

## FPF PBC Report Draft Outline, for discussion at FPF7, 1 March 2024

Timeline: First Complete Draft: 17 May 2024

Edited Complete Draft: 31 May 2024

Submit to PBC: 14 June 2024

[If recommended, submit LOI to LHCC in early 2025.]

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### PBC Charge:

- An update of facilities studies, including core study results, updates on vibration, RP studies, and revised estimate for CERN host lab costs.
  - A complete and unified plan for the size and placement of experiments in the cavern.
  - Completion of “flagship” physics studies that emphasize core strengths and also complementarity with the rest of the world-wide program.
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Executive Summary – 2 pages [Include the PBC charge]

[~75 pages total]

1. Physics Case – 8 pages
  - a. 3-4 Physics Highlights (Transformational, robust in the global context)
  - b. Neutrinos
  - c. QCD
  - d. New Physics and Dark Sectors
  - e. Astroparticle Connections
  - f. Implications for the full HL-LHC Program and Future Colliders
2. History, Need for the FPF – 3 pages
  - a. Pathfinder Experiments
  - b. Site Selection
  - c. Physics Drivers Set the Size and Location of the FPF
3. The Facility – 10 pages
  - a. Civil Engineering
    - i. Baseline Design, Site Investigation Study
    - ii. Vibration, Radiation Protection Studies
    - iii. Options (Longer Cavern, Taller Cavern)
    - iv. Timeline
    - v. Costing
  - b. Services
    - i. Power, Ventilation, Cooling
    - ii. Timeline

- iii. Costing
  - c. Experimental Environment (background particle rates)
- 4. FASER2 – 7 pages
  - a. Experimental Description
  - b. Expected Physics Performance (Resolution, Background Rejection, etc., not sensitivity contours)
  - c. Present Status, Required R&D
  - d. Cost and Schedule
- 5. FASERnu2 – 7 pages
  - a. Experimental Description (Incl. Sweeper Magnet Results, Scanning Facilities)
  - b. Expected Physics Performance (Muon background)
  - c. Present Status, Required R&D
  - d. Cost and Schedule
- 6. AdvSND – 7 pages
  - a. Experimental Description
  - b. Expected Physics Performance
  - c. Present Status, Required R&D
  - d. Cost and Schedule
- 7. FLArE – 10 pages
  - a. Experimental Description
  - b. Expected Physics Performance
  - c. Present Status, Required R&D
  - d. Cost and Schedule
- 8. FORMOSA – 5 pages
  - a. Experimental Description
  - b. Expected Physics Performance
  - c. Present Status, Required R&D
  - d. Cost and Schedule
- 9. Experimental Options – 10 pages
  - a. FASER2 Magnet
  - b. NuTeV-type Detector
  - c. Nu<sub>e</sub> Detector
- 10. Integration – 5 pages
  - a. Plan
  - b. Timeline
  - c. Costing

11. Budget Profile – 5 pages

- a. Including partnership of CERN, US DOE/NSF, STFC, JSPS, INFN, etc.

12. Organization and Timeline – 5 pages

- a. Growing international users community
- b. Meetings, documents
- c. Governance structure
- d. Including importance of supporting continuity in energy frontier experiments

Appendices?