data, beyond that published in journals, can be improved.
In terms of data collection, storage and usage there are major challenges to overcome. The field of combustion is unique in that the data itself comes from a varying set of scientific communities, such as theoretical and experimental chemists, physicists and engineers, just to name a few. And each one has their own set of requirements and data.
Within the field of computer science there is a multitude of efficient database storage solutions. There are also efforts by groups within the United States to this end. However, the solution is far from final. The challenge lies in the development of standards which satisfy the needs of the multitude of various user groups within combustion. For this reason an active open discussion is needed within the combustion community with the goal of establishing specific guidelines for the construction of an efficient database that satisfies the users within the combustion community. The members of this COST Action represent a cross section of these researchers and thus an excellent basis for a complete and thorough discussion.
The main challenge of this WG is to provide a forum for all experts in the combustion community to formulate a common set of requirements for a universal combustion database not only capable of efficiently store the vast amount of raw data generated by experiments and modelling but also, more importantly, efficiently accessible for future use and maintenance.

WG5: Integration of fundamental knowledge towards technology application for Smart Energy Carriers exploitation.
The aim of WG5 is to apply/integrate the knowledge tools developed in WG1-WG4 by means of a mutual exchange between academic and industries. This will provide optimized ready to use tools and techniques for an effective use of SECs on large scale.
The research activities of the WG will be driven by the identification of validation test cases, identified in collaboration with the industrial partners to provide scale-bridging information from the laboratory units to the real applications. Such test cases will need to share important similarities with the intended applications (internal combustion engines, gas turbines, furnaces), without the complex interactions characterizing the industrial systems.

Integration of detailed kinetic mechanisms in large scale numerical simulations.
Detailed kinetic models are crucial to properly understand fuel and combustion properties such as ignition, heat release and pollutant formation. Comprehensive chemical schemes for the SECs and the related pollutant formation pathways will be available from both WG1 and WG2. An objective of WG5 will be to develop methodological approaches and tools for the integration of detailed

kinetic models into large-scale simulations, taking into account the nature of the combustion regime and the features of the targeted technology. This will require the development and use of efficient reduction techniques.
Validation of the reduced models will be performed not only under conditions where fundamental experimental data exists (WG1 and WG2), but also under typical operating conditions of the combustion device. This will provide quantified estimates about the uncertainty related to the developed models, establishing a mutual exchange with the activities carried out in WG4.

Development of reliable, widely applicable and affordable turbulence/chemistry interaction models
Combustion phenomena take place over a large range of temporal and spatial length scales. Direct resolution of all pertinent scales for practical combustion applications is impossible even with the largest computers currently available. To simulate fluid-dynamics/chemistry interaction it is necessary to use turbulent combustion models. Most of the existing models are based on the assumption that the chemistry is fast compared to the flow. These assumptions are likely to be violated in advanced combustion technologies that are mainly kinetically controlled.
In such cases finite-rate chemistry models (using flamelet- or Probability Density Function-based approaches) and having the ability to handle complex chemistry/flow interactions need to be considered and assessed for both Reynolds-averaged Navier-Stokes and Large Eddy simulations.
Validation of the above combustion models will be based on test cases identified in collaboration with the industrial partners. It is important to stress the scale-bridging nature of such test cases, which implies that they should be relevant enough to the intended use, e.g. engines, turbines and burners, but allowing at the same time the validation of physical sub-models.

Assessment of the uncertainty related to numerical predictions for their use in new design and regulation
Methodologies to constructively couple simulations and experiments (like Validation and Uncertainty Quantification - V/UQ), to provide estimates of the uncertainty related to numerical predictions, can greatly improve reliability of numerical simulations thus enabling a more straightforward transfer of innovative technologies toward practical applications.
The need for consolidating V/UQ techniques in the field of the numerical simulation of reacting flows is quite urgent. Other disciplines (Wind Engineering, COST Action 732) have already tackled this problem. The combustion community, also in view of the multi-scale, multi-physics nature of the problem appears behind on this track.
Assessment of these methodologies will require strong interaction with the WG4, in view of the

understanding of the all sources of error/uncertainty, including the experimental error, related to the statistical and bias errors associated to the measurements, the scenario uncertainty, including both uncertain model parameters and boundary conditions, the modelling error, which arises from the non-perfect knowledge of the physical phenomena, and the numerical error, deriving from the numerical approximations adopted in the model (i.e. grid resolution, discretization error, convergence error, etc.).

E. ORGANISATION

E.1 Coordination and organisation

Management and organisation of the Action

The management and organization of this Action will be carried out following the COST Action regulation and procedures. A well-defined and operative structure will be established that will ensure coordination of national research and promote capacity building and dissemination. The Management Committee (MC) organizes, implements and coordinates the activities of the Action. It will be composed from up to two representatives from each signatory country and is responsible for budget planning and allocation of funds, planning of events (i.e. MC and WG meetings, Workshops, Training Schools), defining and overseeing the STSM implementation plan, communicating tasks and milestones, conducting internal evaluation and monitoring of the Action, communicating with the COST Association.

The MC will be supported in these activities by:

1. WG Leaders for each Working Group (WG) that will manage, monitor and report the activities of each WG. WG Leaders will be appointed by the MC, taking due cognisance of gender balance and Early Stage Researcher involvement, with each WG Leader supported by a deputy (WG Vice-Leader). The Action participants will be grouped in 5 Working Groups
2. Early Stage Researcher and Gender-Balance Advisory Committee: consisting of at least two members which has the aim of promoting the participation of young researchers and assuring equality in gender participation.
3. Industrial Advisory Committee: consisting of at least two members that will provide effective means of communication between research and industrial participants and ensure that industrial needs are properly addressed.