Business Excellence

Creating an Excellent Tomorrow, Today

Recurring Cost Saving

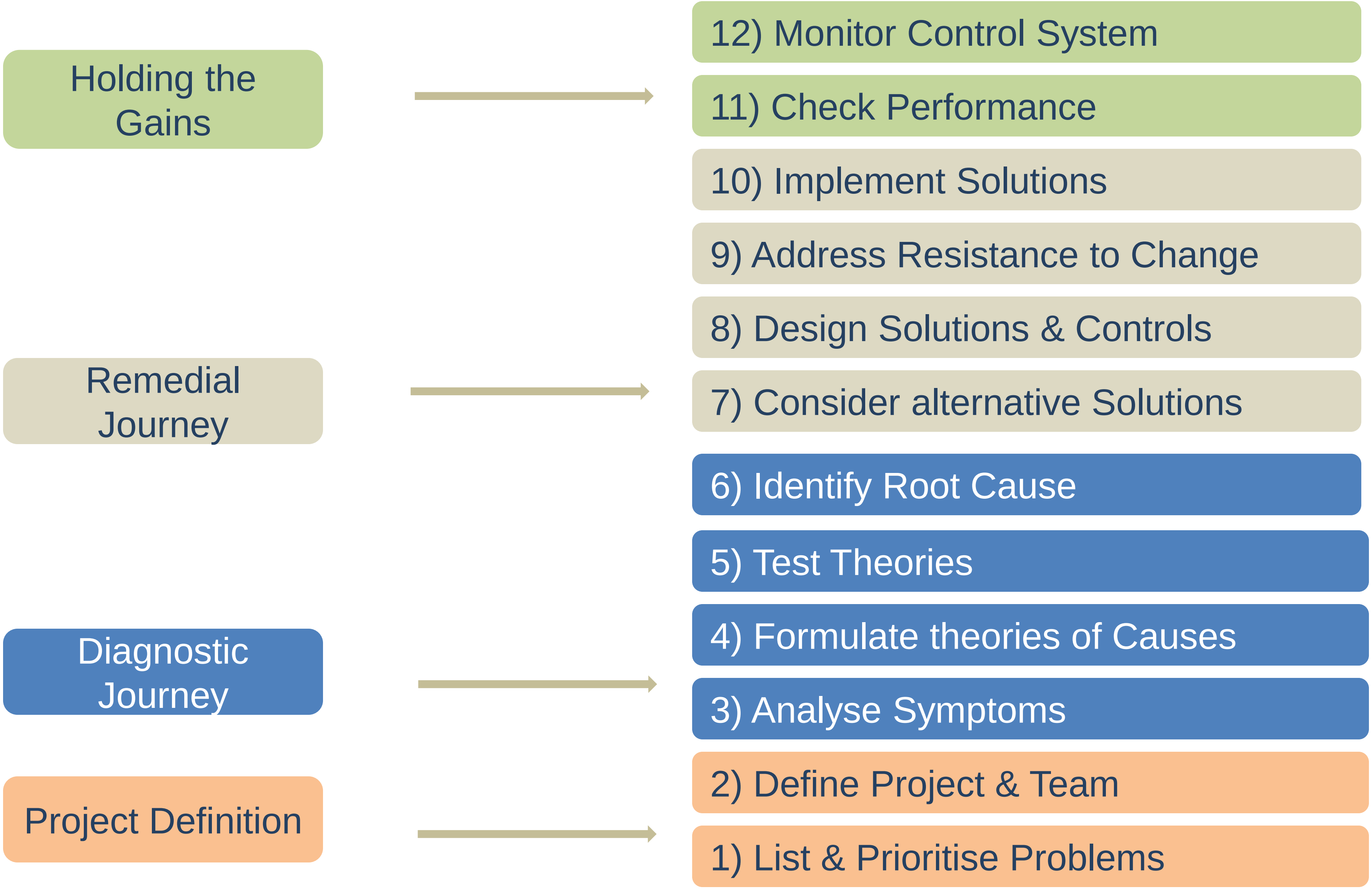
Reducing Opex Cost by implementing Power Saving initiatives at Baggage Handling System (T3)

CIP/2018-19/867 DIAL

GMR

Presented by: Sunil Sharma

12 Steps Methodology of Problem Solving



Holding the Gains

Remedial Journey

Diagnostic Journey

Project Definition

12) Monitor Control System

11) Check Performance

10) Implement Solutions

9) Address Resistance to Change

8) Design Solutions & Controls

7) Consider alternative Solutions

6) Identify Root Cause

5) Test Theories

4) Formulate theories of Causes

3) Analyse Symptoms

2) Define Project & Team

1) List & Prioritise Problems

Mission Statement

"Reducing Opex Cost by implementing Power Saving initiatives at Baggage Handling System (T3)"

- ❑ At DIAL, the Baggage Handling System is almost 7kms long with 5 levels of screening, handling 135,000 bags per day.
- ❑ Aligning our goal with DIAL Mission:
  We had planned to Reduce our Energy Consumption by some innovative method or process improvement.
- ❑ Daily Average Energy consumption @BHS: 19MWH/day

Listing Prioritizing Problems

Venue	T3 BHS Meeting Room
Date	30th June 2018
Team Leader	Mr. Sunil Sharma (SS)
Team Members	Mr. Ayush Yadav(AY), Mr. Pawan Kumar(PK), Mr. Vijay Jain(VJ), Mr. Gopal Kaushik(GK).

S. No.	List of Issues	SS	AY	PK	VJ	GK	TOTAL
1	Higher IDLE TIME of BHS conveyors.	5	5	3	5	4	27
2	Improper baggage induction from Airlines.	4	4	1	4	5	21
3	Under utilization of Redundant BHS lines.	5	5	4	4	2	20
4	Ever increasing list of “DG” items from BCAS.	2	3	2	3	2	13
5	Higher baggage rejection for security reasons.	4	1	2	1	2	10

Marking 1 – 5
1 – Least priority.
5 – Highest priority work.

Project Title

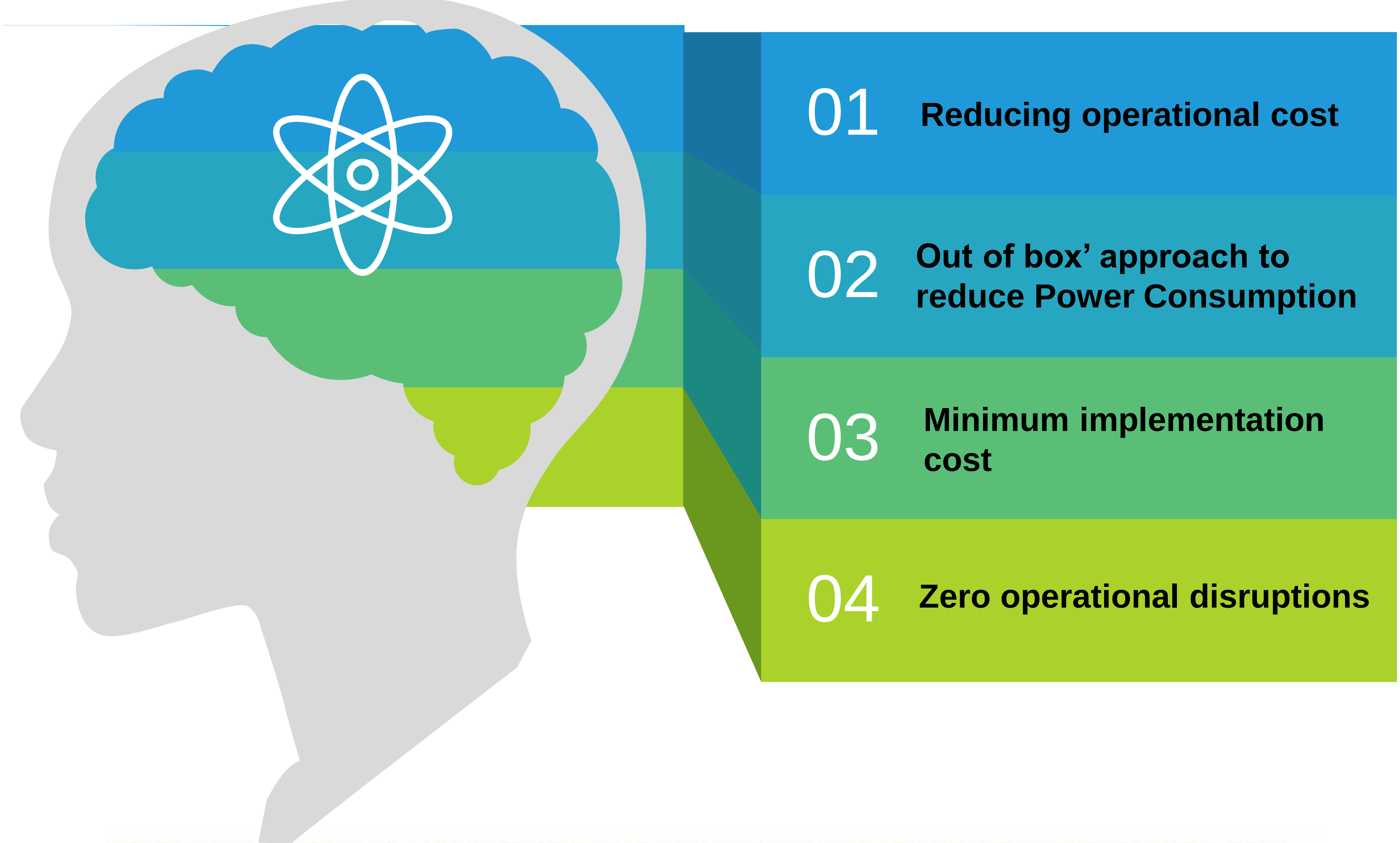
To Reduce the Energy Consumption at Baggage Handling System-T3

by 10% by Oct’ 2018.

SPECIFIC | MEASURABLE | ACHIEVABLE | RESULT ORIENTED | TIME BOUND

S M A R T

Project Target



01 **Reducing operational cost**

02 **Out of box’ approach to reduce Power Consumption**

03 **Minimum implementation cost**

04 **Zero operational disruptions**

Team Constitution

Team Leader Name: Sunil Sharma

Team Members Name:
Ayush Yadav - Responsible for ensuring PLC Changes
Pawan Kumar - Implementation of Energy Score Card
Vijay Jain - Training to Airlines / GHA for Baggage Induction
Gopal Kaushik - PDB Healthiness
Siemens Team - Implementation of Line Diversion & Idle time setting

Team Mentor Name: A Kalyanasundaram

Analyze Symptoms

- **Continuous increase in Electrical Tariff**
- **Ageing of BHS System (Procured in yr 2008)**
- **Wrong Induction of Baggage from Check-In**
- **Higher ‘Idle Time’ setting of Conveyors**
- **Rise in Passenger Load**
- **Higher Baggage Rejection due to DG *(Dangerous Goods)* items.**

Analyze Symptoms

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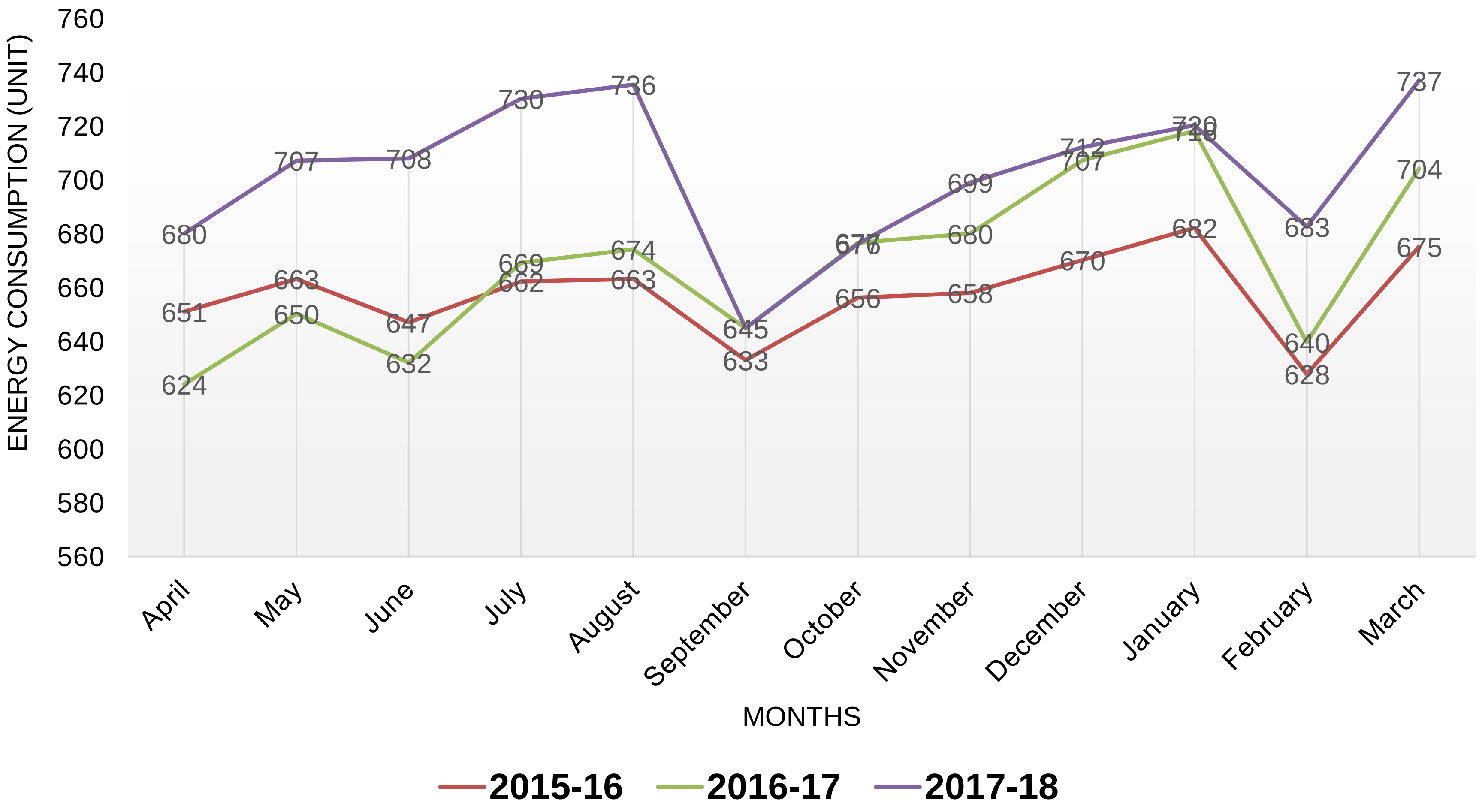
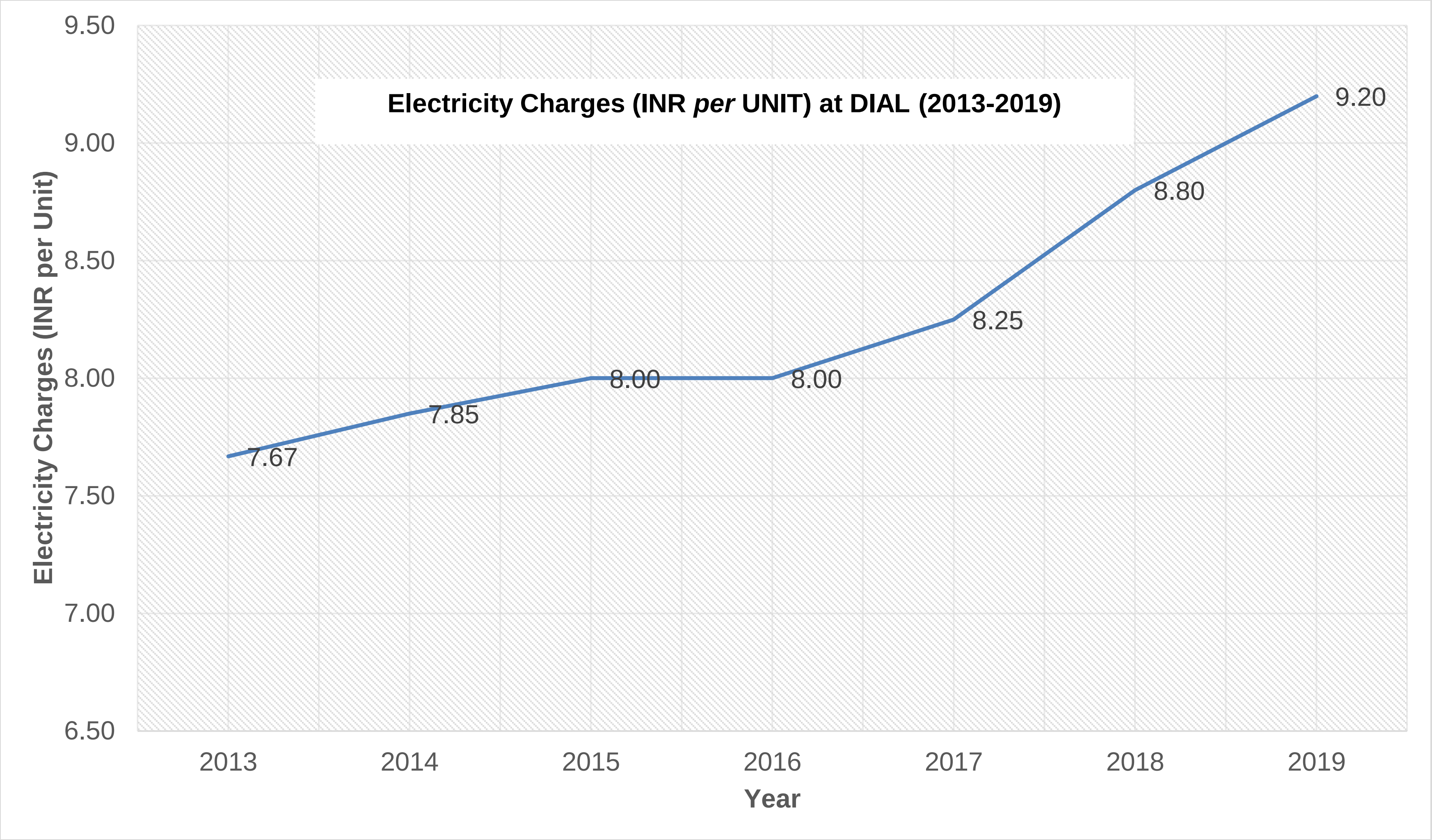
BHS Energy Consumption Trend

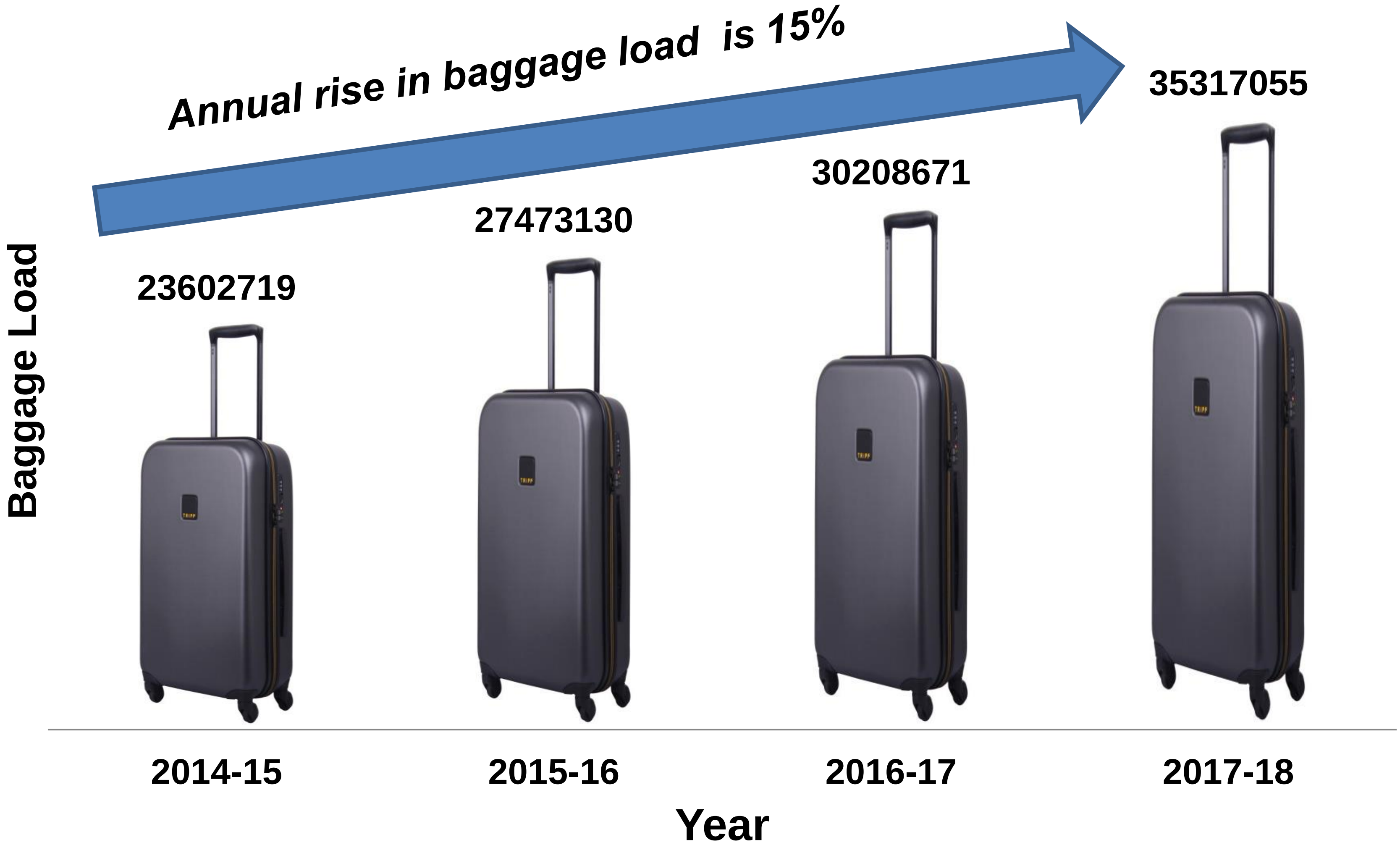


Humility I Entrepreneurship I Teamwork and Relationships I Deliver the Promise I Learning and Inner Excellence I Social Responsibility I Respect for Individual

Analyze Symptoms


Electricity Charges (INR *per* UNIT) at DIAL (2013-2019)

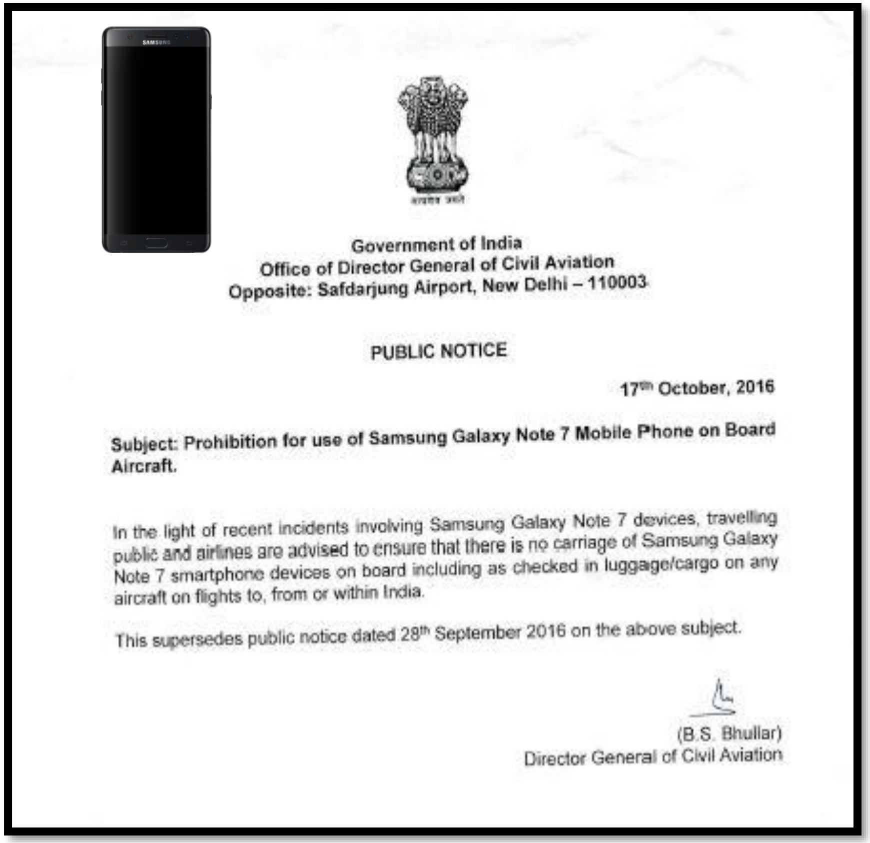
Analyze Symptoms



Annual rise in baggage load is 15%

Analyze Symptoms

DGCA Latest list of Prohibited article in Check-In Baggage



Government of India
Office of Director General of Civil Aviation
Opposite: Safdarjung Airport, New Delhi – 110003

PUBLIC NOTICE

17th October, 2016

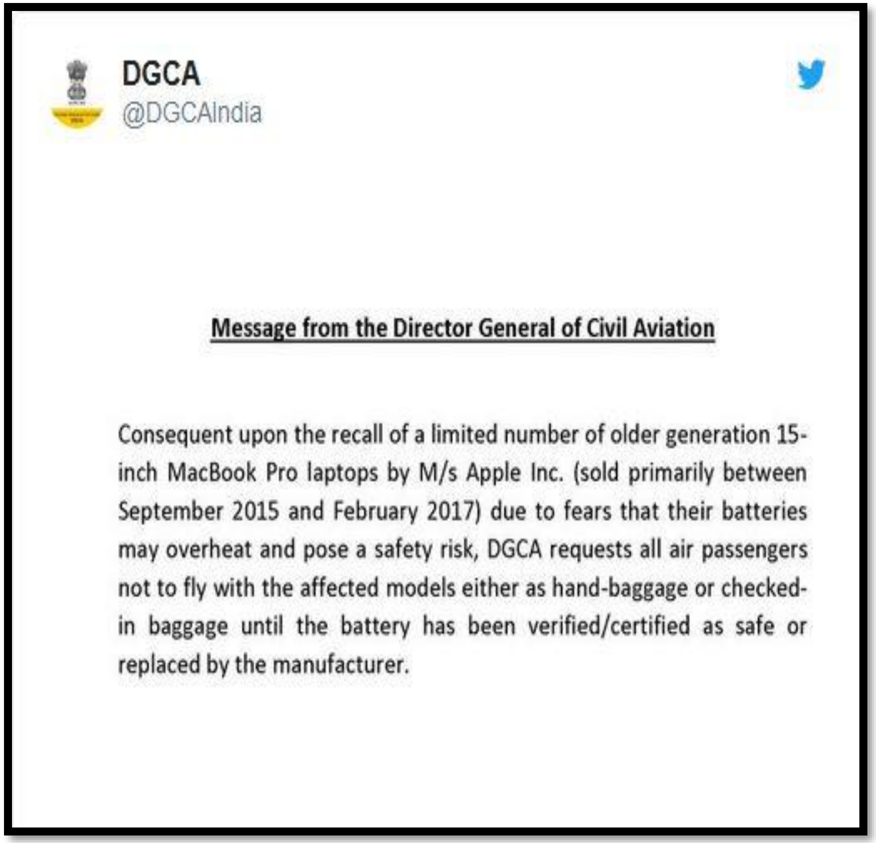
Subject: Prohibition for use of Samsung Galaxy Note 7 Mobile Phone on Board Aircraft.

In the light of recent incidents involving Samsung Galaxy Note 7 devices, travelling public and airlines are advised to ensure that there is no carriage of Samsung Galaxy Note 7 smartphone devices on board including as checked in luggage/cargo on any aircraft on flights to, from or within India.

This supersedes public notice dated 28th September 2016 on the above subject.

(B.S. Bhullar)
Director General of Civil Aviation

Ban on Mobile Phones



DGCA
@DGCAIndia

Message from the Director General of Civil Aviation

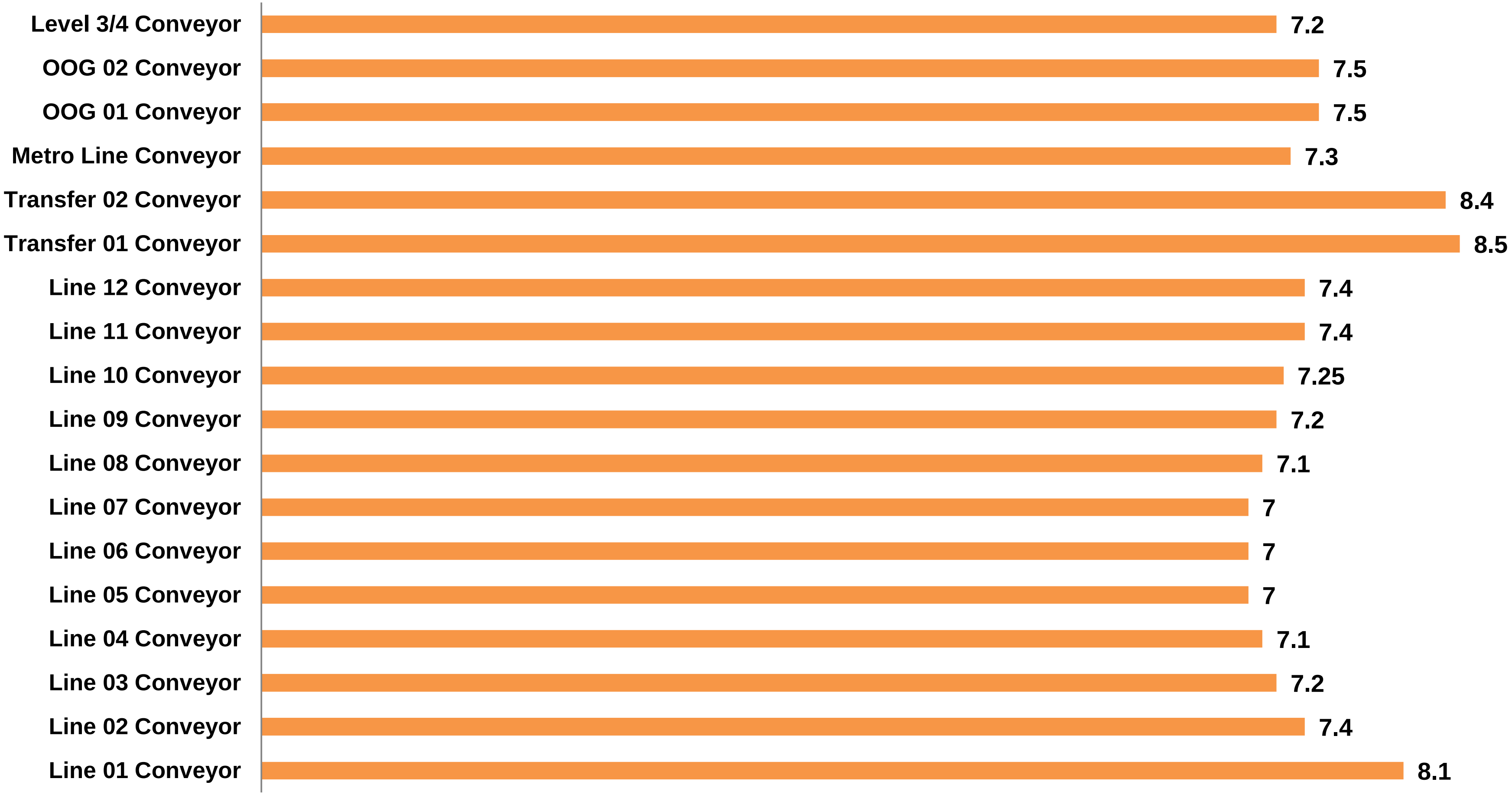
Consequent upon the recall of a limited number of older generation 15-inch MacBook Pro laptops by M/s Apple Inc. (sold primarily between September 2015 and February 2017) due to fears that their batteries may overheat and pose a safety risk, DGCA requests all air passengers not to fly with the affected models either as hand-baggage or checked-in baggage until the battery has been verified/certified as safe or replaced by the manufacturer.

Ban on Laptops

Addition of new items in the List of "Dangerous Goods" increases the travel time of bags.

Analyze Symptoms

Idle Time Setting
(in minutes)



Brain Storming Session

Team Members Present:

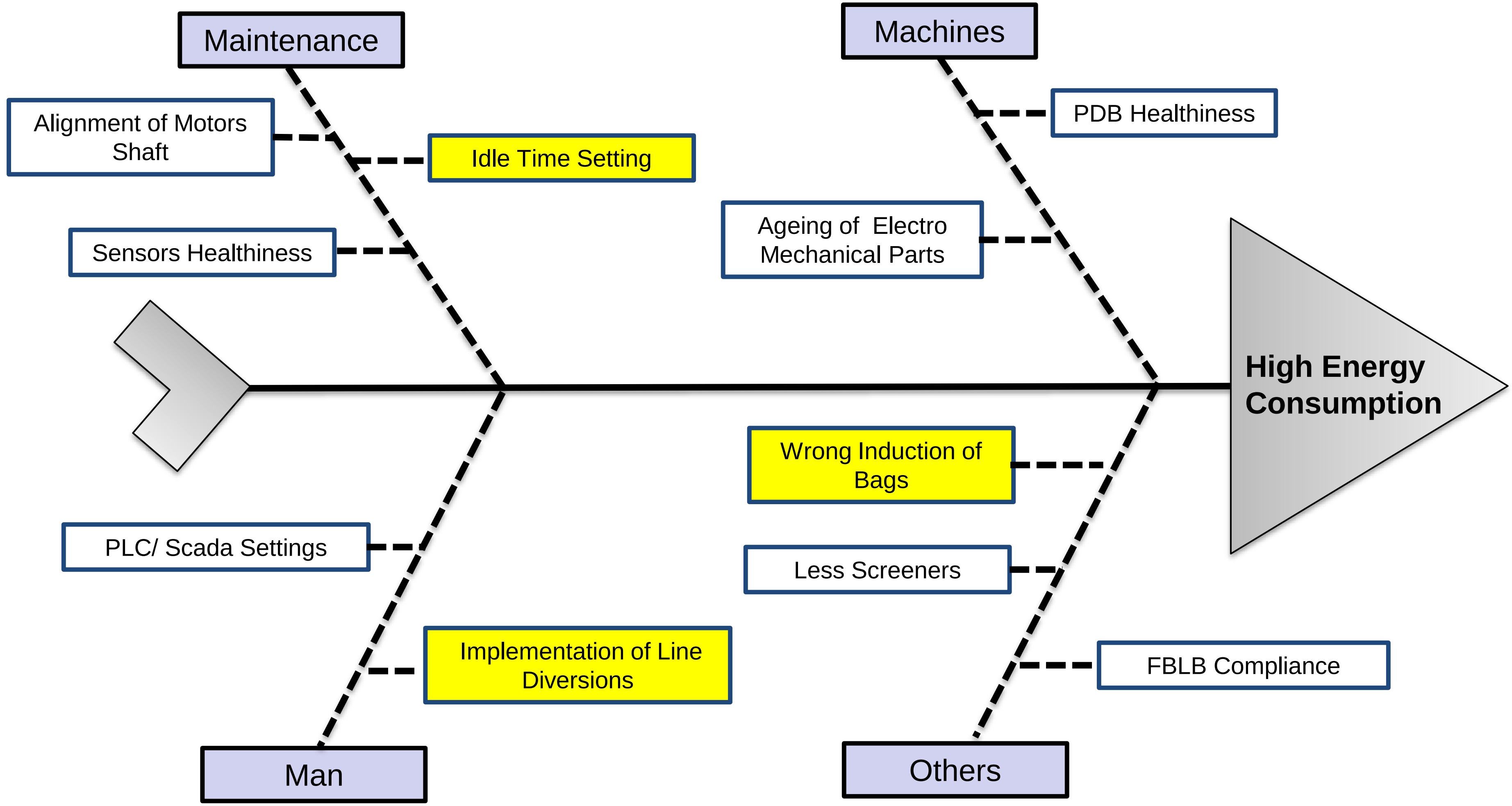
- Mr. A.Kalyanasundaram, P&E
- Mr. Sunil Sharma, P&E
- Mr. Ayush Yadav, P&E
- Mr. Pawan Kumar, P&E
- Mr. Vijay Jain, P&E
- Mr. Gopal Kaushik, P&E
- Mr. Sanket Tyagi, Siemens

- Venue: BHS Command Center, Terminal 03

- Date : 30-June-18

- Topic: Identification of causes using FISHBONE diagram.

Cause and Effect Analysis



High Energy Consumption

Maintenance
- Alignment of Motors Shaft
- Idle Time Setting
- Sensors Healthiness

Machines
- PDB Healthiness
- Ageing of Electro Mechanical Parts

Man
- PLC/ Scada Settings
- Implementation of Line Diversions

Others
- Wrong Induction of Bags
- Less Screeners
- FBLB Compliance

Fishbone Diagram

Identified Problems via Brainstorming

Project Definition ◇ | Diagnostic Journey ◆ | Remedial Journey ◇ | Holding The Gains ◇

Venue	T3 BHS Meeting Room
Date	30th June 2018
Team Leader	Mr. Sunil Sharma
Team Members	Mr. Ayush Yadav, Mr. Pawan Kumar, Mr. Vijay Jain, Mr. Gopal Kaushik

S. No.	Problems
1	**Conveyors "Idling Time" was high.**
2	**Under utilization of Redundant lines.**
3	**Higher baggage rejection due to improperly inducted bags from Checkin.**

Probable Solutions

1

Upgrading to ICS (Individual Carrier System)

2

Revising conveyors “Idle Time” settings from 7mins to 1min

3

Extensive usage of “Redundant Lines” during peaks times

4

Monitoring “Baggage Rejection Trend” with in-Line Security

5

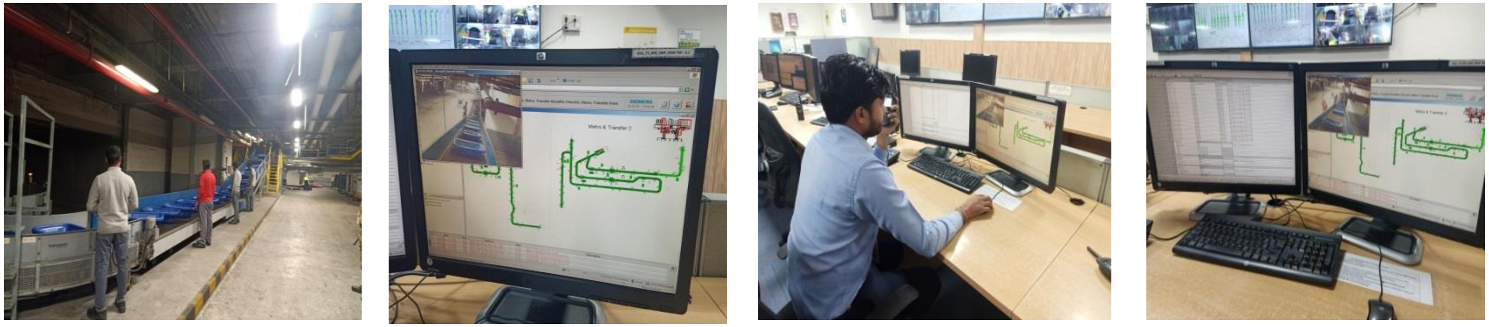
Providing necessary BHS trainings to Airlines & GHA’s

Design Control & Solutions

(Pilot)

Pilot Project done at “*Metro Baggage Line”* for risk analysis:

- **PLC Settings changed for all Metro Line Conveyors**
- **Motor OEM consulted for the proposed changes.**
- **Analysis of System Logs with Siemens Germany.**
- **System behaviour observed for 2 weeks.**



Design Control & Solutions
(Full Scale)

Post completion of Pilot project, following steps implemented in BHS:

01 Necessary changes made at PLC level to revise the “Idle Timings” for the entire Baggage Handling System

02 Being a live airport, implementation done in phased manner

03 Extensive usage of “Redundant Lines”

04 Daily Review of BHS Consumption

05 Implementation of individual “Energy Score Card” for all BHS shift managers

Activity Plan

S. No	ACTIVITY	RESP	July				August				September				REMARKS
			I	II	III	IV	I	II	III	IV	I	II	III	IV	
1	Pilot Project at Metro Line	PLAN	🟦												
		ACTUAL	🟩												
2	Monitoring the changes & LOG analysis	PLAN		🟦	🟦										
		ACTUAL		🟩	🟩										
3	Implementation at Full Scale (Departure Lines) & Monitoring the changes	PLAN				🟦	🟦	🟦	🟦	🟦	🟦				
		ACTUAL				🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩		
4	Implementation at Arrival Lines	PLAN										🟦	🟦	🟦	
		ACTUAL									🟩	🟩	🟩	🟩	

🟦 Plan 🟩 Actual

Probable Resistance and Remedies

S. No.	Agency	Expected Resistance	Remedy	Responsibility
1)	**Siemens**	Changing PLC protocols at a live airport.	Controlled environment created at Metro line for PLC changes.	Siemens/ DIAL BHS
2)	**Airlines GHA**	Following proper baggage induction procedures at Checkin.	Necessary trainings imparted to all Airlines & GHA staff.	DIAL BHS
3)	**DIAL**	Usage of “Redundant Lines” during non peak hours.	Monthly Score card system devised capturing individual performance.	DIAL BHS

Implementation Steps

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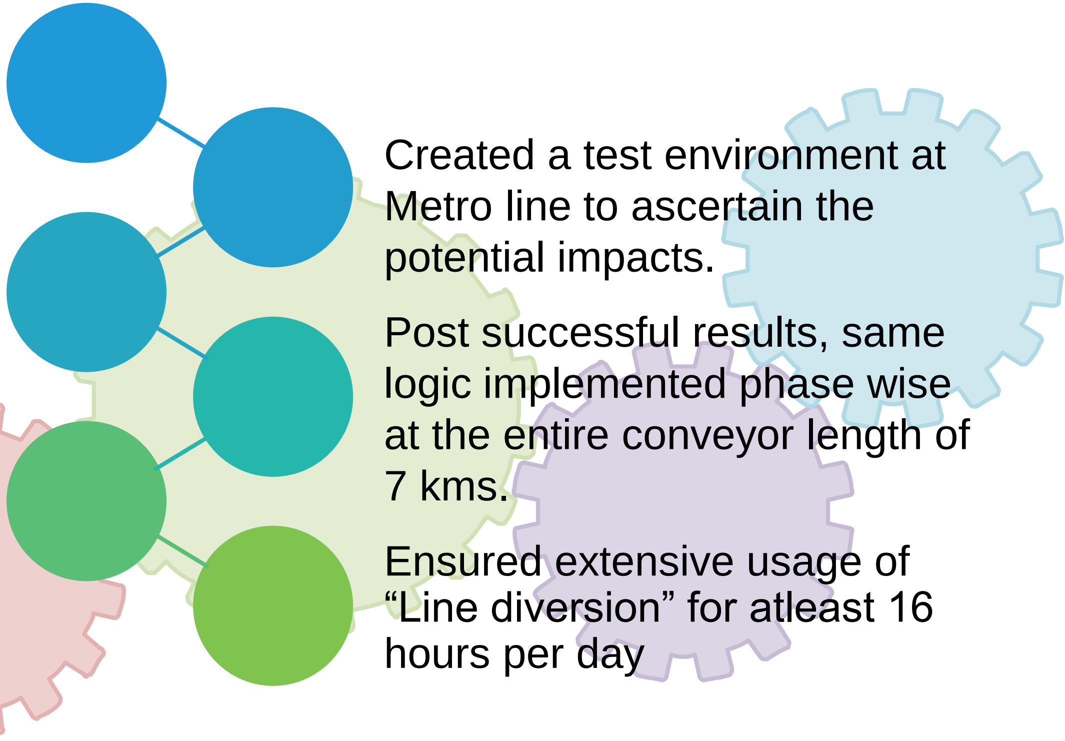
Project Definition | Diagnostic Journey | **Remedial Journey** | Holding The Gains



Developed new Logic at PLC level for reducing the “idling time” of Conveyors

Observed system behaviour for 2 weeks.

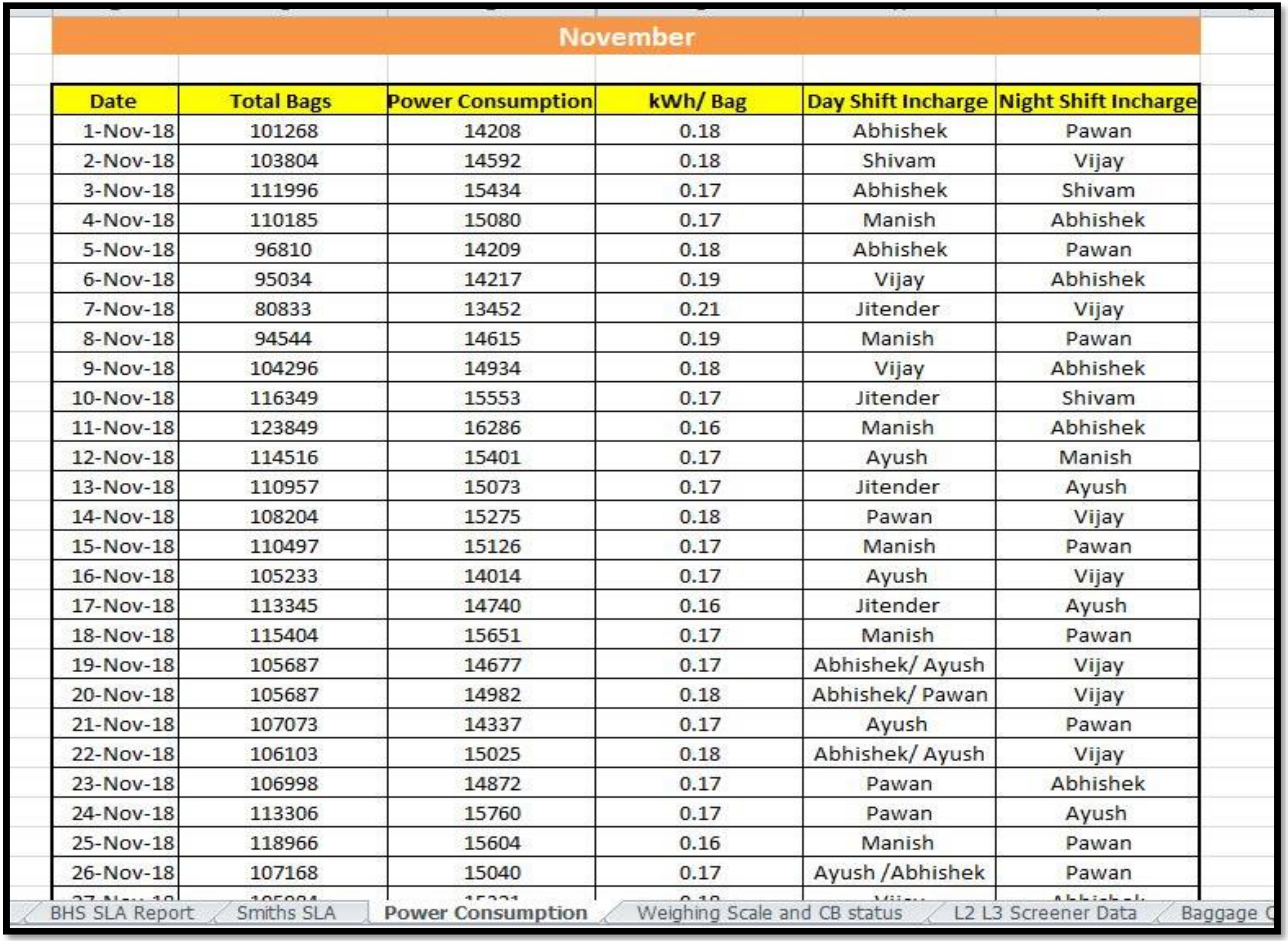
Trainings imparted to Airlines Staff on Proper Baggage Induction procedures.

Created a test environment at Metro line to ascertain the potential impacts.

Post successful results, same logic implemented phase wise at the entire conveyor length of 7 kms.

Ensured extensive usage of “Line diversion” for atleast 16 hours per day

Daily Shift Wise Power Consumption Tracking

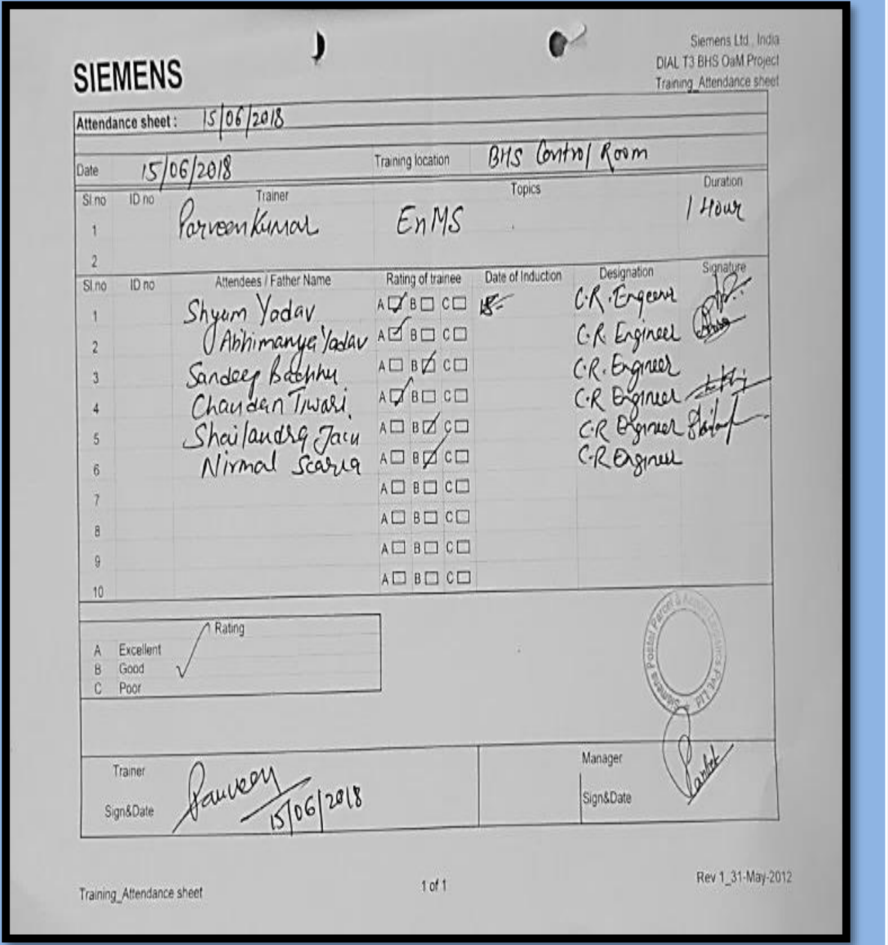


November

Date	Total Bags	Power Consumption	kWh/ Bag	Day Shift Incharge	Night Shift Incharge
1-Nov-18	101268	14208	0.18	Abhishek	Pawan
2-Nov-18	103804	14592	0.18	Shivam	Vijay
3-Nov-18	111996	15434	0.17	Abhishek	Shivam
4-Nov-18	110185	15080	0.17	Manish	Abhishek
5-Nov-18	96810	14209	0.18	Abhishek	Pawan
6-Nov-18	95034	14217	0.19	Vijay	Abhishek
7-Nov-18	80833	13452	0.21	Jitender	Vijay
8-Nov-18	94544	14615	0.19	Manish	Pawan
9-Nov-18	104296	14934	0.18	Vijay	Abhishek
10-Nov-18	116349	15553	0.17	Jitender	Shivam
11-Nov-18	123849	16286	0.16	Manish	Abhishek
12-Nov-18	114516	15401	0.17	Ayush	Manish
13-Nov-18	110957	15073	0.17	Jitender	Ayush
14-Nov-18	108204	15275	0.18	Pawan	Vijay
15-Nov-18	110497	15126	0.17	Manish	Pawan
16-Nov-18	105233	14014	0.17	Ayush	Vijay
17-Nov-18	113345	14740	0.16	Jitender	Ayush
18-Nov-18	115404	15651	0.17	Manish	Pawan
19-Nov-18	105687	14677	0.17	Abhishek/ Ayush	Vijay
20-Nov-18	105687	14982	0.18	Abhishek/ Pawan	Vijay
21-Nov-18	107073	14337	0.17	Ayush	Pawan
22-Nov-18	106103	15025	0.18	Abhishek/ Ayush	Vijay
23-Nov-18	106998	14872	0.17	Pawan	Abhishek
24-Nov-18	113306	15760	0.17	Pawan	Ayush
25-Nov-18	118966	15604	0.16	Manish	Pawan
26-Nov-18	107168	15040	0.17	Ayush /Abhishek	Pawan

Step taken to reduce BHS Consumption

Training to Siemens Team on EnMS



SIEMENS

Siemens Ltd , India
DIAL T3 BHS OaM Project
Training_Attendance sheet

Attendance sheet : 15/06/2018

Date	15/06/2018	Training location	BHS Control Room	
Sl.no	ID no	Trainer	Topics	Duration
1		Parveen Kumar	EnMS	1 Hour
2				

Sl.no	ID no	Attendees / Father Name	Rating of trainee	Date of Induction	Designation	Signature
1		Shyam Yadav	A ☑ B ☐ C ☐	15	C.R. Engeer	
2		Abhimanyu Yadav	A ☑ B ☐ C ☐		C.R. Engineer	
3		Sandeep Bachhu	A ☐ B ☑ C ☐		C.R. Engineer	
4		Chandan Tiwari	A ☑ B ☐ C ☐		C.R Engineer	
5		Shailendra Jain	A ☐ B ☑ C ☐		C.R Engineer	
6		Nirmal Scaria	A ☐ B ☑ C ☐		C.R Engineer	
7			A ☐ B ☐ C ☐			
8			A ☐ B ☐ C ☐			
9			A ☐ B ☐ C ☐			
10			A ☐ B ☐ C ☐			

Rating	
A	Excellent
B	Good
C	Poor

Trainer Sign&Date: Parveen 15/06/2018

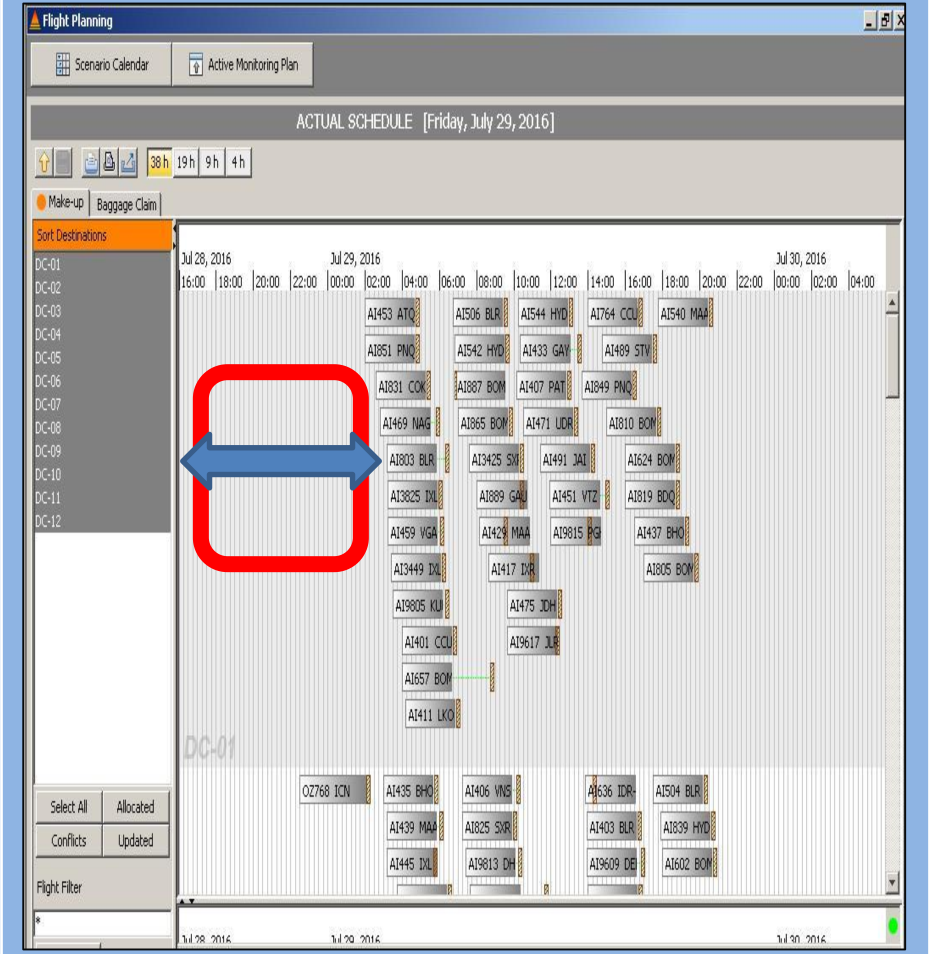
Manager Sign&Date:

Training_Attendance sheet

1 of 1

Rev 1_31-May-2012

Optimization of BMA Carousal


Flight Planning
Scenario Calendar
Active Monitoring Plan
ACTUAL SCHEDULE [Friday, July 29, 2016]
38 h
19 h
9 h
4 h
Make-up
Baggage Claim
Sort Destinations
DC-01
DC-02
DC-03
DC-04
DC-05
DC-06
DC-07
DC-08
DC-09
DC-10
DC-11
DC-12
Jul 28, 2016
Jul 29, 2016
Jul 30, 2016
16:00
18:00
20:00
22:00
00:00
02:00
04:00
06:00
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02:00
04:00
AI453 ATQ
AI506 BLR
AI544 HYD
AI764 CCU
AI540 MAA
AI851 PNQ
AI542 HYD
AI433 GAY
AI489 STV
AI831 COK
AI887 BOM
AI407 PAT
AI849 PNQ
AI469 NAG
AI865 BOM
AI471 UDR
AI810 BOM
AI803 BLR
AI3425 SXR
AI491 JAI
AI624 BOM
AI3825 IXL
AI889 GAU
AI451 VTZ
AI819 BDQ
AI459 VGA
AI429 MAA
AI9815 PGH
AI437 BHO
AI3449 IXL
AI417 IXR
AI805 BOM
AI9805 KUU
AI475 JDH
AI401 CCU
AI9617 JLR
AI657 BOM
AI411 LKO
DC-01
OZ768 ICN
AI435 BHO
AI406 VNS
AI636 IDR
AI504 BLR
AI439 MAA
AI825 SXR
AI403 BLR
AI839 HYD
AI445 IXL
AI9813 DH
AI9609 DEL
AI602 BOM
Select All
Allocated
Conflicts
Updated
Flight Filter
*

Power Consumption Stats_July & Oct' 18

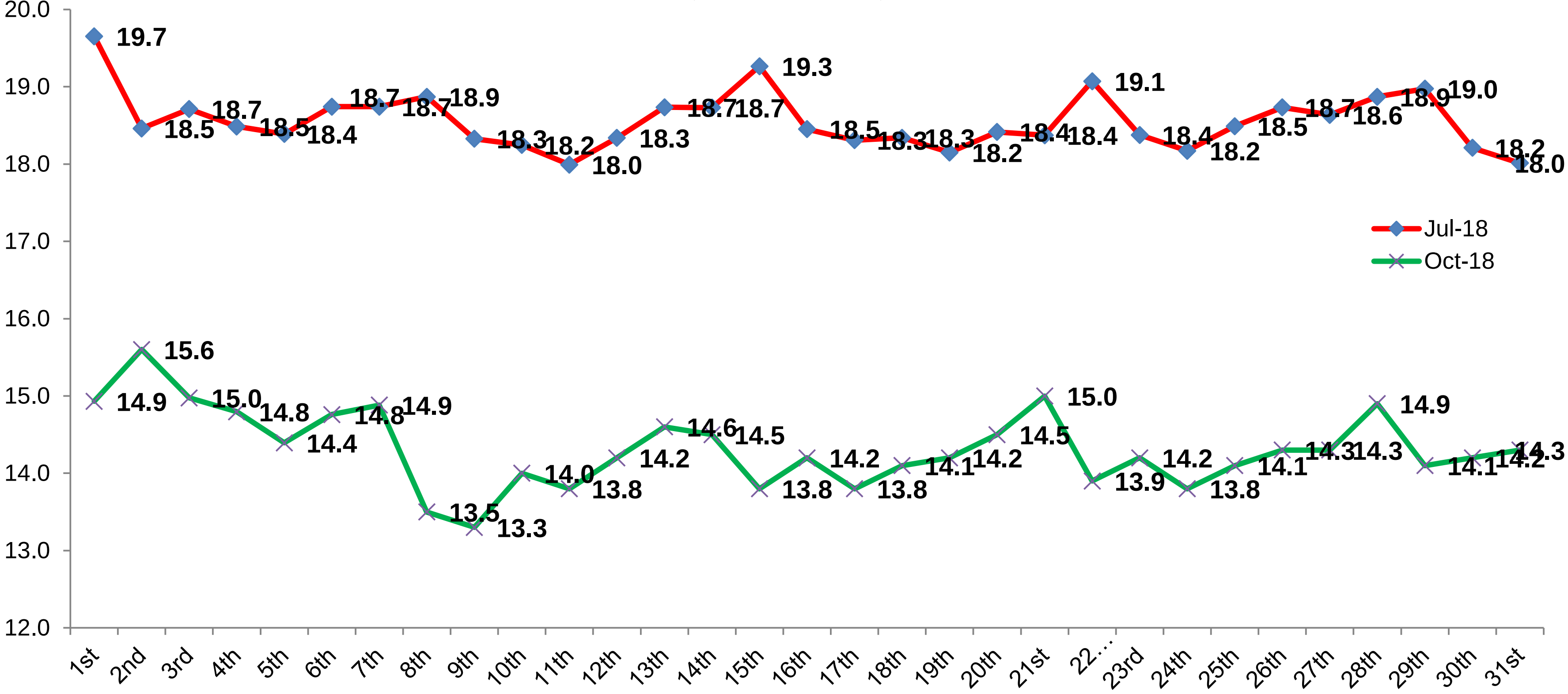
Total Power Consumption

- July - 575 MWH
- Oct - 444 MWH

22% reduction

Total Baggage Load

- July - 29,93,404
- Oct - 30,63,955



Holding the Gains

01 Recurring annual Savings of INR 1.4 Cr.

02 Half yearly savings for FY 18-19 is INR 78 Lakhs (06 Months).

03 Regular review of revised “Idle Timings” of all conveyors.

04 Sharing monthly system logs with Siemens Germany for joint analysis.

Holding the Gains

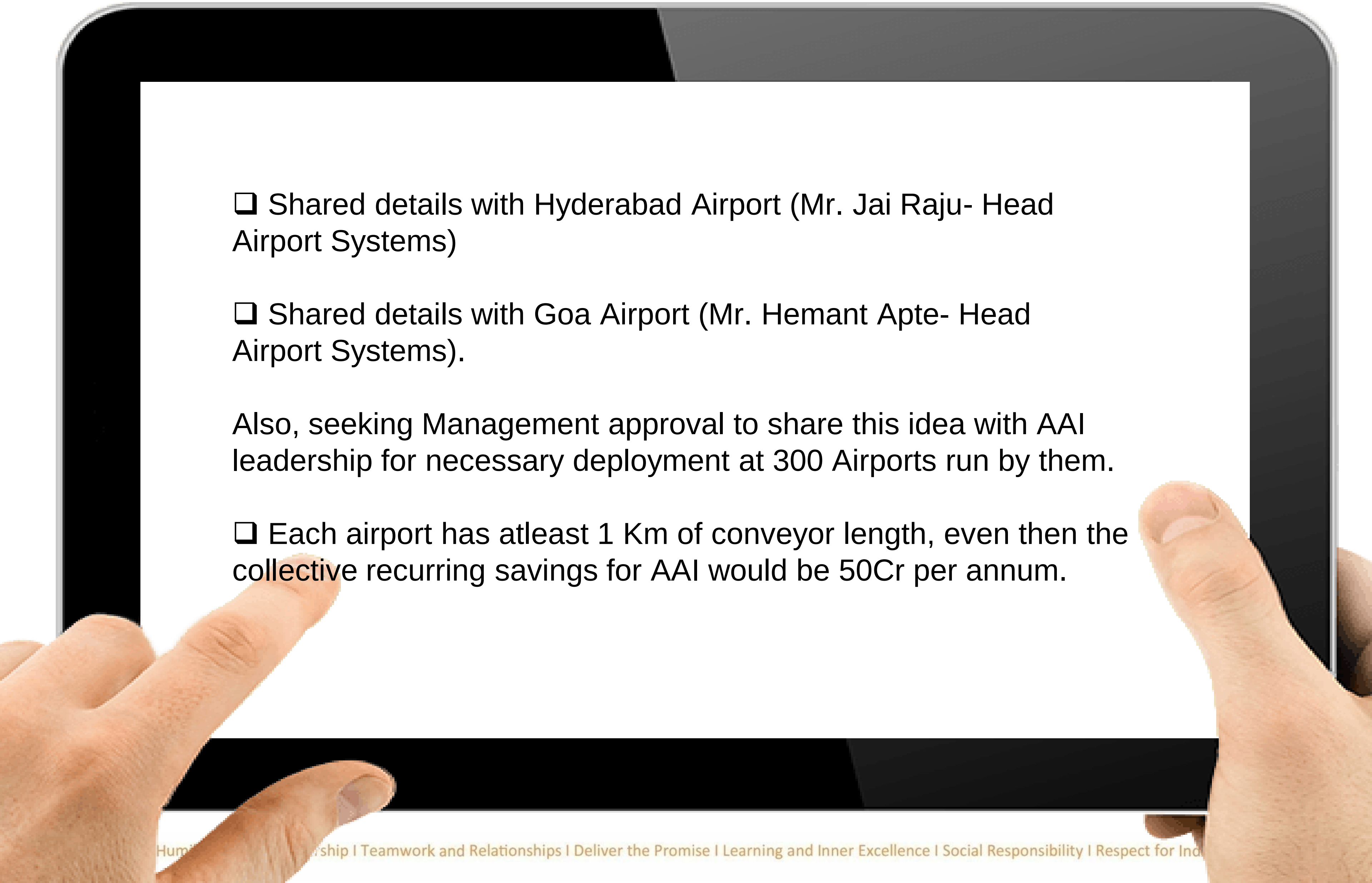
05 Daily monitoring of “Line diversions hours” via individual scorecard system.

06 Imparting regular BHS trainings to Airlines & GHA’s for DO’s & DON’T’s.

07 Horizontal deployment advised to all Group Airports.

08 Taking que from DIAL, Dubai airport has decided to replicate this model at there existing terminal and the proposed new Airport *(AL Makhtoum).*

HORIZONTAL DEPLOYMENT



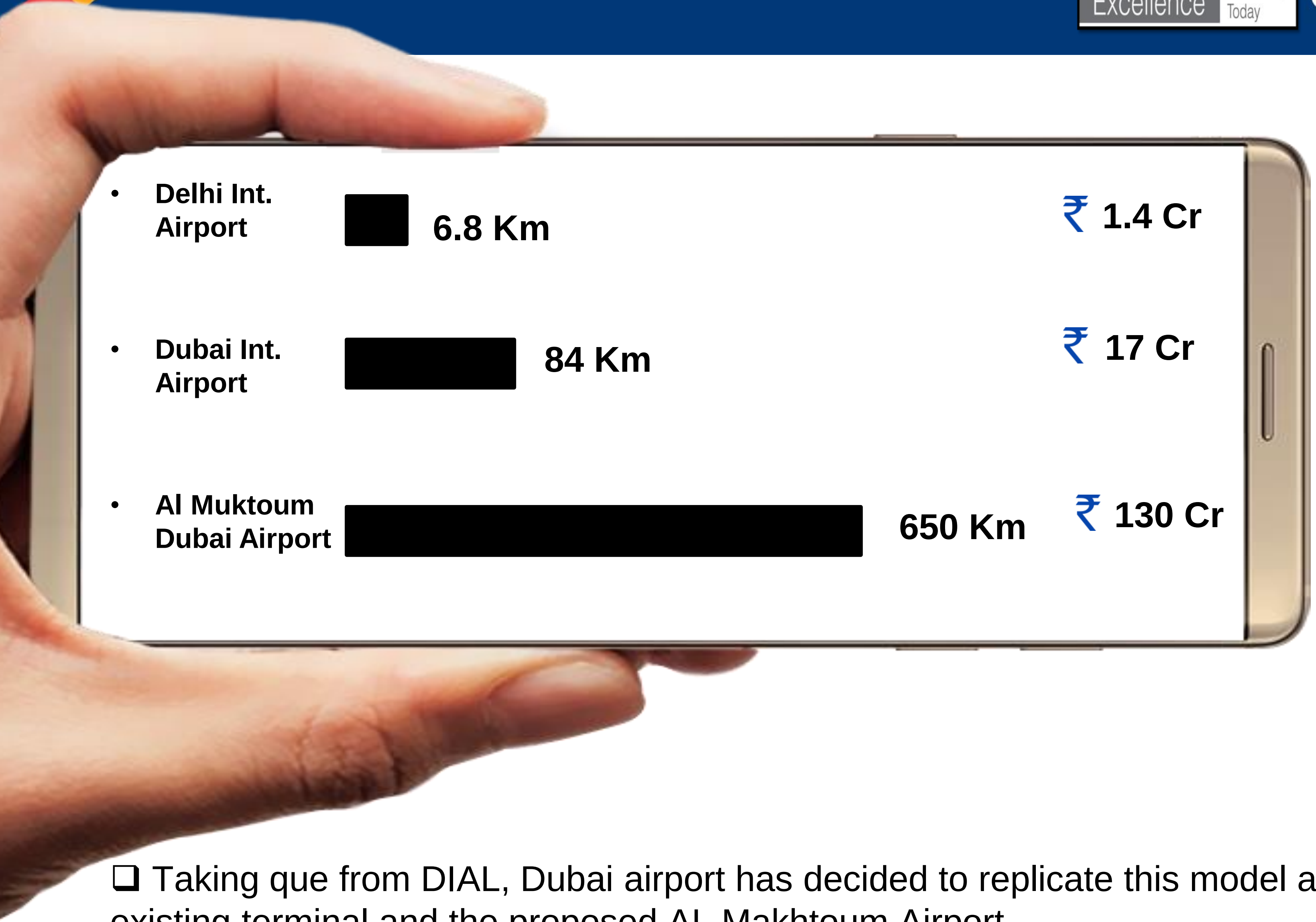
- ☐ Shared details with Hyderabad Airport (Mr. Jai Raju- Head Airport Systems)

- ☐ Shared details with Goa Airport (Mr. Hemant Apte- Head Airport Systems).

Also, seeking Management approval to share this idea with AAI leadership for necessary deployment at 300 Airports run by them.

- ☐ Each airport has atleast 1 Km of conveyor length, even then the collective recurring savings for AAI would be 50Cr per annum.

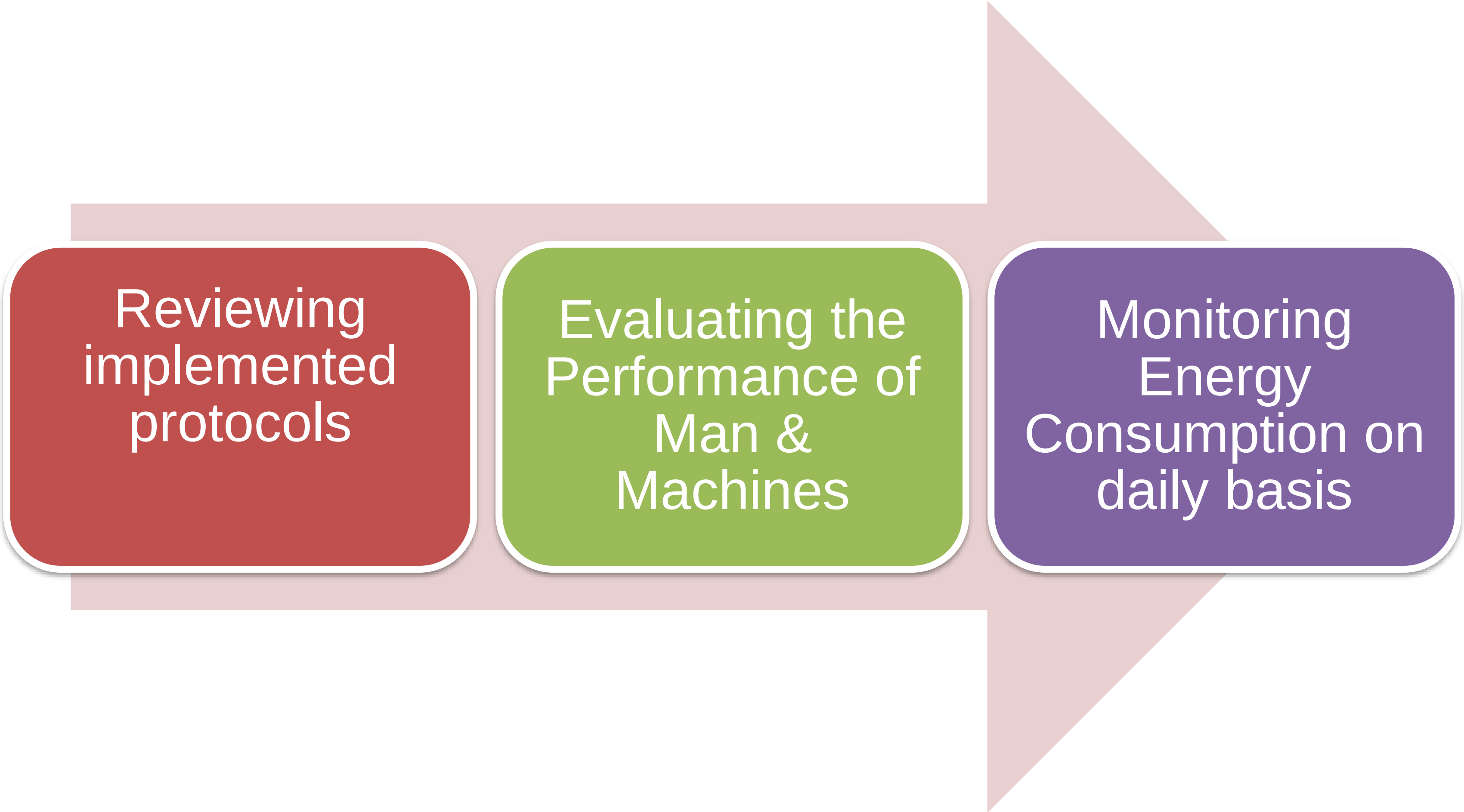
INDUSTRY IMPACT



- Delhi Int. Airport — 6.8 Km — ₹ 1.4 Cr
- Dubai Int. Airport — 84 Km — ₹ 17 Cr
- Al Muktoum Dubai Airport — 650 Km — ₹ 130 Cr

❑ Taking que from DIAL, Dubai airport has decided to replicate this model at there existing terminal and the proposed AL Makhtoum Airport.

Monitor the Control System



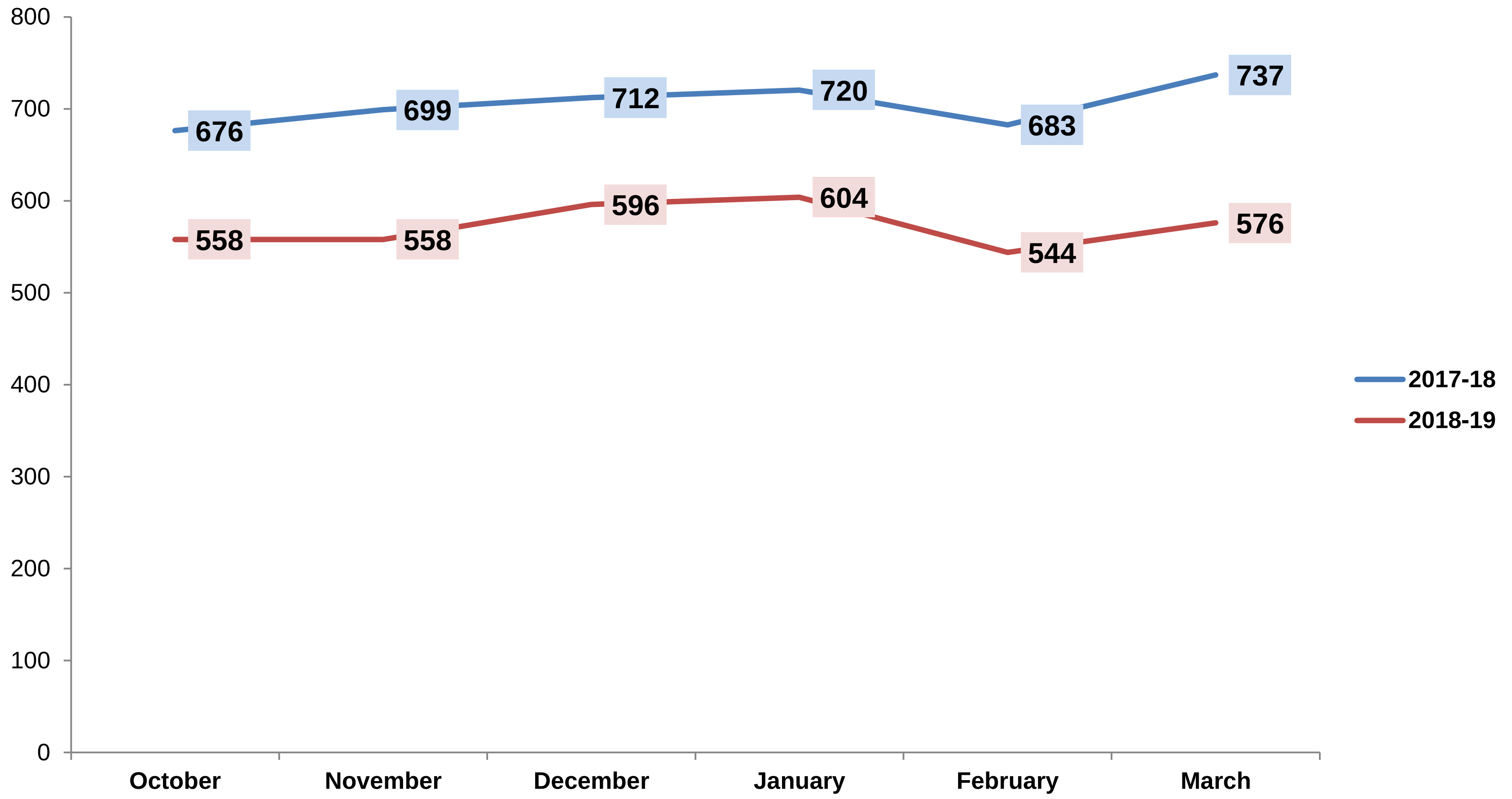
Reviewing implemented protocols

Evaluating the Performance of Man & Machines

Monitoring Energy Consumption on daily basis

Summary of Benefits

Comparison on BHS Consumption (2017 vs 2018)



Summary of Benefits

Summary of Key implemented steps	Non - Financial Benefits (Process Measures / Cycle time etc)	Financial benefits (Language of money)
❑ Necessary changes made at PLC level to reduce the Idle Timings. ❑ Increasing the usage of "Line Diversions" ❑ Airlines & GHA's trained on proper baggage induction procedures.	❑ Lower Optimized usage of available resources. ❑ Improved service quality. ❑ For cross functional deployment, advised similar solution to other GMR owned airports.	❑ Monetary savings of INR 1.5Cr in a year. ❑ Recurring savings. ❑ Less wear & tear of electro mechanical components, thereby higher product lift cycle and lower maintenance cost.

Awards & Accolades

Winner
Energy Savings by altering the IDLE Timings of BHS
Congratulations for
BLIP
Rs. Fifty Thousand Only
Team Ranked 1st
GMR

1st Prize in BLIP Competition

Thank You