The goal of Fusion Summer Study (see Prospectus for the meeting) is to provide a forum for interaction among fusion scientists in order to develop a scientific and technical basis for consensus on:

- The key issues for plasma science, technology, and energy and environment for fusion energy development.
- The opportunities and potential contributions of existing and possible future facilities and programs to reduce fusion development costs and achieve attractive economic and environmental features.

The cross-cutting energy working group is exploring the above issues in the context of the energy mission of the fusion program. Two main categories of topics are being addressed: (1) Our visions of the end-product of the fusion research and (2) the development plan for these visions. In order to focus the discussion, the energy working group has developed a list of questions/hot topics to guide the discussions.

Our goal is to assemble, review, and assess all available technical information on to the topics.

Our Deliverables are five-page summaries of our work for each topic.

The alloted time for discussion during the summer study are 6 afternoon sessions (4 during the first week and 2 during the second week). (see Summer Study schedule). So, the discussion time for each topics is limited and should be focused. In particular we want to ensure sufficient discussion time during the summer study.

In order to focus the discussion, we will need to perform a considerable amount of homework before the meeting. In particular, our aim is to assemble and review all available technical information on to the topics before the meeting. These are scientific background relevant to the question. The main topic of discussion is, therefore, the assessment of the information and resolution of the questions/hot topic given the relevant information. Even in this area, we would like to do as much as possible before the meeting, identify points of agreement and disagreements and focus the discussion time during the summer study to debate and resolution (if possible) of the issues.

To this end, the topic coordinator for each area has drafted a roughly two-page document to initiate the discussion on the topic. **Participants and Contributors are encouraged to review these documents and forward their feedback to the topic coordinator and/or post them on the discussion board.** We are expecting that these document to be revised considerably before the summer study and are used as a basis to focus the discussion on areas of disagreement. **We will use snowmass to discuss only the issues of disagreement.**

The meeting plans are as follows:

- In addition to write-ups posted on the Web, hard copies of our write-ups will be distributed to participant during the registration day.
- During the first afternoon of working group activity (Tuesday, July 13), we will have summary and/or invited talks on the topics of the energy working group. These presentation, hopefully, will bring all participants up to speed.
- The rest of the first week (Wednesday through Friday) we will start with a 30 minute reporting of the previous-day sub-group activities to the entire working group and then break into smaller sub-groups for discussion. No general session on Wednesday July 14.
- During the first week, the two subgroup will have parallel sessions (but each subgroup addresses their topics in serial fashion). In order to promote discussion on any given topics we may break into smaller groups of 25 people.

Based on the discussions of the meeting and follow-up activity, we are planning to provide a five-page document which review and assess all available technical information on to that topic.

Click on topics to find the latest draft write-up for this topic. Forward your comments to topic corrdinators and/or post them on the discussion board.

Subgroup A: Long-term visions for fusion power applications

Overall Coordinators: Don Steiner & Bill Nevins (Click here to send E-mail to both corrdinators)

Topic A1. What are the currently projected economic, environmental and social characteristics of the alternative energy systems for the 21st century? (Fusion, Fission, Fossil, and Renewables).
Topics Coordinators: John Perkins & Jeffrey Freidberg (Click here to send E-mail to both corrdinators)

Topic A2. What are the desired/required characteristics of an attractive fusion energy/non-energy system? Can current concepts evolve into such an end point(s)? If so, what are the required developments? If not, what are the the required breakthroughs/innovations that will be required to make fusion systems commercially attractive?
Topics Coordinators: Jeffrey Freidberg & Don Steiner (Click here to send E-mail to both corrdinators)

Topic A3. What is the potential role of fusion for applications other than energy (e.g., H-generation, fissile fuel production, tritium production, waste burning, etc)?
Topics Coordinators: Don Steiner & Bill Nevins (Click here to send E-mail to both corrdinators)

Topic A4. Is there a potential role for advanced fusion fuels? If so, what is that role and how might it be exploited?
Topics Coordinators: Bill Nevins & John Perkins (Click here to send E-mail to both corrdinators)

Click on topics to find the latest draft write-up for this topic. Forward your comments to topic corrdinators and/or post them on the discussion board.

Subgroups B: Range of Steps Along Development Paths, Options, Directions, Accomplishments, and Decision Criteria

Overall Coordinators: Ron Stambaugh & Gerald Navratil (Click here to send E-mail to both corrdinators)

At present, fusion concepts that projected for the energy development phase require large and costly experimental programs. In order to move forward, the US fusion community should reach a consensus on what set of affordable devices/steps can we embark upon in the next 10 years in order to to build the technical and political basis for fusion energy eventually. This subgroup activity focuses on devices which generate large amount of fusion energy and devices that lead directly to future high-average-fusion-power facilities. Examples include short-pulse copper machines, steady-state DD advanced tokamaks, the IRE(s) for inertial fusion and ITER-like ETRs.

Topic B1. What are the key technical steps we need to make along various fusion development paths? What are the scientific and technological challenges that should be resolved? What are the decision criteria (scientific, technological, financial, and political) to move forward after completion of each step? How can we ensure that fusion technologies necessary for each step are developed?
Topics Coordinators: Ron Stambaugh & Wayne Meier (Click here to send E-mail to both corrdinators)

Topic B2. How could evolutionary paths for different fusion concepts (both MFE and IFE) contribute to overall fusion energy development? Could different fusion concepts be used for various development steps (e.g., how much of the ignition physics learned in the tokamak topology is transferable to other MFE concepts?)
Topics Coordinators: Wayne Meier & Ned Sauthoff (Click here to send E-mail to both corrdinators)

Topic B3. Within an international context, what foreign fusion development steps do we foresee? What role should the US seek to play in those development steps? What domestic development steps could we foresee in this context?
Topics Coordinators: Ned Sauthoff & Gerald Navratil (Click here to send E-mail to both corrdinators)

Topic B4. Certain next step devices have been proposed. In the context of answers provided to questions B1 to B3, the following generic set of questions are posed for these proposed next step devices: tokamaks (short-pulse ignition and steady-state advanced tokamak), spherical tokamaks, stellarator, NIF, IRE, and other fusion concepts that may appear in a longer time-frame:
What technical issues will the proposed step address? What issues will it not address? What is the degree of technical risk and schedule achievable? What opportunities are offered by the concept to reduce fusion development costs (either in the near term or integrated over time) and achieve attractive economic and environmental features? What position will the results, if as expected, put us in to move fusion forward to the next step beyond?
Topics Coordinators: Gerald Navratil & Ron Stambaugh (Click here to send E-mail to both corrdinators)