Integrated Computational Materials Engineering.
- Establishment of well-targeted materials design and processing concepts.
- Building and strengthening a common European research community in the area of Integrated Computational Materials Engineering.
- Increased competitiveness of the European industry by cost saving in materials design and processing and a shortened time-to-market for materials with advanced properties
- Emphasize any potential advances in energy storage, generation or savings in the applications areas for the new materials/processes/properties obtained through ICME
- Proposals should clearly demonstrate credible benefits in engineering applications areas for the materials/processes/properties developed through ICME
- Projects within this topic could be basic or applied research (TRL target for project deliverables within levels 2-5)
- All proposals should clearly state and motivate at what level on the Technology Readiness Level (TRL) scale the project is situated at the beginning and after the project is finished (see Annex 2). In order to increase the potential for new business opportunities and commercial exploitation of the results, proposals aiming at TRL below 4 should include a plan for the transition to higher TRL's at a later stage (i.e. beyond the project end date) and demonstrate industrial involvement. This can be realised by establishing an industrial advisory board (or alternatively by the participation of one or more companies in the project consortium when feasible). For proposals aiming at TRL above 4, industrial partners should be involved in the project consortium.

### Target groups

This topic is targeted to two steps in the innovation chain: basic research and applied research. Project consortia focusing only on basic research or only on applied research are also eligible. The establishment of a strong collaboration between research entities and further networking is strongly encouraged.

**Keywords**

ICME, constitutive modelling, computational simulation, experimental validation, multiple length scales

## Topic 2: Innovative surfaces, coatings and interfaces

### Technical content/scope

Surface and coating technology is a key enabler for new solutions in numerous industrial sectors in Europe. This call will stimulate application driven development of innovative, multifunctional coatings and related processes.

The target properties addressed in this call include but are not limited to : tribology, chemical and corrosion resistance, optical, electromagnetic, (anti-) adhesive, electro-catalytic characteristics, active and responding coatings, long term performance, multifunctionality and coatings for severe environmental conditions. In particular, energy related coating properties are encouraged to be addressed in the sector of wind, PV, concentrated solar cells (CSC), geothermal energy, bioenergy, fossil fuel energies, nuclear energy, energy efficient materials (EEM) for buildings and energy storage. The proposals should also consider the processing aspect of the new technology aiming for flexible and energy-efficient approaches in production with smart use of materials (saving resources and tailoring applications) in an environmentally friendly manner.

### Objectives

The objective of the call is to develop innovative or significantly improved coatings, interfaces and process solutions by chemical and/or physical surface modification. This call aims to generate new insights in surface modification, manufacturing, and tailoring of (multi-) functional coatings by a holistic understanding of the relationship of materials - processes - applications. This will enable a new generation of engineered surfaces with improved and combined characteristics.

The project proposals should address innovative surface modification and coating solutions, consider innovative processing routes or new concepts for coating and surface treatment.

Project proposals should also focus on one or several of the following points: interdisciplinary process combinations, innovative surfaces and coating materials, material compounds, nanomaterials, surfaces with sensor capabilities, structured surfaces, composite coatings or multilayers. Consideration should be given to basic understanding of the mechanisms, experimental assessment, prototyping, up-scaling, manufacturing and/or validation.

In order to ensure relevance for different partners in the value chain, the proposal should state clear concepts for application(s) and industrial sector(s).

### Expected impact

- Innovative components/products with tailored properties or functionalities by tuned surfaces and coatings.
- A positive ecological and energetical impact in terms of avoidance of hazardous materials and compounds and aspects of sustainability in processes, coating material, technology and product life cycles is expected.
- The project should address innovative products or technologies based on functionalised surfaces and coatings that might have strong societal impact, on e.g. safety, economics, employment and life quality, and are expected to create synergies between industry and research.
- The project should include partners all throughout the value chain; even proposals focused on basic research should give a strategy for transfer to industry including a roadmap of valorisation with a strong emphasis on IPR protection.
- The transnational and/or international exchange of researchers from RTD entities and industrial partners is encouraged.
- All proposals should clearly state and motivate at what level on the Technology Readiness Level (TRL) scale the project is situated at the beginning and after the project is finished (see Annex 2). In order to increase the potential for new business opportunities and commercial exploitation of the results, proposals aiming at TRL below 4 should include a plan for the transition to higher TRL's at a later stage (i.e.

beyond the project end date) and demonstrate industrial involvement. This can be realised by establishing an industrial advisory board (or alternatively by the participation of one or more companies in the project consortium when feasible). For proposals aiming at TRL above 4, industrial partners should be involved in the project consortium.

### **Target groups**

This topic is targeted to all groups in the innovation chain: basic research, applied research and industrial R&D. The particular subject of the proposal deals with the establishment of a strong collaboration between research entities and SMEs.

Interdisciplinary projects are encouraged and should enable a broader cross-sectorial use. Participation of large industry is encouraged e.g. as potential end user of the technology proposed.

### **Keywords**

Functionalised surfaces, (multi)functional coatings, understanding relationships between materials - processes - and applications.

## Topic 3: High performance synthetic and biobased composites

### Technical content/scope

Within the scope of this call, composites are defined as engineered materials, including hybrids, composed of two or more constituents - typically a polymer matrix and a reinforcement being in the form of a fibre or a filler - to meet the requirements which cannot be otherwise fulfilled by one component alone. The matrix and/or fibres/fillers can be synthetic or biobased. With biobased materials it is meant materials obtained from renewable, biological resources.

### Objectives

The call aims basically at composites having adequate functional properties for the target applications including mechanical performance like high strength or stiffness to weight ratio and physical-chemical properties like thermal and electrical conductivity. The research proposals could also address methodology and tools for design-optimisation, manufacturing, automation, process and structural health monitoring, modelling and simulation of processing as well as in-service behaviour of composites. The possible application areas may include among others energy applications (consumption reduction, storage and production), light weight structures in transportation, mobility, and other engineering applications.

The research proposals should address one or more of the following:

- New material designs based on defined structure/property relationships, enabling substantial improvement of the mechanical performance.
- Development of new biobased resins, biobased fibres/fillers, biobased composites with natural fibre reinforcement, and fully biobased composites.
- New composites which combine improved mechanical performance with other physical or physical-chemical functionalities. This could be achieved among others by the integration of nanophases into the material.
- Composite processing methods enabling high production rates, aiming at applications in high-volume markets. Material innovations could encompass fast curing, low viscosity resins or stampable thermoplastic composite sheets, but also automation, robotisation and energy optimisation of the production process should be envisaged.
- Composite processing technologies for joining, assembling and repair, which also reduce after-work.
- Composite end-of-life technologies.
- Novel and unique knowledge in molecular design, functionalization and characterization of a wide range of fibre or filler reinforced composite materials.
- Modelling and simulation of processing conditions and in service behaviour of composites using a multiscale approach.
- Composites with improved reinforcement/matrix interaction.

To strengthen the whole innovation chain it is strongly recommended that the project proposal is balanced by incorporating materials, processing and application development of composites. Such integration could be further enhanced by fostering collaboration between universities and industry, and by a consortium covering the whole value chain.

### Expected impact

- More competitive industrial products and processes using the advanced materials design and manufacturing concepts.
- Socio-ecological benefits provided by products with higher integration level of functionality, lighter products to transport, lighter dynamic applications to decrease energy consumption, and by using materials with lower environmental impact.
- Because the composites industry is characterised by a large number of scattered players, including SME manufacturers and equipment suppliers, the projects should result in networks inside Europe, thereby improving the sharing of knowledge and reinforcing both technological and scientific platforms.

- All proposals should clearly state and motivate at what level on the Technology Readiness Level (TRL) scale the project is situated at the beginning and after the project is finished (see Annex 2). In order to increase the potential for new business opportunities and commercial exploitation of the results, proposals aiming at TRL below 4 should include a plan for the transition to higher TRL's at a later stage (i.e. beyond the project end date) and demonstrate industrial involvement. This can be realised by establishing an industrial advisory board (or alternatively by the participation of one or more companies in the project consortium when feasible). For proposals aiming at TRL above 4, industrial partners should be involved in the project consortium.

#### **Target groups**

This topic is targeted to all groups in the innovation chain: basic research, applied research, industrial R&D. The particular subject of the proposal deals with the establishment of a strong collaboration between research entities, SMEs and large industry.

#### **Keywords**

Composites (synthetic, biobased), hybrid material systems, functional properties, in-service behaviour, design methodology, process technology

## Topic 4: Functional materials

### Technical content/scope

Advanced functional materials are, and should remain, an important economic and employment generator in Europe. Multifunctional materials, as opposed to structural materials, are the bottleneck for almost all technologies. Designing of materials and microstructures with tailored properties is needed to achieve high performance in industrial applications, especially when considering long term stability. Special attention must be paid to the requirements for application conditions referred to energy technologies.

Currently over 80 % of Europe's energy use is based on oil, gas and coal. The European Strategic Energy Technology Plan (SET Plan) recognises this situation and emphasises the growing need for cost-competitive low carbon energy and energy efficiency technologies. The SET Plan Materials Road Map emphasises the pivotal enabling role of advanced materials and clearly outlines the medium to long term strategy for the coming years.

### Objectives

The scope of this call is to develop advanced functional materials, or material systems with improved physical, chemical and mechanical properties leading to advances on the following topics:

1. Multifunctional, nano/microstructured materials with properties tailored to perform function on demand:
  - Materials that can integrate several functions into structures, such as electromagnetism, thermal management, optics capability
  - Smart materials that enable sensing, actuation, energy storage, structure
2. Production of fuels
  - Production of hydrogen and hydrocarbon fuels: photocatalytic water splitting, (co-)electrolysis
  - Bioenergy (biogas, biofuels)
  - Advanced materials for separation, purification, affordable implementation of carbon capture/separation, materials for the storage or utilisation of CO<sub>2</sub>
3. Power generation
  - Materials for fuel cells (catalysts, electrodes, etc.)
  - Wind energy (materials for generators, such as permanent magnets)
  - Solar energy generation (for example: materials for photovoltaics, concentrated solar power and concentrated photovoltaics)
  - Functional materials under extreme conditions in power generation plants (nuclear, concentrated solar power, geothermal energy, IGCC plants)
4. Energy storage
  - Hydrogen storage
  - Electrochemical storage (ionic and electronic conductors for new electrochemical concepts, supercapacitors)
  - Thermal storage such as molten salts and eutectic alloys
5. Efficient use of energy
  - Energy efficiency in residential and commercial buildings (for example: advanced insulation materials, materials for high efficiency / high brightness lighting (LEDs / OLEDs)...) )
  - Energy efficiency in energy intensive industrial sectors such as chemicals, cement, glass, non-ferrous metallurgy, pulp and paper, etc. (for example advanced insulation or heat exchanger under harsh environment, materials for high power electronics in converters, thermoelectric conversion ...)

The research proposals should give sufficient attention to mid- or long term industrial feasibility, reliability, durability and life cycle analysis (LCA) including cost analysis (LCC) and environmental compatibility. The materials development should aim to a clear and quantified improvement in performance, cost reduction and sustainability towards critical raw materials use. Proposals should include some quantitative appraisal on the expected greenhouse gas emissions savings (including CO<sub>2</sub>, methane, nitrous oxide and F-gases).

A proposal must consider, demonstrate and clarify its added value and impact, and where appropriate, its alignment with the SET Plan materials Roadmap. For basic research programmes (lower TRL), radically new concepts should be proposed and demonstrated with respect to the state of the art.

In case the research proposal intends to make use of critical and potentially scarce raw materials - see critical raw materials for EU2 - the applicants are requested to present a justification for this choice. Projects may also address substitution or recycling of such critical or scarce materials.

### Expected impact

- Ensure the future European energy supply through technological development based on novel multifunctional materials
- Support the European strategic policy targets in terms of greenhouse gas emission reduction and developing affordable sustainable energy sources and usage.
- Improved competitiveness and strengthened industrial leadership.
- Strengthened innovation excellence of the European academia and research institutes.
- All proposals should clearly state and motivate at what level on the Technology Readiness Level (TRL) scale the project is situated at the beginning and after the project is finished (see Annex 2). In order to increase the potential for new business opportunities and commercial exploitation of the results, proposals aiming at TRL below 4 should include a plan for the transition to higher TRL's at a later stage (i.e. beyond the project end date) and demonstrate industrial involvement. This can be realised by establishing an industrial advisory board (or alternatively by the participation of one or more companies in the project consortium when feasible). For proposals aiming at TRL above 4, industrial partners should be involved in the project consortium.

### Target groups

This topic is targeted to all groups in the innovation chain: basic research, applied research, industrial R&D. The particular subject of the proposal deals with the establishment of a strong collaboration between research entities, SMEs and large industry. Consortia focusing only on basic research or industrial R&D are also eligible.

### Keywords

Advanced functional or multifunctional materials, improved properties (physical, chemical and mechanical), nano/microstructured materials.

## Topic 5: Interfaces between materials and biological hosts for health applications

### Technical content/scope

Wellness and healthy ageing of the European population will require new or improved solutions to health-related issues. Many of these solutions will come from the development of new advanced materials as key components of diagnostics (contrast agents, implantable devices) and therapeutics products (drug delivery systems, implants, tissue regeneration strategies, cell and gene therapies, etc.). These materials will necessarily be in contact with the human body at different levels.

The purpose of this call topic is to provide opportunities to advance material-based technologies closer to the market. This action is aligned with societal challenge regarding “Health, Demographic Change and Wellbeing” as defined in the H2020 framework. It is also in agreement with the recognition of advanced materials as a Key Enabling Technology for strengthening the competitiveness of the European industry.

### Objectives

The main objective is to obtain a better understanding of the interfaces between biomaterials (non-biological) and its biological hosts (e.g. organs, body tissues, cells and human bio-fluids). Materials investigated should target at least one clinically relevant application.

Proposals may address one or more of the following;

- Interactions between biomaterials and biological species with specific focus on multiple length and/or time scales.
- Aspects such as biofilm formation and biodegradation,
- The crossing of biological barriers such as blood brain barrier, digestive system, skin barrier, or cell membranes
- Understanding of the impact of the sterilisation process on bio/materials interfaces.

Successful proposals are expected to take into account the following:

- The potential market and exploitation routes of the understanding that would lead to technical solutions should be outlined.
- A report on relevant regulatory issues should be provided.
- If applicable, adequate consideration should be given to the scale-up of the proposed technological solutions and to the possible industrialisation towards a final product.

Moreover, the proposals are strongly encouraged to consider the following issues:

- Where appropriate the *in vitro* testing and/or assays in small animals should be conducted following the bio-ethical committee rules of each centre.
- Cross collaboration between materials scientists, biologists, medical doctors and industrial partners.
- International collaborations with leading research entities from M-ERA.NET associated countries.
- Involvement of SMEs and/or industrial partners.

### Expected impact

- Understanding the complexity of bio/materials interfaces at multiple spatial and/or time scales going far beyond the current state of the art.
- Achievement of new or improved materials' performance for health.
- Higher competitiveness of the European health industry through more reliable products and processes.
- Improved market access through increased awareness of the regulatory protocols.

- Increased collaborations between materials science RTD performers, industrial and medical stakeholders in the health sector.
- At the end of the project the technology being addressed is expected to reach TRL 5□ (see Annex 2).
- All proposals should clearly state and motivate at what level on the Technology Readiness Level (TRL) scale the project is situated at the beginning and after the project is finished (see Annex 2). In order to increase the potential for new business opportunities and commercial exploitation of the results, proposals aiming at TRL below 4 should include a plan for the transition to higher TRL's at a later stage (i.e. beyond the project end date) and demonstrate industrial involvement. This can be realised by establishing an industrial advisory board (or alternatively by the participation of one or more companies in the project consortium when feasible). For proposals aiming at TRL above 4, industrial partners should be involved in the project consortium.

### **Target group**

This topic is targeted to all groups in the innovation chain: basic research, applied research, industrial R&D. Collaboration between research entities, SMEs and large industry is encouraged.

**Keywords:** Biomaterials, bio-interfaces, biofilms, biodegradation, nanotechnology, nanomaterials for biomedicine, implants, scaffolds, cell membrane,

## Topic 6: Materials for additive manufacturing

### Technical content/scope

Additive Manufacturing (AM) is a process of building 3D parts and components directly based on a digital model usually by adding material layer by layer. AM is a rapidly developing industrial sector and, potentially, a disruptive one not least because, in principle, it has the potential to be material and energy effective and sustainable compared to subtractive technologies. However, the potential to fully exploit 3D AM processes is currently limited due to the limitations of the available materials' sets. While past developments have focused mainly on polymers and metal alloys, there exist big opportunities related to ceramics and composites. Within this call, the driving force for materials development should come from specific potential applications that will arise from improved performance, reliability and economics of manufactured components.

### Objectives

The objective is to develop innovative metallic, ceramic and polymeric materials designed for use in AM processes and advanced production systems in order to confer improved or modified properties for the manufacturing of components. The main focus of this call lies in the development of materials specifically designed for use in AM processes (e.g. tuning composition, structure, morphology, powder processing parameters etc.). The final goal of proposed projects should be to demonstrate the ability of new materials and processes to achieve finished components exhibiting improved performance, preferably with reduced life cycle costs.

Project proposals should address developments in e.g. mechanical and corrosion properties, surface finishing, internal stress reduction, electrical and thermal conductivity, and materials specifically designed to exploit the potential of AM systems to produce reliably functionally graded and composites components. Focus should be on materials for and production processes for final part production. Proposals should aim to emphasise energy related aspects of the research.

Examples of proposals that would be considered eligible under this call include, but are not exclusively confined to:

- Development of materials and processes designed to overcome problems relating to internal stress in AM parts.
- Development of materials for the AM production of components for use in extreme environments.
- Materials for use in the production of improved scaffolds used in regenerative medicine applications.
- Development of novel materials and processes to enable innovative applications for AM parts.
- New materials for energy efficient heat exchangers with complex geometry.

### Expected impact

- Development of materials for the production of reliable AM parts/components suitable for specific application classes.
- New feedstock materials (e.g. powder, wire, filament) specifically developed to enhance functionality, reliability and performance
- New process technology adapted to the production of new feedstock materials.
- Projects within this call could be basic or applied research (TRL target for project deliverables within levels 3-6)
- Project consortia should involve companies having the ability to industrialise the results
- The use of living biological materials as part of the AM process is not covered by this call

- All proposals should address any environmental, social or ethical impacts where relevant
- All proposals should clearly state and motivate at what level on the Technology Readiness Level (TRL) scale the project is situated at the beginning and after the project is finished (see Annex 2). In order to increase the potential for new business opportunities and commercial exploitation of the results, proposals aiming at TRL below 4 should include a plan for the transition to higher TRL's at a later stage (i.e. beyond the project end date) and demonstrate industrial involvement. This can be realised by establishing an industrial advisory board (or alternatively by the participation of one or more companies in the project consortium when feasible). For proposals aiming at TRL above 4, industrial partners should be involved in the project consortium.

#### **Main target groups**

This topic is targeted at all groups in the innovation chain: basic research, applied research, industrial R&D. Collaboration between research entities, SMEs and large industry is encouraged as is participation in project consortia by international organisations.

#### **Keywords**

Materials development; 3D printing; Additive Manufacturing; Component properties; Production; Polymers; Metals; Ceramics; Application driven; Life cycle cost; Materials efficiency

## Annex 2 Technology Readiness Level

All proposals should clearly state and motivate at what level on the Technology Readiness Level (TRL) scale the project is situated at the beginning and after the project is finished (see Annex 2). In order to increase the potential for new business opportunities and commercial exploitation of the results, proposals aiming at TRL below 4 should include a plan for the transition to higher TRL's at a later stage (i.e. beyond the project end date) and demonstrate industrial involvement. This can be realised by establishing an industrial advisory board (or alternatively by the participation of one or more companies in the project consortium when feasible). For proposals aiming at TRL above 4, industrial partners should be involved in the project consortium.

Where the topic description refers to the concept of “Technology Readiness Level” (TRL), the following definition in accordance with H2020<sup>1</sup> applies:

- TRL 1 - basic principles observed
- TRL 2 - technology concept formulated
- TRL 3 - experimental proof of concept
- TRL 4 - technology validated in lab
- TRL 5 - technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
- TRL 6 - technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)
- TRL 7 - system prototype demonstration in operational environment
- TRL 8 - system complete and qualified
- TRL 9 - actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)

In the project proposal, it should be indicated what is the TRL position in the beginning of the project and after the project is finished.

Topic	TRL 1	TRL 2	TRL 3	TRL 4	TRL 5	TRL 6	TRL 7	TRL 8	TRL 9
Integrated Computational Materials Engineering.									
Innovative Surfaces, Coatings and Interfaces.									
High performance synthetic and biobased composites.									
Functional Materials.									
Interfaces between materials and biological hosts for health applications.									
Materials for additive manufacturing									

<sup>1</sup> [http://ec.europa.eu/research/participants/portal/doc/call/h2020/common/1597678-part\\_18\\_general\\_annexes\\_incl\\_corr\\_en.pdf](http://ec.europa.eu/research/participants/portal/doc/call/h2020/common/1597678-part_18_general_annexes_incl_corr_en.pdf)

## Annex 3: Funding organisations participating in the M-ERA.NET Call 2016

Country/Region	Funding organisation involved	Contact person:
Austria	FFG Austrian Research Promotion Agency	FFG-TP: Name: Fabienne EDER Phone: +43 57755 5081 e-mail: fabienne.eder@ffg.at
		FFG-BP: Name: Konstantin SAVOV Phone: +43 577 55 1313 e-mail: konstantin.savov@ffg.at
Belgium	Flanders: VLAIO	Name: Paul SCHREURS Phone: +32 2 432 42 85 e-mail: ps@iwt.be
		Name: Johan MICHIELS Phone: +32 2 432 43 06 e-mail: jmi@iwt.be
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Name: Arnaud GOOLAERTS Phone: +32 2 504 93 28 e-mail: arnaud.goolaerts@frs-fnrs.be		
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France	Region Aquitaine Limousin Poitou-Charentes	Name : Emmanuelle PALLIER VALENZUELA Phone : +33 555 45 00 80 e-mail: e-pallier-valenzuela@laregion-alpc.fr Name : Fanny Duban Phone : +33 555 45 17 83 e-mail: f-duban@laregion-alpc.fr
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	PTKA Projektträger Karlsruhe	Name: Stefan SCHERR Phone +49 721 608 25286 e-mail: stefan.scherr@kit.edu

Country/Region	Funding organisation involved	Contact person:
Hungary	NKFIH National Office for Research, Development, and Innovation	Name: Elod NEMERKENYI Phone: + 36-1-896-3987 e-mail: elod.nemerkenyi@nkfi.gov.hu
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Netherlands	Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)	Name: Sabine VAN RIJT Phone: +31 (0)70 3494477 e-mail: s.vanrijt@nwo.nl
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Country/Region	Funding organisation involved	Contact person:
Poland	NCBiR The National Centre for Research and Development	Name: Katarzyna SAMSEL Phone: +48 22 39 07 156 e-mail: katarzyna.samsel@ncbr.gov.pl
Portugal	FCT-Funadção para a Ciência e a Tecnologia	Name: Dina CARRILHO Phone: +351 213 924 381 e-mail:Dina.Carrilho@fct.pt
Romania	UEFISCDI Executive Agency for Higher Education, Research, Development and Innovation Funding	Name: Monica CRUCERU Phone: +4021 308 05 61 e-mail: monica.cruceru@uefiscdi.ro
Russian Federation	Foundation for Assistance to Small Innovative Enterprises (FASIE)	Name: Olga LEVCHENKO Phone: +7 495 231 38 51 e-mail: levchenko@fasie.ru
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Turkey	TÜBİTAK The Scientific and Technological Research Council of Turkey	Name: Burcu Koc HASKILIC, Dursun Can ÖZCAN Phone: +904685300 e-mail: burcu.haskilic@tubitak.gov.tr can.ozcan@tubitak.gov.tr

**Commitment per funding organisation 2016:**

M-ERA.NET Call 2016		Integrated computational materials engineering	Innovative surfaces, coatings and interfaces	High performance synthetic and biobased composites	Functional materials	Interfaces between materials and biological hosts for health applications	Materials for additive manufacturing	Estimated public funding [M€]
Austria	FFG-BP		X		X	X		2.0
Austria	FFG-TP	X		X			X	1.0
Belgium - Flanders	VLAIO	X	X	X	X	X	X	1.0
Belgium - FSC	FNRS	X	X	X	X		X	0.3
Belgium - Wallonia	DGO6	X	X	X	X	X	X	1.0
Brazil - Sao Paulo	FAPESP	X	X	X	X	X	X	0.4
Cyprus	RPF	X	X	X	X	X	X	0.4
France - ALPC	Region ALPC	X	X	X	X	X	X	0.3
Germany	PtJ		X	X	X		X	4.0
Germany	KIT						X	1.0
Hungary	NKFIH	X	X	X	X	X	X	0.3
Iceland	RANNIS	X	X	X	X	X	X	0.25
Ireland	SFI	X	X	X	X	X	X	0.5
Israel	MATIMOP-ISERD	X	X	X	X	X	X	0.4
Italy	MIUR		X	X		X		0.6
Italy - Calabria	CALABRIA		X	X	X	X		0.5
Latvia	VIAA	X	X	X	X	X	X	0.4
Lithuania	RCL	X	X	X	X	X	X	0.202
Luxembourg	FNR	X	X	X	X	X	X	0.5
Netherlands	M2i	X	X	X	X	X	X	0.3
Netherlands	NWO	X	X	X	X	X	X	1.5
Norway	RCN		X	X	X		X	3.0
Poland	NCBR	X	X	X	X	X	X	1.0
Poland	NCN	X	X	X	X	X	X	0.5
Portugal	FCT	X	X	X	X	X	X	0.75
Romania	UEFISCDI	X	X	X	X	X	X	1.5
Russia	FASIE	X	X	X	X	X	X	0.5
South Africa	DST	X	X	X	X	X	X	0.2
Spain	MINECO	X	X	X	X	X	X	1.0
Spain - Asturias	IDEPA	X	X	X	X	X	X	0.4
Spain - Basque Country	EJ-GV/Innobasque	X	X	X	X	X	X	0.5
Spain - Castile Leon	ADE	X	X	X	X	X	X	0.5
Slovakia	SAS	X	X	X	X	X	X	0.36
Slovenia	MIZS	X	X	X	X	X	X	0.63
Taiwan	MOST	X	X	X	X	X	X	1.0
Turkey	Tübitak	X	X	X	X	X	X	2.0

## Annex 4: M-ERA.NET Full-Proposal Evaluation Criteria

- **1. Excellence (max. 5.0 points)**
  - 1.1 Clarity and pertinence of the objectives (max. 1.5 points)
  - 1.2 Credibility of the proposed approach and soundness of the concept (max. 2.0 points)
  - 1.3 Extent that proposed work is ambitious, has innovation potential, and is beyond the state of the art (e.g. ground-breaking objectives, novel concepts and approaches (max. 1.5 points)
  
- **2. Impact (max. 5.0 points)**
  - 2.1 Contribution at the European or international level to the expected impacts listed in the work programme under the relevant topic (max. 2.5 points)
  - 2.2 Enhancing innovation capacity and integration of new knowledge; Strengthening the competitiveness and growth of companies by developing innovations meeting the needs of European and global markets; and, where relevant, by delivering such innovations to the markets; Any other environmental and socially important impacts (not already covered above); (max. 1.0 points)
  - 2.3 Effectiveness of the proposed measures to exploit and disseminate the project results (including management of IPR), to communicate the project, and to manage research data where relevant (max. 1.5 points)
  
- **3. Quality and efficiency of the implementation (max. 5.0 points)**
  - 3.1 Appropriateness of the management structures and procedures (max. 1.0 points)
  - 3.2 Quality and relevant experience of the individual participants (max. 1.0 points)
  - 3.3 Quality of the consortium as a whole (including complementarity, balance) (max. 1.0 points)
  - 3.4 Appropriate allocation and justification of the resources to be committed (budget, staff, equipment) (max. 2.0 points)
  
- **Ethical issues:** Full-Proposal include H2020 „Ethicas issues Table”. In case ethical issues apply (applicants mark respective issues in the table) M-ERA.NET recommends that the national/regional organisations observe these issues (e.g. post-evaluation review) for their respective funded projects.

### Additional Information

Individual assessment report: Each criterion will be scored between 0.0 and 5.0 representing the sum of the scoring of the individual sub criteria.

Sub-criteria have individual maximum scores with a resolution of 0.1 points. There are no thresholds for sub-criteria. The awarded scores for each sub-criterion have to be justified with written statements by the evaluators.

Peer review report: the rapporteur will compile a peer review report, to be accepted by all 3 evaluators. The final scoring of the main criteria will take into consideration the scores from the

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individual assessments. Each criterion will be scored between 0.0 and 5.0 in multiples of half (0.5) points.

The threshold for individual criteria will be 3.0; the overall threshold, applying to the sum of the individual scores will be 10.0.

In case of equal scoring of proposals the scores of the individual criteria and sub-criteria can be compared as follows for the elaboration of M-ERA.NET ranking list: compare scoring of criterion 1, if still equal compare scoring of criterion 2, if still equal compare scoring of criterion 3, if still equal sub-criteria can be compared.

## Annex 5: Checklist for Proposers

The proposal conforms to the call guidelines.	<input type="checkbox"/>
Every project partner has been in direct contact with his/her national or regional funding organisation and has checked that their collaboration and their project contribution is eligible for funding.	<input type="checkbox"/>
All partners who are not eligible for 100% funding are able to provide financial resources for their own contribution.	<input type="checkbox"/>
The consortium is aware of the necessity to have a consortium agreement, including amongst others the agreements on intellectual property rights (IPR) and publication rules for a funded project (to be signed before the first payment)	<input type="checkbox"/>
All project partners have checked the national/regional programme procedures and regulations. All project partners are aware of documents requested by the national/regional funding organisations. <b><i>IMPORTANT REMINDER: All consortium partners must check if applications (at Pre-Proposal and/or Full-Proposal stage) have to be submitted also to their national/regional funding organisations.</i></b>	<input type="checkbox"/>

Please go <https://www.m-era.net/joint-call-2016> to submit the:

1. Pre-Proposal form online.  
Deadline for submission: 14 June 2016, 12:00 noon Brussels time
2. Full-Proposal form + Annex 1 to the Full-Proposal form online.  
Deadline for submission: 10 November 2016, 12:00 noon Brussels time

For further information on M-ERA.NET: please go to <http://www.m-era.net>