

出國報告（出國類別：其他）

參加「歐盟 M-ERA.NET 2 啟動會議」報告

服務機關：科技部

姓名職稱：徐文章研究員

派赴國家：奧地利

報告日期：105.02.16

出國時間：105.01.25~105.01.29

摘要

為促進奈米材料科學的國際合作，本部自 2012 年起即參與歐盟 M-ERA.NET(國際奈米材料合作計畫)。因為 M-ERA.NET 執行績效良好，於 2016 年 1 月期程結束後，歐盟 M-ERA.NET 計畫指導委員會同意持續提供經費，支持歐盟國家進行國際合作；新期程之計畫名稱為 M-ERA.NET2，執行期程為 5 年，審查通過之計畫，台灣團隊由科技部支持研究經費，歐洲團隊由歐盟提供經費支持，計畫以核定 3 年期計畫為原則，藉由長期的學術合作研究，促進跨國之互動與科技交流，並完成特定之任務。

M-ERA.NET2 執行期程為 2016 至 2020 年，係延續 M-ERA.NET (2012 年 2 月至 2016 年 1 月)計畫，目前新期程計畫涵蓋 28 個不同的國家，41 個補助機構(funding agency)。就新期程的成員分析，其中 85%為舊有之成員，曾參與前一期之計畫徵求，另有 15%為新成員。

本期之徵求主題有六項，涵蓋計算材料科學(computational materials engineering)、表面塗層(surfaces), 複合材料(composites), 機能材料(functional materials)、生醫界面材料(interfaces between materials and biological hosts)、積層製造材料(additive manufacturing)等。

整體目標為:

1. 強化應用於低碳能源的材料研發應用
2. 加速產業化的應用
3. 提供彈性架構因應新興需求
4. 跨領域的合作
5. 以材料研究對社會產生貢獻

本次 M-ERA.NET2 會議為啟動會議，會議中討論 2016 徵求計畫的各事項，目的在經過會議討論後，修正或確定規劃單位之各項預擬建議，獲得各參與國家與補助機構的同意，後續依照此共識執行。

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壹、會議目的

為促進奈米材料科學的國際合作，本部（原國家科學委員會）自 2012 年起即參與歐盟 M-ERA.NET 的國際奈米材料合作計畫，透過與歐盟 M-ERA.NET 計畫指導委員會合作，推動國際合作研究計畫，進行實質科技合作。

M-ERA.NET 於 2016 年 1 月結束，因為績效良好，歐盟同意繼續提供經費支持歐盟國家進行此跨國之國際合作。新期程之計畫名稱為 M-ERA.NET2，執行期程為 2016 至 2020 年，審查通過之計畫，台灣團隊由科技部支持研究經費，歐洲團隊由歐盟提供經費支持，計畫以核定 3 年期計畫為原則，藉由長期的學術合作研究，促進跨國之互動與科技交流。

目前台灣的材料國際合作研究計畫，蓬勃發展，科技部陸續推動了幾年與歐盟的奈米材料聯合徵求計畫，每年台灣都有計畫團隊獲得支持，研究能量獲得歐盟指導委員會的肯定。台灣的奈米材料研究亦透過此跨國之合作，提高國際能見度，在研究上能截長補短，開創新視野，產生互利的效果。

歷年已執行之共同研究議題如下：

102 年核定通過 2 件計畫

主持人	<u>coordinator</u>	partner
主持人執行機構	國立臺灣大學材料科學與工程學系暨研究所	中央研究院物理研究所
計畫名稱(英文)	Hybrid Materials for Low Cost Volatile Organic Compound Sensor System	physical properties of composite materials
計畫執行起迄	102/9/1~105/7/31	102/9/1~105/7/31
合作國家	芬蘭、匈牙利、西班牙	斯洛伐克(coordinator)、匈牙利

103 年核定通過 3 件計畫

主持人	partner	partner	partner
主持人執行機構	國立交通大學光電工程學系（所）	國立交通大學電機工程學系（所）	國立臺灣大學工程科學及海洋工程學系暨研究所
計畫名稱(英文)	COSiFlex: Composite organic and silicon technologies on flexible substrates	Design and Implementation of the OLED Driving Circuit and OPD Readout Circuit	Enabling technology for high-quality piezoMEMS (ENPIEZO)

計畫執行起迄	103/9/1~106/7/31	103/9/1~106/7/31	103/9/1~106/7/31
合作國家	澳洲(coordinator)、台灣	澳洲(coordinator)、台灣	斯洛維尼亞 (coordinator)、挪威、台灣

104 年核定通過 2 件計畫

主持人	partner	partner
主持人執行機構	國立臺灣大學化學工程學系暨研究所	國立臺灣科技大學化學工程系
計畫名稱(英文)	Development of a cycle-stable high capacity Li2S-Si Battery (ACHiLiS): Anode	Developing highly stable and safe Li2S/C composite cathodes
計畫執行起迄	104/9/1~107/7/31	104/9/1~107/7/31
合作國家	德國(coordinator)、台灣	德國(coordinator)、台灣

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貳、會議過程



圖一、 Dr. Roland Brandenburg 為本次會議之主持人與負責人

1月27日會議於維也納的 Hotel de France 召開，主要區分為個6項主題，首先由 Dr. Roland Brandenburg 開場，進行 Management 討論，就本計畫目標、任務與執行作說明；接著進行各分項工作之討論，包含聯合徵求計畫與非聯合徵求計畫之各項執行細節與配合措施，建立溝通平台與後續召開之會議，計畫審查與評量的評分方式與執行機制，執行期間之協助與追蹤等。

會議期間討論之6項主題如下:

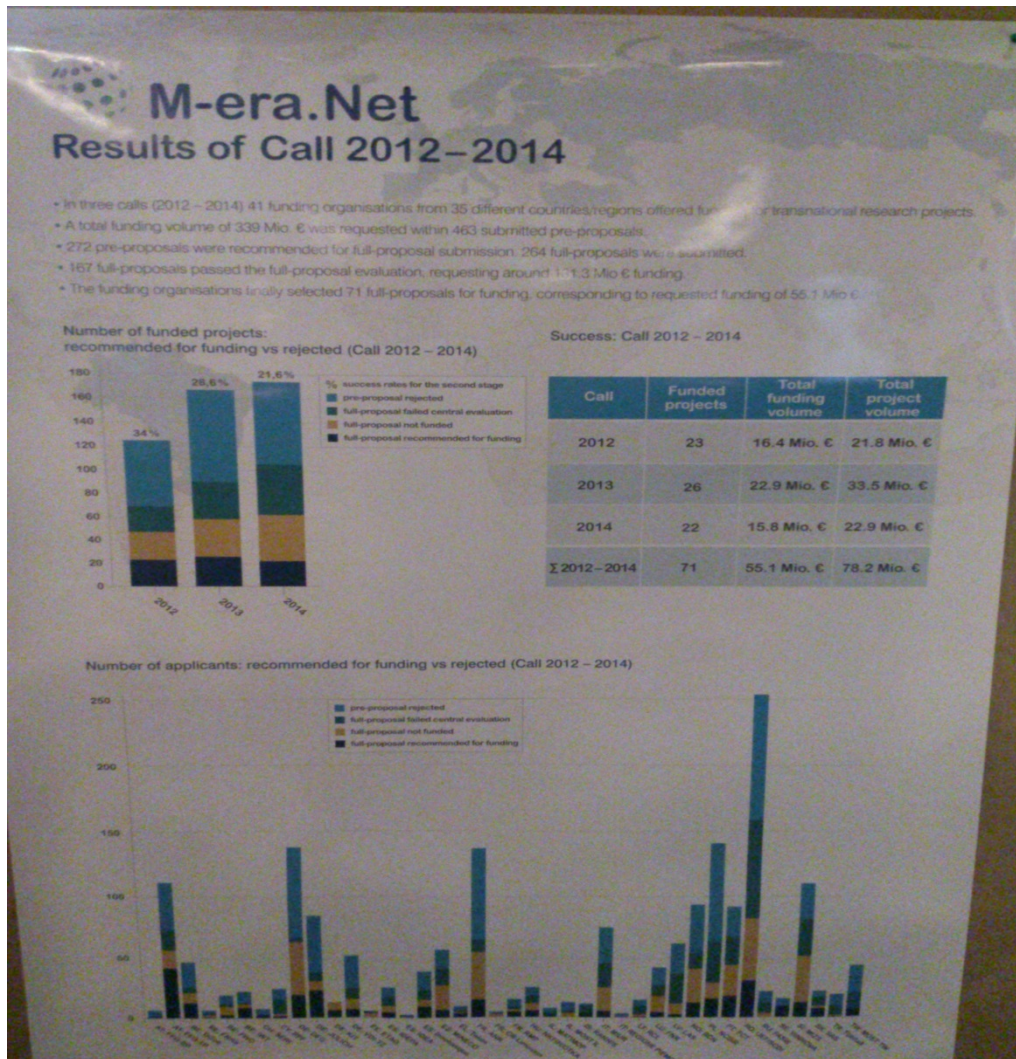
1. Management
2. Additional activities I: Additional joint calls without EC co-funding
3. Communication, exploitation and dissemination of the results
4. Co-funded call (Call 2016): Preparation and launch

5. Co-funded call (Call 2016): Evaluation and proposal selection
6. Co-funded call (Call 2016): Follow-up and monitoring of projects



圖二、亞洲地區國家只有台灣參與此會議與合作徵求計畫

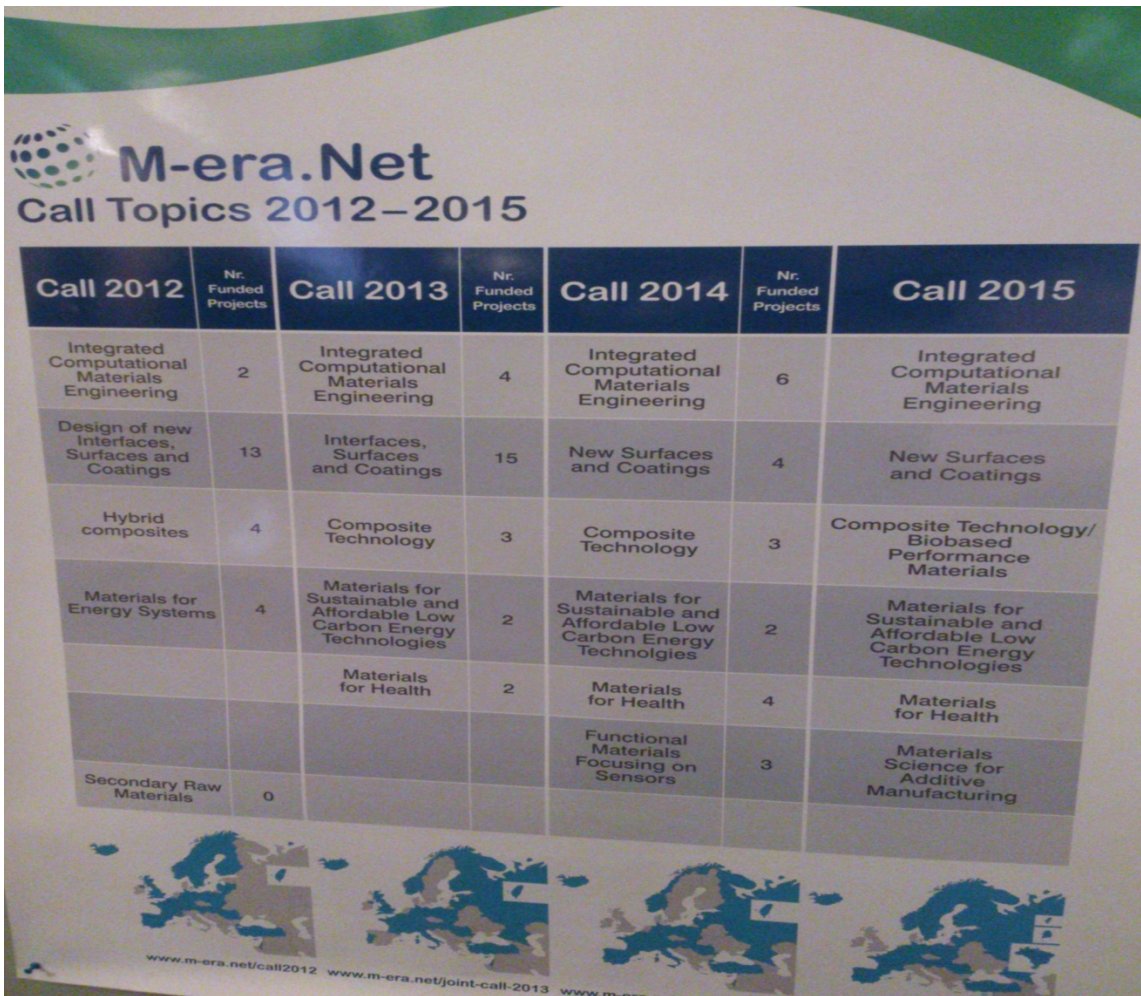
會議期間，主持人多次提到台灣團隊，並以台灣作為說明與舉例的對象。席間經詢問 Dr. Roland Brandenburg，日本與韓國因為經費之考量，目前未參與此期程計畫，亞洲地區僅台灣持續參加，主持人讚許過去幾年台灣之積極參與，期待未來能持續有計畫通過。



圖三、第一期計畫海報展示

歐盟 M-era.Net 於 2012 年徵求通過 23 件計畫、2013 年通過 26 件計畫、2014 年通過 22 件計畫。

台灣團隊於 2012 年徵求案通過 2 件計畫、2013 年通過 3 件計畫、2014 年通過 2 件計畫。



圖四、第一期計畫各年度徵求主題海報展示

2012 徵求主題

1. Integrated Computational Materials Engineering
2. Design of new interfaces, surfaces & coatings
3. Hybrid composites
4. Materials for Energy Systems

2013 徵求主題

1. Integrated Computational Materials Engineering (ICME):
2. Interfaces, Surfaces and Coatings:
3. Composite Technology
4. Materials for Health
5. Materials for Sustainable and Affordable Low Carbon Energy Technologies

2014 徵求主題

1. Integrated Computational Materials Engineering

2. New surfaces and coatings
3. Composite technology
4. Materials for Sustainable and Affordable Low Carbon Energy Technologies
5. Materials for Health
6. Functional Materials Focusing on Sensors

2015 徵求主題

1. Integrated Computational Materials Engineering
2. New surfaces and coatings
3. High performance synthetic and biobased composites
4. Materials for Sustainable and Affordable Low Carbon Energy Technologies
5. Tailoring of bioactive material surfaces for health applications
6. Materials for additive manufacturing

M-ERA.NET2 (2016 年)新期程計畫徵求之主題有六項:

1. Integrated computational materials engineering

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 process ability. 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.

2. Innovative surfaces, coatings and interfaces

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.

3. High performance synthetic and biobased composites

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.

4. Functional materials

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.

5. Interfaces between materials and biological hosts for health applications

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 necessary 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.

6. Materials for additive manufacturing

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.

2016 徵求計畫重要時程規劃

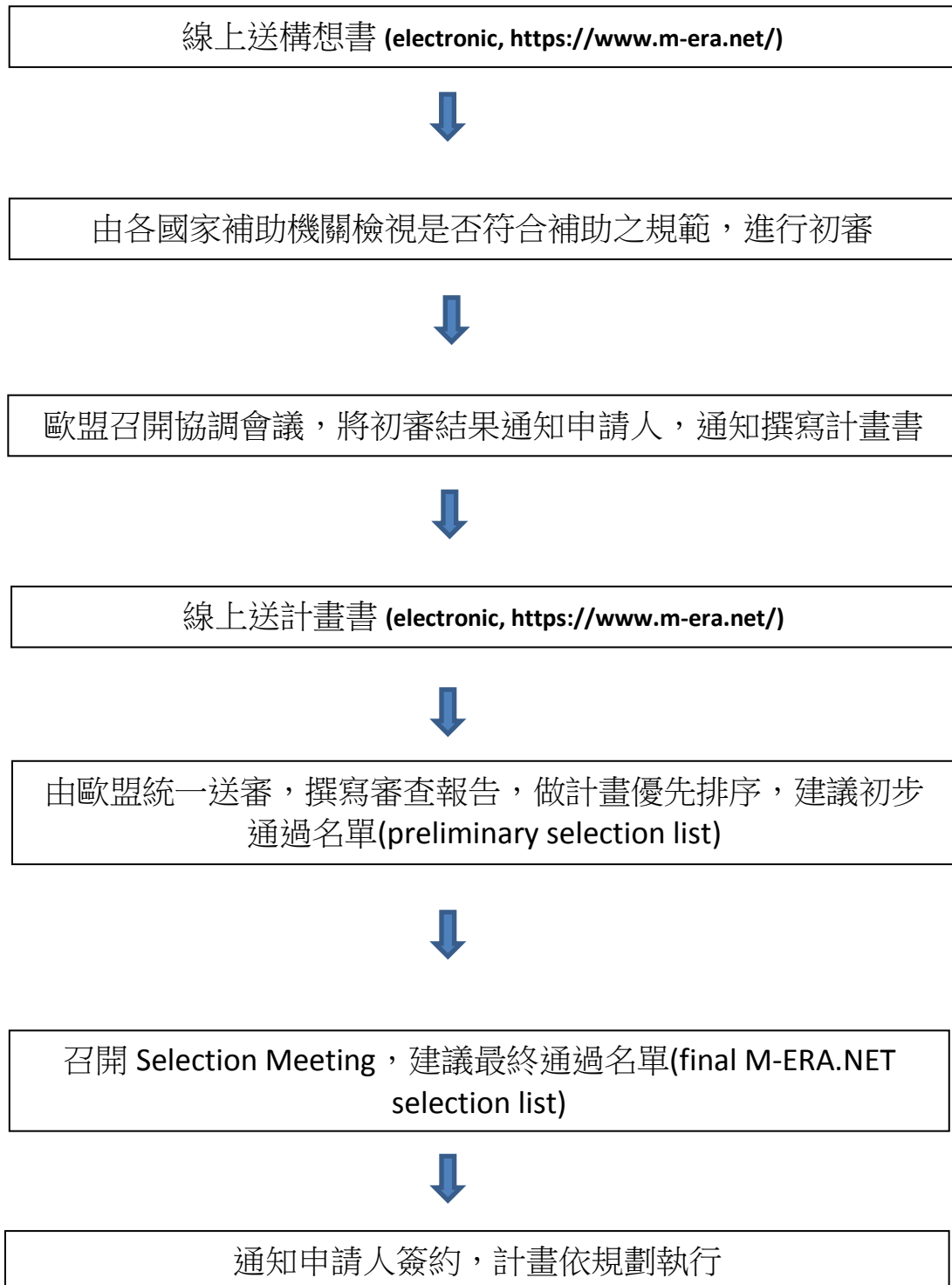
Date	Step
1 March 2016	Start of M-ERA.NET 2
15 March 2016	Launch of the co-funded call
14 June 2016	Deadline for submission of pre-proposals
23 June 2016	National/regional eligibility check of pre-proposal finished (provided online via IT tool)
September 2016	National/regional assessment of pre-proposal finished (provided online via IT tool)
6 September 2016	Coordination Meeting and feedback to applicants
10 November 2016	Deadline for submission of full proposals
20 December 2016	Deadline for individual assessments by international evaluators
10 January 2017	Deadline for compilation of consensus report (online discussions and peer review report finished)
13 January 2017	Peer review reports and ranking list to call consortium

17 January 2017	National/regional commitment for funding finished (provided online via IT tool) resulting in a preliminary selection list
24 January 2017	Selection Meeting – coordination of national/regional funding recommendation for final M-ERA.NET selection list
31 January 2017	Feedback to applicants
February 2017	Contract negotiations for selected proposals on national/regional level
Feb - May 2017	Start of funded projects
May 2020	End of all funded projects
July 2020	Deadline for reporting
September 2020	Deadline for final payment of funded projects
28 February 2021	End of M-ERA.NET 2

2016 相關文件與表格說明

1. 申請說明(申請人)
2. 問與答
3. 構想書格式
4. 計畫書格式
5. 審查與推薦說明(審查委員)
6. 網站建置與文宣

2016 徵求計畫審查程序示意圖



參、心得與建議

1. 歐盟新期程 M-ERA.NET 2 國際奈米材料合作計畫之徵求，科技部持續參與合作，執行期程為 2016 至 2020 年，審查通過之計畫，台灣團隊由科技部支持研究經費，歐洲團隊由歐盟提供經費支持，計畫以核定 3 年期為原則。
2. 會議期間有成員表示構想審查時程過於緊迫，恐怕無法達成，希望稍延後。對於評分標準，係採 0.1 分級距、0.5 分級距、1 分級距，Dr. Roland Brandenburg 建議各國自行決定，但是 EU evaluator Dr. Laurence C Archibald 建議應該由指導委員會決定，各國執行時才會有較一致之標準。因此確切審查時程與評分方式，將依 M-ERA.NET 2 的最後決定配合辦理。