Central Project Monitoring of Various Key Sectors

Submitted By -

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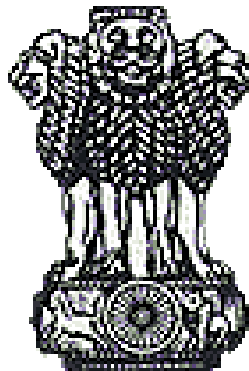
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सत्यमेवजयते

GOVERNMENT OF INDIA

INFRASTRUCTURE AND PERFORMANCE MONITORING DIVISION (PI-WING)

MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION

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1. <u>Background of the Ministry</u>

The Ministry of Statistics and Programme Implementation is the Ministry of Government of India whose main concern is to deliver aspects based on statistics which are released in our country. The Quality aspects are estimated on the basis on the census and survey which are conducted by the Government of India. The administrative is also taken into account in delivering statistical aspects which are published on the official site of the ministry. It has a survey Department whose main role is to collect field data through professional staff which are further compiled so that statistical techniques and scientific sampling methods can be applied on it. The Ministry has also a programme implementation called as **Infrastructure and Project Monitoring Division (IPMD)** whose main responsibilities are to monitor project and check performance of all sectors and their respective agencies. It performs a role in handling project of more than Rs 150 crores and performance of 24 sectors and their agencies and bring out some analytical reports based on the performance of these infrastructure sectors and Agencies. It also helps to improve the performance of the project by bringing out the problems which arise in the project in the meetings so that useful measures can be taken to overcome the problem of the project.

2. <u>Objective of the Report</u>

1. To calculate monthly scores at sector/agency level quantifying project performance based on monthly reporting data of April-23 OCMS Data Dump.
2. To determine the best performing sector, agency and project.

3. Performance Scoring of Sector, Agency and Project
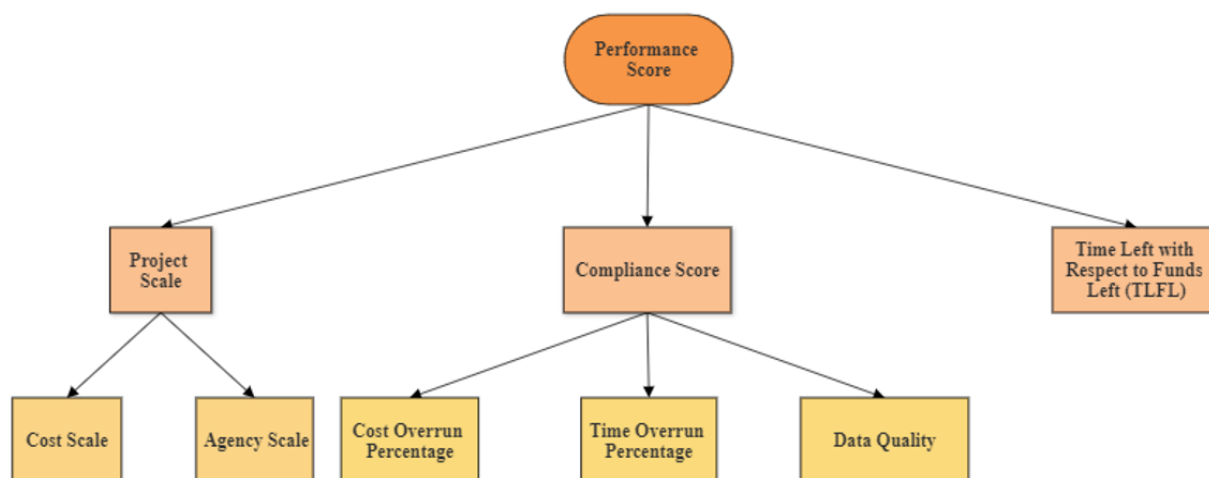
Figure 1 : Parameters involved to determine Performance Score

Note:

1. **Project Scale** – To be perused while computing Agency Performance Score.
2. **Compliance Score & Time Left with Respect to Funds Left** – To be perused while computing Project Performance Score.

i. **Project Scale**
   a) **Cost Scale** – Every Project has different size; some are larger projects while some are smaller Projects. Therefore, the Weights has been assigned to these projects on the basis of their Original Costs.
   b) **Agency Scale** – It is the number of projects in an Agency which have been assigned the weights to estimate the scores at agency level.

ii. **Compliance Score**
   a) **Cost Overrun Percentage -** This is defined as the percentage of cost overrun for each project of an agency.

$$\text{Cost Overrun Percentage} = \frac{(\text{Anticipated Cost} - \text{Original/Revised Cost of project})}{\text{Original/Revised Cost of project}} \times 100$$

Or

$$\text{Cost Overrun Percentage} = \frac{(\text{Current Expenditure} - \text{Original Cost of project})}{\text{Original Cost of project}} \times 100$$

NOTE:

- Latest Revised or Original date of Completion is to be considered.
- Current Expenditure should be considered in case Anticipated Cost is not available.

b) **Time Overrun Percentage -** This is defined as the percentage of time overrun for each project of an agency.

$$\text{Time Overrun Percentage} = \frac{(\text{Anticipated DOC} - \text{Original/Revised DOC})}{\text{Anticipated DOC} - \text{Date of Approval}} \times 100$$

(where DOC = Date of Completion)

NOTE:

- Latest Revised or Original date of Completion is to be considered.

c) **Data Quality –** It shows the quality of a dataset by analyzing the missing values and how well it shows accurate and valid results.

Critical fields include:

- Original Completion Date is Missing/Reported.
- Anticipated Date is Missing/Reported ; If it is Reported, if it is lapsed or not.
- Physical Progress with Cumulative Expenditures
- Budget Estimate with Cumulative Expenditures
- Cumulative Expenditures has exceeded the Anticipated Cost

- Reason of Delay is Missing/Reported.
- Data Gap of more than one Year between reporting Date of Approval and Date of Commissioning of Original Project cost more than Rs. 500 crore

iii. Time Left with Respect to Funds Left (TLFL)

It is calculated as:

$$\text{TLFL} = \frac{\text{Percentage Balance Time left for completion of project}}{\text{Percentage Balance funds left for utilization}} \text{ x100}$$

Where,

Percentage Balance fund left for completion of project

$$= \frac{\text{Cumulative Balance funds left for utilization}}{\text{Total Original or Revised or Anticipated cost of project}} \text{ X 100}$$

Note :- Greater Original/Revised/Anticipated Cost should be taken

Cumulative balance funds left for utilization

= Total Original / Revised / Anticipated cost of project (whichever is greater) – Current Expenditure

And,

Percentage Balance time left for Completion (months) =
$$\frac{\text{Anticipated DOC} - \text{ Current Month in Financial year}}{\text{Total Completion time}} \text{ X100}$$
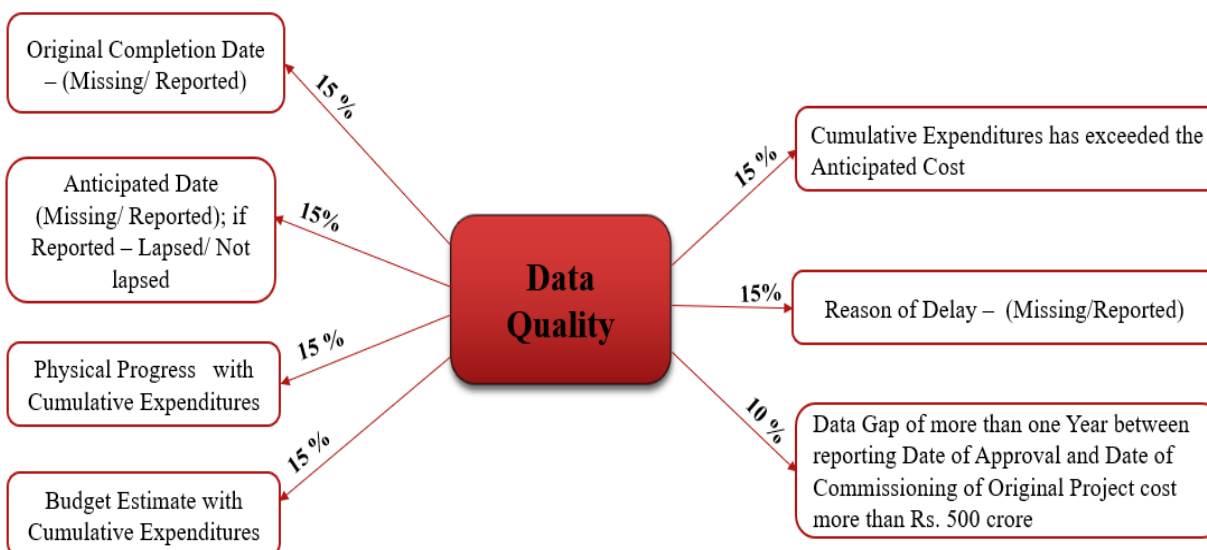
And,

Total Completion time $= \text{Anticipated DOC} - \text{DOA}$

(where DOC = Date of Completion and DOA = Date of Approval)

3. <u>Parameters Affecting Data Quality</u>

<u>**Figure 2 : Weights Assigned to Parameters Affecting Data Quality**</u>

When the above parameters are taken into account, then the data quality will be estimated as:

$$\text{Data Quality} = \frac{\sum_{i=1}^{n}(Weights\ of\ Parameters)*(Score\ of\ Parameter)}{\sum_{i=1}^{n}(Weights\ of\ Parameter)}$$

4. <u>Mechanism of Generation of Performance Scores</u>

The parameters have been taken into consideration to calculate the final performance score of a particular project using the following formula:

Project Performance Score $= \boldsymbol{\alpha} * (\boldsymbol{Compliance\ Score}) + \boldsymbol{\beta} * (\boldsymbol{TLFL})$

$$= \boldsymbol{\alpha} * (\boldsymbol{COR} + \boldsymbol{TOR} + \boldsymbol{Data\ Quality}) + \boldsymbol{\beta} * (\boldsymbol{TLFL})$$

Where α and β are the weights assigned to the parameters respectively as:

$\boldsymbol{\alpha} = \mathbf{0.6}, \boldsymbol{\beta} = \mathbf{0.4}$

and the weights will be further divided as :-

Compliance Score = COR (0.2) + TOR (0.2) + Data Quality (0.2)

Furthermore, the Performance Score of an agency is given as follows:

Agency Performance Score $= \gamma * (\text{Project Scale}) + \mu * (\text{Weighted Scores at Project Level})$

Where $\gamma = 0.2 \, and \, \mu = 0.8$

Also, Weighted Scores at Project level$= \dfrac{\sum_{i=1}^{n}(\text{Weights of Cost Scale})*(\text{Project Performance Score})}{\sum_{i=1}^{n}(\text{Weights of Cost Scale})}$

Hence, the Performance Sector of a sector is given as follows:

Sector Performance Score $= \dfrac{\text{Performance Score of an agency in a sector}}{\text{Number of Agency in a sector}}$

5. Conditions to Assign Weights to Parameters

Parameters	Sub-parameters	Conditions
Project Scale	Cost Scale	If Cost Scale >= 150 but < 500 , Weight = 0.20 If Cost Scale >= 500 but less than 1000 , Weight = 0.40 If Cost Scale >= 1000 but less than 5000 , Weight = 0.60 If Cost Scale >= 5000 but less than 10000 , Weight = 0.80 If Cost Scale >= 10000, Weight = 1
	Agency Scale	If Agency Scale <= 5 , Weight = 0.25 If Agency Scale <=10, Weight = 0.50

		If Agency Scale <= 15, Weight = 0.75 If Agency Scale > 15, Weight = 1
Compliance Score	Cost Overrun Percentage (COR)	If COR % < 10, Weight = 1 If COR % >= 10 but < 50 , Weight = 0.75 If COR % >= 50 but < 70 , Weight = 0.50 If COR % >= 70 , Weight = 0.25
	Time Overrun Percentage (TOR)	If TOR % < 10, Weight = 1 If TOR % >= 10 but < 50 , Weight = 0.75 If TOR % >= 50 but < 70 , Weight = 0.50 If TOR % >= 70 , Weight = 0.25
	Data Quality *(Rules for assigning weights to Data Quality is on next page)*	If Data Quality < 10 , Weight = 0.25 If Data Quality >= 10 but < 50 , Weight = 0.50 If Data Quality >= 50 but < 70 , Weight = 0.75 If Data Quality >= 70 , Weight = 1
Time Left with Respect to Funds Left (TLFL)		If TLFL >= 0.70 , Weight = 1 If TLFL >= 0.40 but < 0.70, Weight = 0.5 If TLFL < 0.40, Weight = 0.25

6. Conditions to Assign Scores to Data Quality

| Parameters	Conditions
Original Date – (Missing/Reported)	If Original Date = "N.A." , Weight = 0 else 1
Anticipated Date – (Missing/ Reported); if Reported – Lapsed/ Not lapsed	If Anticipated Date = "N.A." , Weight = 0 else If Anticipated Date < "April-23", Weight = 0 else 1 (*Note: April-23 is Reporting Month; this report is based on April-2023 OCMS data dump*)
Physical Progress with Cumulative Expenditure	If Physical Progress = "N.A." and Cumulative Expenditure = "N.A.", Weight = 0 If Physical Progress > 0 and Cumulative Expenditure = 0, Weight = 0 If Physical Progress = 0 and Cumulative Expenditure > 0, Weight = 0 If Physical Progress > 0 and Cumulative Expenditure > 0 , Weight = 1
Budget Estimate with Cumulative Expenditures	If Cumulative Expenditure = "N.A." and Budget Estimate = "N.A.", Weight = 0 If Cumulative Expenditure > 0 and Budget Estimate = 0, Weight = 0 If Cumulative Expenditure = 0 and Budget Estimate > 0, Weight = 1 If Cumulative Expenditure = "N.A." and

	Budget Estimate > 0, Weight = 0 If Cumulative Expenditure > 0 and Budget Estimate > 0, Weight = 1
Cumulative Expenditures has exceeded the Anticipated Cost	If Cumulative Expenditure > Anticipated Cost, Weight = 0 else 1
Reasons of Delay	If (Other Problems AND Internal Reason AND External Reason) = "N.A." , Weight = 0 else 1
Data Gap in reporting DOA and DOC of projects having budget more than 500 crore	If Budget Estimate > 500 AND "Data Gap in reporting DOA and DOC" <12 , Weight = 0 else 1

7. Suggestive View for Performance Scoring

(Results have been obtained according to the data of April 2023 OCMS Data Dump provided)

Following visualization represents the Performance Score of all sectors which is as follows:-
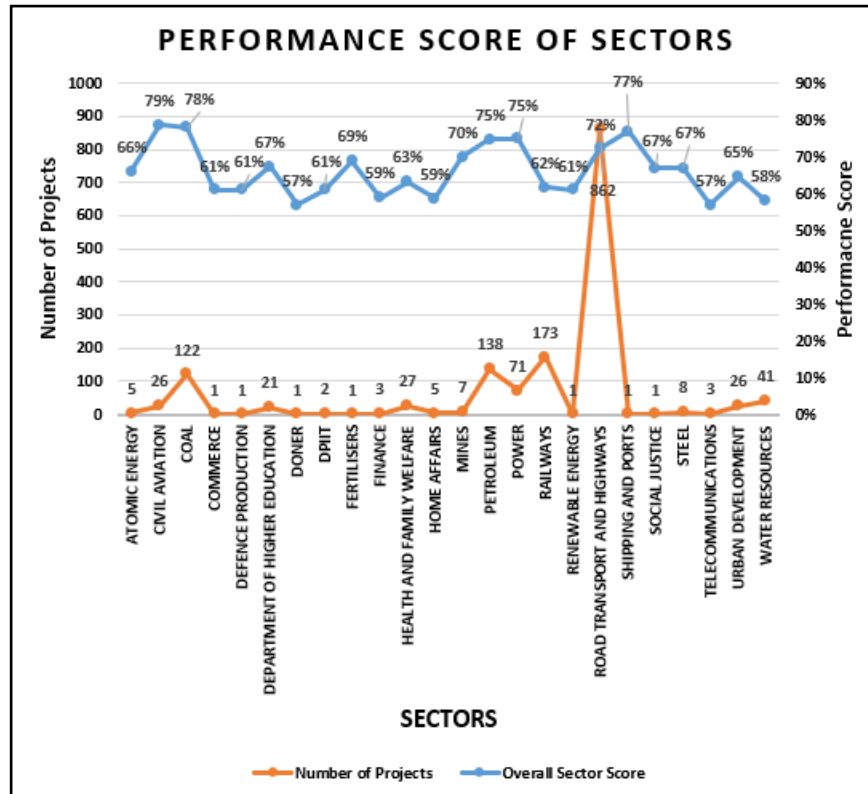
Figure 3 : Performance of Best Sector out of all Sectors

In the above visualization, Performance Score of all the Sectors has been obtained in which Civil Aviation has the highest performance score of 79% but this sector has handled only 26 projects while Coal has handled 122 projects with a performance score of 78% , so it is considered as the best sector out of all 24 sectors.

To get more better insights, better approach would be to consider top 10 Sectors with their Best Performing Agency and Least Performing Agency which can be visualized as follows:-

Figure 4 : Performance of Best Agency in a Particular Sector

The above visualization represents the scores of all sectors with the scores of their Best Agency in which Coal is the Best Sector with its Best Agency WCL having highest score of 95% as compared to other Agency.

*Note (for graph): % indicated alongside of Sector/Agency name is respective Performance Score.*

Some more Insights regarding Best Performing Agencies can be stated as follows:-

SECTOR_NAME	AGENCY_NAME_SHORT	PERFORMANCE

		SCORE
CIVIL AVIATION (79%)	AAI	79%
COAL (78%)	**WCL**	**95%**
DEPARTMENT OF HIGHER EDUCATION (67%)	CPWD EDUCATION	73%
HEALTH AND FAMILY WELFARE (63%)	HSCC	70%
PETROLEUM (75%)	BPCL	92%
POWER (75%)	NHPC	81%
RAILWAYS (62%)	RITES	85%
ROAD TRANSPORT AND HIGHWAYS (72%)	NHAI	79%
URBAN DEVELOPMENT (65%)	BMRCL	83%
WATER RESOURCES (58%)	KMDA	66%

The best project across all sectors can be visualized as:-
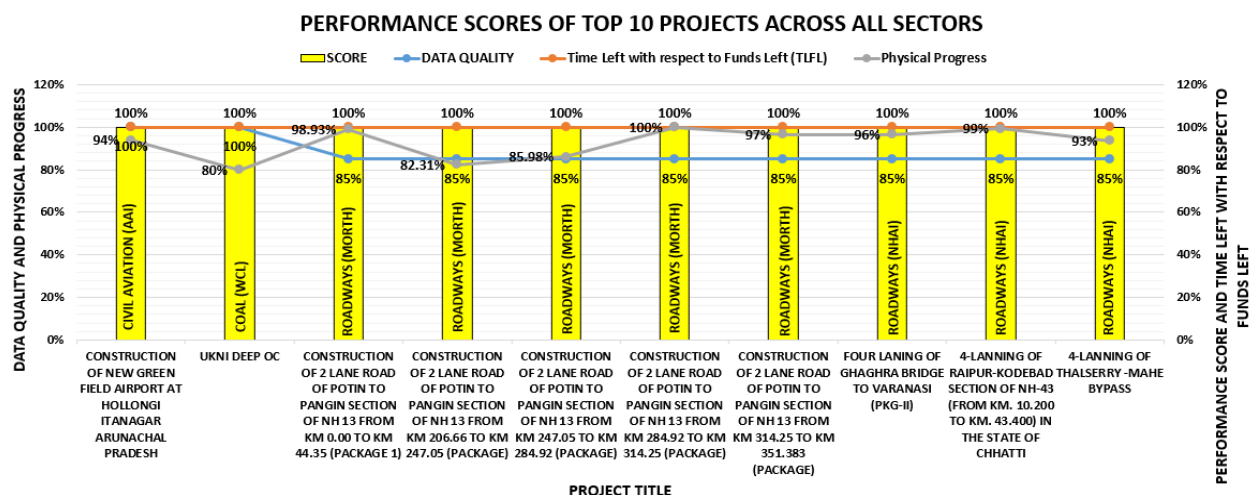
Figure 5 : Performance of Best Project Across All Sectors

Of all projects across Sectors with 100% performance score, **"Construction of New Green Field Airport at Hollongi Itanagar Arunchal Pradesh"** pertaining to **Civil Aviation** having
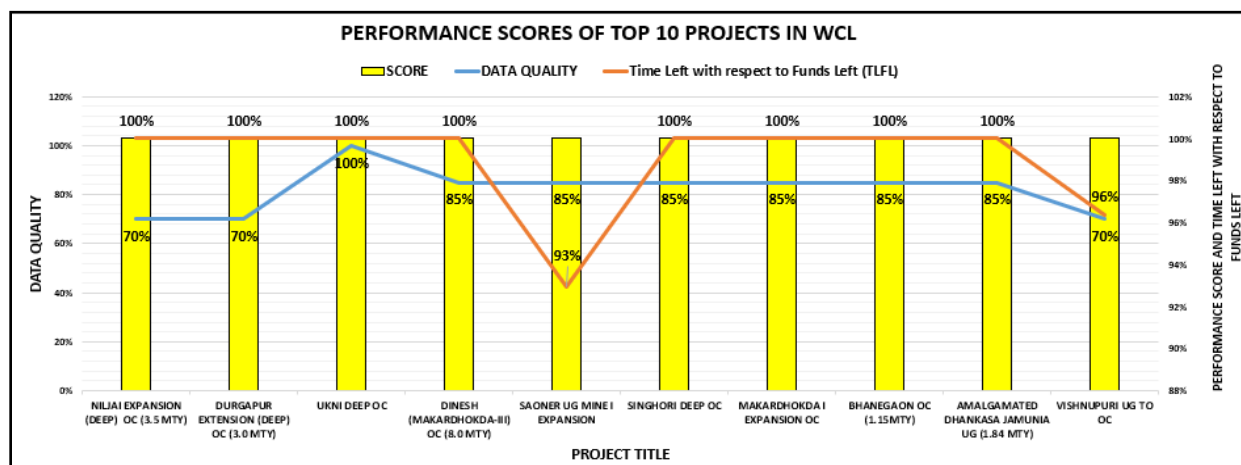
highest **"*Time left with respect to the funds left" (Balance time left for completion wrt funds left)*** and highest *"Data Quality"* with well **"*Physical Progress"*** shall be considered as **best one**.
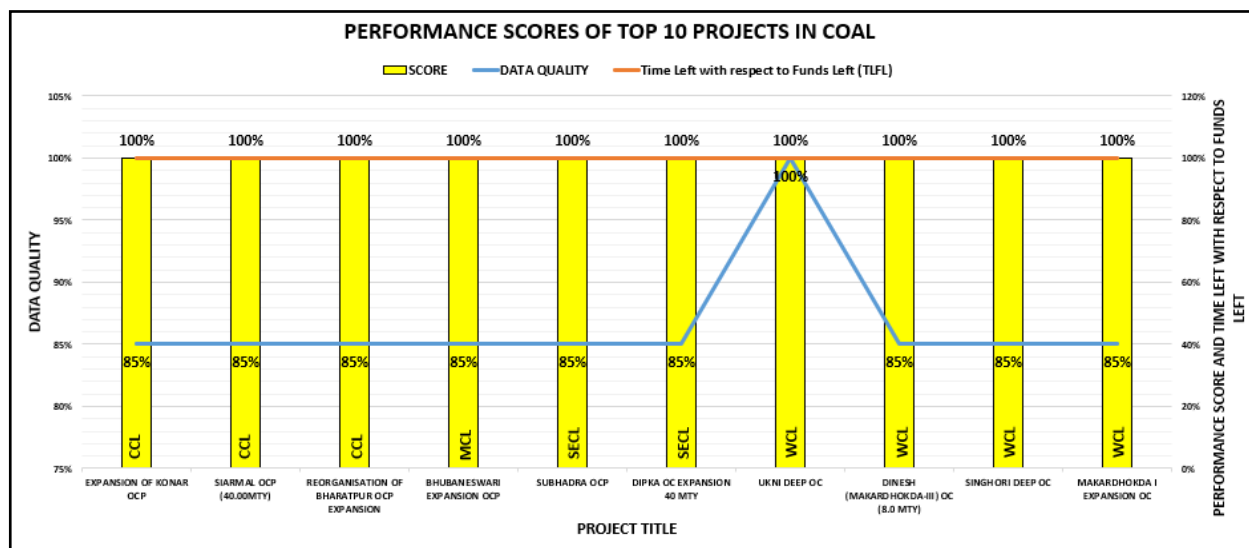
Figure 6 : Performance of Best Project in Coal

Of all projects pertaining to COAL with 100% performance score and 100% Time left with respect to the funds left**, "UKNI DEEP OC"** project pertaining to WCL Agency of the Coal Sector having highest *"Data Quality"* **shall be considered as best one.**

Figure 7 : Performance of Best Project in WCL Agency (Best Agency) of Coal

All projects showcased above are with 100% performance score, however, to rule out best project of all, project with highest *"Time left with respect to the funds left" (Balance time left for*

completion wrt funds left)" and highest *"Data Quality"* shall be looked for. Therefore**, Ukni Deep OC** project pertaining to WCL Agency of the **Coal** Sector **can be considered as the best of all as** having highest *"Ratio of Balance work left"* and highest *"Data Quality"*.

8. Conclusion

As per April-2023 OCMS data dump of all infrastructure projects (>150 Crore and above), following shall be concluded:

1) **Construction of New Green Field Airport at Hollongi Itanagar Arunchal Pradesh** pertaining to **AAI-MoCA** *[Original Cost: 645.63 Crore , Physical Progress :93.79% , TOR:0 , COR:0]* is the **best performing Project** across all sectors**.**

2) **Coal Sector** *[Total No. of Agency: **9 ,** Total no. of projects: **122 ,** No. of Projects with TOR (< 10%): **76 ,** Project with COR(< 10%) : **117**, No. of Projects with TLFL (> 70%):**45** , No. of Projects with Data Quality (> 70%): **103**]* is the **best performing sector.**

3) **WCL** is the **best performing Agency** of the **Coal sector** *[Total no. of projects: **23 ,** No. of Projects with TOR (< 10%) : **23**, Project with COR(< 10%) : **23**, No. of Projects with TLFL (> 70%): **16 ,** No. of Projects with Data Quality (> 70%): **16].**

4) The **Best Project in Coal Sector** as well as pertaining to **WCL Agency (Best Agency**) is **Ukni Deep OC Project** *[Original Cost: **318.14 Crore ,** Physical Progress: **80% ,** TOR: **0 ,** COR: **0**] .*

9. Excel Sheet of the Analysis C:\Users\IPMD\Downloads\Excel Sheet of Performance Scores.xlsx

Performance
Scores.xlsx