mKETs-Pilot productions project

The goal of the mKETs-PL project is to prepare and foster a common understanding and consensus for future actions in Europe focusing on multi-KETs pilot productions

mKETs-PL working document

Deliverable D3b: interim report

Date:	24 September 2013
Authors:	Axel Thielmann, Michael Meister, Peter McNally, David Holden, Maurits Butter, Ruud Baartmans
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The project partners of the mKETs-PL consortium are:

- Netherlands organisation for Applied Scientific Research TNO
- Fraunhofer-Gesellschaft
- Commissariat à l'énergie atomique et aux énergies alternatives (CEA)
- Cambridge University-Cambridge Enterprise
- VTT
- Tecnalia
- Technology Partners Foundation
- Joanneum Research Austria
- D'Appolonia S.p.A
- Strauss & Partners
- Spark
- Noblestreet

Content

1. Introduction

The objective of this interim report is to provide a summary of the main results of Phase 1 of the multi-KETs pilot lines project (the first 7 Months) of the project. It includes the following elements:

- **Benchmark study summary:** 15 case studies on EU member states, one study on the EU and 4 case studies on other countries (USA, Japan, China, South Korea) have been conducted and were presented to the Commission in draft versions. The country reports provide an overview of the various public policy initiatives on KETs, (multi)-KETs, and pilot production activities. An industrial perspective is also provided focusing on pilot activities, organizations involved and characteristics of pilot activities. The benchmark study summary summarizes the main findings across these 20 country reports.
- **Online survey summary:** The online survey report is part of the benchmark study. Its summary contains a description of the online survey and the results.
- **Long list of pilot production examples:** This long list contains examples of pilot production as identified in the EU country studies collected by the respective consortium partners: 128 examples were identified.
- **Legal assessment summary:** This assessment provides a description of the legal context for multi-KETs pilot production. Issues such as state aids and competition as well as the World Trade Organisation regulations are addressed in this analysis. The analysis covers policies at local, regional, national and EU levels and compares the main competing countries (USA, Japan, China, South Korea) based on inputs from the interviews conducted within the country studies.
- **Overview of other activities:** An overview of other activities within the project such as the establishment of the steering committee, meetings and the project website.

2. Summary of the main results

2.1. Benchmarking Study summary

The benchmark report contains country reports for 20 countries (15 EU member states plus China, Japan, Korea and USA) and for the EU (Doc02.[xx]_[Country].docx). The country reports are subdivided into two parts: a policy and a business perspective, both focusing on the role of KETs, mKETs and pilot activities in the respective countries. The reports are based on desk research and interviews conducted with business and policy stakeholders. First, a general introduction to the country specific innovation system with emphasis on KETs is given followed by the organisation of mKETs policy and the main policies for pilot activities. The business perspective section covers the implementation of multi-KETs pilot activities and an evaluation of the KET policies/KET innovation eco-system based on business interviews. The country studies conclude with a summary of the policy and business perspectives and a set of recommendations.

The summary of the benchmarking study (130911 Doc02 22_Benchmarking Study Summary_VI.docx) gives an overview of the policy and business perspectives in a comparative country analysis based the country reports. The comparative country analysis is subdivided into three parts: Business perspective, Policy perspective and Examples of joint piloting activities.

2.1.1. Benchmark study business perspective

The Business Perspective section focuses on pilot production activities and their relation to markets. The overall role of pilot production activities for single companies and their necessities are depicted. Opportunities for co-operation in the field of pilot production activities are discussed with emphasis on technology specific tasks. The special role of SMEs is also discussed.

The anchor point for pilot production activities is the **market**, as technology plays an enabling role. On the one hand, application and market uncertainties are crucial barriers for technology deployment. But, on the other hand markets offer great potential for technology based value creation. Hence, even strongly technology oriented countries have broadened their perspective regarding technology deployment and increasingly take market related aspects into account. Funding activities should not extend technology push but provide a solution to an industrial problem, a market need, or a societal challenge.
Market figures are crucial for decision making regarding pilot production activities. As market data is often insufficient, valuable potentials are not exploited. To overcome this barrier and to reduce risk, market and technological assessments should be combined to allow a clear and unbiased market and technological risk assessment.

Pilot production activities are to a great extent **industry owned and led**, first of all because companies know best which technologies and markets to invest in and secondly as production processes are expected to be more efficient if they are in the hand of industry. Moreover, risk of losing know-how is of greatest concern. As pilot production is an early stage of manufacturing, it makes sense to build on existing competencies and equipment, and to develop related internal skills. Finally, flexibility of pilot production is a major reason for a model based on single-company ownership.

Pilot production activities are pursued for different **reasons**. Both new product developments and production technologies are tested in pilot production. In addition, low volumes of the new product are manufactured for testing purposes. Companies use different approaches to implement pilot production: Existing facilities are adapted for the new task, stand-alone sites are installed for testing, or new equipment serves as a seed for future full-scale production. Accordingly, costs for pilot production activities varies widely. But, in some cases – in particular in micro- and nanoelectronics and industrial biotechnology – they exceed hundreds of millions of Euros. Therefore, even large companies can afford only a small number of pilot production investments.

Not least due to the huge investment sums, **time** plays a dominant role. Pilot production activities have to argue convincingly the time-to-market perspective and are in competition with expansion investments in a

given investment period. Timing is crucial with respect to the "window of opportunity": A company wants to be the first to the market, but does not want to be too early either. Due to long-term technology cycles, there is a need for persistence and for flexibility regarding funding foci – both for companies and public funding authorities.

Co-operation along the value chain is highly valued. In particular the collaboration with lead customers is attractive in order to ensure market access. Moreover, if an application is clear upfront, the pilot production facility can be purpose-designed and the risk of over-engineering is reduced. SMEs prefer co-operation with downstream partners. But, this cooperation can also be capitalized by large companies: Depending on relative market power, large companies can push the burden of development risk to their suppliers.
For KET- and specifically for multi-KET-deployment a multi-industrial stakeholder system is needed, where several partners bear substantial risk – not only the KET-manufacturer. Also the KET-integrator has to provide significant investment and bear a large market risk related to the launch of a product based on a new technology.
A crucial barrier for technology commercialization is a deadlock between downstream users who do not commit to a KET-product without a testing in advance and the developers of KET-products. This testing depends on the existence of sufficient number of pilot products and so pilot production is needed. However the management of the KET-product company refuses investment in pilot production without the commitment of potential customers.
Localization of co-operation partners can be important: It is a success factor if a pilot production activity is imbedded in a vibrant innovation eco-system. This can mean close innovation cycles with suppliers or, downstream, a tailor made development for a lead market. Public authorities often see the value added potential of technology oriented industrial communities and try to foster local co-operation. But, this can cause misallocation because in most of the cases "excellence" is a preferred success factor for KET-deployment than "proximity".

SMEs have lower levels of investment available for pilot production compared to large enterprises, however they still perform pilot activities. They tend to use existing production facilities for pilot purposes or relay on a manual production approach. Hence, the effort for pilot production activities in SMEs remains often below one million Euros. Public authorities play a role in financing of SME's pilot production activities, in particular through interest rate reduced loans.
Public funding measures can pull SMEs into the "slipstream" of large enterprises as part of the innovation eco-system or support several SMEs to build an innovation network. A funding mechanism which activates large enterprises to open up their facilities to SMEs appears to be less promising, because such facilities are usually purpose designed and highly confidential.

2.1.2. Benchmark study policy perspective

The Policy Perspective section deals with the concepts of KETs and multi-KETs and their relevance for national innovation policy. The second view on national policy deals with pilot production funding and, as a commonly widespread measure, experiences with interest rate reduced loans are discussed. A broader perspective delivers the integration of national and EU-measures and other policy measures fostering innovation. The chapter concludes with two programme-related sections: One deals with objectives and criteria, and the other with the terms of a pilot production centred programme.

Applications, grand challenges and markets are at the centre of **national European innovation policy**. The main objective is to support the national economy and in particular relevant sectors. The more public funding addresses near-to-market activities the more open-topic programmes are used.
KETs and especially **multi-KETs** are not the main focus of innovation policy in most EU countries. Only some countries have a track record regarding systematically funding KETs. Japanese and Korean policies used to be more technology oriented but are changing towards an application focus.
Internationally, most overlap for KET-programmes is seen between "Advanced manufacturing" and "Advanced materials". Considering national policies, one KET seems to be missing: Maybe "Advanced virtual intelligence" could gather all the related issues. "Processes" should be added to "Advanced manufacturing" to emphasise

the roll of process industry.
The six originally defined KETs have differences regarding maturity, cost intensity, and technology related specifics. Also, the contribution to different sectors and as a consequence the levering effect regarding value added is rather distinguished.

Pilot production activities are only rarely the explicit concern of funding programmes within national innovation policies, even though in reality public authorities play a role as a funding source. From the companies' perspective, public financing is not decisive to start an innovation activity, but it has an important effect on the acceleration of processes and reduces time-to-market.
From a policy maker's perspective, there are different reasons for pilot production support. First of all, the private sector has to shoulder two risks during such technology deployment: Market and technological risk. Moreover the horizon for time-to-market is in most of the cases notably higher for KETs- or even multi-KETs-products. These issues can lead to barriers for technology deployment in the related region or country. In addition, it can make sense to support SMEs, as they are structurally handicapped regarding financing of pilot production facilities. Another reason for funding programmes can be to foster EU-wide pilot activities.

Especially interest reduced **loans** are a widespread instrument for near-to-market support, in particular for SMEs. Public loans can have a levering effect on private venture capital. Moreover they can mitigate the financing shortage for companies in crisis affected countries.

EU-policy serves as a trigger to initiate support programmes in countries where rates of innovation are low, whereas both, moderate and highly innovative countries orient less to the EU for policy formulation. In particular the European Regional Development Funds (ERDF) play an important role in public pilot production support. Regarding Shared facilities, the European Strategy Forum on Research Infrastructure (ESFRI) has been mentioned as a good example.

The EU and industry do not necessarily have the same **objectives and criteria** regarding the results of innovation funding. Hence, large enterprises or multinationals are able to exploit the competition between different technology sites worldwide. For a new funding scheme European public authorities should constrain a relevant part of the value chain to be in Europe or at least support the development of an economically healthy downstream sector. Or more in general, an exploitation plan should be demanded for the technology or patents with a focus on the benefits for Europe.

The terms of a pilot production centred programme should ensure easy and fast approval; the evaluation jury should be close to industry; and a strong involvement and commitment of the industry in a funded project should be a precondition.

Beside single company pilot production facilities there are two other kinds of facilities that can be distinguished:

Shared facilities are used by different companies for discrete pilot activities, these include testing, low volume production, or analysis and testing. Shared facilities are interesting for companies because of the highly specialized infrastructure – this is in particular for large enterprises. For SMEs these infrastructural services are appreciated to overcome occasionally the shortage of human resources. Shared facilities are also valued for financial reasons, due to reduced investment costs. Finally, the provision of such facilities is attractive for first testing activities without significant expense.
Intellectual property and confidentiality is a special issue at shared facilities, as normally the users are working on the same core technology. Hence, special attention has to be paid to IP-protection measures. In the best case the companies are active in different markets. To avoid a conflict of interest, it may be best to have independent companies or RTOs in ownership roles. In practice, at shared facilities often the running and maintenance costs are underestimated in the beginning.

Several countries support joint **Platforms of R&D** in order to establish a whole innovation eco-system. In such a case, several partners gather in jointly used premises for complementary innovation activities. In contrast to shared facilities, Platforms of R&D are dedicated to co-operative and pre-competitive research and development up to the first pilot products. These entities are mainly characterized by open innovation approaches with several stakeholders collaborating throughout the innovation and value chain. Benefits for the

participating companies are close innovation cycles with partners from other disciplines. The co-operation leads to an accelerated research and development process. In particular, for breakthrough innovations this kind of co-innovation of a whole value chain seems to be crucial.

2.2. Online survey

The online survey report (130823 Doc02.23 Online Survey_revised.docx) contains a description of the online survey and the results. The main results of this survey can be summarized as follows:

KETs and multi-KETs
A large share of quoted "other high-tech domains" points towards other KETs maybe not covered by the 6 identified KETs. On average two KETs were quoted as relevant major technology domains per company, with a tendency towards fewer KETs in SMEs. Advanced manufacturing does not differ from other KETs and is often combined with the other KETs. Although it is mostly quoted in combination, it is not "automatically" included. Clear definitions are needed, so that the potential beneficiaries of the mKET pilot lines programme know how to assess it. Regarding the HLG definition of multi-KETs (at least two KETs + AMT) the survey led to the following results: 4 out of 5 EU respondents of this survey involved in pilot production would not feel included. Furthermore, nanotechnology and advanced materials would be over- and photonics and industrial biotechnology underrepresented. SMEs would feel less addressed than large enterprises, who would thus be privileged.

All KETs are not equal
In some regards, the KETs differ (by views on policy, cost of pilot productions, combination, etc.), even if the overall trends are similar for all. Industrial biotechnology differs in particular from the other KETs in several instances; it is less combined and appears to have particular needs on policy.

Importance of market demand
The market demand is the most important trigger for picking up innovation activities. Technology push, public subsidies and market regulation play a smaller role.

Properties of pilot production
Most pilot production facilities? cost less than EUR 10m, however some are more expensive. Specifically micro- and nano-electronics and industrial biotechnology require larger investments. Public funding plays an important role for pilot production. Pilot production facilities mostly serve as testing facilities for products and to a smaller extent for production technologies. It is still typically strongly related to R&D.

Cooperation
Cooperation along the value chain with customers is very important, followed by RTOs and suppliers of equipment. Acceleration of the innovation process and access to competence are the major reasons for cooperation, whereas the risk of losing knowledge that is core to the competitive advantage is by far the strongest reason against cooperation.

Public Funding
Direct public funding for private businesses is by far seen as being most effective for the planning, set-up and operation of a pilot production facility. Other modalities, such as taxation, public loans and grants and indirect funding are still seen as effective. Regulations are assigned a rather low effectiveness. Support through public procurement is also seen as rather ineffective. R&D oriented measures are assessed as most effective in terms of objectives of support.

Shared facilities
Shared facilities for pilot production are already often supported by policy. Shared facilities are used by half of the respondents. The major reasons to use shared facilities are access to specific know-how and financial

reasons, as well as lower operating risks. Major reasons to not use shared facilities are the risk of losing knowledge, a competitive strategy not to use any kind of shared facility and reduced freedom in the development process when using shared facilities.

Knowledge-leakage risk
It appears to be a contradiction, that cooperation and shared facilities are mostly used to gain specific know-how but the major reason against such cooperation is the risk of losing know-how, in particular process knowledge. This contradiction needs to be addressed when talking about cooperation and shared facilities. It is further reflected in issues with intellectual property as observed in the legal aspects of the online survey, where IP was very often quoted as impeding (please refer to the legal assessment report for further information).

SMEs
SMEs use more cooperation than large enterprises, especially with customers. Facility sharing is also an issue, however not more than for large enterprises. The reasons to use shared facilities for SMEs are more financial. SMEs in general use less public support, but on the other hand are strongly dependent on it in terms of pilot production. Furthermore, venture capital, bank loans and guarantees play an important role. Public loans as well as indirect funding are more appealing to SMEs, however, direct funding is still the most preferred.

2.3. Long list of pilot production examples

The long list of pilot production examples (Doc02.24_Long List of pilot lines_updated2.docx) contains examples as identified in the EU country studies collected by the respective consortium partners: 128 examples were identified.

It is very important to mention that this list does neither reflect typical or best practice pilot productions, nor claims to be in any way complete or representative for the countries. The pilot activities mentioned here are an excerpt of those cases where information is publically available. This information is typically not in the public domain for pilot production in private companies due to a desire not to disclosure competitive knowledge and strategies. Therefore, this list is strongly biased towards shared and open facilities and publically funded initiatives and the single-company owned pilot production facility is significantly underrepresented.

Keeping this in mind it still is a valuable list of interesting pilot activities. The list is composed of the name of the pilot activity, the country and location in which it is situated, a short description and, if available, an internet address. The list is sorted alphabetically by country.

2.4. Legal assessment

From a legal perspective mKETs are a truly challenging phenomena. By pulling together a wide range of often colliding sets of interests, mKETs have created an unprecedented legal ecosystem. This legal jungle has caused the question to arise as to how the regulatory framework, relevant to mKETs, impacts the development of mKETs.

Tensions in the legal framework affecting mKETs
In order to answer this question, the first step is to set out the relevant the regulatory framework (relevant legal areas being: free movement, public procurement, state aid & subsidies law, intellectual property, and competition). The regulatory system impacting mKETs is the result of balances struck by European Union institutions between the tensions which have arisen between these legal areas. The description of these tensions is based on desk research. There are a number of tensions that can be identified between the relevant legal areas. First, there is a tension between intellectual property law and competition law; intellectual property law and competition law often come into conflict, in particular with regards to technology transfer. Second, a tension was identified between state aid & subsidies law and competition law, due to the potential

for the use of public funds to distort competition in the internal market. A third tension may exist between on the one hand, state aid law & subsidies law and on the other hand, public procurement law. The overlapping application of State aid and procurement law has the potential to cause legal uncertainty. A fourth tension is one within competition law itself. The traditional application of competition law principles to the "new economy" which is characterised by competition "for the market" rather than competition "on the market" could be detrimental to the development of mKETs. The last tension is not within the EU law framework, but rather exists between EU and international law. Both use a different approach in relation to the level of monitoring and enforcement of similar legal frameworks.

The tensions between these legal areas tend to be starker at certain points on the mKETs value chain, For example, patent protection and State aid measures play an important role early on in encouraging the development of mKETs. However, later in the value chain, a point is reached where a balance must be struck between the stimulation of mKETs and the need to prevent distortion of competition on the market. This example shows where the difficulty lies for policymakers and legislators; it is hard to determine exactly where in the value chain stimulation is conducive to mKETs development and where it is detrimental to competition.

Perceived regulatory obstacles

After having conducted research on the general tensions, the principal obstacles presented by the regulatory framework, as perceived by mKETs stakeholders, were identified through interviews with experts from industry and government as well as the analysis of the benchmarking provided by our project partners. The perceived obstacles are grouped into two categories. The first category consists of those obstacles which stem from aspects of the regulatory framework which impose a higher regulatory burden on mKETs stakeholders within the EU than are faced by those outside the EU. The second category consists of those obstacles which arise due to less strict enforcement of, or compliance with regulatory provisions in certain non-EU States. In the first category one of the main obstacles perceived is the EU State aid notification procedure, which can be burdensome and time-consuming, particularly on high-tech sectors such as mKETs where the window to market is short. Another of the principal obstacles in this first category relates to the fact that the state aid framework is based on assumptions that do not hold true for mKETs pilot activities. For instance, the state aid framework for R&D&I tends to focus on the "technological valley of death" rather than the "commercial valley of death" which is of more relevance to mKETs due to the degree of capital intensity required at later TRLs/MRLs. The third obstacle in this category is the discrepancy between EU state aid law and WTO subsidies law. For most of the EU's competitors in the field of mKETs, the WTO rules are the only source of restriction on the level of support which they can provide to entities developing mKETs pilot lines, but the WTO rules are not as restrictive as State aid rules in terms of the State support which it is possible to grant. The last obstacle in the first category is the cost of protecting intellectual property.

The second category comprises three obstacles noted by mKETs stakeholders. The first is the level of Chinese state involvement in industry which is placing the EU at a competitive disadvantage. The second obstacle is the lack of intellectual property protection enforced by the Chinese government. The final obstacle in this category is that of East Asian powerhouse companies going un-scrutinised by national authorities. The result is that they can engage in activities which their European counterparts are prevented from engaging in, which enables them to gain a competitive advantage on global markets.

Conclusions and recommendations

The final aspect of this legal assessment focuses on the provision of a number of recommendations on how best to tackle the obstacles. The recommendations are split into the same two categories as the obstacles. The first category comprises six recommendations:

- The reduction of State aid notification periods;
- The provision of clarity on projects of common European interest;
- Alignment of definitions in EU state aid law and WTO subsidies law;
- Re-alignment of notification thresholds to suit the development of mKETs;
- Harmonised criminal law sanctions for patent infringement; and
- General regulatory harmonisation.

Four recommendations are offered in the second category:

- Better alignment of WTO enforcement measures with EU State aid law enforcement measures;
- Continue to attempt to resolve issues of Chinese patent infringement through constructive dialogue;
- Continue use of anti-dumping and countervailing measures to tackle illegal Chinese State subsidies; and
- Engage in constructive dialogue with certain East Asian States about inadequate competition enforcement

2.5. Green paper (informal deliverable)

The Green paper is an informal deliverable and is a 'live' document which will be developed and refined over the full course of the project. It will be one of the main results of the project and therefore we would like to provide an overview of its current status.

The Green paper (version 5) includes a consolidated view on mKETs and pilot production activities and provides a second iteration towards the definition of the concept of multi-KETs pilot activities and translation into policy. Where the first versions were more descriptive (collecting information), this version will also include some hypothesis to be tested and refined as approaches to policy development for mKET pilot activities.

Initiated at the start of the project, a broad document has now evolved into a more focused paper that highlights the different aspects of the environment for multi-KETs pilot production activities.

However, the current version of the document (the fifth and adjusted version after the second stakeholder workshop) must be seen as an intermediary discussion paper. Results of the discussions during the second workshop have been integrated, as well as additional views on market failure, State Aid rules and four refined types of pilot production activities. However, not all of the findings are included and the document includes a number of hypothesis that are going to be analysed and further refined based on the country studies, benchmark study and the survey.

Background to the approach taken in the green paper

This document is based on extensive desk research, interviews, workshops and the online survey. During this first stage of the project, the following activities were conducted:

- Preliminary desk research for the first conceptual views and perspectives on pilot production activities (PPAs) and multi-KETs.
- Some 200 interviews, both within the framework of more general information collection on the concept of mKETs and pilot production, as well as input to the 20+1 country studies.
- Desk research to enhance the information base of the 20+1 country studies.
- Two expert workshops to discuss diverging views on mKETs and PPA, as well as how to converge the views into more consolidated conceptual definitions and elaborate them with practical examples.
- A survey among 679 experts in Europe, Asia and America (20 countries). Often these experts were experienced in PPAs, as representatives of government, research and industry.
- Development of the 20+1 country studies, in which the information provided (desk research and interviews) was assessed and integrated into a consolidated view on country specific policy and industrial strategies concerning mKET PPAs.
- A benchmark assessment of the 20+1 countries including the main differences, similarities and conclusions which could be drawn.
- A legal assessment, looking at both the European and Member State level, analysing the influences from State Aid laws, IPR, Competition law and other relevant legislation.
- Discussions in the project Steering Committee on preliminary outcomes of the study and conclusions to be drawn.

In addition to these more formal activities, many discussions were conducted among various project partners to incorporate the views from the work done.

The current state of this report is that the views and information are integrated in several concepts, but also translated into a first perspective on potential policies to support PPAs. However, not all findings are integrated yet:

- The further general demarcation and definition of mKETs is refined based on outcomes of the country studies, survey, interviews, workshops and desk research.
- An analysis of the innovation chain and valley of death is provided, based on the interviews, workshops and desk research.
- The concept of PPA is further defined and demarcated (based on interviews, workshops and desk research) and a preliminary categorisation of four types of pilot production activities is provided, including a first characterisation. A further refinement and consolidation is still needed based on the country studies and survey.
- A preliminary assessment of important barriers to these four types of PPAs is conducted to test the approach and create a first look at possible outcomes. This assessment must be further refined with the outcomes of the benchmark study, the individual country studies and survey. Also feedback from additional external experts will be organised (e.g. Steering Committee members).
- An assessment of the consequences of State Aid law and legislation is made, leading to a view on the consequences of legislation to policy supporting PPAs. A further refinement of these consequences with the country studies and survey is scheduled.
- The preliminary characteristics and identified barriers for the four types of PPAs are translated into related market failures and potential policies. This preliminary policy assessment provides a systematic first view on potential policies, but still needs a full assessment based on the country studies and survey.

The definition and demarcation of mKETs and PPA are well established, but the further translation into types of PPAs and related potential policies must be seen as a hypothesis that will be tested in the coming months. Next to that, a further refinement by the demonstrator activities (Phase II) will enhance the quality and information of the outcomes. Also an assessment of the consequences of the individual KETs is scheduled (e.g.: Do individual KETs show different PPAs?), as well as a more in depth economic analysis (e.g. expected jobs, related market structures, EU value chain).

3. Other activities

3.1. Steering committee

A project steering committee composed of experts in the field of the Key Enabling Technologies was established. The members of the Steering Committee are Andreas Wild (ENIAC), Mike Wale (Oclaro), Paolo Matteazzi (MBN), Paul Mijlemans (Umicore), Terry Wilkins (Leeds University), and José Carlos Caldeira (Manufuture, EFFRA). The first steering committee meeting was held on 2 July 2013. All members have signed a confidentiality agreement.

3.2. Meetings and workshops

In order to produce the reports mentioned above meetings with the Commissions, steering committee and stakeholders were prepared and held (Table 1).

Table 1: Meetings during the first phase

Meeting	Date	Venue
Kick-off EC	18 January 2013	Brussels
Kick-off consortium	30 January 2013	Hoofddorp, Netherlands
Stakeholder workshop 1	5 March 2013	Brussels
Informal meeting EC	15 February 2013	Brussels
Stakeholder workshop 2	30 May 2013	Brussels
Steering Committee meeting	2 July 2013	Brussels

As well asthe meetings mentioned above numerous phone/web conferences between the EC and the core-team took place.

3.3. Project website

A project website was developed (www.mkpl.eu) as an external communication platform. The website runs on a content management system (WordPress). It contains information on the project: the project background and objectives, news, Key Enabling Technologies, demonstrator phase and the partners of the project.

4. Reflection and Future steps

This section provides a brief reflection on the first phase of the project as well as a description of the future steps.

4.1. Reflection Phase 1: lessons learned and open challenges

Within the project two high level workshops were conducted, where a limited number of experts were invited to share their expertise on the subject of KET pilot lines. Questions on, for example, the difference between KETs and multi-KETs have been discussed in the first workshop on the 5th of March 2013. On the 30th of May, the second workshop took place and it had the objective to foster the development of a shared and coherent vision and approach for the efficient development of multi-KETs pilot production in Europe.

The results so far (summarized in chapter 2) have led to the following preliminary list of lessons learned and open challenges. Where needed these lessons and challenges will be further elaborated and refined in the second phase of the project.

Policy on pilot activities

- The valley of death to be addressed with a policy on pilot activities should focus on addressing the commercialisation phase of product development and its manufacturability. In this phase, investment risk is the main barrier to be addressed. Although the main focus of a pilot production activity oriented policy aims at reducing investment risk, the systemic nature of innovation can also lead to the conclusion that policy should aim at the technological pillar and at the competitive manufacturing. An integrated approach is needed to ensure efficient and effective policy support.
- Addressing the problems in the innovation chain that block commercialisation of products needs an integrated approach, allowing feedback mechanisms. Efficient and effective policies supporting pilot activity includes support in earlier stages and later stages of the innovation chain. To ensure optimal benefits from policy support, the other connected stages of the KETs lifecycle must be addressed and their development supported. This can lead to support of KET-component production, as well as KET-subsystem development, or even KET-product production to ensure that funding was not in vain.
- A crucial observation is that the barriers and issues concerning scale up activities in large companies are fundamentally different compared to those in small and medium enterprises. Where the main issue of large companies in general are financial and investment oriented (access to capital), SMEs also have issues with existing capacities (e.g. skills, networks, IPR expertise).

Combining Technology readiness with Manufacturing readiness

- By definition, TRLs can be used to assess the position of a product in relation to the technological valley of death. The TRL approach cannot be used as a criterion to assess if support is needed to cross the commercial valley of death.
- Multi-KETs are deepening this problem, as by definition more than one technology is to be assessed on its TRL level.
- The MRL scale can be used as an additional selection criterion. Initiatives in MRL4-8 are suggested to be eligible for policy support.

Open challenge: The development of an integrated approach for TRL+MRL. This approach should be closely connected with the TRL approach as recently described in the second HLG report.

Industry value chain

- Looking at the industrial value chain, pilot activities can be seen upstream (components) and downstream (products). A political discussion is needed to select which pilot production activities in which part of the value chain are to be supported. Upstream pilot activities will be significantly different than downstream activities and may require fundamentally different policy. To gain the best result from policies supporting

pilot production activity, it must be ensured that the right side of the value chain will optimally make use of left side supporting activities.

- Industry value chains are often global. The conclusion is that requirements for full coverage of the value chain in Europe can be counterproductive, as many innovative value chains will have non-EU partners.
- Addressing pilot activities does not imply that the actual pilot activities need to be supported. Next to directly supporting pilot activities, supporting related adjacent steps in the innovation chain can reduce problems for the pilot activities and lowers the barriers for the industry to initiate pilot activities. An integral and holistic view is needed to develop the most effective and efficient policy.

Pilot production activities instead of pilot lines activities

- The term 'pilot lines' covers only a certain type of up-scaling and commercialisation activities in industry. An important other type of activity are pilot plants (same "beast", but other industry). The term pilot production activities (PPA) should be used to cover both.
- The term pilots focuses on product developments and in principle do not include the commercial up-scaling of the production system.
- Shared facilities are often mentioned, but can be seen as potential policy instruments to reduce the financial risk by sharing expensive equipment and combining expertise. This is especially of importance to SMEs.

Four types of pilot production activities

There are two perspectives that can be combined to show four types of pilot production activities. The first perspective is based on the observation that there can be a fundamental difference in the focus of a pilot production activity between the development of the manufacturing process or the further development of the core product. This perspective originates from the core distinction described in the section on MRLs and TRLs. Where TRLs characterise the stage of development of the core product to be produced, the MRLs characterise the stage of development of the manufacturing process. This translates into a fundamental difference in objective and actors participating:

- Manufacturing: Development of the manufacturing process that produces a first batch (low volume) production output in order to evaluate and fine-tune economic and technological feasibility of the manufacturing process and offers a first output to be evaluated by users.
- Product: Co-innovation of the manufacturing process and the product by evaluation of small scale produced products in an operational environment. Objective is to further fine-tune the product based on technological, economic and user-demand feasibility.

The second perspective is based on the observation that large companies and small/medium sized companies face fundamentally different problems in pilot production activities because of their available skills and network situation. Addressing these different problems through policy requires fundamentally different policies:

- Small scale: The size of participating organisations are small and medium size and their cooperation has a consortium character with most participants being on an equal basis. Consortia have a limited number of members. The investments needed are limited in absolute terms, but high when compared to the turnover of the core partners.
- Large scale: Size of the participating organisations are large and the organisational form in general is a strong core small partnership (e.g. joint venture), combined with a number partners based on subcontracting. The investments needed are high in absolute terms, but also high compared to the turnover of the core partners.

A first preliminary overview of the characteristics of the four types of pilot productions activities is presented in chapter 4.5 of the Green paper.

4.2. Future steps: Entering Phase 2

The second phase of the project focuses on gathering practical experience and examples and integrating them into the previous work. Up to 4 existing pilot production activities will be selected for further assessment and will act as a demonstrator to show the added value of pilot production activities to the broader community.

Objectives of the demonstrator projects

In the coming months, up to four organisations or consortia (Demo-organisations) will be selected as examples of multi-KETs pilot lines. From these organisations best practices are to be learned (demonstration) and failure and success factors will be identified (assessment of practical experiences) in order to derive policy recommendations for the support of European pilot production activities. These Demonstrators have the following objectives:

- Policy assessment: Collecting policy and practical experiences in conducting pilot production activities as input for policymaking.
  This is done to get practical input on what the issues are in the scaling up of prototype products to (pre-commercial) mass manufacturing. It provides important input to the further development of a policy roadmap and enhances its contribution to better shape existing and new policy initiatives as well as funding instruments to ensure that they contribute directly and efficiently to EU strategic goals.
- Demonstration activity: Demonstration of pilot production activities to third parties in order to share experiences.
  This aims to enhance the information base of SME's, research organisations, intermediary organisations, and policymakers, to facilitate and motivate them to engage in pilot production activities. Furthermore, the mKPL-Demonstrators are to enhance the visibility and awareness of industry and research to the issue of pilot production activities and create a common understanding and consensus within government, industry and research on pilot production.

The selection of the demonstrator projects is based on an open invitation to the broader community to offer their services and will follow the following procedure:

1. *Expression of interest:* Invitation for Expressions of Interest (EoI) from the community to provide basic information about potential demonstrator activities by each respondent.
2. *Selection of long list:* Selection of 10 Expressions of Interest to be further developed into a full project proposal.
3. *Ensuring full understanding:* The organisations of the 10 selected EoIs will be contacted to ensure a full understanding of the requirements of the project proposal.
4. *Invitation to tender:* The selected organisations of the 10 EoIs will be invited to develop and send in full project proposals for the mKPL-Demonstrators.
5. *Evaluation of proposals:* The full project proposals will be evaluated. During this step the organisation can be asked to provide additional information.
6. *Selection of proposals:* Based on a pre-evaluation from the mKLP-consortium and mKPL-Steering Committee, the European Commission will award up to 4 proposals.
7. *Contract negotiations*: Up to 4 proposals will go into final negotiations for fine-tuning the proposals, including further detailing of work and deliverables.
8. *Finalization of selection:* The procedure will be finalized with the signing of the contracts.

A background document provided information for the first step of the procedure. The call for Expressions of interest was open from 1 August – 16 September 2013. On 1st of October the organisations of the 10 selected EoIs will be informed and invited to develop and submit a full proposal. The selection of the proposals will take place in the beginning of November. We aim to start the first demonstrators on 1st of December.

Upcoming meetings and events

In Phase 2 the following meetings and events are scheduled. This list will probably be extended with workshops and meetings that will take place in the context of the demonstrator projects.

Table 2: Scheduled meetings and events

Meeting	Date	Venue
Workshop 3	24 October 2013	Brussels
Steering Committee meeting	10 December 2013	Brussels
Mid-term Conference	23 January 2014	Brussels
Steering Committee meeting	26 June 2014	Brussels
Workshop 4	23 September 2014	Brussels
Steering Committee meeting	24 September 2014	Brussels
Final Conference	18 November 2014	Brussels

4.3. Conclusions

The project is on track. All goals so far have been met and although some of the deliverables (country reports) became available with 1 to 2 months delay this did not have an effect on phase 2.

Contact information

mKETs-PL consortium

Overall project management
Ruud Baartmans, Maurits Butter
P.O.Box 49
NL-2600 AA Delft
The Netherlands
☎: +31 888668517
✉: ruud.baartmans@tno.nl

Other partners
Fraunhofer-Gesellschaft, Axel Thielmann
CEA, David Holden
CU/Cambridge enterprise, Finbarr Liveley
VTT, Matthias Deschryvere
Tecnalia, Mirari Zaldua
TPF, Leo Turno
JR Austria, Christian Hartmann
D'Appolonia S.p.A, Nicolò Olivieri
Strauss & Partners, Roland Strauss
Spark, Marc de Vries
Noblestreet, Arnoud Goudsmit