
Data Driven Sustainability
Virtual Collaboration
Artificial Intelligence
Industrial Process Simulation for Optimization
BMW
THE iX1
LEAN GREEN DIGITAL
HACKATHON
黑客松
2023
HACKATHON
@BMW iFACTORY

TEAM INTRODUCTION.

Data Driven Sustainability

数据驱动可持续发展

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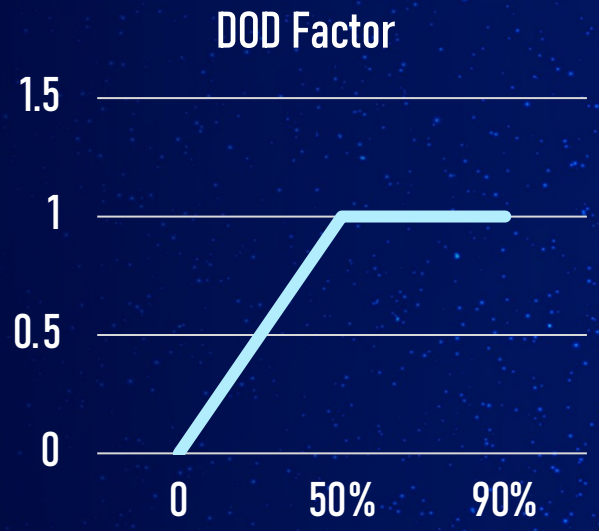
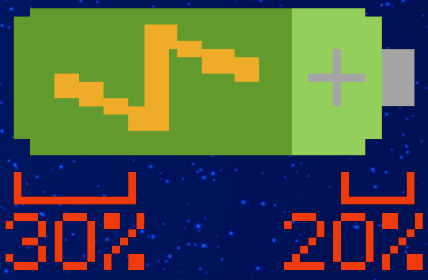
上海科技大学 Shanghai Tech University

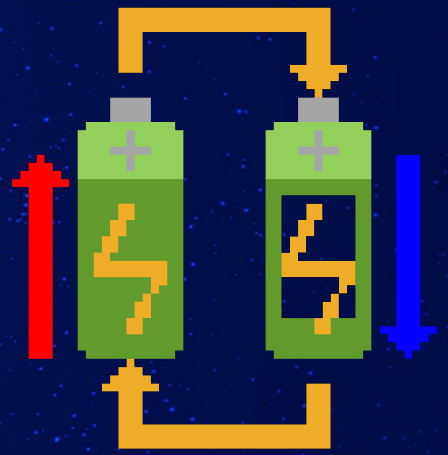
QUESTION 2 BATTERY LIFE DECAY

$$\Delta S_t = 1 \times 10^{-4} \times \left\{ \begin{array}{ll} \frac{D_{OD}}{0.5} & if\ D_{OD} \leq 0.5 \\ 1 & otherwise \end{array} \right\} \times \left\{ \begin{array}{ll} 1 & if\ 0.3 \leq S_{OC} \leq 0.8 \\ 1.05 & otherwise \end{array} \right\} + M_t$$



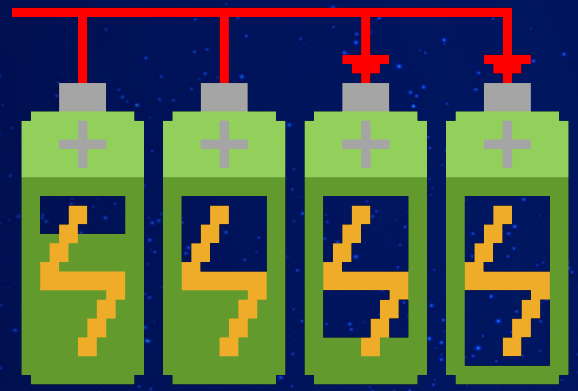


Extreme SOC Penalty:
~0.05



Charge / Discharge
Transition Penalty:
~0.01

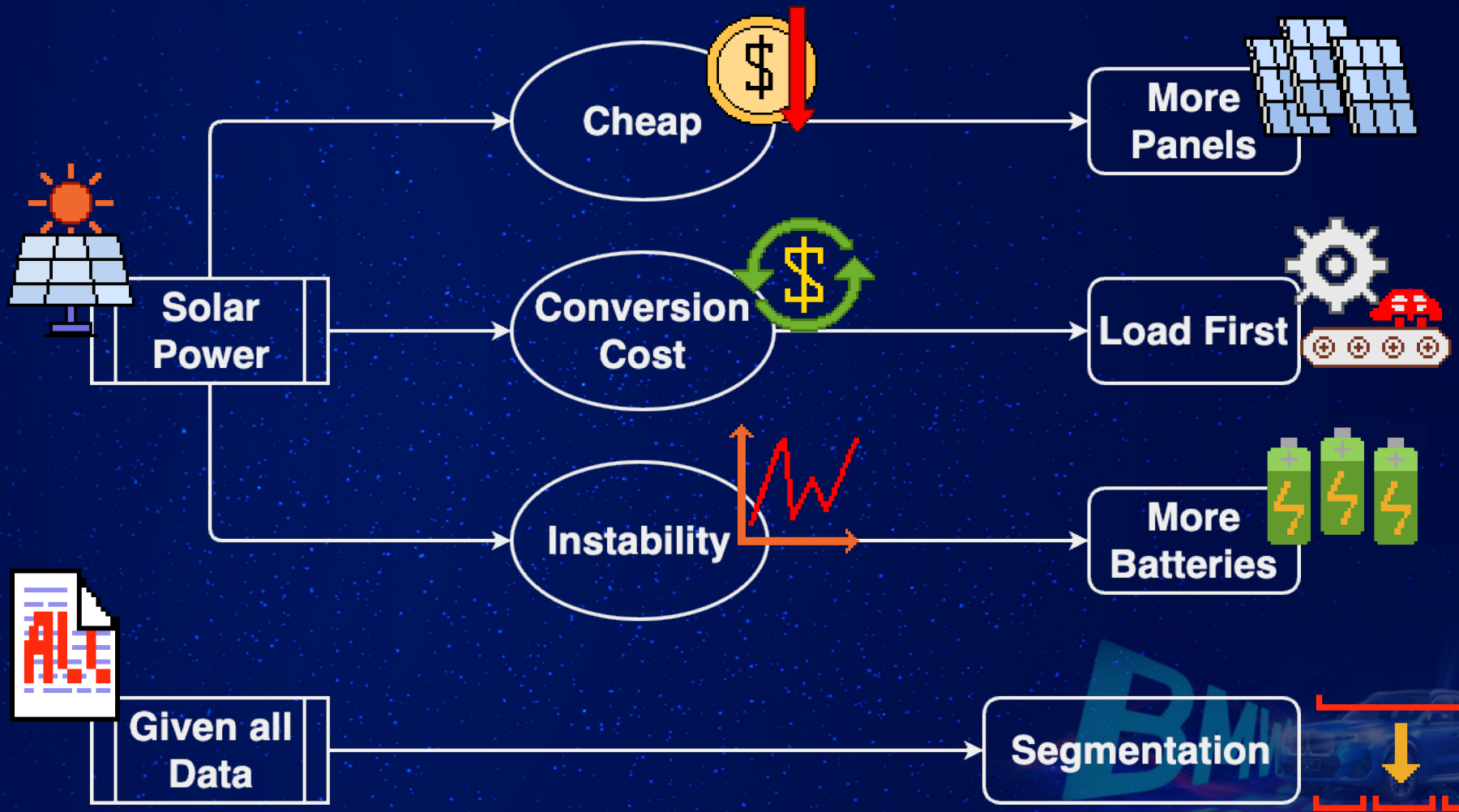
QUESTION 2 BATTERY LIFE DECAY



Charge the most discharged

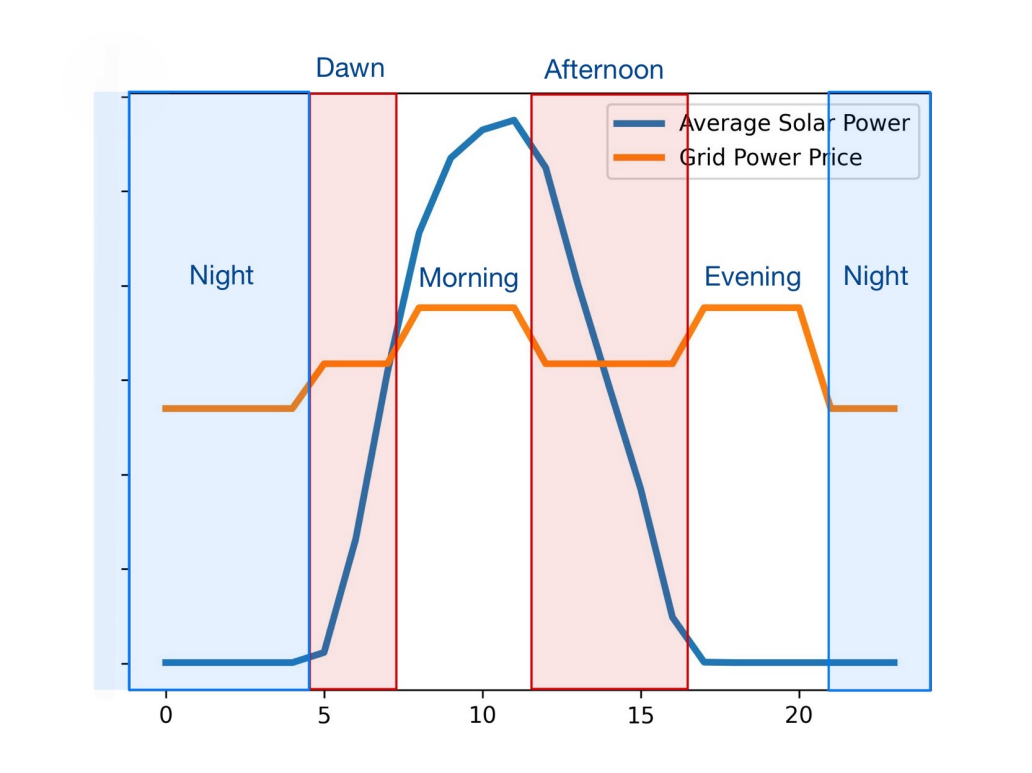
Discharge the most charged

QUESTION 1 POWER SCHEDULING——INTUITION

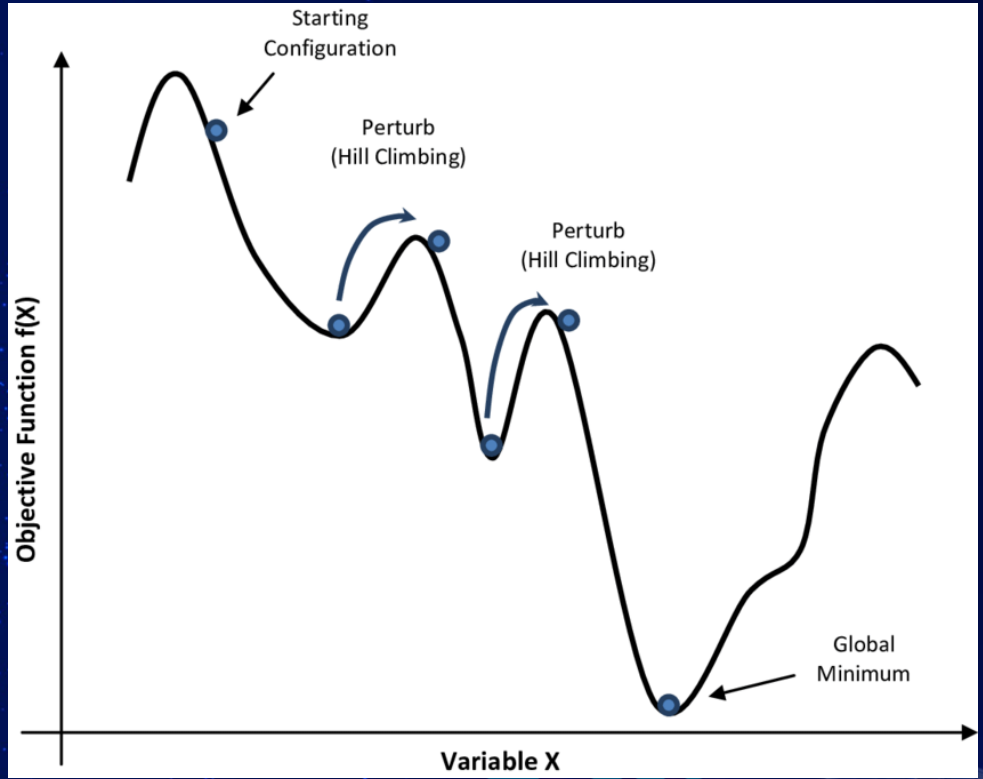


QUESTION 1 POWER SCHEDULING——ALGORITHM

FOCUSING ON DATA

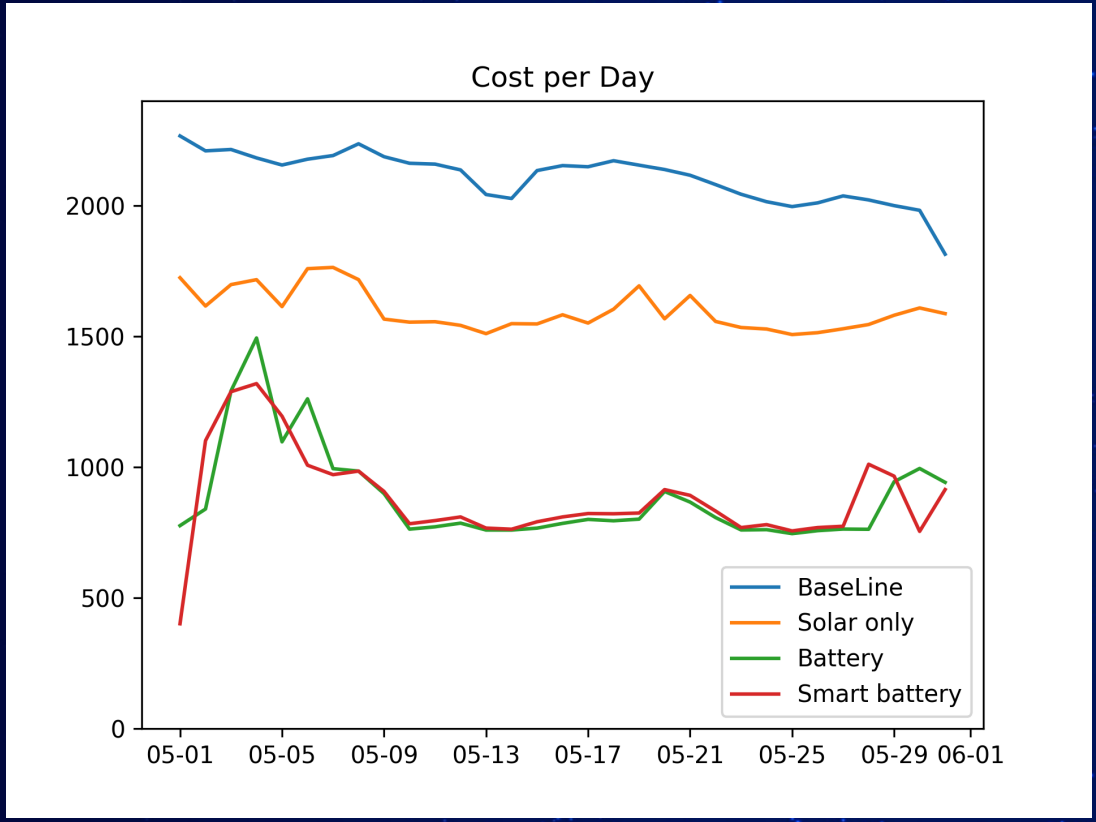


SIMULATED ANNEALING

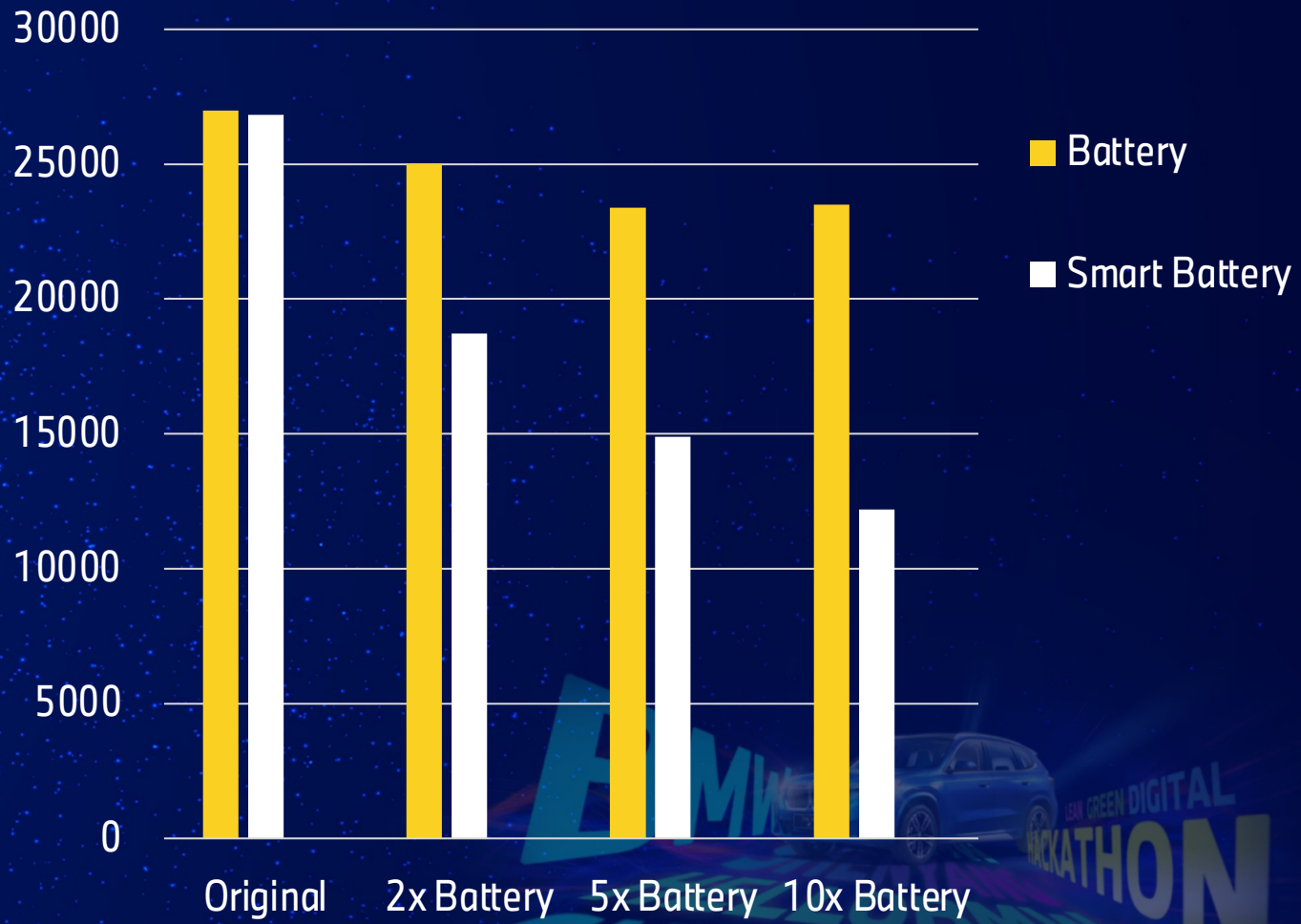


QUESTION 1 POWER SCHEDULING – HOW SMART?

FOUR ALGORITHMS

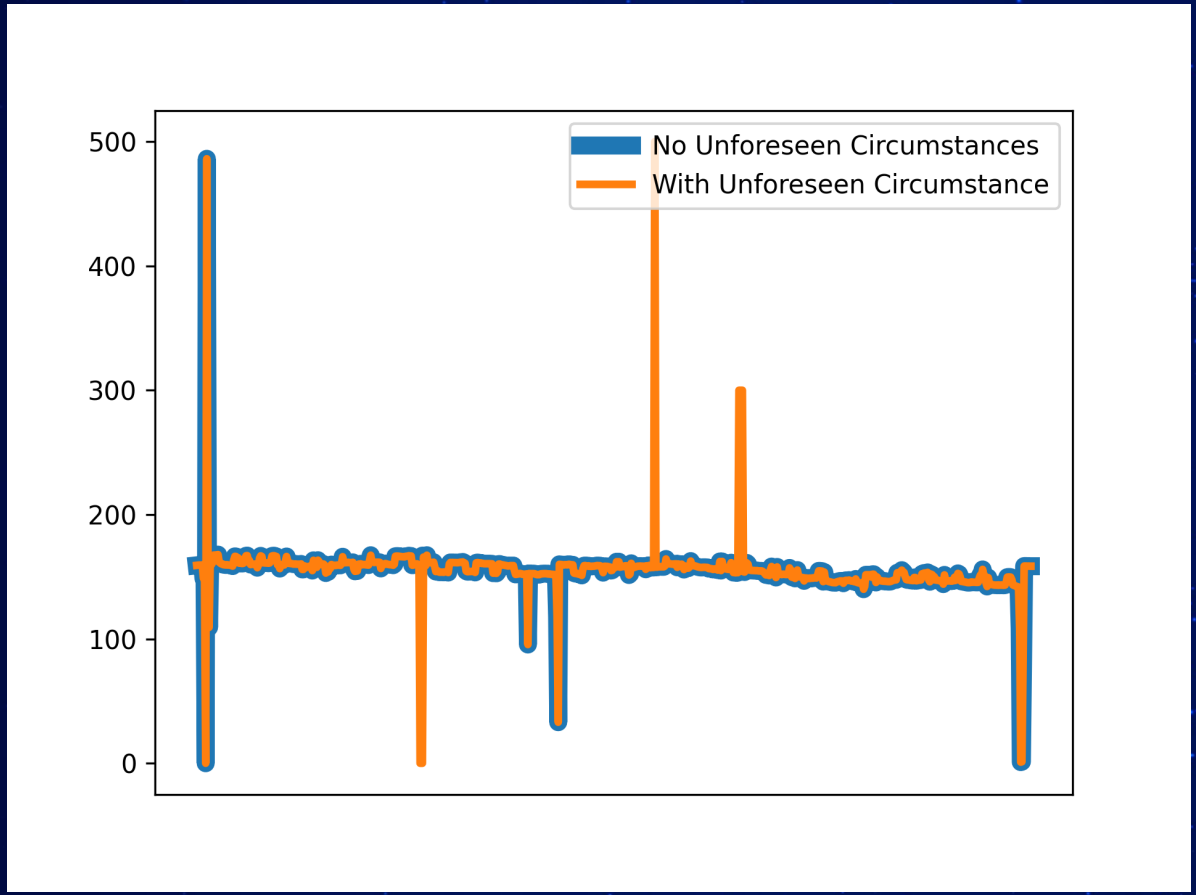


LARGER BATTERY PACK?



QUESTION 1 POWER SCHEDULING – HOW SMART?

RESISTANCE TO ACCIDENTS



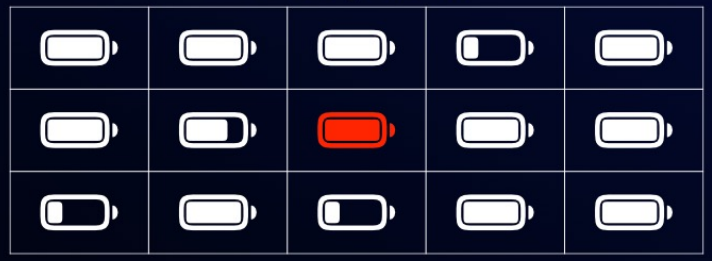
- Coping with unprecedented accidents with schedule(blue)
- Up to **15%** extra cost reduction

OPEN PROBLEM PROSPECTIVE

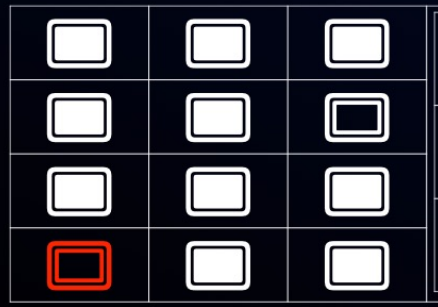
OPEN PROBLEM DEMO OF POWER SCHEDULING SYSTEM

Battery sets: 2	Solar panels: 3000
Active robots: 21056	Online time: 796 hrs

Battery Status

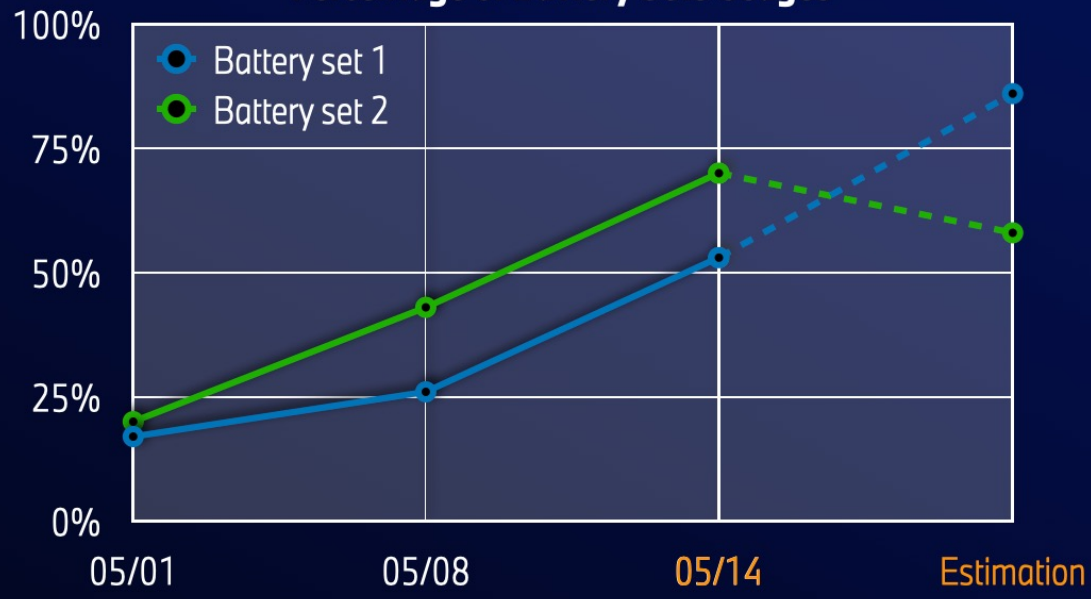


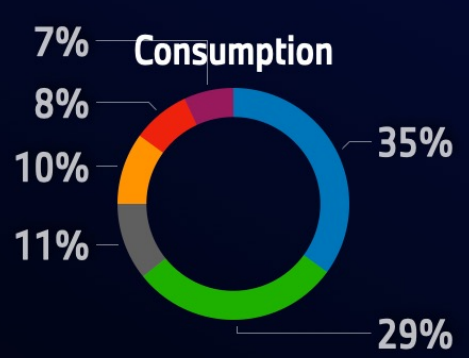
Solar Panel Status

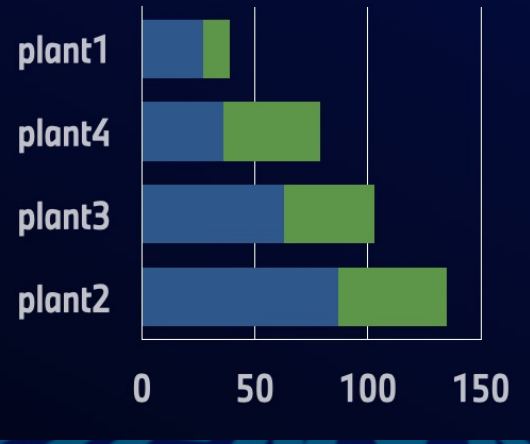


Online	2996
Offline	4
Power	692 KW·H

Percentage of Battery Sets Usages







THANKS!