



**European Cooperation  
in the field of Scientific  
and Technical Research  
- COST -**

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**Brussels, 22 November 2013**

**COST 083/13**

**MEMORANDUM OF UNDERSTANDING**

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Subject : Memorandum of Understanding for the implementation of a European Concerted Research Action designated as COST Action TU1304: Wind energy technology reconsideration to enhance the concept of smart cities (WINERCOST)

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Delegations will find attached the Memorandum of Understanding for COST Action TU1304 as approved by the COST Committee of Senior Officials (CSO) at its 188th meeting on 14 November 2013.

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**MEMORANDUM OF UNDERSTANDING**  
**For the implementation of a European Concerted Research Action designated as**

**COST Action TU1304**  
**WIND ENERGY TECHNOLOGY RECONSIDERATION TO ENHANCE THE CONCEPT**  
**OF SMART CITIES (WINERCOST)**

The Parties to this Memorandum of Understanding, declaring their common intention to participate in the concerted Action referred to above and described in the technical Annex to the Memorandum, have reached the following understanding:

1. The Action will be carried out in accordance with the provisions of document COST 4114/13 “COST Action Management” and document COST 4112/13 “Rules for Participation in and Implementation of COST Activities”, or in any new document amending or replacing them, the contents of which the Parties are fully aware of.
2. The main objective of the Action is to foster and accelerate long-term enhancement of Built environment Wind energy Technology (BWT) in Europe by scrutinizing the wealth of knowledge on Wind Energy Technology (WET) accumulated during the last decades, as well as to investigate and propose strategies of societal acceptance for the acceleration of the application of such BWT systems.
3. The economic dimension of the activities carried out under the Action has been estimated, on the basis of information available during the planning of the Action, at EUR 52 million in 2013 prices.
4. The Memorandum of Understanding will take effect on being accepted by at least five Parties.
5. The Memorandum of Understanding will remain in force for a period of 4 years, calculated from the date of the first meeting of the Management Committee, unless the duration of the Action is modified according to the provisions of section 2. *Changes to a COST Action* in the document COST 4114/13.

## **A. ABSTRACT AND KEYWORDS**

WINERCOST aims to merge the efforts of the European research groups working on the Wind Energy Technology and the pathways to introduce it by means of robust applications to the urban and suburban built environment, thus enhancing the concept of Smart Future Cities. This Action revisits safe, cost-effective and societally accepted wind energy technology for consideration in the design and development of the future urban/suburban habitat.

The principal objective of the WINERCOST activity is to collect the existing expertise on the Built environment Wind energy Technology (BWT) recently developed as a follow-up of the Onshore/Offshore Wind Energy Technology (ON/OFF-WET) and to investigate effective adoption methods for enabling the concept of Smart Future Cities. In addition, the utmost important issue of the social acceptance strategy will be scrutinized in close collaboration with municipality authorities, industry, manufacturers as well as the international wind energy organisations and platforms.

A meticulously developed dissemination plan centrally based on the Action's website, scientific publications in international journals, conferences and training schools, as well as the motivation of senior prominent experts, early stage researchers and opinion makers and involvement of industry and city authorities leaders to enhance the relevant social acceptance strategy.

**Keywords:** Built environment Wind energy Technology, Wind Energy Technology, Sustainable Energy Systems, Social Acceptance of Wind Energy Technology, Smart Future Cities

## **B. BACKGROUND**

### **B.1 General background**

The objective of Future Smart Cities of HORIZON 2020 aims at 20% of renewable energy in terms of produced electricity by renewable sources. Nowadays, the major contributors to locally produced renewable energy are photovoltaic systems, solar panels and combined heat power systems, whereas there is a significant potential from small and medium scale (15kW-100kW) wind turbines to complement them. The upper limit of 100kW is the maximum power that can be connected directly to the low voltage grid in most European countries, where, during the last years, a significant growth in the sector of small and medium turbines has been observed and a further increase is expected in the next years (BWEA2011). According to the Kyoto Protocol, WET provides a robust and mature technology to meet the increasing energy demand without compromising the environment. As Europe is currently the worldwide leader in ON and OFF-WET with respect to size, expansion trends and

innovation applications like BWT, now is the appropriate time for all the COST countries stakeholders to intensively collaborate in order to exchange expertise, to discuss any open problems (like noise, integrity, societal acceptance, etc), to disseminate the respective outcomes to engineers/designers/researchers and in particular early stage researchers by means of the Training Schools, the Seminars and the Conference educational material in digital and hard copy versions. Municipal authorities and decision-makers will be attracted to the discussion on the BWT applications societal acceptance. COST is the best mechanism for support because the explicit intention is to reduce the fragmentation in BWT research avoiding duplication in research by bringing together the scientific knowledge and structurally disseminating it across Europe. This Action also builds upon previous successful COST Actions such as COST C14 (Impact of wind and storm on city life and built environment), COST 732 (Quality assurance and improvement of micro-scale meteorological models) and ES1002 WIRE (Weather intelligence for renewable energies). The WINERCOST framework will strongly benefit the Future Smart Cities concept by identifying prerequisites and conditions for the adoption of the BWT into the urban and peri-urban habitat constructions, by supporting relevant measures and actions, by promoting its capability and by trying to convince city and municipal authorities, decision-making groups and in particular local society itself about the assets of the application of the BWT exploitation in Smart Cities. Besides the obvious positive issues of WET (CO<sub>2</sub> zero emission, job creation, etc), the respective heavy economic social load, the social acceptance with reference to the aesthetics, the noise etc. of the BWT are still open problems which will be systematically collected, discussed and thoroughly analyzed within the WINERCOST Action.

## **B.2 Current state of knowledge**

Campbell and Stankovic [1] distinguish between **three categories of possibilities for integration of wind energy generation systems into urban environments**: (1) siting stand-alone wind turbines in urban locations (being the most common one [2-3]); (2) retrofitting wind turbines onto existing buildings; and (3) full integration of wind turbines together with architectural form. They were generally conventional Horizontal Axis Wind Turbines (HAWT), intended to be mounted on the top of masts in fairly open areas. The performance of these systems has been reported to be very site-specific [4] and in many cases the proximity to buildings has decreased the performance (e.g. [5]). Campbell and Stankovic [1], Mertens [6], Lu and Ip [7] and Balducci et al. [8,9], among others, investigated the potential to take advantage of augmented airflow around buildings, addressing both category 2 and category 3 applications, the former including traditional or newly developed wind turbines fitted onto either existing buildings or new buildings, without modifying the building form.

Examples are the roof-mounted ducted wind turbine by Grant et al. [10], the modern adaptation to the Sistan wind energy mill by Müller et al. [11], the Crossflex design by Sharpe and Proven [3], which is a new development of a Darrieus turbine form, and the 3-in-1 wind–solar hybrid renewable energy and rain water harvester with power-augmentation-guide-vane (PAGV) for a Vertical Axis Wind Turbine (VAWT) by Chong et al. [12]. Finally, category 3 consists of modified building forms for full integration of wind turbines (BIWET). Well-known examples of buildings designed for integration of large-scale wind turbines are the Bahrain World Trade Center [13], the Strata Tower in London [14] and the Pearl River Tower in Guangzhou, China [15]. Campbell and Stankovic [1] investigated, computationally and also experimentally, category 3 applications focused on “twin-tower” configurations, where the HAWTs are placed in between the two towers. These efforts, conducted in the framework of the European project WEB (“Wind Energy for the Built environment”), found “kidney” or “boomerang” shapes to be the best shapes. Substantial power enhancement was found for effective angles of wind incidence up to 60°, and satisfactory power output (i.e. > 50%) when the wind is effectively coming at right angles to the building/turbine. Sharpe and Proven [3] recently proposed certain principles for the effective design of BWT systems. Although several valuable earlier research efforts have focused on BWT and its application in actual urban areas, these efforts have so far been fragmented and often not combined with social acceptance strategies. It is these issues that will be addressed by WINERCOST and that constitute and strengthen its **innovative** character. During the first part of WINERCOST, a systematic collection will be established of the existing expertise on (1) ON-WET, (2) OFF-WET and (3) any other type and application of wind energy structures (treating also non-technical issues and society acceptance) and the exchange of the accumulated scientific and technological knowledge among the partners that aims to lead to the cross-fertilisation of the research activities. Following the discussions of the possible negative effects (e.g. noise, production/installation costs, logistics, reliability, integrity, system robustness, aesthetic and societal acceptance problems), the second part of WINERCOST will mainly focus on developing a strategy to enhance the Smart City Concept by massively introducing BWT applications to the urban/peri-urban environment. In this framework, a wealth of expertise on the previous WET topics will be collected, critically analyzed and worked out by the partners.

### **B.3 Reasons for the Action**

BWT should be an efficient and economic alternative to the immensely expensive large Aeolian park concept, as soon as (i) more efficient and cost-effective small and medium turbines appear in the market, (ii) wind resources in smart urban and peri-urban habitat are more precisely estimated and

(iii) the necessary societal acceptance is gained. The time is now right to assemble the previously fragmented research efforts and to establish an experts network in ON-WET, OFF-WET and BWT. The principal objective of the WINERCOST being the coordination of the recently developed European expertise on the Built environment Wind energy Technology (BWT) to enable the concept of Smart Future Cities, as well as the societal acceptance strategy together with municipality authorities, the international wind energy organizations and platforms, will positively contribute to both European economic/societal needs and on scientific/technological advances. To this end, WINERCOST aims at significantly contributing to the aforementioned objectives by means of innovation actions by (i) evaluating assets and disadvantages of the existing variety of ON- and OFF-WES, (ii) widely and thoroughly working on innovative methods of adaptation of BWT and (iii) initiating a social debate on the use of BWT. With ref to (i), innovative assessment methods and innovative structural energy infrastructure systems (e.g. hybrid towers, new structural materials like composites etc.) will be investigated. In (ii), BWT will be investigated; in particular, innovative application ideas for the integration of Small Turbines in buildings will be studied, a promising and economic sector not yet widely developed. In (iii), sociologist/psychologists etc. and scientists together with city authorities will for first time systematically collaborate towards a societally accepted strategy on a successful urban habitat integration of BWT. Firstly the WINERCOST website will be developed; at this site, all the scientific and technological outcomes and administrative documents will be uploaded. In addition, the educational material from the Training Schools, the International Conferences/Strategic Workshop Proceedings and the Journal papers will be also uploaded at the website. During the Workshop and the Conferences, city/municipality authorities will be invited to participate so that the impact of the relevant obtained outcomes be maximized with reference to BWT aesthetics and societal acceptance issues. Maximally productive outcomes will be obtained by the systematic and structured collection and dissemination of existing knowledge and by the investigation of BWT integration possibilities in Smart Cities with reference to urban planning, architecture, aesthetic and societal acceptance criteria, thus constituting a strong incentive for the respective stakeholders to thoroughly exploit the BWT in the development of Smart Cities. These efforts are concentrated in WINERCOST reports and Workshop, International Conferences and Training Schools, specifically aimed at young engineers and early stage researchers, taking due regard of gender balance. The scientific, **economic and social impact** of WINERCOST is expected to be more than important. As the demand of energy increased enormously over the last century, it has now become important to consider the environmental impact of the energy production. Thus, meeting the increased demand for energy, it is imperative to search for **the most environmental friendly technologies: WET and the BWT emit zero greenhouse gasses; the principal CO<sub>2</sub>-zero**

**strategy criterion for the Smart Cities Concept.**

#### **B.4 Complementarity with other research programmes**

WINERCOST is coherent and complementary to several other projects in the field of renewable energy production and interaction with urban built environment. In particular, the most significant ones are all the mentioned below where WINERCOST members participate and thus, a wealth of research findings are available for the WINERCOST Action: (1) **WINEUR: Wind energy integration in the urban environment** <http://www.urbanwind.net/wineur.html> (EU “Intelligent Energy Europe”) (2) **WEB: Wind Energy for the Built environment** (JouleIII) (3) **Warwick Microwind Trial project** <http://www.warwickwindtrials.org.uk> (4) **IEA Task 28, Social Acceptance of Wind Energy Projects** <http://www.socialacceptance.ch> (International Energy Agency Wind Energy) and (5) **TREO** <http://www.treoproject.com/> **Road traffic to energy conversion technology**. WINERCOST is also complementary to the research projects: **SUPRAPOWER** (SUPERconducting, Reliable, lightweight And more POWERful offshore wind turbine), **MARINA PLATFORM** (MARINE renewable integrated Application PLATFORM) , **MARINET-Marine Renewables Infrastructure Network for Emerging Energy Technology** (FP7-INFRA2010), **SAFETOWER** (Develop tailored manufacturing for Wind Energy towers, RFCS), **INNWIND** (Innovative Wind Conversion Systems (10-20MW) for Offshore Applications, FP7), **Life time estimations of wind energy converters based on continuously uploaded numerical models** (DFG) and **Mapping the wind energy potential in the city of Eindhoven** (National Project) and the **COST Action ES1002 WIRE** (Weather Intelligence for Renewable Energies) that focuses on proper and specific forecasting of “energy weather” for the energy production. **Relevant strong links with all the aforementioned research projects (and many more) do exist as these projects are carried out by the members of the WINERCOST consortium.** WINERCOST perfectly fits to all European and national research frameworks like ESF, FP, EUROPE, DFG under the title ENERGY, and in particular to the forthcoming EU framework program HORIZON 2020-Future Smart Cities.

### **C. OBJECTIVES AND BENEFITS**

#### **C.1 Aim**

The WINERCOST Action objective is from one side to foster and accelerate long-term enhancement of Built environment Wind energy Technology (BWT) in Europe by scrutinizing the wealth of knowledge on Wind Energy Technology (WET) accumulated during the last decades and from the

other side to investigate and propose strategies of societal acceptance for the acceleration of the application of such BWT systems.

## **C.2 Objectives**

The WINERCOST objectives are:

1. The use of Wind Energy Technology (WET) as a source of knowledge for the Built environment Wind energy Technology (BWT);
2. The fostering and enhancing of the BWT applications;
3. The work on social acceptance strategy and other non-technical issues to accelerate the use of BWT;
4. The dissemination of the WINERCOST outcomes.

## **C.3 How networking within the Action will yield the objectives?**

Within the framework of the WINERCOST activities (Working Group meetings, Strategic Workshop, International Conferences, Training Schools and STSMs) the wealth of the members' expertise will be offered for the analysis of the existing knowledge and its application to BWT systems. The merging of the experts possessing rich onshore/offshore WES expertise with those having a strong built environment WET background leads to the overcoming of a series of technological and practical obstacles, thus leading to the acceleration of the application of the built environment wind energy technology. In addition, the networking activities will significantly contribute to effectively treat non-technical problems and in particular, the societal acceptance issues. As the consortium members are pioneering research groups with respect to WET research achievements, the available manpower as well as the infrastructure (testing facilities/ equipment etc) are appropriate for the successful completion of the Action and for the achievements of the aforementioned objectives. In particular, the Strategic Workshop will signal a meticulously well-structured policy through the Training Schools, STSMs and the International Conferences to transfer the existing knowledge to early stage researchers and engineers, thus leading to the acceleration of the advancement of the BWT application.

## **C.4 Potential impact of the Action**

The WINERCOST impact dramatically contributes to the achievement of the Smart Future Cities

concept as it will: (1) **Solve** technical and non-technical problems by using the existing experience from onshore/offshore WET systems (2) **Promote** the Built environment Wind energy Technology (BWT) good practice applications (3) Thoroughly **discuss** the strategy to obtain societal acceptance and therefore, accelerate its implementation (4) **Educate** and **specialize** early stage researchers and engineers on Built environment Wind energy Technology (BWT) and (5) **Start a fruitful dialogue** with municipality authorities and the rest of the stakeholders on the use of BWT and the relevant assets

## C.5 Target groups/end users

The WINERCOST outcomes exploitation is multifold: Both the participating research groups/city authorities involved in the proposal preparation (e.g. city of Birmingham, Limassol etc) from one side and the WET/BWT industry and suppliers, the IEA, municipality authorities and citizen groups from the other side will exploit the wealth of the WINERCOST accumulated scientific and technological knowledge.

## D. SCIENTIFIC PROGRAMME

### D.1 Scientific focus

Having as ultimate objective the implementation of the concept of Smart Future Cities, WINERCOST Action will motivate the European Wind Energy research groups to put all their efforts to the advancement of the Built environment Wind energy Technology (BWT) at the urban and peri-urban built environment. To this end, the rich existing expertise on the well established Onshore and Offshore Wind Energy Technology (ON /OFF-WET) will be collected and effectively used as a robust background towards a safe, cost-effective and socially accepted BWT for consideration in the plans, design and development of the future urban and peri-urban habitat.

To this end, the **principal research tasks** of the Action will be the following:

(1) To **collect** any available **data of existing small, medium and large wind turbines and wind turbine supporting structures** for urban and peri-urban areas. In a first step, existing data on installed capacities of Small and Medium Wind Technology (SMWT) in the urban environment are to be collected and evaluated with reference to turbines types and sizes, installation capacities, wind conditions and grid integration (central or de-central). Aim of this task is to collect actual knowledge, assess relevant WET applications and evaluate assets and weaknesses.

(2) To **transfer of knowledge from on- and offshore wind energy projects**. A review of the

installation process of ON- and OFF-SHORE WET applications since the decade of '80s will show the development of well-established wind energy markets. It is necessary to check, if gained experiences and knowledge of the “large” wind energy could be effectively downscaled to SMWT.

(3) To **evaluate regional differences** including **energy policies** and **design requirements and building rules** for SMWT in urban areas. Due to the differences in installation capacities of SMWT in urban areas, a review of policy based factors like energy funding is to be discussed. Political-based installation and design requirements will reveal local needs for possible improvements in actual design guidelines. Additional, differences in fixed price purchase will be also taken into account.

(4) To **assess wind conditions in urban and peri-urban environment, wind maps/roses quality and wind comfort problems in neighbouring areas**. Compared to large ON- and OFFSHORE wind turbines, SMWT are comparably small, a fact that can be traced back to wind conditions and site-specific wind fields. A review on existing wind data for urban areas will show the opportunities for SMWT in the built environment.

(5) To **determine societal acceptance criteria** as the installation of SMWT in urban areas is significantly influenced by the acceptance by the local communities. A European criteria catalogue on social acceptance does not yet exist, although some preliminary effort has been recently done in international energy fora. This results from a different understanding and acceptance of the SMWT. Nevertheless, to seek for required research needs, a thorough investigation of the social acceptance criteria is to be performed. By this, necessary research in the different countries of the participants and also for Europe can be used for future research needs and activities.

(6) To **discuss European energy policies and strategy for advancement** of the BWT with consumers, municipalities, industry (turbine manufacturers) and network providers. As a result, a new research field for the investigation of optimized central or de-central grid-integration may be implemented.

- **During the first half of the WINERCOST Action** the existing expertise on ON-WET and aeolian parks, OFF-WET and parks and any other application of wind energy structures (in particular, BWT like Building-Integrated-Wind-Energy Technology applications) and the exchange of the accumulated scientific and technological knowledge among the partners that aims to lead to the cross-fertilization of the research activities of the research activities.
- **During the second half of the WINERCOST Action**, the activities are focused on the development of a strategy to enhance the Smart Cities Concept by effectively introducing

BWT projects into the built fabric. The concerted Action will also cover technological implementation difficulties, possible non-technical negative effects (e.g. noise, production/installation costs, logistics, reliability, integrity, system robustness, aesthetic and societal acceptance problems) and European energy policy as well as societal acceptance issues. In this sense, the WINERCOST network of all relevant BWT-stakeholders will develop an overall view on required research needs and necessary research and development actions in future and thus, incorporating all partners' relevant expertise, this Action could be considered as a extensive database of the existing knowledge showing the opportunities for the BWT in urban/peri-urban environment.

With reference to the **human and technical means** needed to achieve the WINERCOST objectives a **platform on WET and BWT-researchers and stakeholders is planned to be developed.**

- **Frequent physical meetings** within the planned Strategic fora and the Core Group/Working Group meetings and Training Schools, a close cooperation is to be achieved.
- **Incorporating** the European Wind Energy Academy and other **international Wind Energy organisations** and **implementing an exchange programme for young researchers** (as possible in EU Horizon 2020) a European wide research platform is to be established increasing the scientific output for future BWT trends. Advanced numerical (FEM/CFD) modelling, extended laboratory and in-situ WET/BWT testing and in-depth investigation of the technical, non-technical, legal and municipality rules are to be performed and openly discussed in the aforementioned WINERCOST scientific Working Groups.
- Last but not least, the participating **municipalities and industry representatives along with those researchers working with BWT social acceptance issues** ensure a successful outcome with reference to the non-technical aspects that, however are pre-requisites for the rapid advancement of the Built environment Wind energy systems.

## **D.2 Scientific work plan methods and means**

The WINERCOST workplan is scheduled to be performed by three **Working Groups** that will work

in parallel and independently; they will respectively focus during the first 2 years on the:

- **WG1A:** Wind simulation, characterization etc. issues (CFD, Maps, etc) with reference to theoretical, experimental and numerical research approaches,
- **WG2A:** ON- and OFFSHORE WET projects and the respective accumulated expertise and
- **WG3A:** Non-technical issues of WET including societal acceptance, European energy policy and municipalities-researchers-industries dialogue.

At the beginning of the third year, the Working Groups **WG1A, 2A, 3A** will be reformulated (having now the short names **WG1B, 2B, 3B** respectively) and focus on the synthesis of the accumulated scientific knowledge and expertise applied to BWT projects according to the following scheme:

- **WG1B:** Built environment Wind Energy Technology (BWT) advances,
- **WG2B:** Built environment Wind energy (BWT) pilot/good practice projects and
- **WG3B:** Societal acceptance, European BWT policy and other non-technical BWT issues. The WINERCOST members will primarily contribute with their large theoretical, numerical and experimental research efforts to the advancement of the Wind Energy harvesting in the urban habitat towards enhancing the Smart Future City concept.

Wind Energy Technology pilot projects and Building-Integrated-Wind Energy Technology good practice applications to enhance Smart Future Cities concept will be scrutinized, whereas a preliminary holistic design approach including the societal acceptance strategies to enhance the Smart Future Cities concept will be investigated.

Each of the aforementioned objectives will be derived by

- (1) **evaluating assets and disadvantages** of the existing variety of ON- and OFF-WET systems,
- (2) widely and thoroughly **working on innovative methods of adaptation** of BWT in the urban environment and
- (3) **initiating a social debate on the use** of BWT with municipality authorities in the presence of the rest of the stakeholders.

With ref to (1), innovative assessment methods and innovative structural energy infrastructure systems (e.g. hybrid towers, new structural materials like composites etc.) will be investigated.

In (2), BWT will be investigated: Building-mounted turbines on both the side and the roof and Building-Integrated Wind Turbines (BIWT) will be researched; in particular, innovative application ideas for the integration of Small and Medium Turbines to the urban habitat and relevant good practice projects will be studied.

In (3), psychologists, sociologists, urbanists together with engineers and other scientists will for first time collaborate towards a societally accepted strategy, in dialogue with the municipality authorities and the industry, on a successful urban habitat integration of BWT. Feedback from experts from international energy fora on this subject along with energy economics will be also received.

## **E. ORGANISATION**

### **E.1 Coordination and organisation**

A robust **management scheme** will be developed so that the WINERCOST Action is implemented in the most appropriate and efficient way. All the WINERCOST activities will be decided at the Management Committee level where the overall Action implementation resides, as well as outcomes and dissemination policy. A **Chairperson** and a **Vice-Chairperson** will be elected by the members of the Management Committee members during the kick-off meeting of the Action and their commitments will be to manage the **Management Committee** and the **Core Group** along the lines of the MoU of the Action.

Having as final objective the enhancement of the concept of Smart Future Cities, the WINERCOST Action aims to insistently collect, systematically analyse, meticulously synthesize and efficiently disseminate a wealth of new knowledge on wind energy harvesting for use in the urban and peri-urban environment along with effective strategies targeting societal acceptance. The aforementioned research networking outcomes obtained within the WINERCOST Framework will be disseminated by means of a carefully designed dissemination policy. The latter will be principally based on the WINERCOST website that will be kept continuously updated. WINERCOST meetings and all other events schedule, as well as Working Groups outcomes (reports, publications, papers, presentations etc.) will be systematically uploaded to the **WINERCOST website**, so that it will be used during all WINERCOST stages and afterwards, as a reference data base for urban wind energy technology issues. To this end, during the kick-off meeting one member among the Management Committee members will be selected and appointed as **Website Coordinator**.

As the WINERCOST consortium is expected to be numerous, during the kick-off meeting, a **Core Group** will be assigned to follow all WINERCOST activities in an everyday basis. The Core Group will be composed by the Chairperson, the Vice-Chairperson, the Working Group leaders and the

Website Coordinator who will potentially meet in short notice to handle and decide on practical Action's issues. This way, the WINERCOST Action will be managed by the above described effective management scheme.

WINERCOST as a concerted action will be implemented by the **Working Groups** within the Management Committee decisions and the MoU framework. Working Group activities will be coordinated by the Working Group Leaders and Vice-Leaders selected during the kick-off meeting by the Management Committee. Although at the end of the 2<sup>nd</sup> year, restructuring of the Working Groups is foreseen, the Working Group Leaders and Vice-Leaders will remain the same to ensure continuation and effectiveness of the management.

The **milestones** corresponding to the implementation of the WINERCOST, besides the systematic meeting of the Management Committee, Core Group and Working Group members, are the following: A Workshop (12<sup>th</sup> month), WINERCOST International Conference (24<sup>th</sup> month), Training Schools (18<sup>th</sup> and 36<sup>th</sup> month), WINERCOST Final Conference (48<sup>th</sup>). If funding is available, one more Training School will be scheduled in the last 6 months before the Final Conference. It is noteworthy that a WINERCOST International Conference is expected to be established and take place every 3 years.

A well-designed **Short Term Scientific Mission strategy** will be implemented so that as many as possible early stage researchers have the chance to join for a short period another research group, enhancing this way their relevant research skills. All those who will participate to the STSM scheme either as visitors or as hosts, upon the completion of the specific STSM activity should have to present the respective outcomes during the next Working Group meeting.

## **E.2 Working Groups**

The WINERCOST in its first half will be implemented along three parallel **Work Packages** by the respective Working Groups WG1A, WG2A and WG3A. At the end of the second year, the **Working Groups** will be reformulated and work to synthesize the accumulated scientific knowledge and expertise by the Working Groups WG1B, WG2B and WG3B. They will primarily work focused on the adoption of the Wind Energy harvesting in the urban habitat towards enhancing the Smart Future City concept. The Work Packages will respectively tackle the Wind Energy Technology applications towards Smart Cities, the Building-Integrated-Wind Energy Technology to Smart Cities and a preliminary holistic design approach and the societal acceptance strategies to enhance the Smart Future City concept.

### E.3 Liaison and interaction with other research programmes

The WINERCOST Action will liaise with all the FP/RFCS/ESF/DFG projects briefly presented in Section B.4. In particular, close collaboration will be established with the following projects:

- *WINEUR: Wind energy integration in the urban environment* <http://www.urbanwind.net/wineur.html>
- *WEB: Wind Energy for the Built environment (JouleIII)*
- *Warwick Microwind Trial project-* <http://www.warwickwindtrials.org.uk>
- *TREO: Road traffic to wind energy conversion technology-*<http://www.treoproject.com>
- *Task 28, International energy Agency - Social Acceptance of Wind Energy Projects -* <http://www.socialacceptance.ch> because the latter are very close to the WINERCOST principal objectives. The exchange of information will be systematically sought as principal members of these three research projects are also members of the WINERCOST consortium. In addition, members of the rest EU funded research projects will be in a systematic way invited to participate to the WINERCOST work meetings and in particular, to offer their experience as lecturers to the WINERCOST Training Schools.

### E.4 Gender balance and involvement of early-stage researchers

WINERCOST will respect an appropriate gender balance in all its activities and the Management Committee will place this as a standard item on all its MC agendas. The Action will also be committed to considerably involve early-stage researchers. This item will also be placed as a standard item on all MC agendas.

Special consideration will be taken so that the majority of the participating members will be **young engineers** and **early stage researchers**, and **gender balance** to be held. In particular, both Short Term Scientific Missions scheme and Training Schools will be addressed to early stage researchers. To this end, as principal selection criteria will be the early stage researcher's career and the gender balance.

## F. TIMETABLE

<b>Month</b>	<b>WINERCOST Activity</b>
1 <sup>st</sup>	<b>Kick-off Meeting: Chair, Vice-Chair, WG-Leaders, WG-Vice-Leaders, Website Coordinator and Core Group members selection</b>
6 <sup>th</sup>	<b>STSMs start</b>
12 <sup>th</sup>	<b>Strategic Workshop</b>
14 <sup>th</sup>	<b>1<sup>st</sup> Training School</b>
24 <sup>th</sup>	<b>1<sup>st</sup> International Conference</b>
26 <sup>th</sup>	<b>2<sup>nd</sup> Training School</b>
36 <sup>th</sup>	<b>3<sup>rd</sup> Training School</b>
46 <sup>th</sup>	<b>4<sup>th</sup> Training School</b>
48 <sup>th</sup>	<b>2<sup>nd</sup> International Conference</b>

Depending on the Action's budget, MC/WG meetings will normally take place twice per year. In case of insufficient resources, MC meetings could be substituted by Core Group meetings. The WINERCOST Website will start immediately after the Kick-off meeting and will be active at least till the end of the Action. Short Term Scientific Missions strategy will be implemented immediately as soon as the WGs are formed, i.e. from the 6th Month till the end of the Action. A Strategic Workshop (12th month), 4 Training Schools (14th, 26th, 36th and 46th month) and 2 International Conferences (24th and 48th month) have been scheduled to strengthen as much as possible the WINERCOST impact.

## G. ECONOMIC DIMENSION

The following COST countries have actively participated in the preparation of the Action or otherwise indicated their interest: BE; CH; CY; DE; EL. HU; IT; MT; NL; PT; SE; TR; UK. On the basis of national estimates, the economic dimension of the activities to be carried out under the Action has been estimated at 52 Million € for the total duration of the Action. This estimate is valid under the assumption that all the countries mentioned above but no other countries will participate in the Action. Any departure from this will change the total cost accordingly.

## H. DISSEMINATION PLAN

## H.1 Who?

The dissemination effort will be done along four major axes:

(1) To approach, open dialogue with and incorporate **decision making administrative structures** like municipalities, technical chambers, urban design bodies or offices and International organization (IEA/EWEA etc) or European level and government policy makers to the WINERCOST activities.

(2) To coordinate relevant activities of the **academia and research centres** working with WET, BWT and SFC (both participating and outside WINERCOST groups).

(3) To convince **industry** (WET manufacturers and WET/BWT service providers) to invest in this sector by communicating to them all the wealth of findings and outcomes of WINERCOST.

and (4) to motivate **general public** in the sense of city/municipality citizens to enthusiastically support the implementation of BWT for Smart Future Cities.

(1) Approaching the first group by **inviting key-persons** in appropriate decision making positions to the activities of the project (Strategic Workshop, International Conferences etc). This is expected to instigate the perception of the importance to integrate wind energy infrastructures into the fabric of the urban networks in the future. This is because these decision-makers need to see first-hand that the relevant technologies are mature enough and ready to hit the market and that they can make a real difference. In this respect, strategic meetings with experts will be important.

(2) **Approaching Academia** (research groups in universities and research centres) is also important as it should increase the research momentum in relevant areas. This will be easily achieved as the channels of information dissemination there (scientific journals, proceedings, relevant websites) are already in place. The International Conferences, as well as the WINERCOST website, are of utmost importance in this case.

(3) Strong efforts should be invested to **attract industry** and **convince** it for investing in an emerging field being traditionally considered as a high risk venture. However, putting people from industry in touch with their potential clients (decision making authorities) and the human capital with the know-how (academia) is certain to generate potential for positive steps.

(4) Last, the **general public** will be communicated the assets of using BWT as a factor of the Smart Future Cities concept and CO2 zero emission policy via the collaborating municipality authorities with the WINERCOST members working with the hot issue of societal acceptance.

## H.2 What?

The main purpose of the Action is to enhance awareness about the Built environment Wind energy

Technology (BWT) and its contribution to the concept of the Smart Future City (SFC) in key-stakeholders (authorities, industry, academia), as well as to the general public. Therefore, WINERCOST **dissemination strategy** is going to work towards making the flow of scientific information of the project known to potentially interested exterior parties targeting mainly municipal authorities in COST countries, other decision making bodies either state or private, researchers working on WET/BWT and SFC and manufacturers/suppliers. This entails both monitoring of the scientific output of the partners and forwarding whatever is judged as appropriate to a circle of recipients which they are to try to widen as much as possible. In addition, major events of the project like Strategic Workshop, Training Schools and International Conferences will be promoted inside Academia, industry and the relevant public administration structures; as this task entails a more senior level, it is going to be served by the heads of the working groups.

With reference to the WINERCOST **website**, this will be developed having a first part that will be open and approachable to the public, and a second higher-level part that will be approached in an interactive way only by the WINERCOST members. At this later password-protected site, the Management Committee will upload all administrative documents, whereas the Working Groups will upload working documents, published papers and other useful information. The Website Coordinator will be responsible for the continuous updating of the website, in particular with respect to STSMs and Strategic Workshop/Conferences issues. In addition, the Action, after discussion and agreement by the Management Committee or the Core Group, will disseminate the WINERCOST activities and outcomes by participating at a few well selected International Conference and fora.

Working Groups research results will be published as **scientific books**, submitted for publication to **peer reviewed scientific/technical journals** or **proceedings** of International Conferences, whereas some publications aiming to attract public interest and societal acceptance will be sent to **non-technical journals, newspapers** and to national and local television.

### **H.3 How?**

As soon as WINERCOST starts producing significant outcomes according to the Timetable, during the 2nd MC/WG meeting (6th month) each Working Group will appoint a member, the **Dissemination Officer (DO)** who will be charged with the duties of interfacing with both the rest of the participating research groups and possible stakeholders with respect to issues regarding dissemination practices, as well as other potential users of the results of the project (manufacturers, city planners, authorities and opinion makers). The DO's will have separate work meetings during the

regular meetings of the Action to develop and systematically update the WINERCOST dissemination plan during the course of the Action, referring after each such meeting to the WINERCOST Chair for the respective Chair/MC approval.