

## Achievements and status as of summer 2003 - a new time-schedule

In 1992 the Rutherford Appleton Laboratory and the Forschungszentrum Jülich started developing and designing a MW spallation neutron source, after a report for the European Commission had identified such a neutron source as one of the major new scientific infrastructural priorities for Europe. In 1997 by then some 10 labs and universities published the first design. The science case that was published at the same time was a joint publication of the ESS project and the European Science Foundation. The partners decided to start an R&D phase to investigate the technical challenges that had been identified. This phase was to last until mid 2000, and was followed by the Project Proposal Phase that was completed by the official European presentation of the science case and the design of the ESS facility with its 5 MW short pulse and 5 MW long pulse target stations. Also in Bonn five sites presented their ambition to host the ESS, most of them consortia involving regional governments. In the meantime, the partners from all over Europe had agreed to conclude a formal MoU with three major objectives:

1. To complete the proposal and formally present it, which happened in Bonn in May 2002;
2. To continue with a Baseline Design Phase that should result in a baseline engineering design by the end of 2003;
3. To get a political decision to construct the ESS late 2003/early 2004.



The time schedule was determined by the ambition to maintain without interruption Europe's lead in neutron science by providing the world's best facility. As a matter of fact much political and planning work had been carried out in previous years. In the mid nineties the UK instigated and provided chair and secretary of the OECD Megascience Forum Working Party that developed the global strategy for neutrons that was eventually endorsed by OECD ministers in 1999. One of its main elements was that the USA, Japan and Europe all needed a MW class spallation source. When the USA and Japan started construction of their MW spallation sources, in 1999 and 2000 respectively, it became clear that Europe would have a hard time to fulfil the ambition for continued leadership in the long run. Given the complexity of European decision making on large facilities a decision earlier than 2003/2004 did not appear to be realistic, as informal governmental consultations pointed out. However, as ESF's Secretary-General Enric Banda underlined in May 2002 in Bonn, a call upon governments to decide to build ESS in the timeframe indicated, seemed wholly appropriate. It was not to be.

The EU member states have established in April 2002 on the initiative of the European Commission a European Strategy Forum on Research Infrastructures (ESFRI) for consultation among governments on the need and the planning for new infrastructures for research in Europe. Its first case was the field of neutrons. A special Working Group was formed to analyse various scenarios for the top tier neutron facility in Europe. Benchmarking performance against a 1.4 MW SNS (to be operational in 2006) it concluded in its report of December 2002 that ESS would give Europe a lead in all relevant scientific fields, a staged approach with a long pulse 5 MW target station first would still give a lead in several fields, while a 1MW short pulse option (either by upgrading ISIS or as a green field AUSTRON version) would keep Europe competitive. If, as now seems likely, SNS would swiftly be upgraded to e.g. 2.5 MW, the Working Group noted that the competitive position of the various options would of course change.

The ESFRI Forum concluded, however, that there was no readiness among governments to decide now on a new source. The baseline scenario, which rests on ILL including its Millennium refurbishment programme and on ISIS with a second target station, will be the European road for the next period. There was an explicit conclusion that Europe needs a major new spallation source in the long run, but no timing for a decision was specified.

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**Summary table of scientific performance for the three scenarios:**

The competitiveness indicators are measured against SNS at its current design level of 1.4 MW.

From the ESFRI NWG report [http://www.cordis.lu/era/infrastructures\\_forum.htm](http://www.cordis.lu/era/infrastructures_forum.htm)

WL = World Lead

SL = Some Lead

C = Competitive

<i>Important Contribution to European Priority Research Mission</i>	<i>Flagship Field of Research</i>	<i>Scenario 1: ESS</i>	<i>Scenario 2: 5 MW Long Pulse</i>	<i>Scenario 3 a: 1 MW Short Pulse 10 Hz</i>	<i>Scenario 3 b: 1 MW Short Pulse 50 Hz</i>
Functional Materials, Microsystems and Information Technology, Nanotechnology	← Solid State → Physics	WL	SL	C	C
Microsystems and Information Technology, Functional Material, Nanotechnologies, Traffic and Transport, Sustainable Development	← Material → Science & Engineering	WL	SL	C	C
Functional Material, Nanotechnologies, Traffic and Transport, Sustainable Development	← Liquids & → Glasses	WL	SL	C	C
Functional Material, Nanotechnologies, Traffic and Transport, Sustainable Development	← Soft → Condensed Matter	WL	WL	SL	C
Functional Material, Health, Sustainable Development	← Chemical → Structure Kinetics & Dynamics	WL	SL	C	C
Health and Biotechnology	← Biology & → Biotechnology	WL	WL	C	C
Traffic and Transport, Cultural Heritage, Sustainable Development	← Mineral → Science, Earth Science, Environment and Cultural Heritage.	WL	SL	C	C
Cosmology, Origin of the Universe, Education, public understanding	← Fundamental → Physics	WL	WL	SL	C

## Schedule for the realisation of a new MW spallation source

That Europe needs a new MW spallation neutron source is acknowledged by both scientists and decision makers. Prior to project baselining, discussions in Europe must lead to settling on a final strategy and concept for the facility. This activity may take weeks, if the Bonn concept with a 5+5 MW long and short pulse target stations is selected. But now that a delay of the project seems unavoidable it will more likely take at least a couple of years.

A continued strong user involvement with continued harnessing of the science case is of key importance for such a project. Furthermore the power of neutron scattering should continue to be demonstrated through optimal use of existing facilities to provide new breakthroughs in a wide a range of disciplines - and through expanding the scientific areas where neutron scattering is advantageously used.

Another important issue is to maintain technical competence/capability, through an advanced technology programme and to investigate a range of possible performance enhancing technologies for a delayed European facility. Such a programme will however not have a direct impact on the planning and construction time schedule.

After a decision to go ahead with baselining and construction planning for the project, it will take about half a year to assemble a project team and a further 1,5 year and about 20 M€ to carry through this construction planning and baselining. Candidate sites should also engage in more detailed site planning. Based on this a decision to construct the ESS can be taken and an operating facility could be ready after an 8 year construction period.

Prototyping activities amounting to approximately 20 M€ could be initiated immediately, but could also be carried out in parallel with or slightly later after the start of project baselining, and then continue into the construction phase. At some risk for a delay of the construction period and a somewhat larger uncertainty in construction costs, prototyping could be delayed until the start of the construction phase.

World-wide collaboration on both science and technology is in all cases essential for a healthy and cost-effective development.

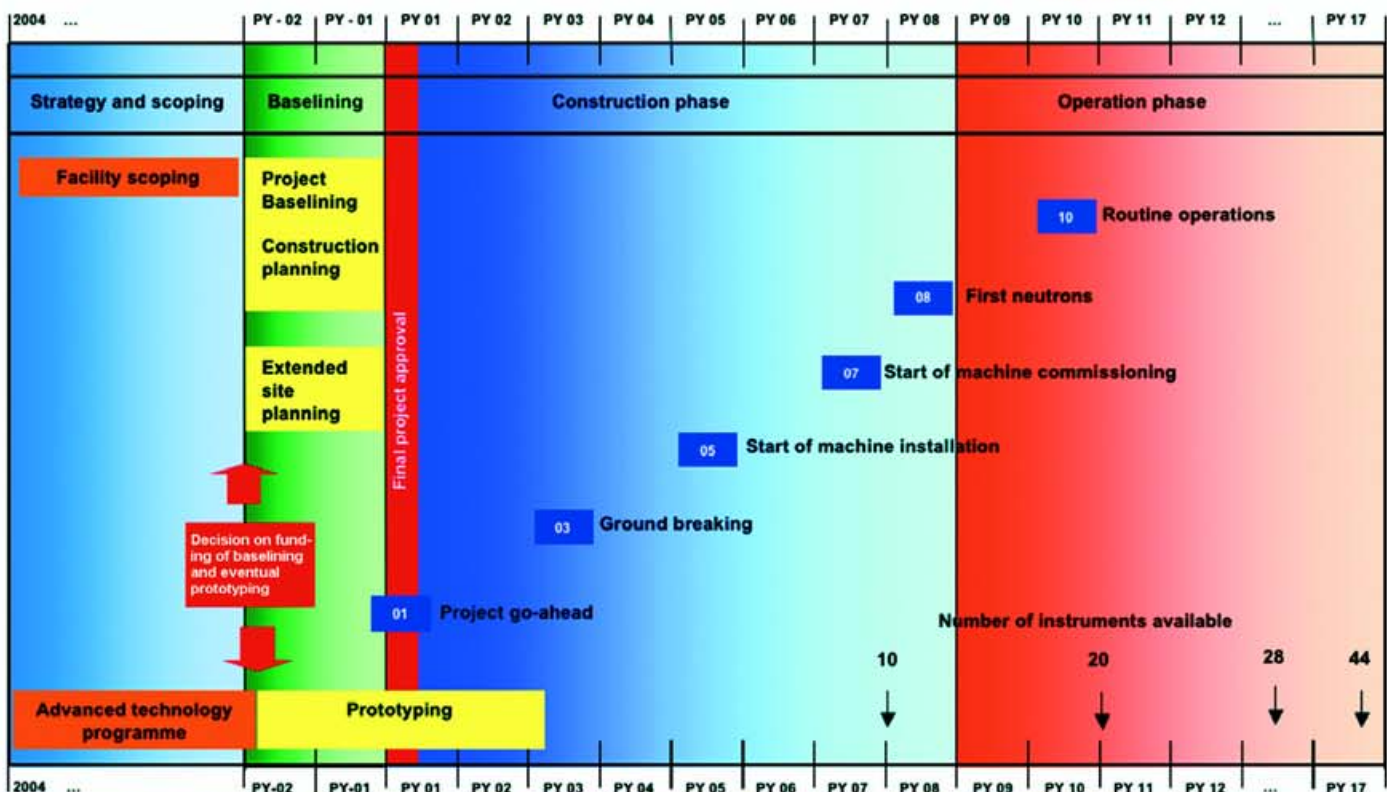


ESS information available here:  
[www.neutron-eu.net](http://www.neutron-eu.net)

... Your central gateway for access to neutron and muon information ...

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The "European portal for neutron scattering and muon spectroscopy" is a common entry point to facilities and information. It is a joint initiative by all European organisations engaged in neutrons and muons, and is supported by the European Commission through FP5 and FP6.



ESS time schedule in terms of project years (PY) relative to the year of a decision to build the facility. The strategy and scoping phase has no fixed length and could be from weeks to years in duration.

The ESS project proposal, technical documentation and science case are on the neutron portal [www.neutron-eu.net](http://www.neutron-eu.net).