

To: ReNew participants
From: ReNeW Executive Committee
Subject: ReNeW goals and strategy

We have been charged by OFES with carrying out the Research Needs Workshop (ReNeW) for Magnetic Fusion Energy Sciences. We expect this activity to have a decisive influence on future directions of US fusion research. It also provides an opportunity for the US fusion community to explain its research goals to a new administration.

Objective: The objective of the ReNeW project is to help OFES develop a plan for US fusion research during the ITER era—roughly the next two decades. ReNeW’s planning activity will culminate in a Report to OFES that will be completed shortly after the ReNeW Workshop, to be held in June 7-13, 2009. The Workshop will be the key integrating event in this activity. The final report will appear by mid-July, 2009.

The plan described in the Workshop report will use as its framework a set of approximately 15 scientific and technical research thrusts. Here the words “research thrust” are used to describe an organized, multi-faceted attack on some question, or coherent set of questions, essential to magnetic fusion energy science and technology, using a combination of new and existing program elements. The Report will describe each thrust in sufficient detail to allow an estimate of the required resources. However, to control the size of the Report a typical thrust description should require no more than 6 to 10 pages. An ideal description of a research thrust will be scientifically compelling (“Yes, this clearly needs to be done”) and internally consistent (“Yes, the described methods and tools fit together into a coordinated attack”).

A key challenge to the ReNeW project is the integration of the building-block thrusts into a compelling and consistent strategy for fusion energy research. We expect this integration activity to be a dominant focus of the Workshop, although it must begin well in advance.

Resources: The information that supports the research thrusts will come from the expertise of ReNeW participants and from a wide range of technical material. However, the Workshop will emphasize three essential resource documents: the report of the Priorities, Gaps and Opportunities Panel, chaired by Martin Greenwald (“Greenwald report”); the report of the Toroidal Alternates Panel, chaired by David Hill (“TAP report”); and the June 2006 report of the Energy Policy Act (EPAct) task group of the U.S. Burning Plasma Organization (“EPAct report”).

The Greenwald report has special importance for ReNeW: it establishes both the structure of the ReNeW organization and the starting point for ReNeW planning. In particular, ReNeW will use, with possible minor revision, the fifteen issues identified by the Greenwald panel, along with the gaps revealed in Chapter 4 of that report, as the essential challenges

to fusion research in the ITER era and beyond. A likely modification would be to add to these lists by appending some of the issues and gaps identified in the TAP or EPAct reports. The mapping of the Greenwald issues and gaps onto ReNeW Themes and Panels should be straightforward, especially since three of the five ReNeW themes are taken directly from the Greenwald report.

Each of the resource documents also list possible opportunities for the ITER era. These recommendations deserve close study by ReNeW participants, since they can provide a helpful starting point for our own list of research thrusts. However ReNeW can be expected to expand or revise previous initiative lists. In addition and most importantly, ReNeW will describe its thrusts at a much finer level of detail than previous reports. Thus ReNeW will provide detailed strategies for its thrusts, with options, facility requirements and decision points. Where more than one strategy or thrust could address a given gap, ReNeW will consider the relative merits of alternative approaches. It will also consider the role of foreign programs and facilities to help address the gaps.

At the end of the Executive Summary of the Greenwald panel report (page 6), four recommendations are listed, each calling for a detailed planning activity. With some oversimplification, one can characterize the ReNeW activity as an implementation of these recommendations.

Scope: The scope of ReNeW, which includes tokamaks and those alternative concepts chosen for study in the TAP report, can be inferred from its resource documents. Programs using other confinement concepts may be included when they directly support this agenda—that is, when they help resolve issues and gaps listed in the resource documents. A more detailed discussion of the ReNeW scope may be found in the document “Scope of ReNeW” on the ReNeW web site.

Other parts of the fusion research program, including confinement concepts not included in the TAP report, will be the focus of future workshops.

Organization: The ReNeW and our report will follow the structure that has already been defined, consisting of 5 Themes, each sub-divided into a number of Issues. (An organization chart is available on the ReNeW website.) Each Theme will have a Chapter in the report. The organization is based mainly on the Greenwald Report and on the soon-to-be-released TAP report. We will take full advantage of the work of those panels in defining the issues, so that ReNeW can focus on the research approaches to resolve those issues.

The October 16 letter from Gene Nardella discusses the ReNeW organization in more detail. In particular this letter addresses means by which the various Themes will communicate with each other.

Web site: A ReNeW web site, <http://burningplasma.org/renew.html>, is available to help us communicate and manage chapter drafts. Implemented by Jim DeKock of the University of Wisconsin, the site includes a public page, allowing visitors to learn about ReNeW from Gene Nardella's letters and other documents. Access to private discussion forums is provided to anyone enrolled in the ReNeW process; however participants who are not already USBPO members and have registered for a USBPO forum account will need to sign up for access to the private ReNeW discussion groups at <https://burningplasma.org/forum/> and click "Register".

Research Needs Workshop, June 7-13: The Workshop can accomplish its integrative task only if participants have the opportunity to study all five Theme chapters beforehand. Therefore initial drafts of the chapters must be completed and distributed at least two weeks before the Workshop.

In developing our research thrusts, the Theme Chairs will ensure that input is solicited from the wider community. Individuals or groups will also be able to submit written commentary and suggestions via the ReNeW web site. In addition, there will be opportunities for people to make presentations, including proposals for thrusts, at a set of Theme workshops to be held in the February or March.

The Theme Workshops will draft a preliminary set of about 25 research thrusts, or 5 per Theme; in early April, the Executive Committee will consolidate these into a consistent set of about 15 thrusts. We will then write the detailed descriptions of these thrusts as the core of the draft report to be issued two weeks before the ReNeW.

At the beginning of the ReNeW each Theme group will report its draft conclusions. We will then proceed to discussions and breakout meetings as necessary to resolve open issues and inconsistencies, with the aim of reaching a coherent set of conclusions, representing the best judgment of all participants, by the close of the Workshop.

Schedule:

1. Panel organization complete: December 3, 2008
2. Theme workshops scheduling complete: December 12, 2008
3. Five Theme Workshops complete: April 17, 2009
4. ExCom consolidates research thrusts: May 2, 2009
5. Consolidated thrusts reviewed by Themes: May 9, 2009
6. Workshop in Bethesda, MD: June 7-13, 2009
7. Final report issued: July 17, 2009