

PSB Availability Statistics 2024

Information I

These slides are a template to summarize availability of your machine in 2024. Please correct and complement the slides considering the following questions:

- What are the main events & challenges impacting availability this year?
 - Is this shown in the data, and does it match your expectations?
 - Is any crucial aspect not visible in the data that should be pointed out?
- What is the outlook for next year?
 - Are you expecting interventions over YETS that might improve availability?
 - Could certain circumstances lead to an availability degradation?

Information II

- There will be additional questions on each slide. Feel free to spread out comments over multiple slides as required
- **We only need reviews of 2024.** Previous years are already well covered (e.g. see the Special RAWG on Accelerator Availability 2023, linked)
<https://indico.cern.ch/event/1340975/>

- All PSB faults this year can be found at:

https://aft.cern.ch/search?timePeriod=%257B%2522timePeriodType%2522%253A%2522fixed%2522%252C%2522startTime%2522%253A%252201012024000000%2522%252C%2522endTime%2522%253A%252201012025000000%2522%257D&accelerator=PSB&hadStates=BLOCKING_OP&excludedFaultStates=NON_BLOCKING_OP%252CUNDERSTOOD%252CSUSPENDED

Availability Schedule

Availability is counted over time periods as follows:

- L4, PSB, PS, SPS: starts once beam is required by a downstream machine
- L3, LEIR starts once beam is delivered to LHC
- LHC starts with beam commissioning
- ISOLDE, AD/ELENA, EAST, NORTH starts with respective physics period

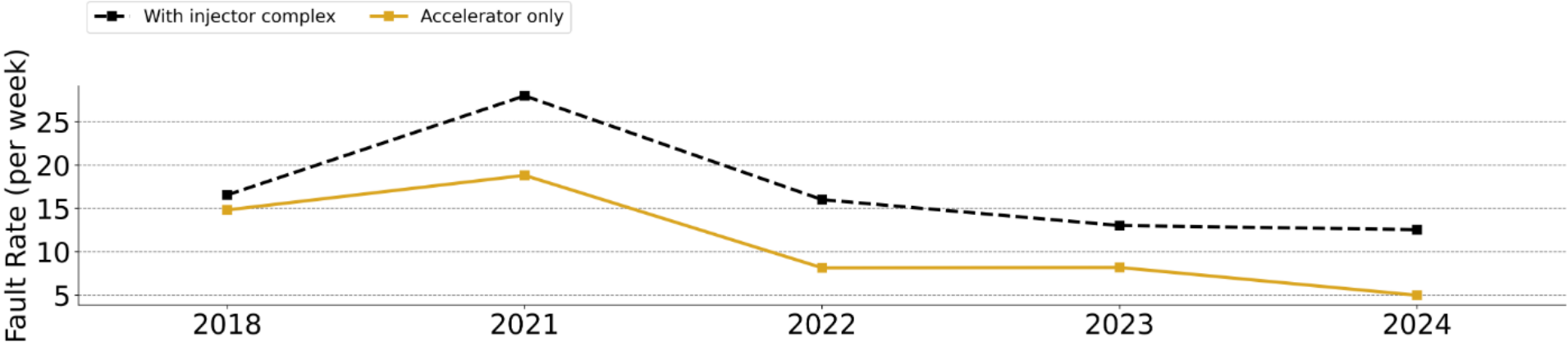
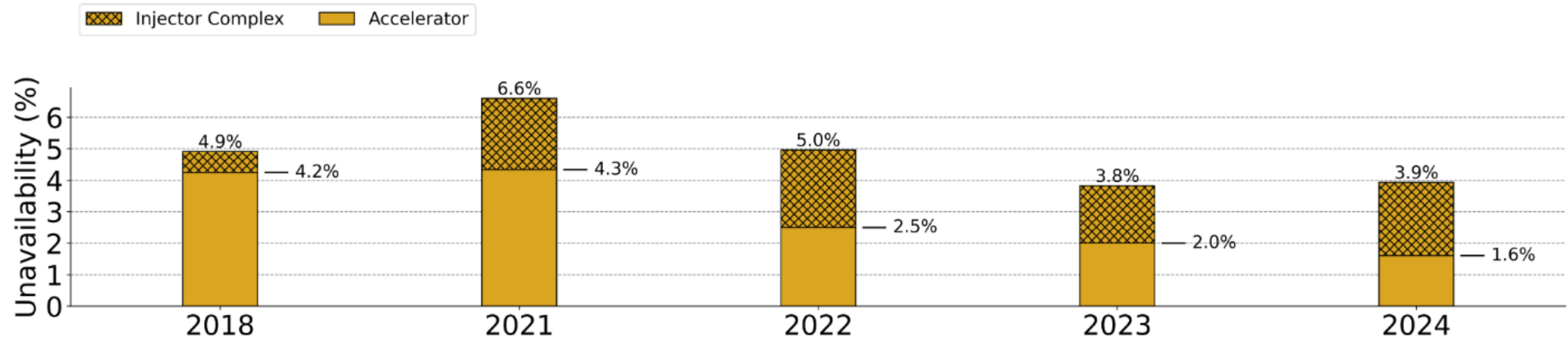
Dedicated MDs and Technical Stops are excluded from availability monitoring.

PSB time periods are on the next page. [Should these times be wrong, please correct them and let us know](#)

PSB Physics Periods

- ('02-03-2018 09:00:00', '18-06-2018 09:00:00'),
- ('20-06-2018 09:00:00', '17-09-2018 09:00:00'),
- ('19-09-2018 09:00:00', '12-11-2018 09:00:00'),
- ('01-03-2021 09:00:00', '21-04-2021 14:00:00'),
- ('22-04-2021 23:00:00', '15-09-2021 05:00:00'),
- ('16-09-2021 11:00:00', '15-11-2021 06:00:00'),
- ('21-02-2022 09:00:00', '11-03-2022 08:30:00'),
- ('11-03-2022 12:00:00', '17-05-2022 04:00:00'),
- ('17-05-2022 17:00:00', '13-09-2022 08:00:00'),
- ('14-09-2022 12:00:00', '28-11-2022 06:00:00'),
- ('10-03-2023 09:00:00', '10-05-2023 08:00:00'),
- ('10-05-2023 12:00:00', '20-06-2023 08:00:00'),
- ('21-06-2023 14:00:00', '30-10-2023 07:30:00'),
- ('31-10-2023 18:00:00', '13-11-2023 06:00:00'),
- ('21-02-2024 09:00:00', '17-04-2024 08:00:00'),
- ('17-04-2024 17:30:00', '12-06-2024 07:30:00'),
- ('14-06-2024 23:00:00', '02-12-2024 06:00:00')

2024 in Context



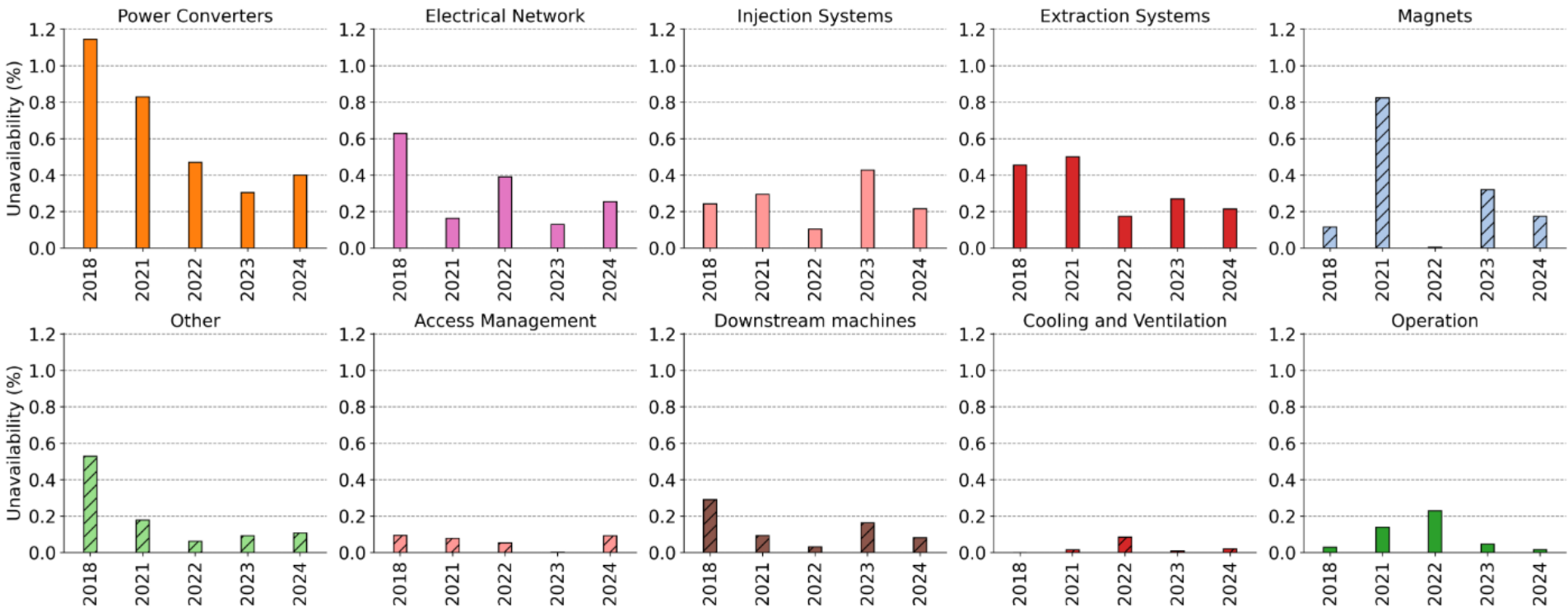
What could be responsible for the observed trends? We seem to have resolved issues with the HOP/Dump spurious interlock (most time it was the investigation that took time) with the updated electronics configuration. No septa faults in 2024, usually we need 1 or 2 few hours stop to change electrovalves. This year more than electrical glitches which tend to stop PSB and less Linac4, we had massive power cut so we were in the shadow of the Linac4 in a few occasions with long downtime. No BSW replacement due to leak (known weakness). Otherwise we are more or less in line with

System Downtime

Please elaborate on the main events and down time.

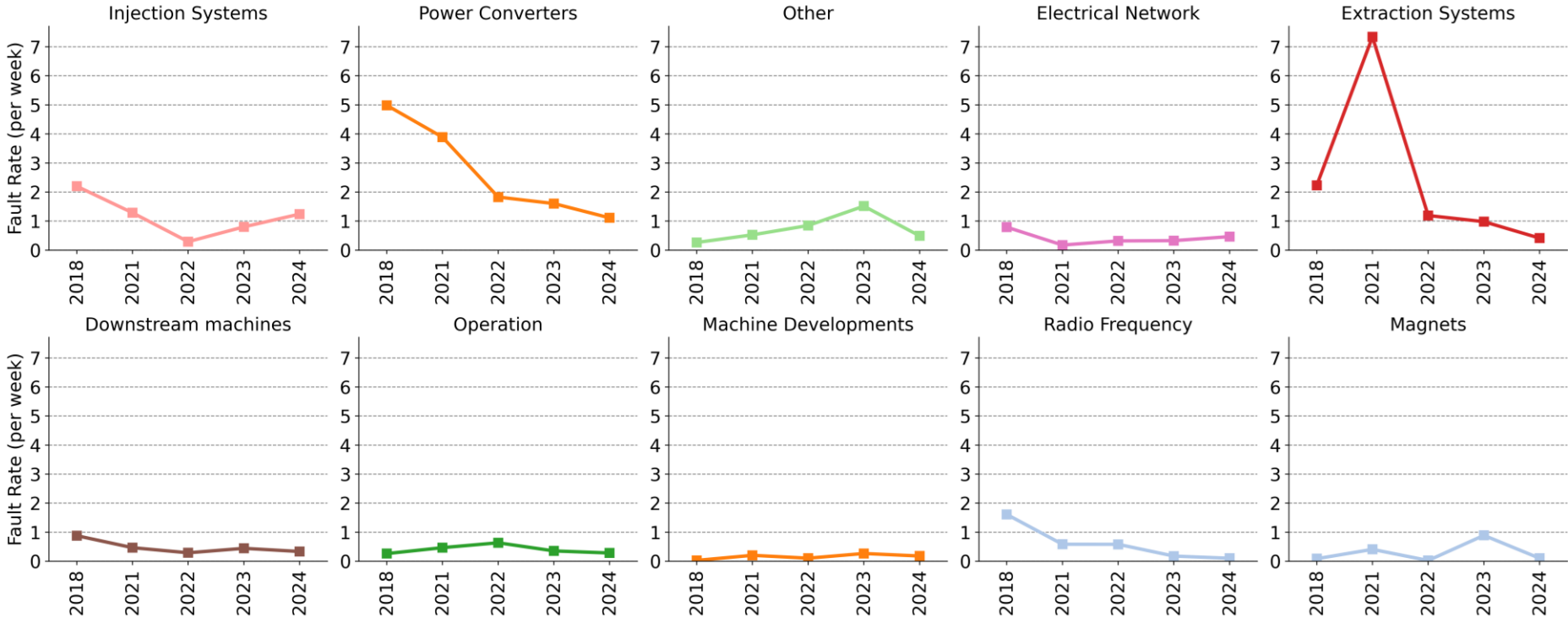
Can any trends be easily explained?

My bits in the comments of the slide



System Failure Rate

Are any mitigations foreseen?
How to you expect this to evolve in 2025?



Unavailability by Duration

Do these trends match your expectations?

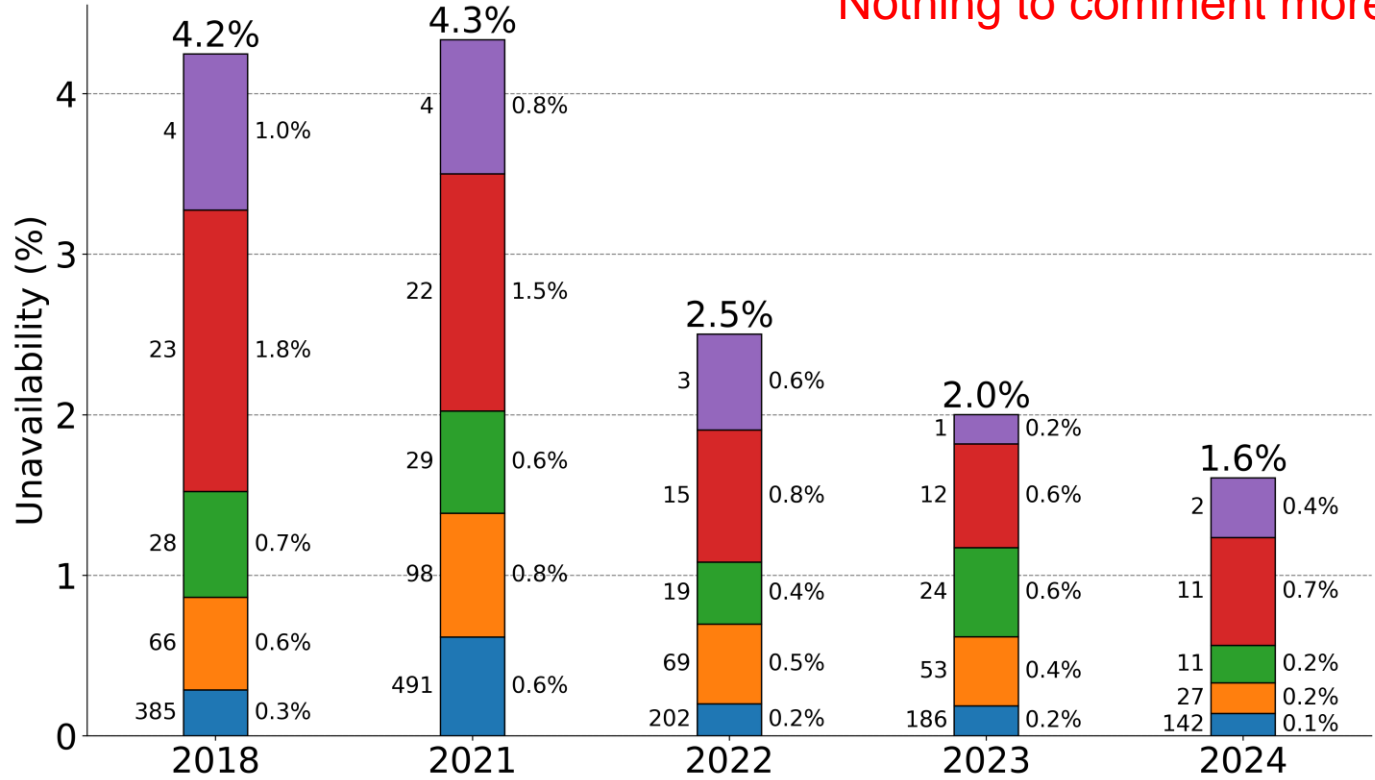
Any positive trends worth remarking?

Are any trends worrying?

Nothing to comment more on this

(w/o injector complex)

PSB



Summary & Conclusion

- Main message and conclusion for 2024?
 - PSB reached its limit in availability
 - To be kept in mind that the PSB has high availability because of the 4 rings which allow degraded mode operation. The operation team has become especially flexible to recover full performance or most of it without 1 ring. For instance, there were 5 days during the Easter period without R3 because of the BE3.KFA14L1 SF6 gas leak but it was acceptable to stay like this for so long (lack of experts' availability).
- Would you like us to provide AFT statistics for a specific problem in more detail?
 - For the time being there is no need for further checks
- What is the outlook for next year? Are there any availability problems expected unless they are addressed over the YETS?
 - No probably next year will be slightly worse as this year it was exceptionally good.
- Desiderata for fault tracking and AFT tool?
 - Generate the nice plots in these reports. And separate them by destination as well? And the processed data could be extracted as .pkl, .csv or .parquet files.
 - Display the data geographically from the layout DB. I know this is a long shot, but one could correlate them with radiation data.