

Alternative scenarios for the current shutdown

LHC Performance Workshop 2009

Session 5

Shutdown schedule 2008/9 and Future shutdowns

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- ☀ **Shutdowns 08-09 & 09-10 : different options**
- ☀ **Future shutdowns – « minimum time window »**

What is being left and what are the key drivers

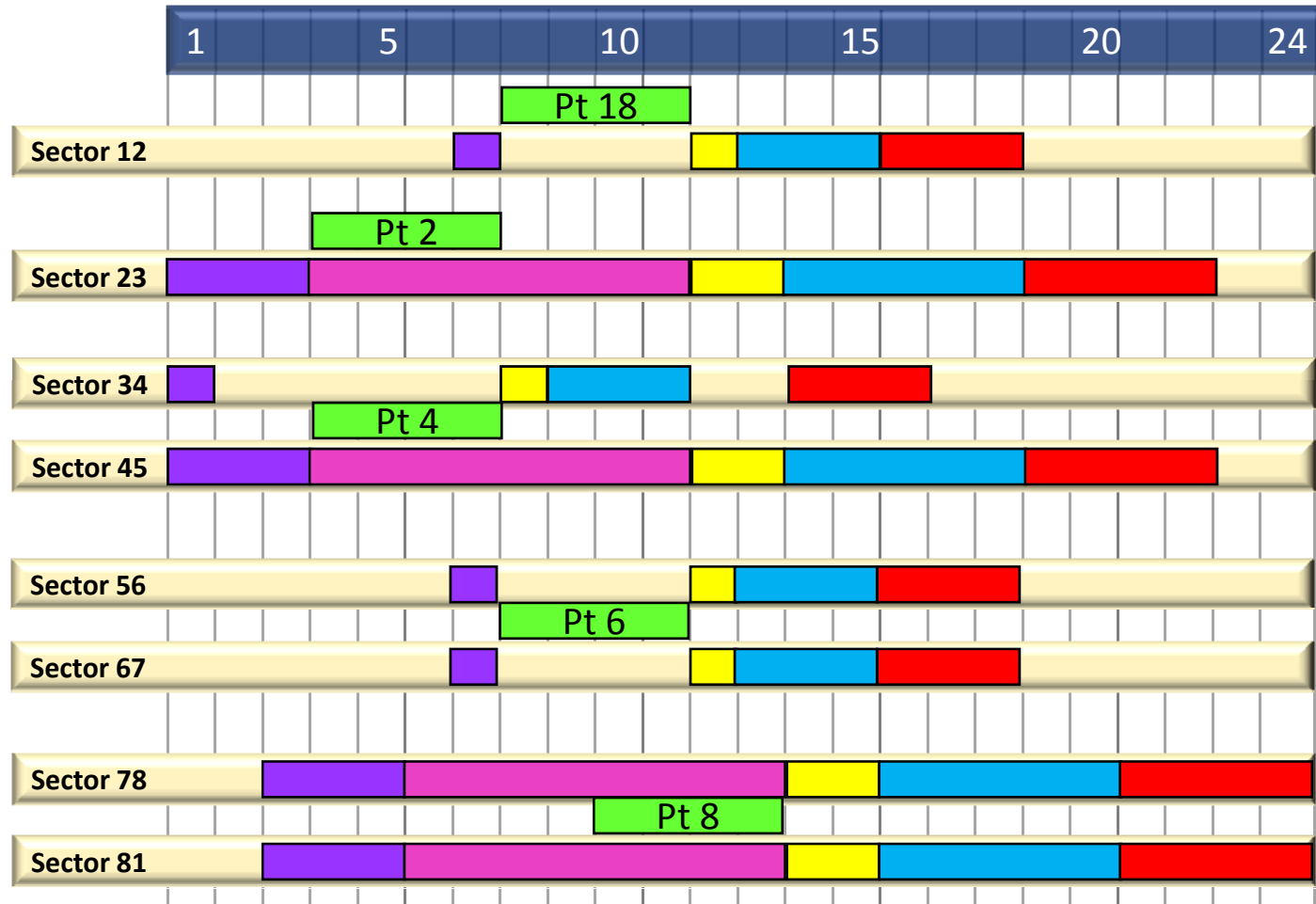
☀ What is being left:

- ☀ Dipole relief valves in 4 sectors
- ☀ Some stand-alone consolidation ~ 5-10
- ☀ Line Y in sectors 78 & 81

☀ Maintenance – key drivers:

- ☀ Cooling towers : 3wks
 - ☀ for the time being 2 contracts = 2points in parallel
- ☀ Cryogenic maintenance: 4 wks
- ☀ Cryogenic logistic
 - ☀ With virtual storage = 8 (but time required for logistic)
 - ☀ 1 wk to empty 2 sectors + 1 wk for reliquefaction + 1 wk to empty 2 sectors

Next shut-down schedule w.r.t « current schedule »



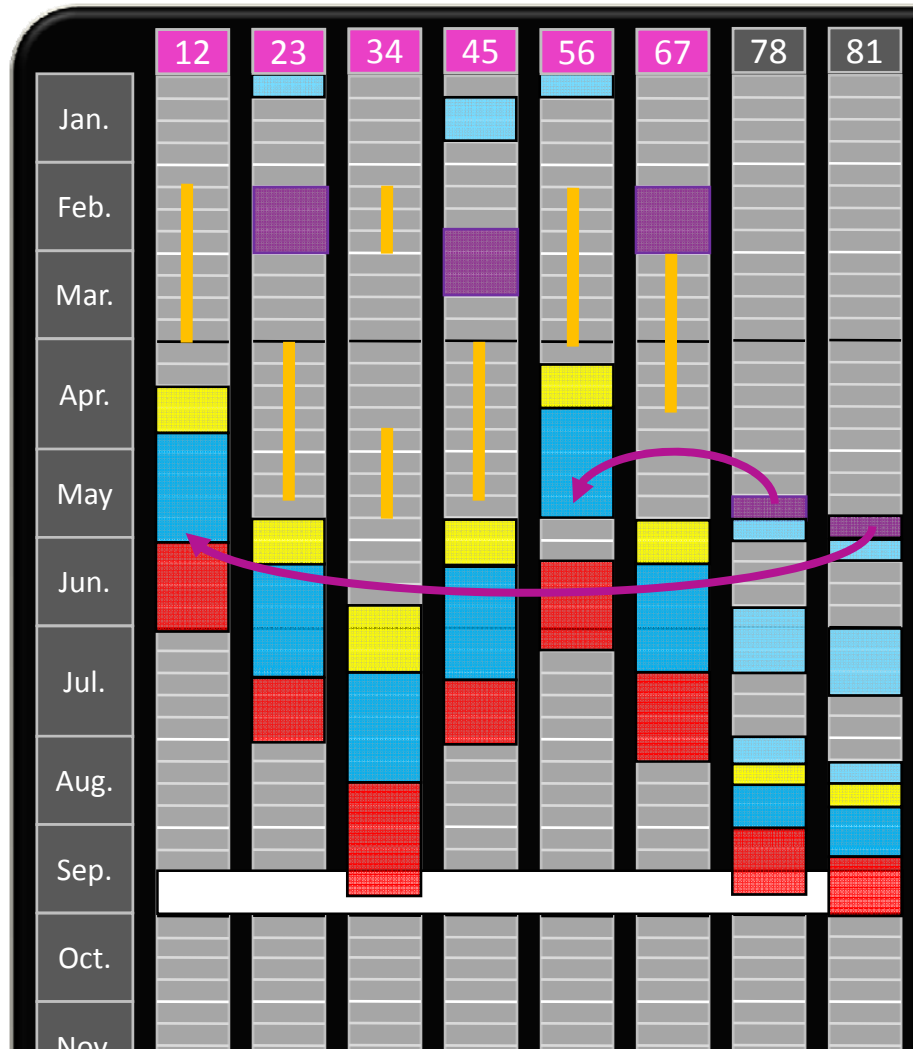
- ❖ Empty LHe / warm-up
- ❖ Consolidation
- ❖ Maintenance
- ❖ ELQA & flushing
- ❖ Cool-down
- ❖ Powering tests

Different options studied

- ☀ With respect to the critical points, different alternative schedules for this shutdown have been studied, as well as the impact on the next shut-down.
- ☀ The following slides will only present the alternative schedules for a decision taken **now**. The summary table will show the results if the decision is taken in March (backup scenarios if delays in some activities).
- ☀ **Two scenarios are presented:**
 - 1. Additional warm-up of sectors 23 & 45**
 - 2. Warm-up all the sectors to R.T.**
 - ☀ Assuming that the mission of the teams for DN200 (incl. VAC & BLM) are extended

This will represent only the schedule but none the cost associated.

Additional warm-up of sectors 23 & 45



- ⚙ The emptying of sectors 78 & 81 can only occur when the first 2 sectors are cold: i.e sectors 12 & 56
- ⚙ Critical points - Changes
 - ⚙ Gaining 1 wk margin on sector 34
 - ⚙ Critical path : Sectors 12, 56, 78 & 81
- ⚙ Delay w.r.t current schedule = + 1 wk

❖ Flushing / warm-up

❖ Consolidation

❖ Cool-down

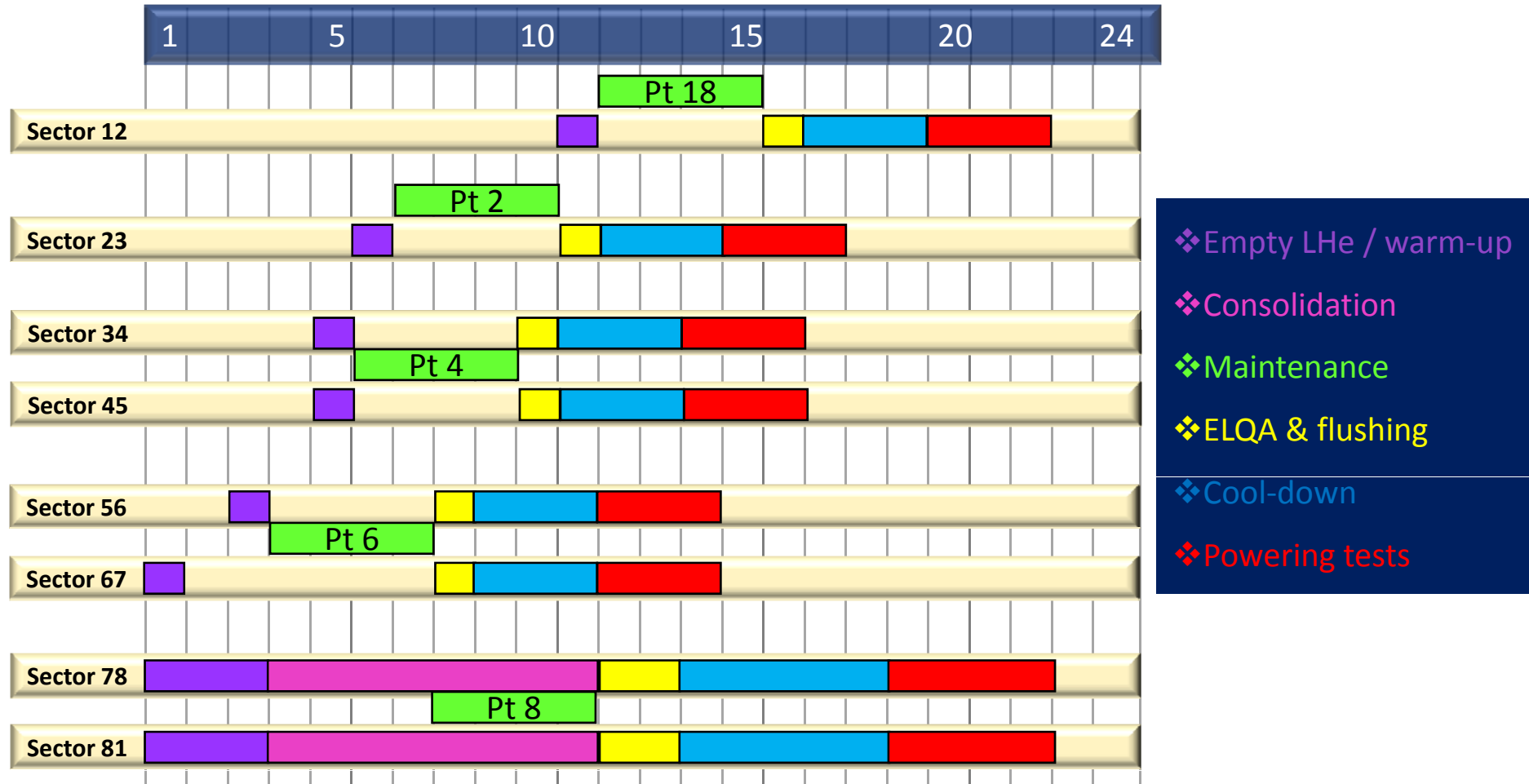
❖ Intermediate CD

❖ ELQA & flushing

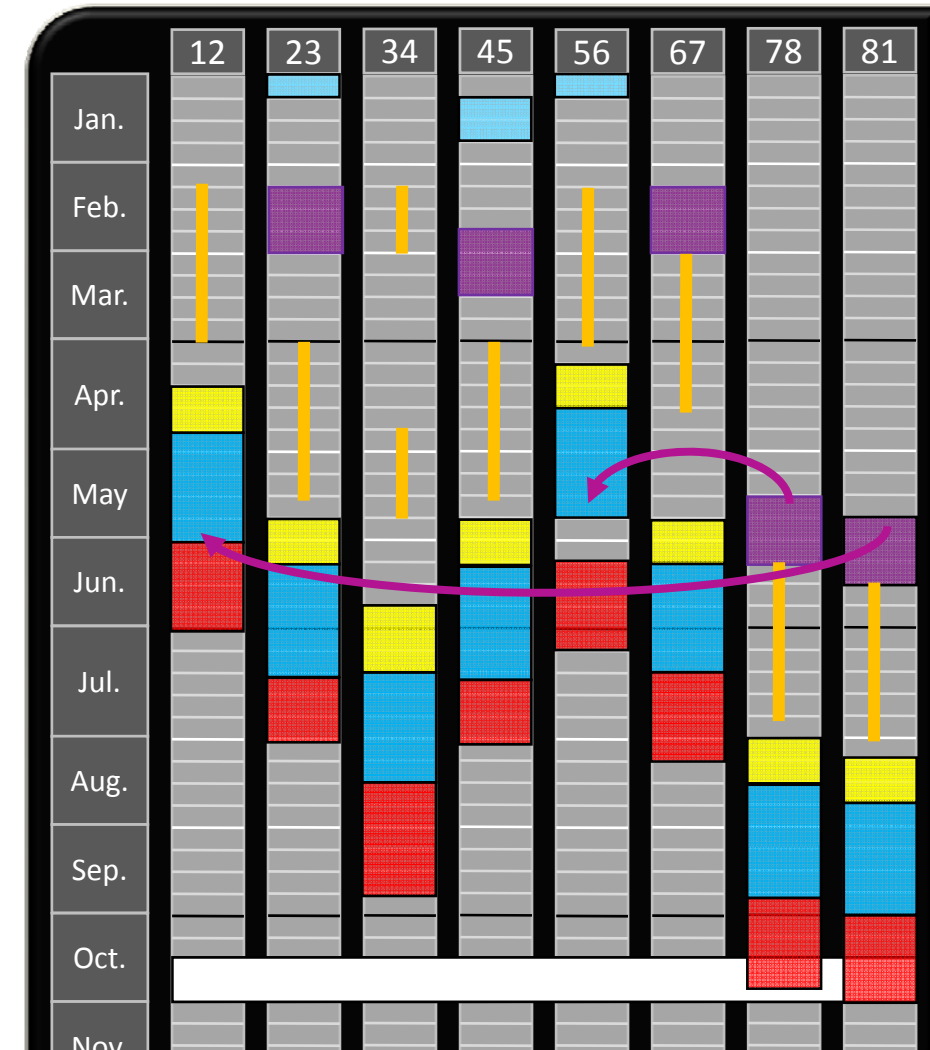
❖ Powering tests

Additional warm-up of sectors 23 & 45

Impact on next shutdown



Total warm-up



- ⚙ The emptying of sectors 78 & 81 can only occur when the first 2 sectors are cold: i.e sectors 12 & 56
- ⚙ Critical points - Changes
 - ⚙ Gaining 5 wks margin on sector 34
 - ⚙ Sectors 12, 56, 78 & 81 on the critical path
- ⚙ Delay w.r.t current schedule = + 5wks

❖ Flushing / warm-up

❖ Consolidation

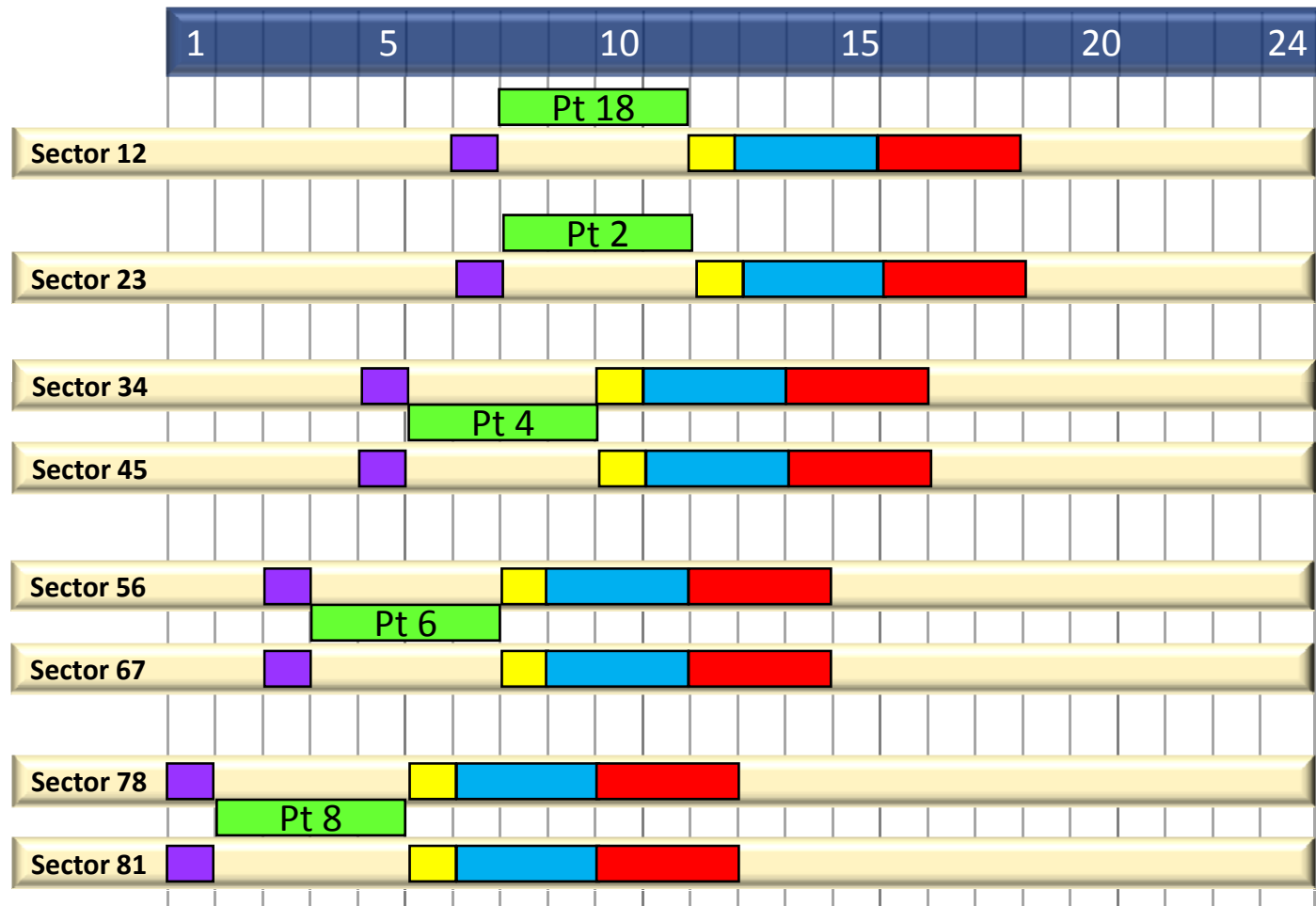
❖ Cool-down

❖ Intermediate CD

❖ ELQA & flushing

❖ Powering tests

Total warm-up Impact on next shutdown



- ❖ Empty LHe / warm-up
- ❖ Consolidation
- ❖ Maintenance
- ❖ ELQA & flushing
- ❖ Cool-down
- ❖ Powering tests

Different options: summary table

	Current	Decision in February		Decision in March	
		Warm-up all but 78 & 81	Total warm-up	Warm-up all but 78 & 81	Total warm-up
End of SD0809	Wk. 38	Wk. 39 (+ 1 wk)	Wk. 43 (+5 wks)	Wk. 44 (+6 wks)	Wk. 46 (+8 wks)
SD0910	24 wks	22 wks (-2 wks)	18 wks (-6 wks)	22 wks (-2 wks)	18 wks (-6 wks)

Warm up all

❖ Advantage:

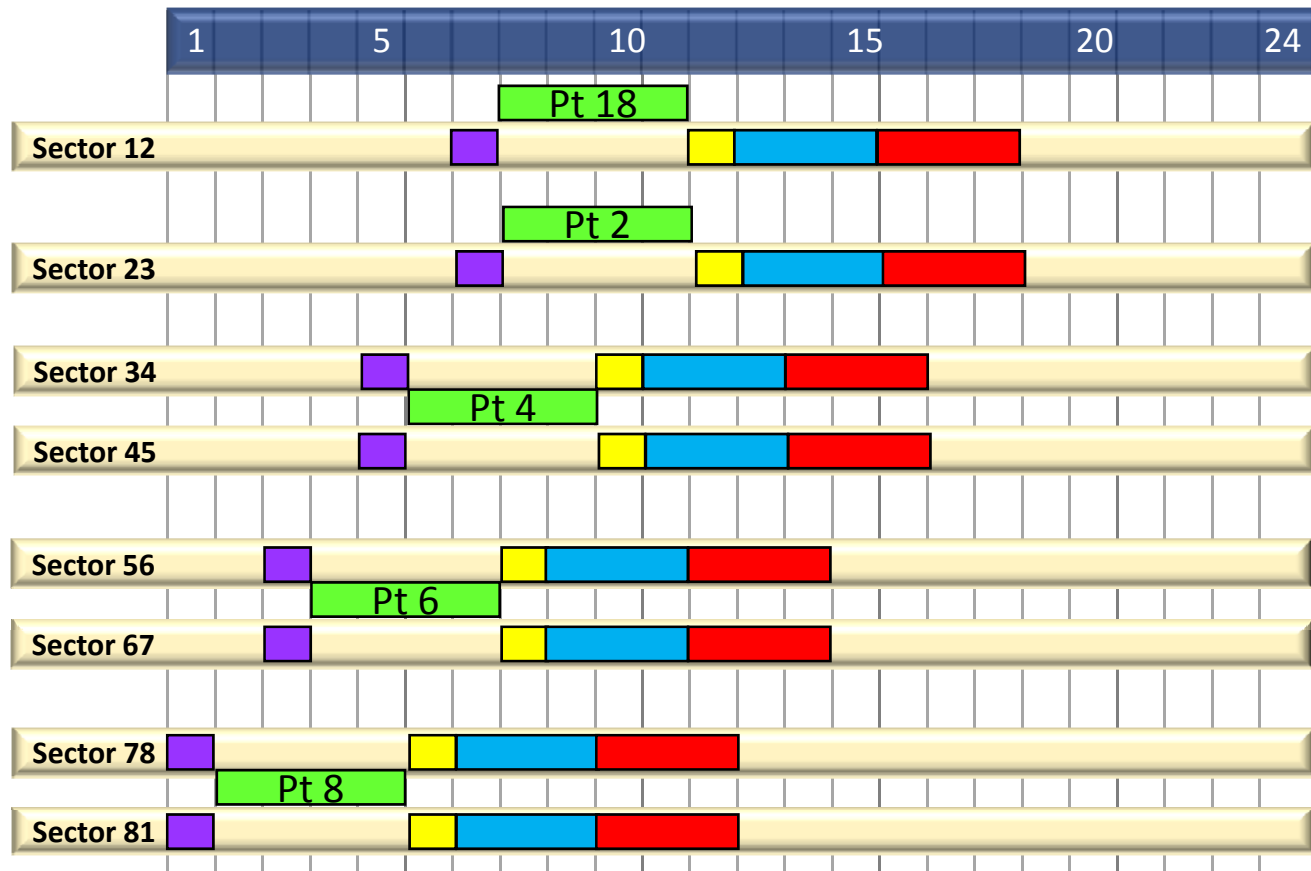
- ❖ Maximise the number of consolidation performed during this shutdown
 - minimize the risk of failure
 - minimize future interventions on irradiated areas (Stand alone)
- ❖ Sector 34 is less critical (more margins).. But then DN200 is becoming the critical point

❖ Disadvantage

- ❖ Beam in November
- ❖ Other consolidations might be needed during next shutdown

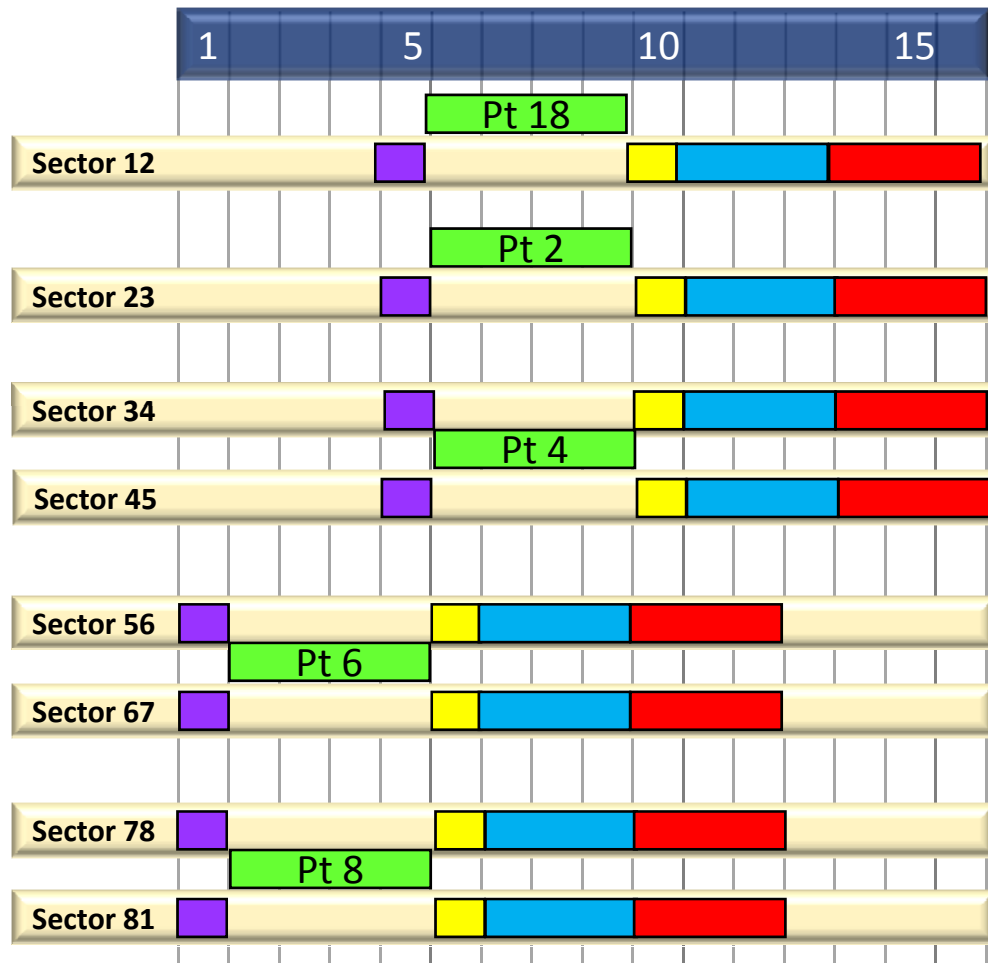
Future shutdown: gain time

- ☼ Let's dream about a shutdown without any consolidations
- ☼ So what can be done to reduce the shut-down length



- ❖ Empty LHe / warm-up
- ❖ Consolidation
- ❖ Maintenance
- ❖ ELQA & flushing
- ❖ Cool-down
- ❖ Powering tests

Future shutdown: gain time



Cryogenics:

Direct emptying of LHe at the even points if additional LHe storage are available

➤ 16 weeks

Less time window will have an impact

- on cryo and CV maintenance contracts
...may be decrease the 4 wks to 3wks ?

- other maintenance...

➤ CERN resources (supervision of works, cool-down, powering tests...)

Decision

as soon as possible

Friday ?