

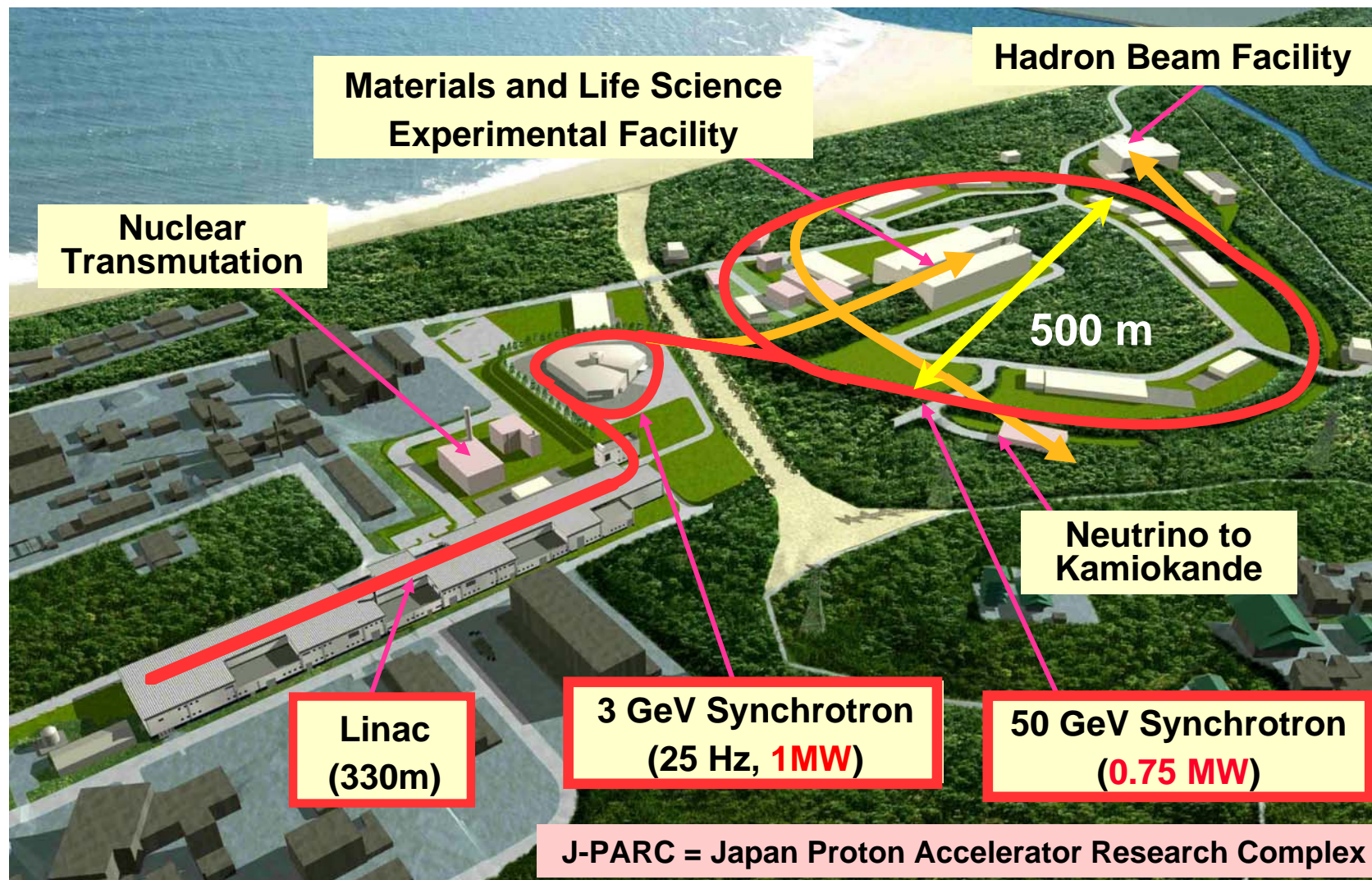
June 30, 2006
50 GeV PAC

J-PARC Overview

Shoji Nagamiya

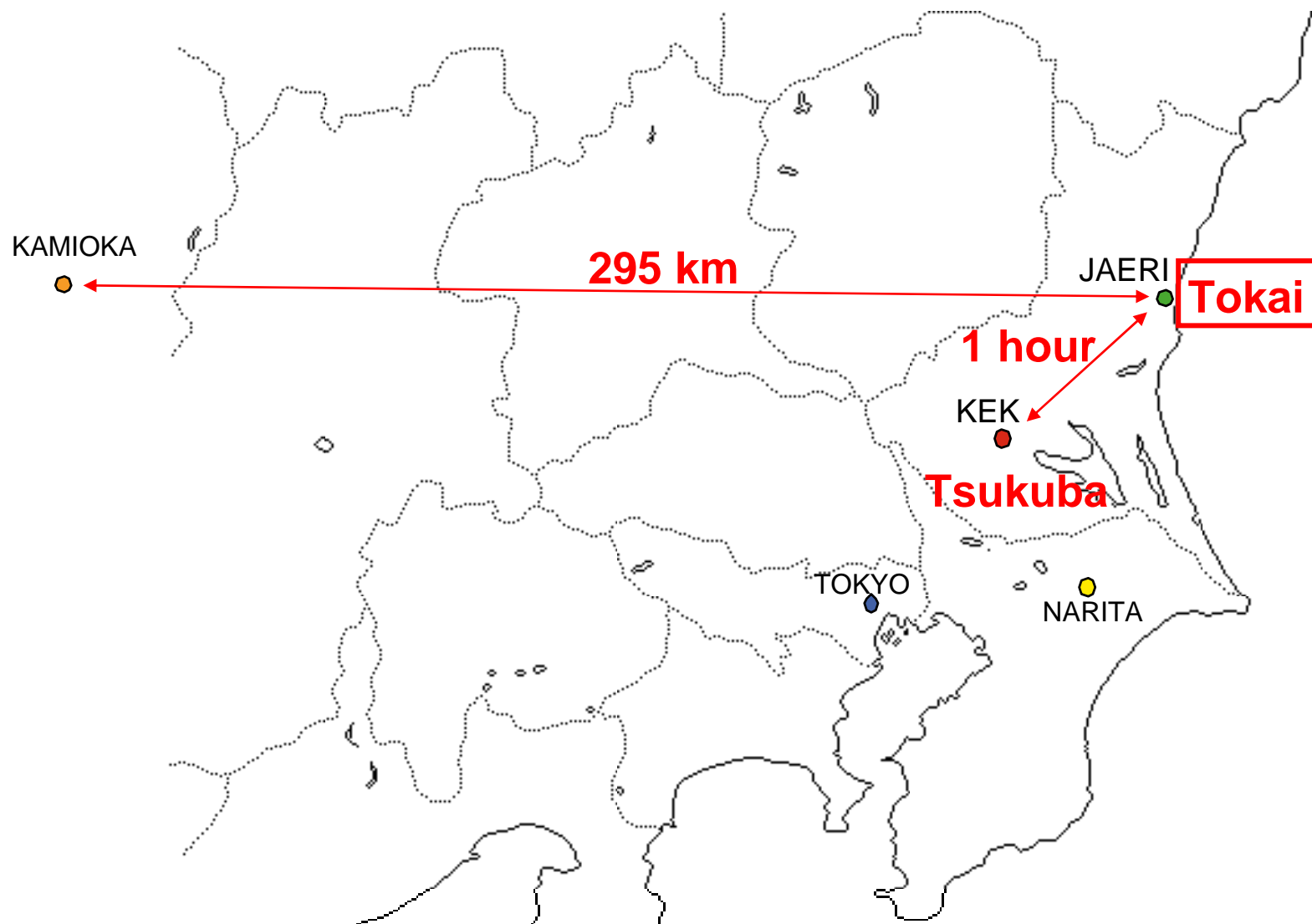
Director of J-PARC Center at KEK/JAEA

J-PARC Facility

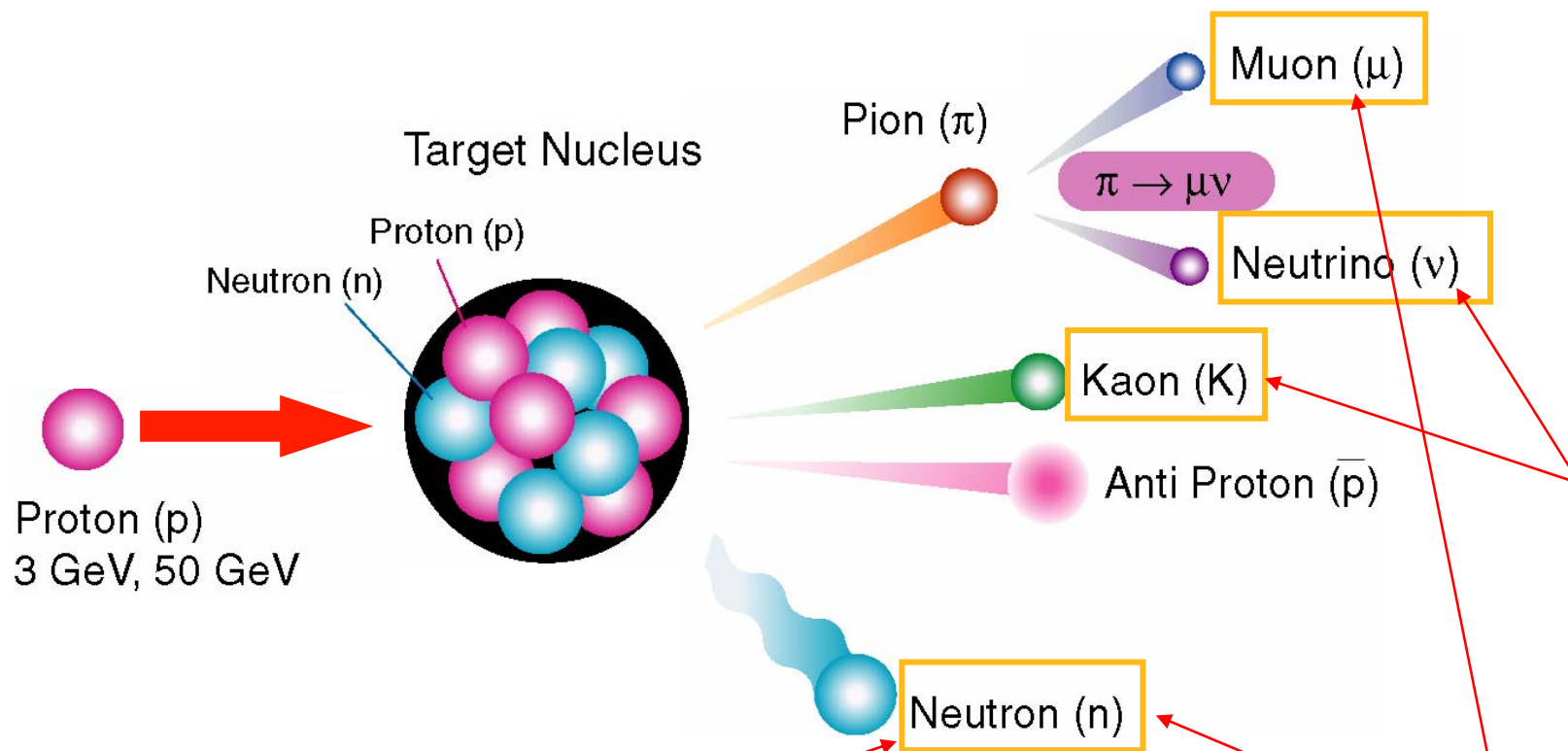


Joint Project between KEK and JAEA

Location of J-PARC at Tokai



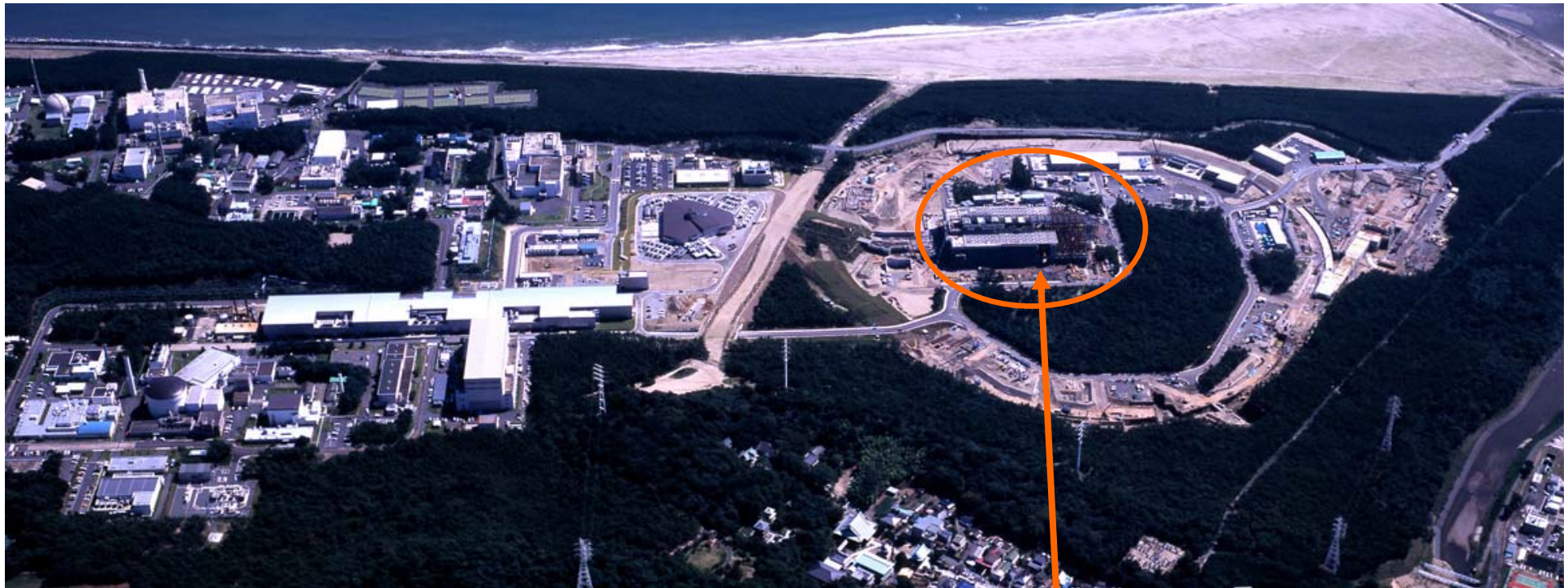
Goals at J-PARC



Need to have high-power proton beams

→ MW-class proton accelerator
(current frontier is about 0.1 MW)

Materials & Life Sciences at 3 GeV
Nuclear & Particle Physics at 50 GeV
R&D toward Transmutation at 0.6 GeV

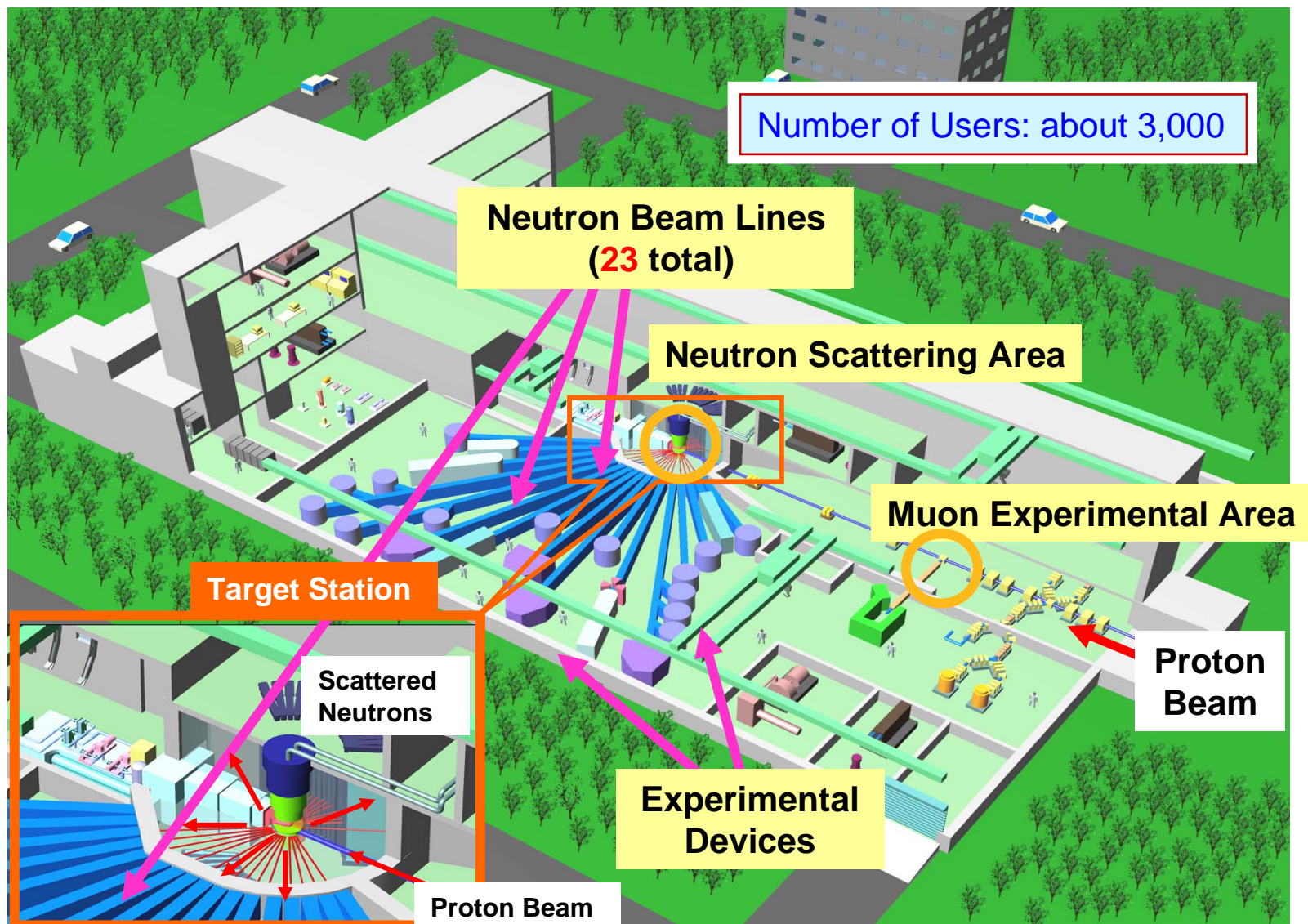


Materials and Life Experimental Facility

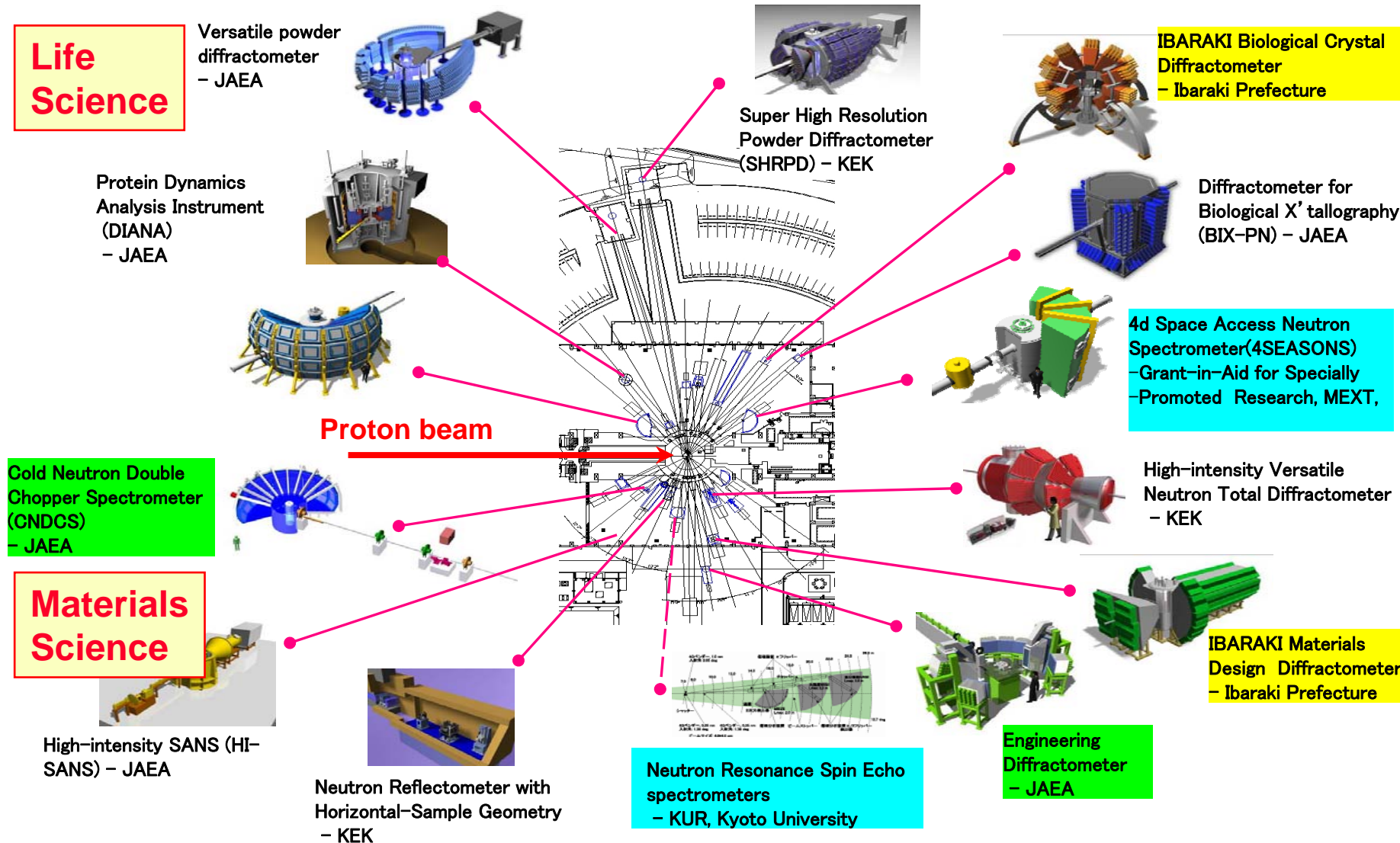
Facility similar to SNS in the US



Materials & Life Experimental Facility



Example of Neutron Instruments

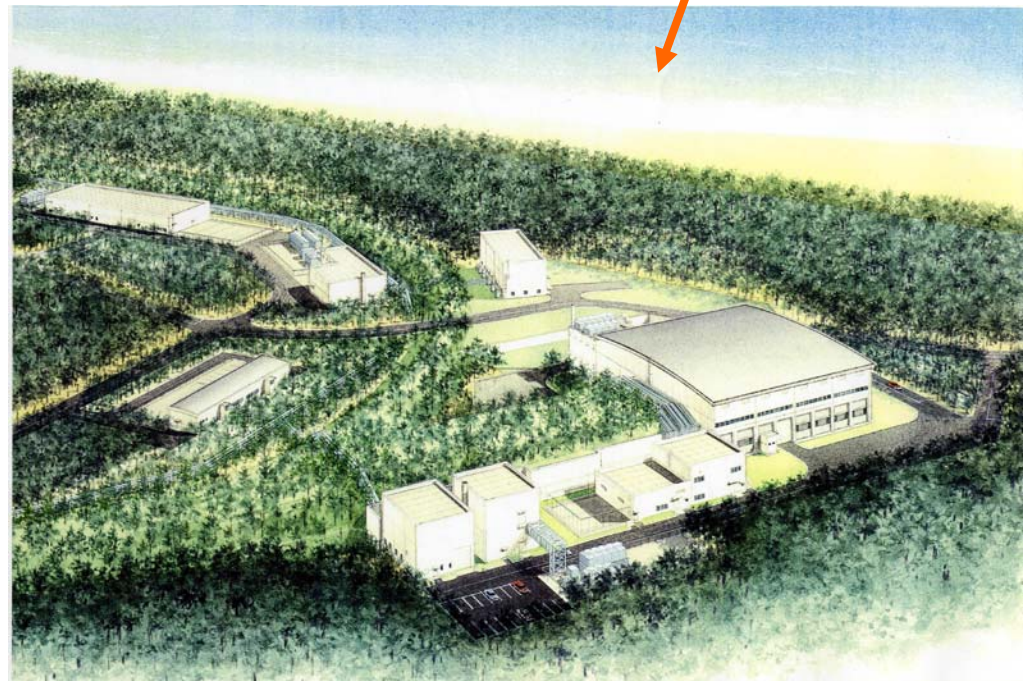




Hadron Experimental Facility

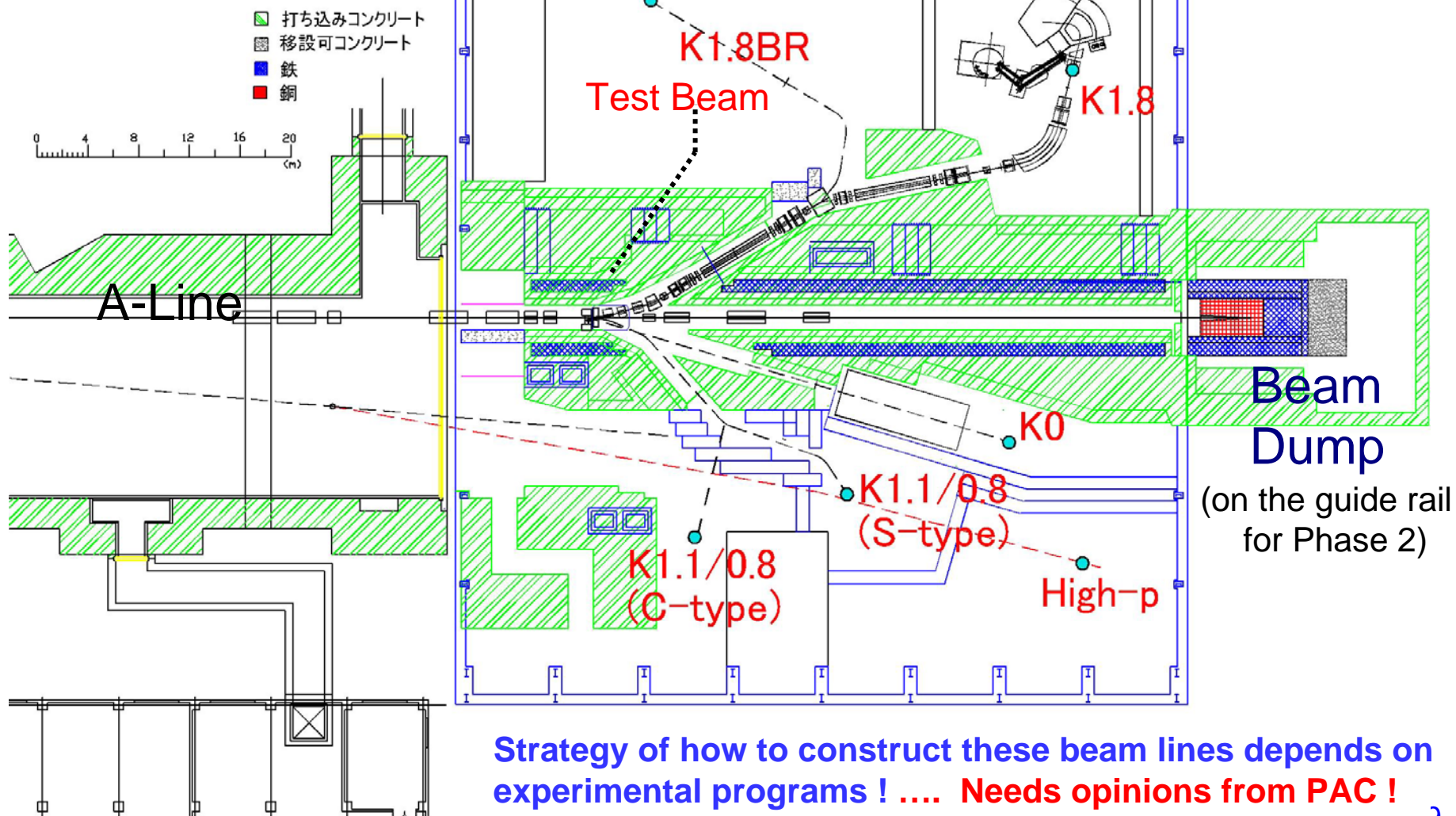
Number of Users: about 600
(about 1/3 from Japan)

Experiments with Intense K-Meson
Beams (Kaon Factory)



Hadron Experimental Hall (Phase 1)

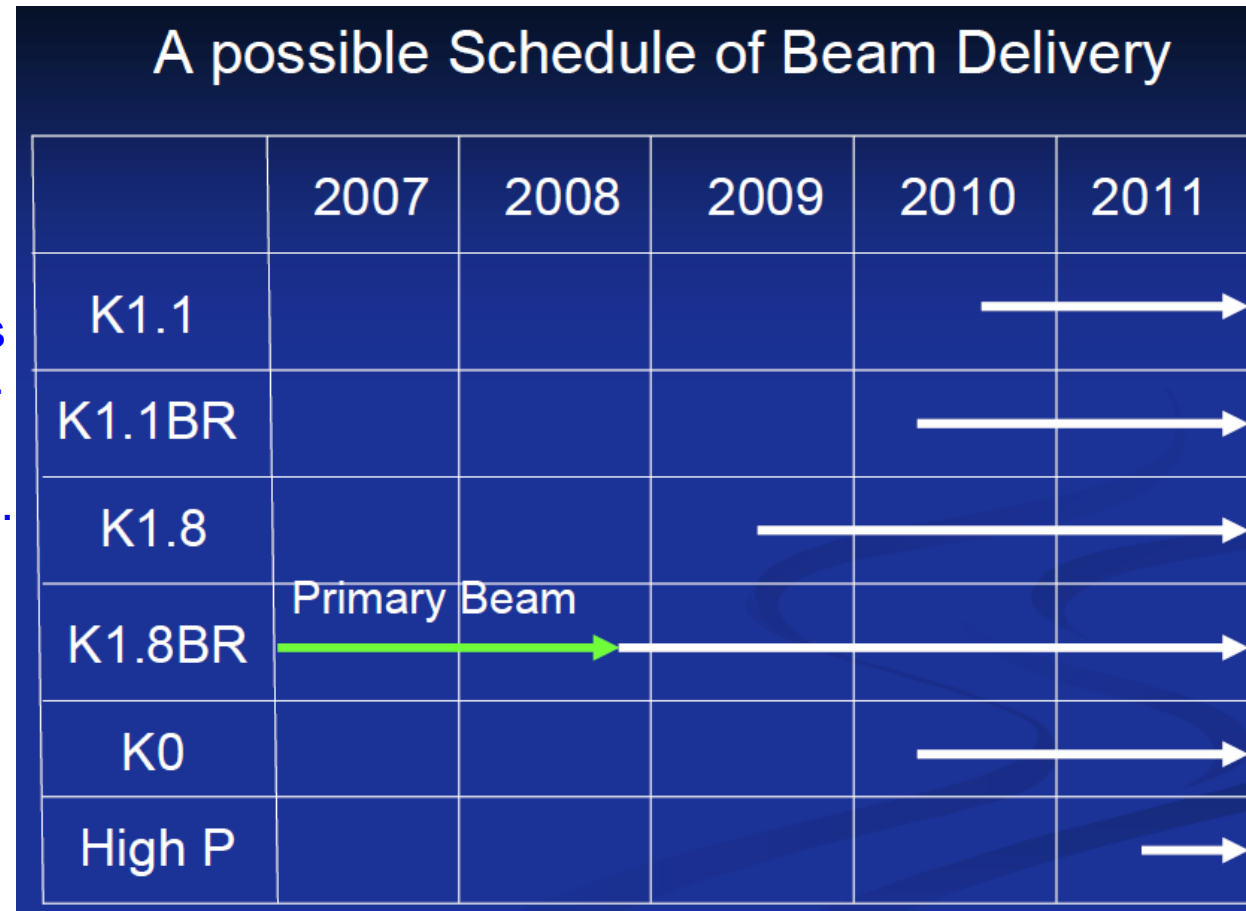
Experimental Area



Strategy for hadron beamlines



Proposal by the Project Team, which is based on recommendations by the previous Committee for 50 GeV.



Need PAC input on the strategy of how to construct these beamlines in time-wise.



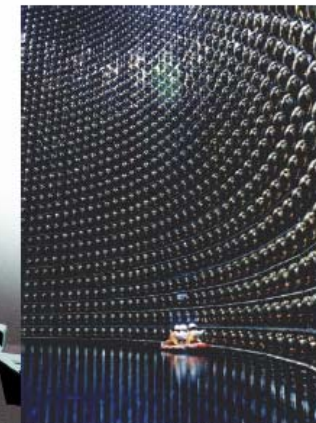
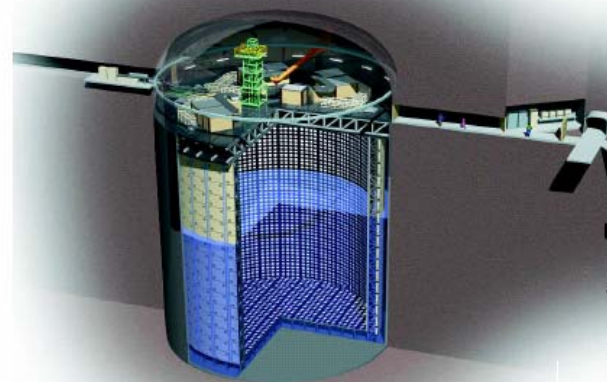
295 km
West

Super Kamiokande

Neutrino Experimental Facility

Number of Users: about 400
(about 1/4 from Japan)

Experiments with Intense
Neutrino Beams



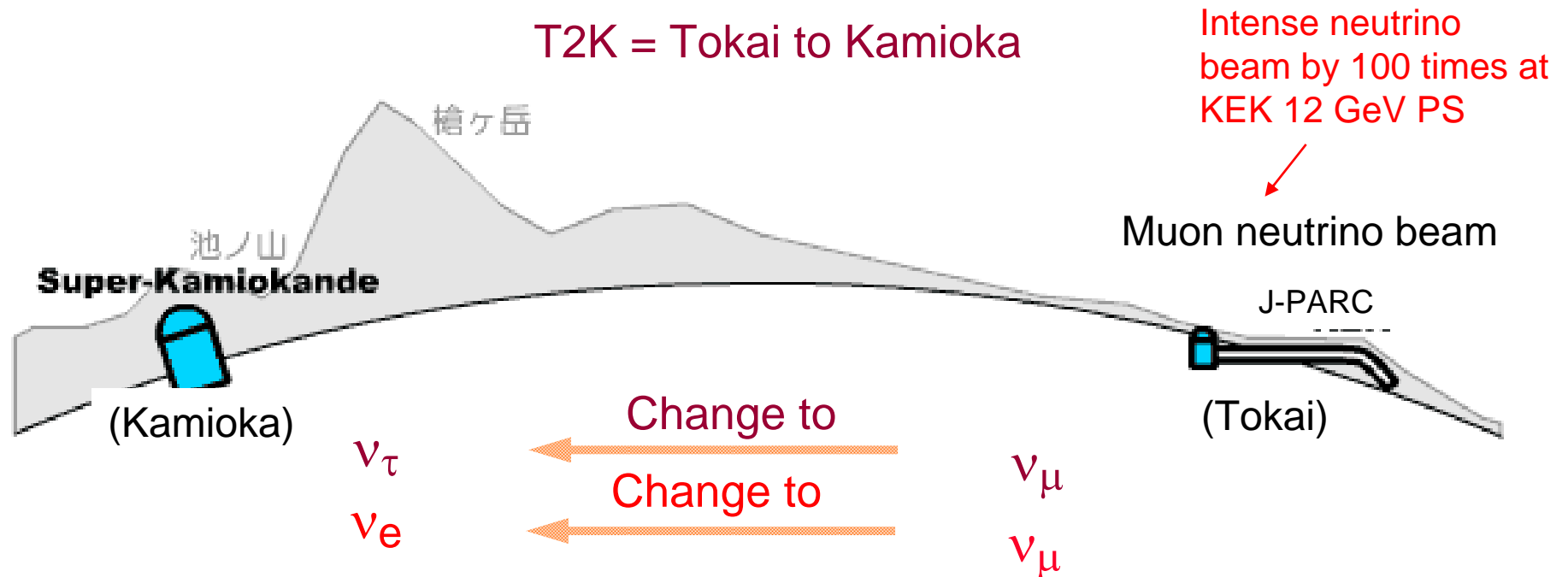
岐阜県神岡町地下1000m

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1996～

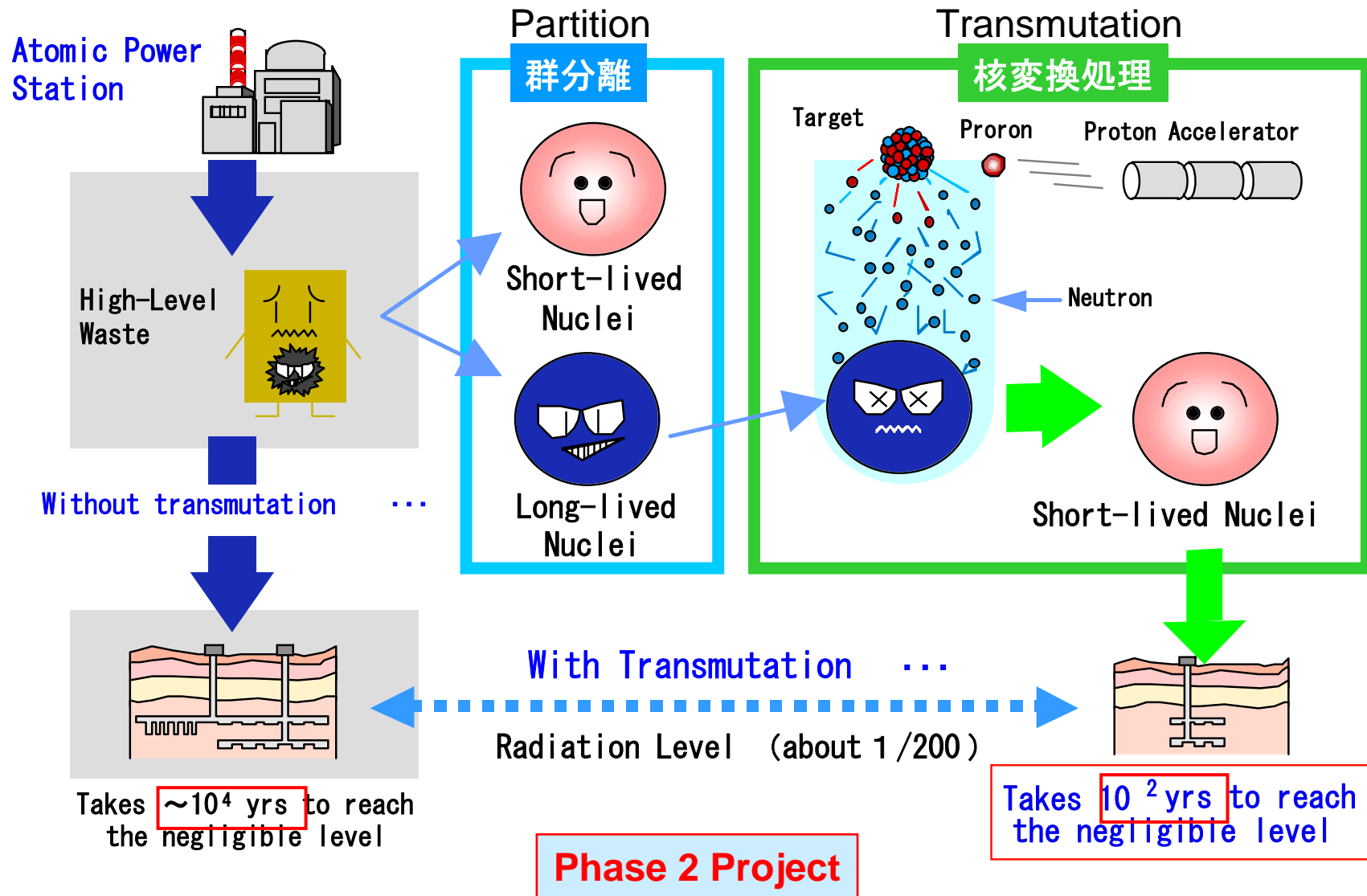
T2K Experiment



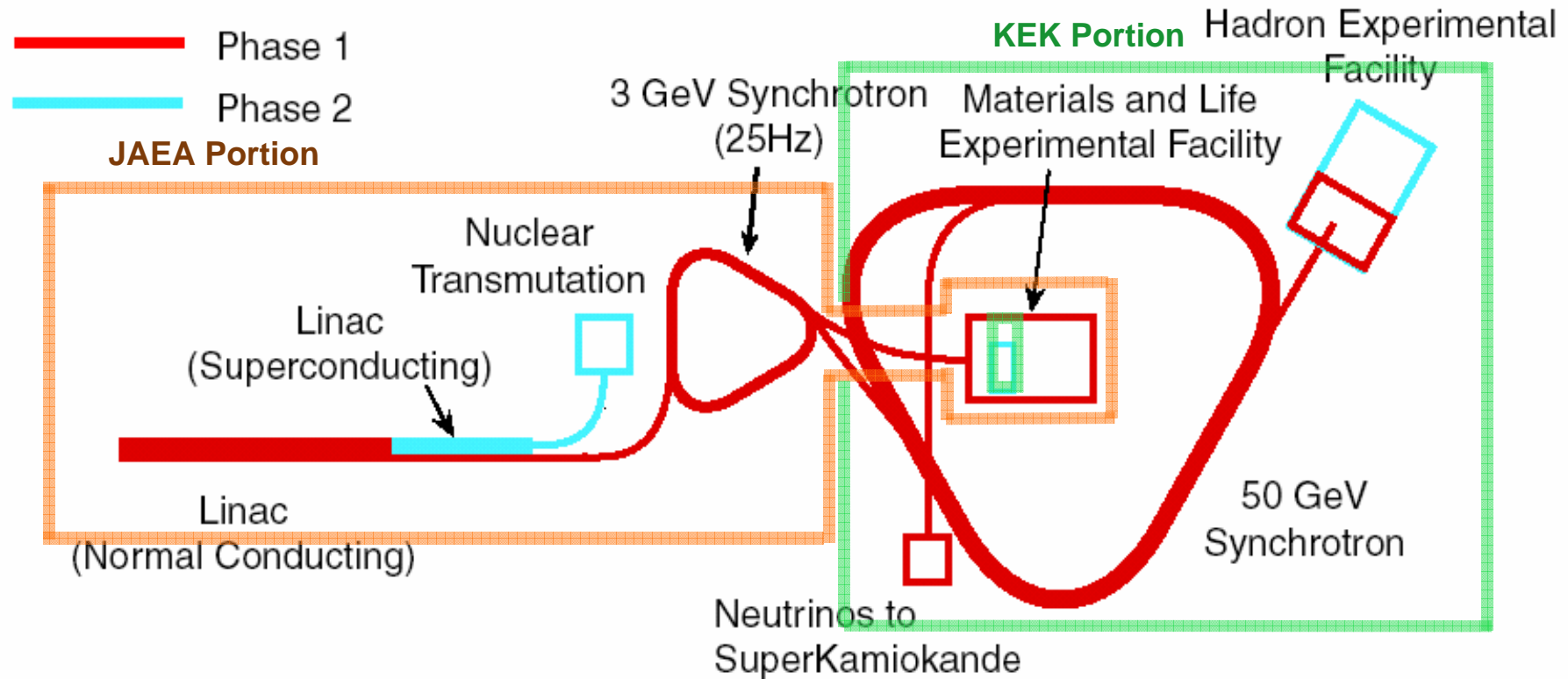
Disappearance of $\nu_\mu \leftrightarrow$ High Statistics T2K
(Five year data at KEK-PS can be measured within a few weeks at J-PARC)

Detection of ν_e at Super Kamiokande \leftrightarrow Totally new experiment

Accelerator-Driven Transmutation (ADS)



Phase 1 and Phase 2



- Phase 1 + Phase 2 = 1,890 Oku Yen (= \$1.89 billions if \$1 = 100 Yen).
- Phase 1 = 1,527 Oku Yen (= \$1.5 billions) for ~ 8 years.
- JAEA: 860 Oku Yen (56%), KEK: 667 Oku Yen (44%).

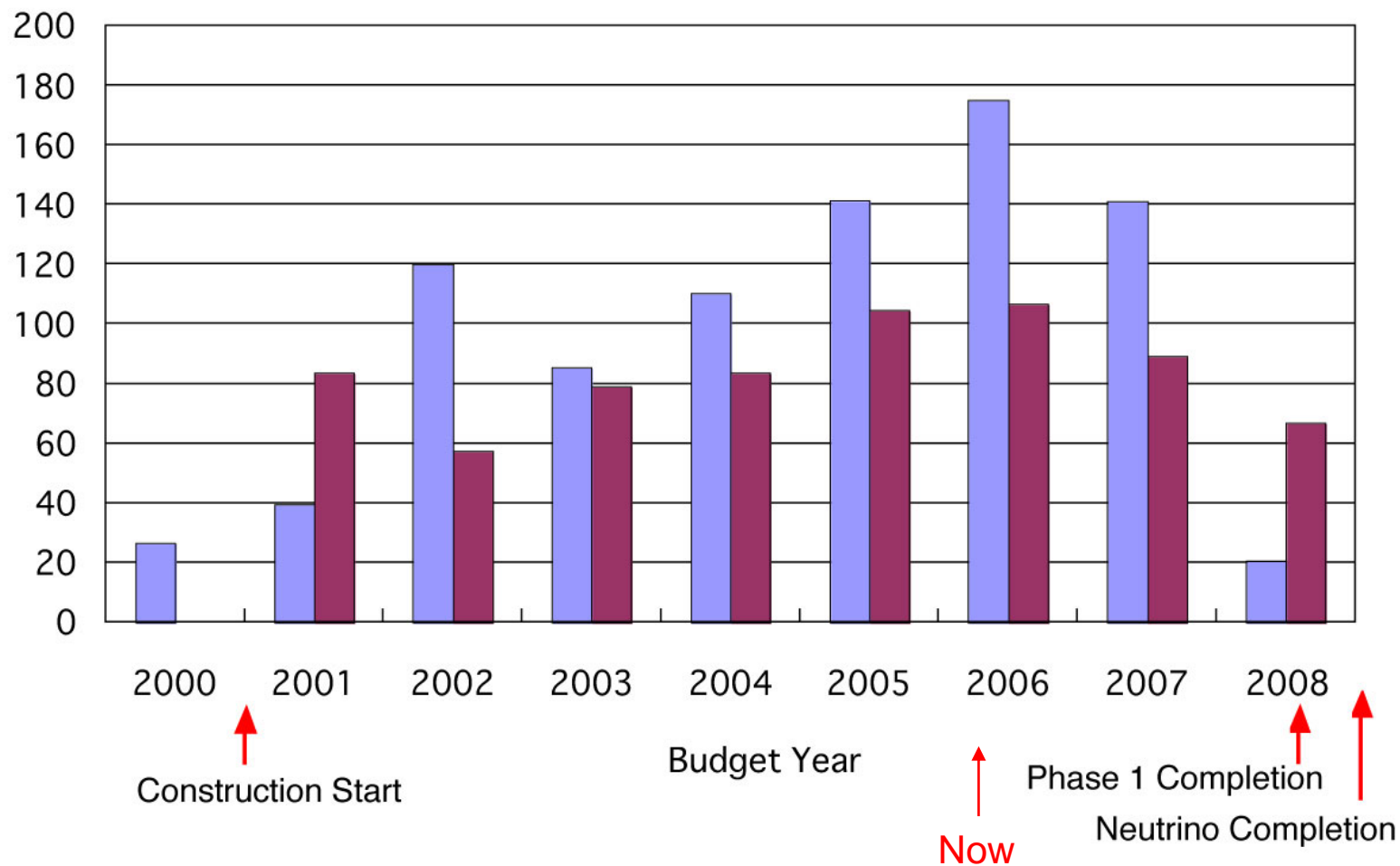
Budget Profile



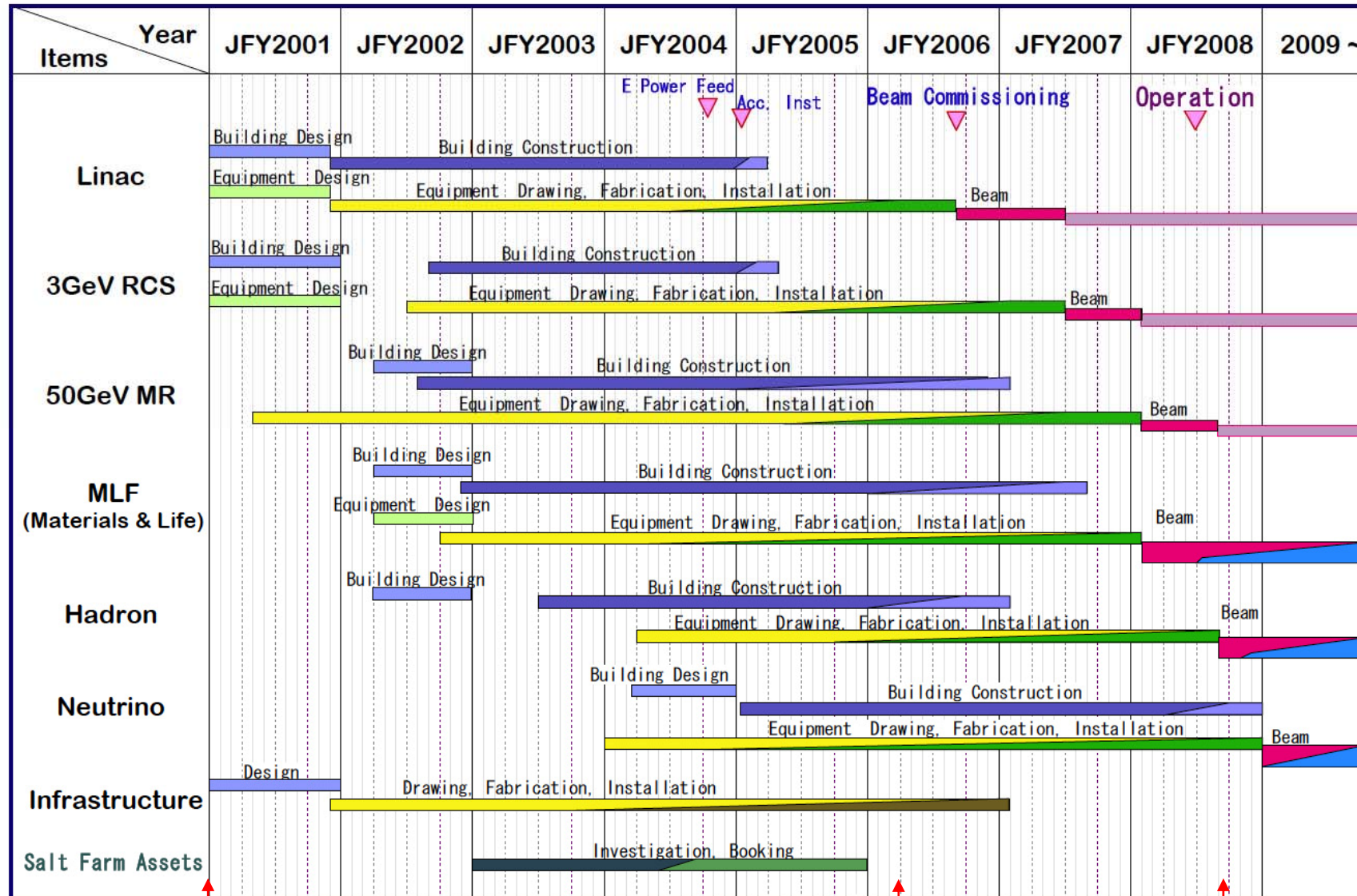
Oku Yen
(Oku = 10^8)

Budget Plan

■ JAEA
■ KEK



J-PARC Construction Schedule



Construction
Start

NOW

Facility
Operation

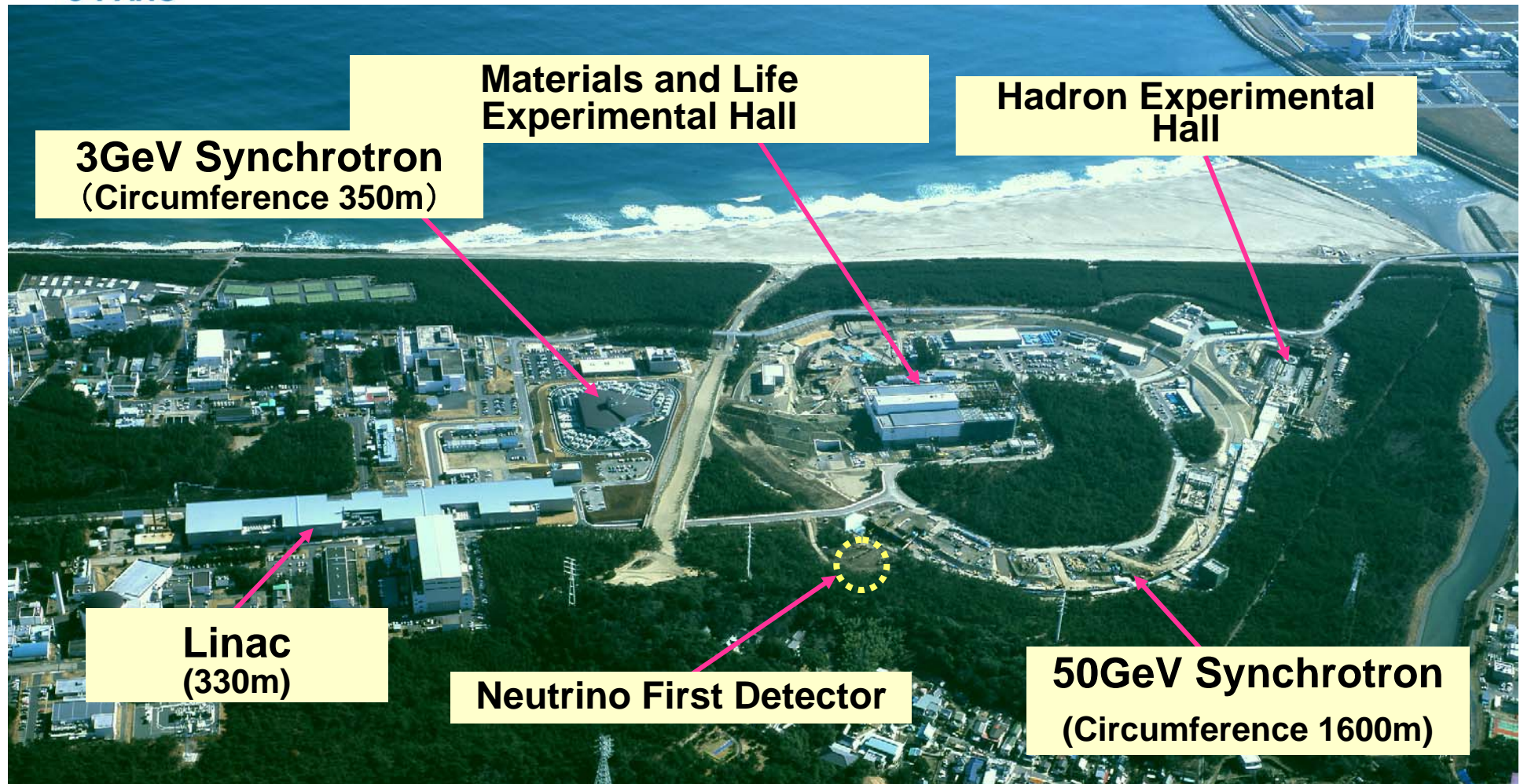
Ground Breaking Ceremony

June, 2002

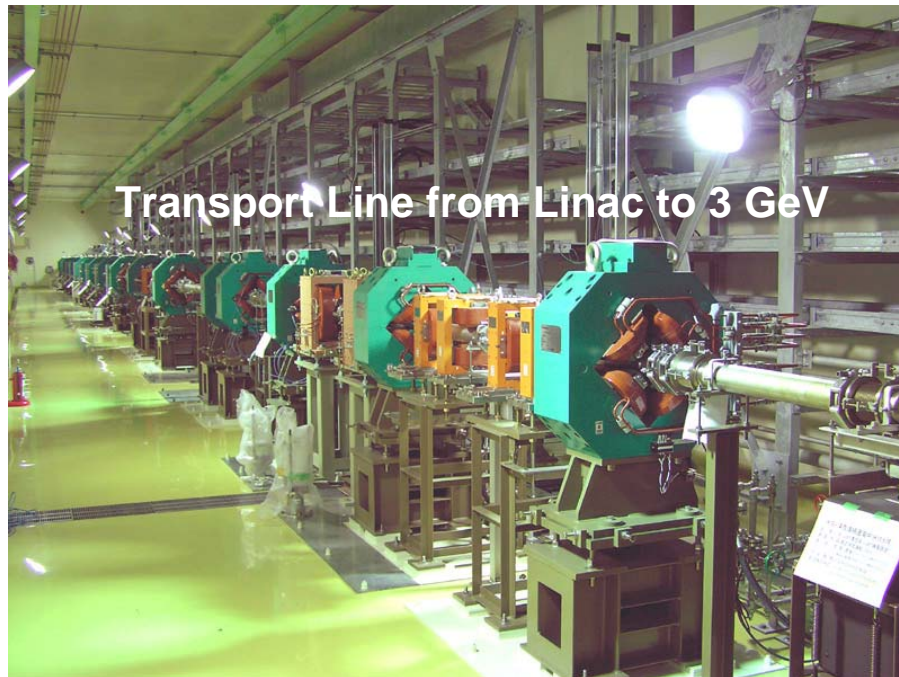
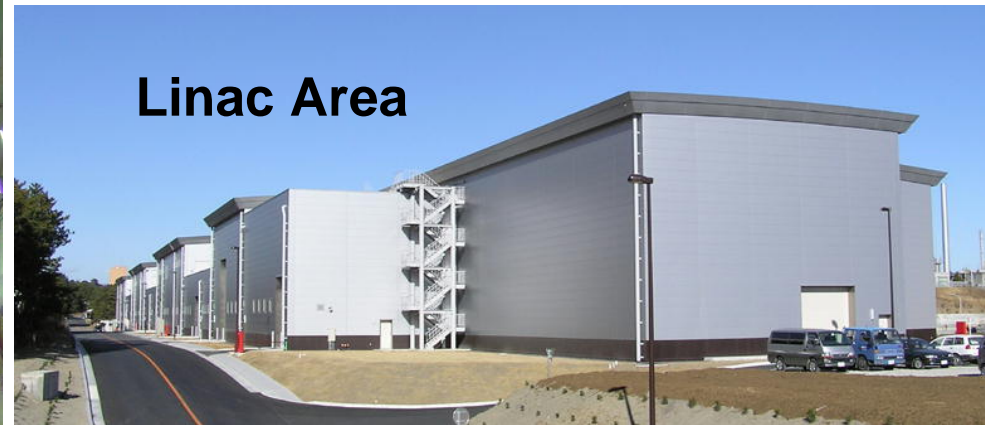
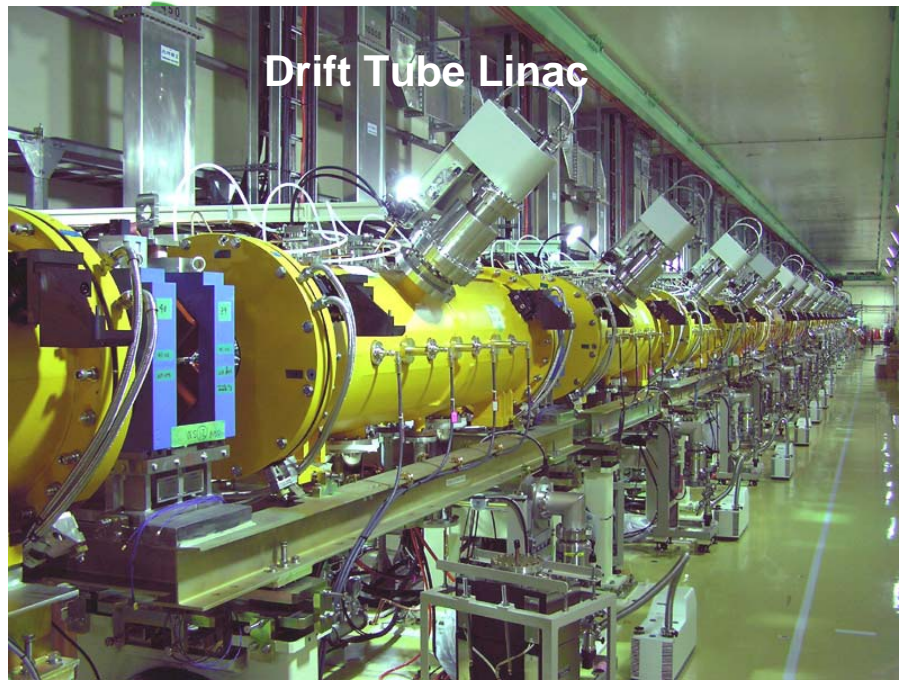




Construction Status of J-PARC



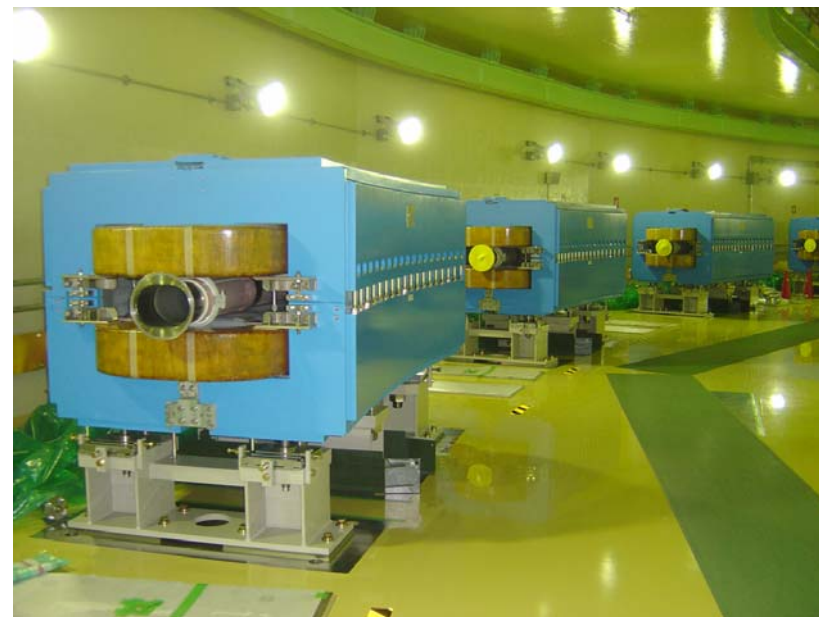
平成18年2月航空写真



Klystrons + Electric Powers



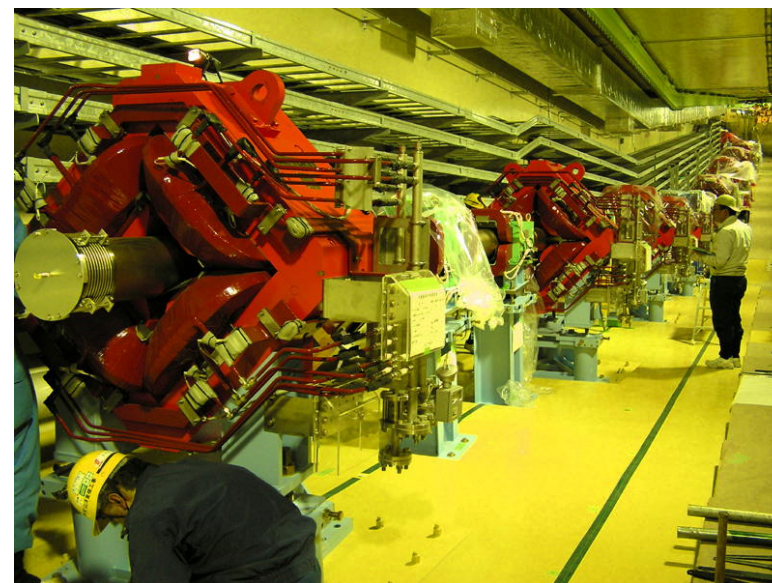
3 GeV Synchrotron Area



3 GeV Tunnel



50 GeV Synchrotron Tunnel



**From 3 GeV to Life & Materials
Experimental Hall**



**Final Construction Area
for the 50 GeV Tunnel**



Neutrino Decay Volume



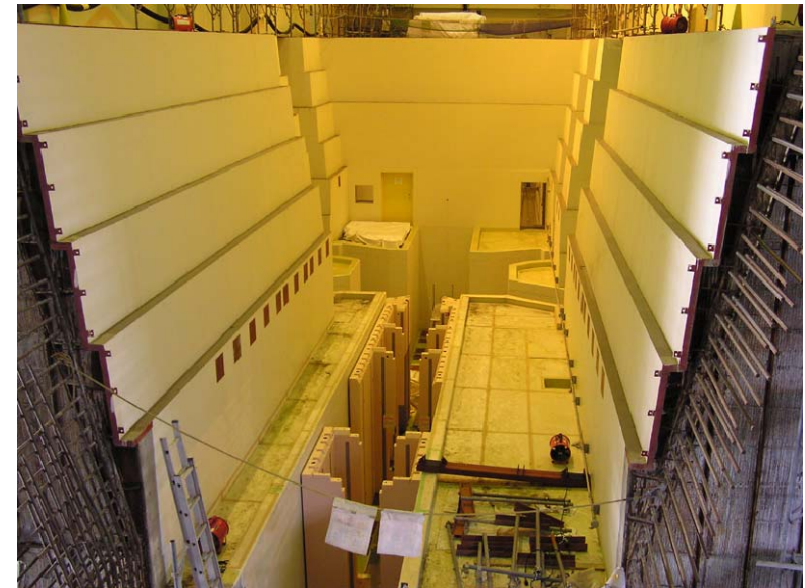
Hadron Experimental Hall



From 50 GeV to Neutrino Line



**Materials and Life
Experimental Hall**



Muon Area (Muon Valley)



Installation of Outer Liner



Extraction Area for Neutron Beamlines





Hadron Experimental Hall

Materials & Life
Experimental Hall

50 GeV

Neutrino

3 GeV

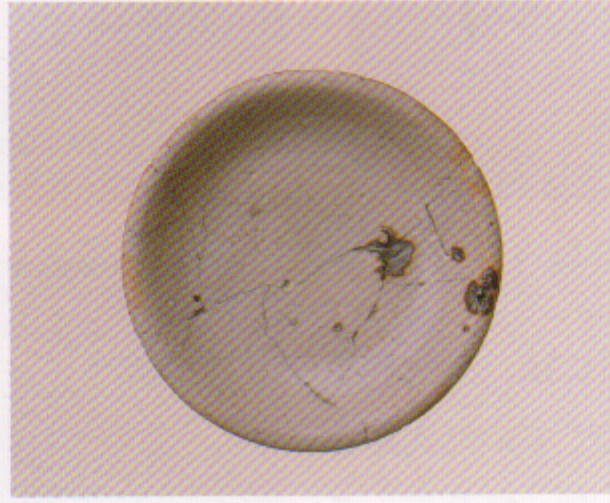
Linac

February, 2006

About 70%
of the
facilities
were
completed.



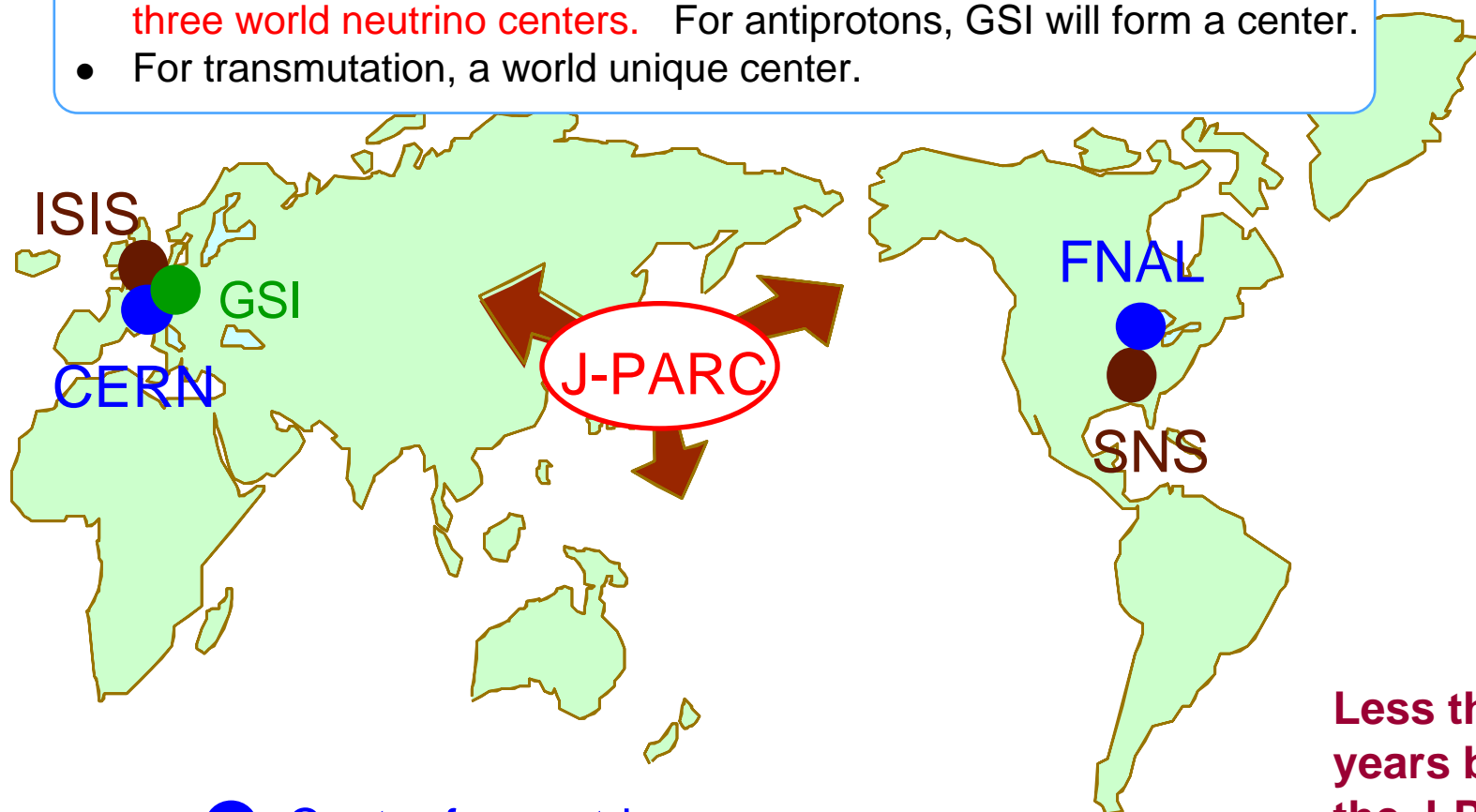
Salt Farm in the 15th Century



Archeological studies on the site
were completed in August, 2004.

World Centers

- Materials and Life Science: **One of three world neutron centers.**
- Nuclear and Particle Physics: **World unique Kaon Factory. One of three world neutrino centers.** For antiprotons, GSI will form a center.
- For transmutation, a world unique center.



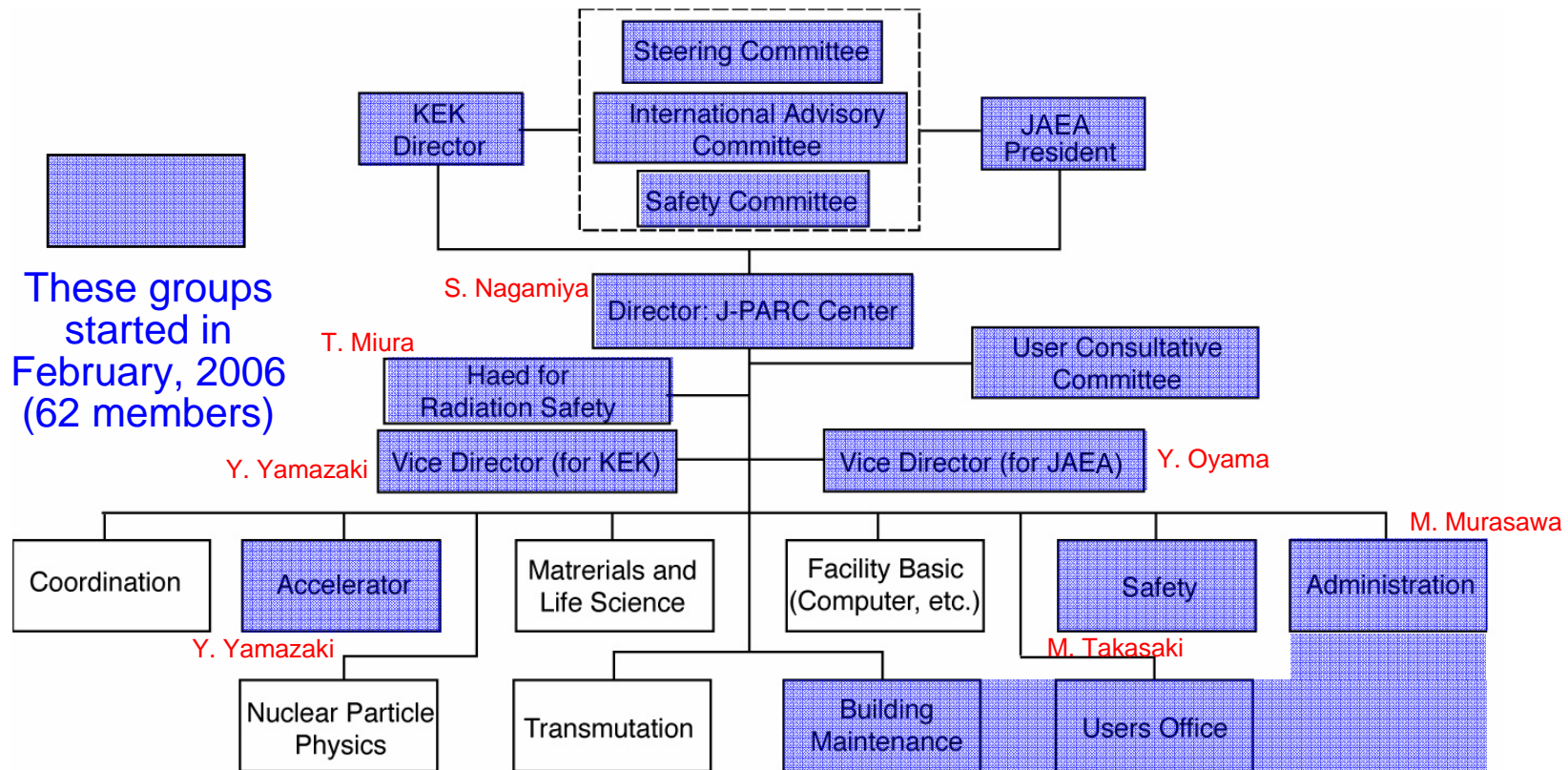
● Center for neutrinos

● Center for neutrons

● Antiprotons

**Less than 3
years before
the J-PARC
completion !**

J-PARC Center (Organization for Operation)

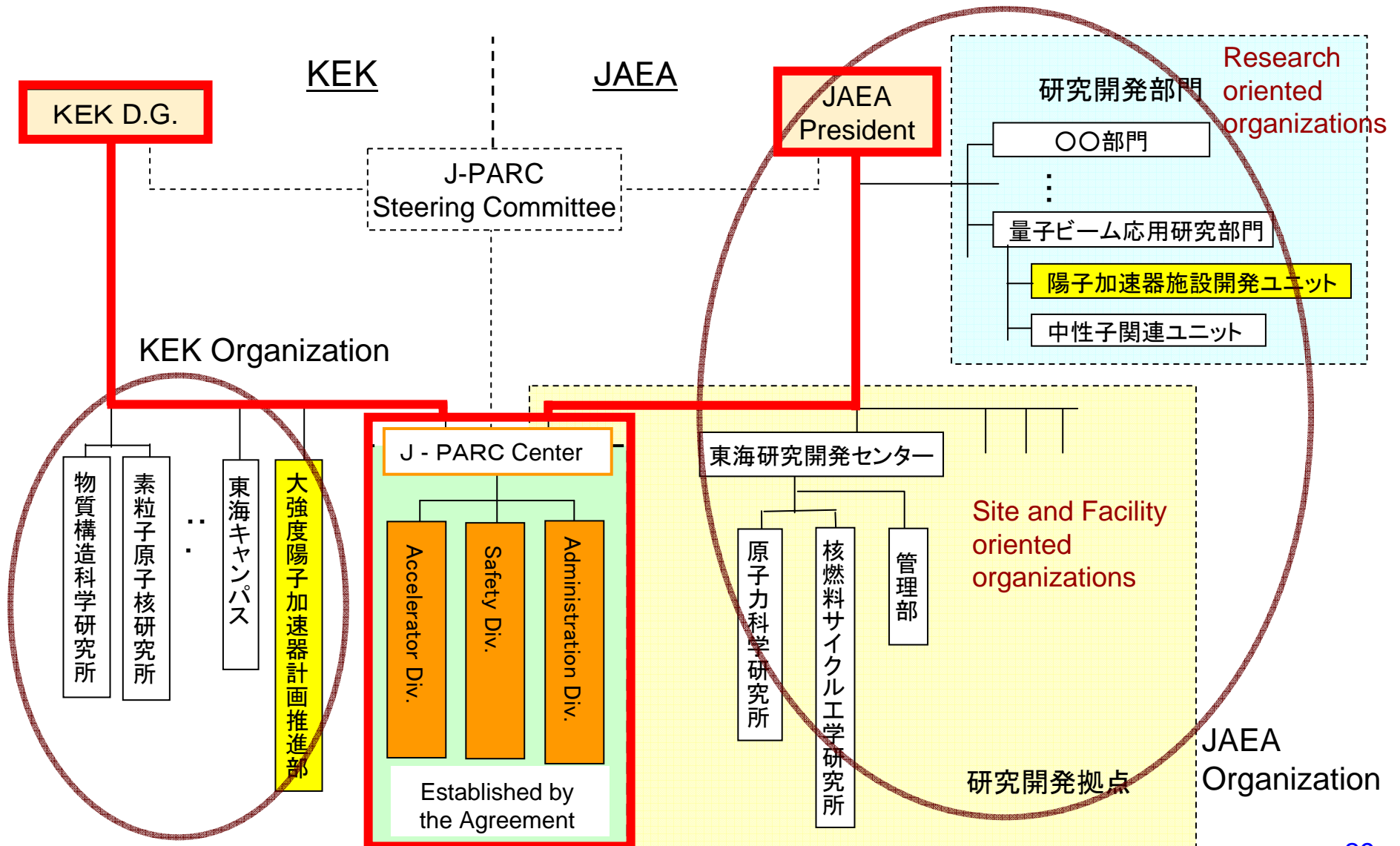


These groups started in February, 2006 (62 members)

Total Expected number at the J-PARC Center:
 330 Regular employees
 280 Temporary (Outsourcing)



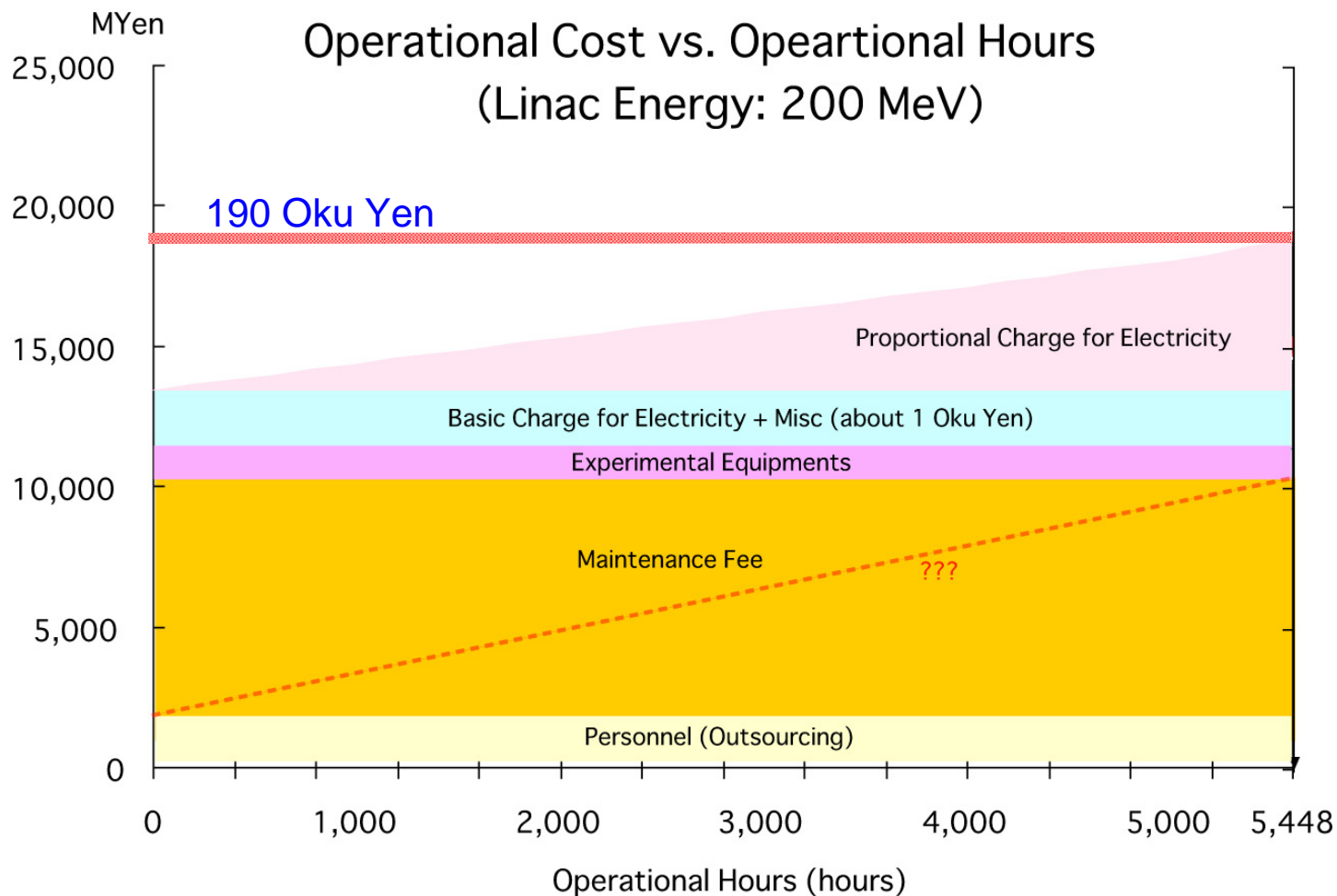
J-PARC Center & Two Organizations





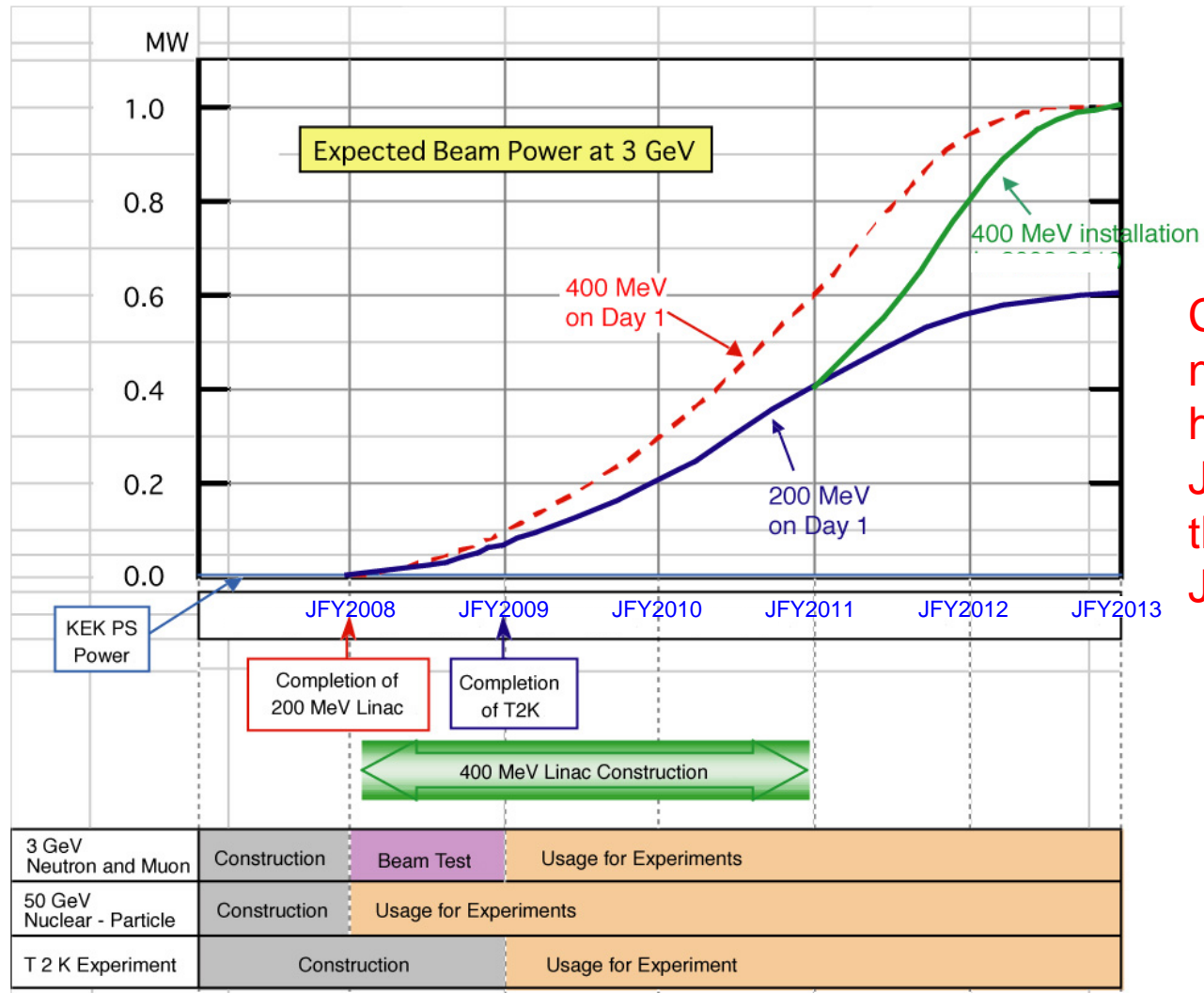
**Actual Start of the J-PARC Center
on February 17, 2006**

Cost Analysis for Operation Budget



Among 190 Oku Yen, 11.5 Oku Yen is proposed for experimental devices.

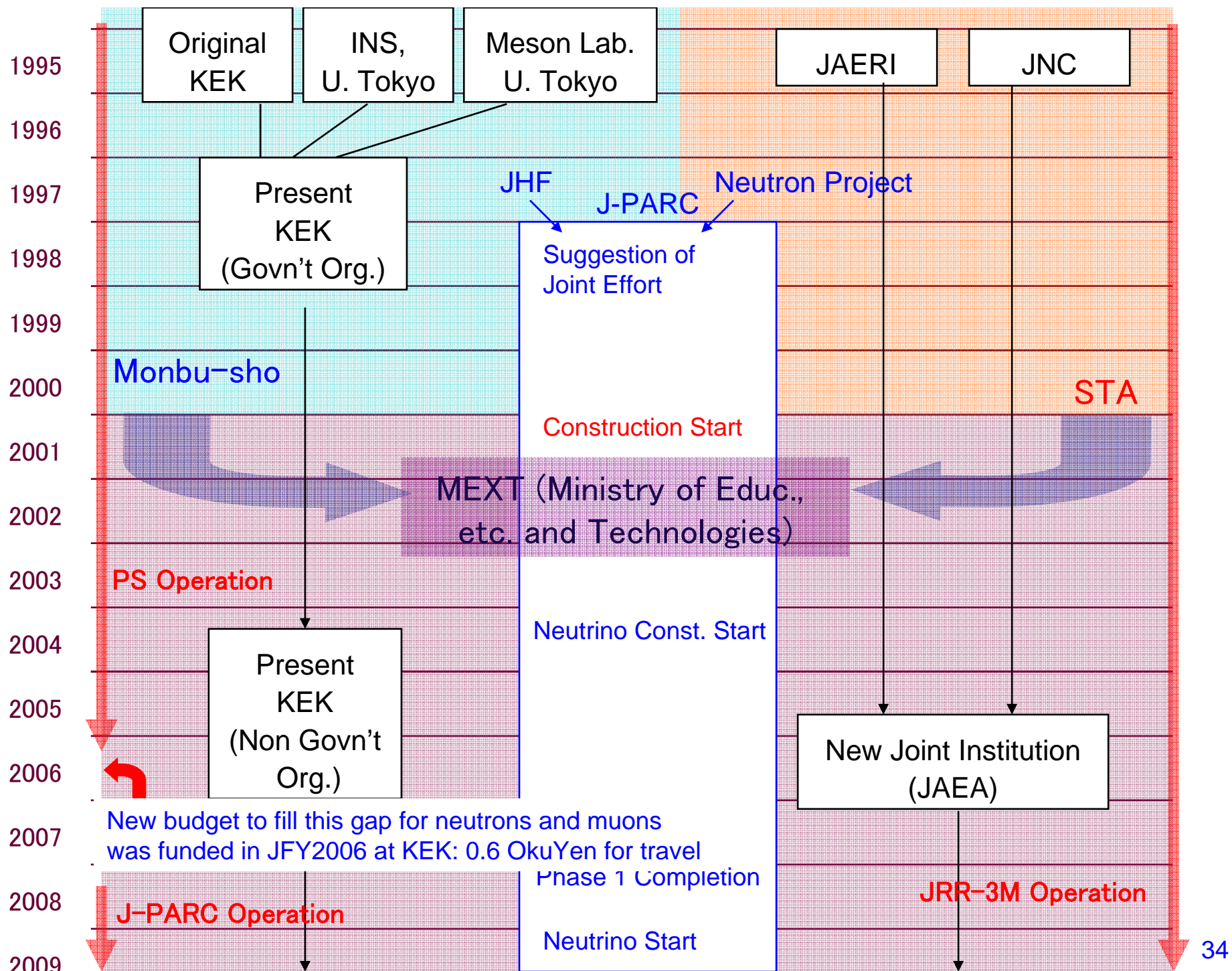
Commissioning & Linac Energy Recovery



Construction needs to start hopefully from JFY2008 and at the latest from JFY2009.



- Nuclear and Particle Physics
 - Submission deadline for the first proposals: April 28, 2006.
 - Proposals are accepted at the J-PARC Center.
 - Institute for Particle and Nuclear Study at KEK formed PAC.
 - PAC meeting: June 30 - July 2, 2006. The results will be sent first to the Director of IPNS at KEK and then to the J-PARC Director.
 - The J-PARC Director shall inform the results to individual experimental groups.
- Call for proposals for neutrons will be made at a reasonable time (most likely, within a year or two).
 - Need to establish the PAC system.
 - One PAC within the J-PARC Center is under consideration.
- Call for Lol's in the areas of Muon was announced in 2005.
 - The first evaluation was made at the MuSAC meeting at J-PARC.



Upgrade Plans for 50 GeV



- Upgrade to 50 GeV (currently 30 GeV for slow and 40 GeV for fast).
Expansion of the Hadron Experimental Hall.
An additional detector at 2 km for neutrinos, etc.
- Power beyond 1 MW (neutrinos to study CP violation in the leptonic sector)
 - Design study was advanced to 1.3 MW.
 - Possibility up to 2.7 MW is in progress by the Accelerator group.
 - Users want up to 4 MW.
- Muon Storage Ring (LFV, muon g-2, etc.)
 - Need additional extraction beam line.
 - Exit was already prepared.
 - Anti-protons together with muons?
- Polarized Protons
 - Study group was formed.
 - Installation of Siberian snakes seems possible.
- Heavy Ion Acceleration
 - Interest exists among users.
 - Need technical studies.



- Uniqueness of the Project - Multipurpose Facility
 - Variety of secondary beams + Variety of frontier sciences.
- International Research Center
- News during the Past One Year
 - Construction for both equipments and facilities: A slight delay, but almost on schedule.
 - Peak in the construction budget in JFY2006 (good news to us).
 - J-PARC Center started.
 - An external review on the operational budget.
 - KEK Tokai campus established.
 - Birth of JAEA. Shutdown of KEK-PS from JFY2006
 - First call for proposals for 50 GeV.
- Issues
 - Timely completion of the construction.
 - How to grow the organizational structure at the operational stage (J-PARC Center).
 - Realistic operational budget.
 - PAC (time and place), Budget for experimental facilities, Power Users, Beamtime Fee, etc.
 - Linac energy recovery, Phase 2 funding, etc.