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India Smart Grid Forum

India SMART UTILITY Week 2024

Supporting Ministries

Virtual Metering of HVDS Transformers

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INTRODUCTION

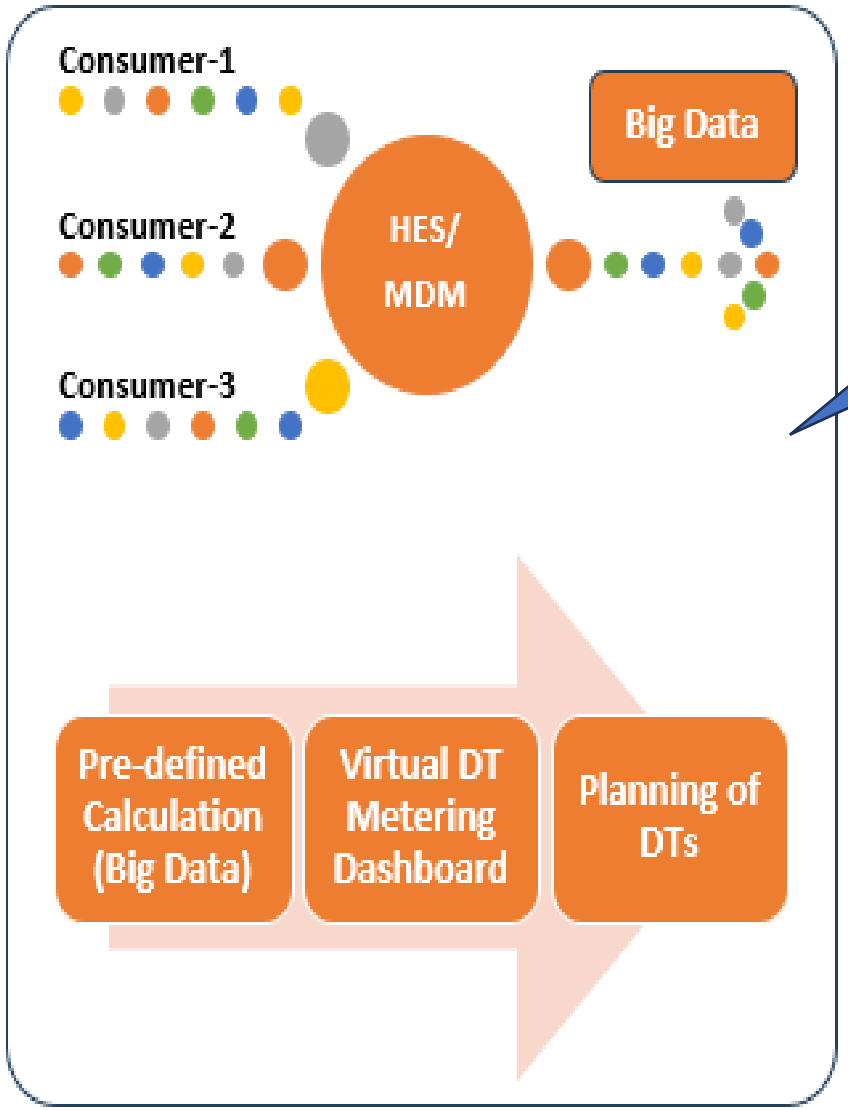
Challenges

- Peak Load monitoring of Non- metered DTs.
- Conventionally, Peak Loading of these DTs are being derived from the MDI/Sanction Load of the downstream Consumers with the help of clamp on meter reading.
- Lead to the decreasing Utilisation factor of the Transformer and increased penetration of Transformer capacity addition which will ultimately led to increased CAPEX infusion.

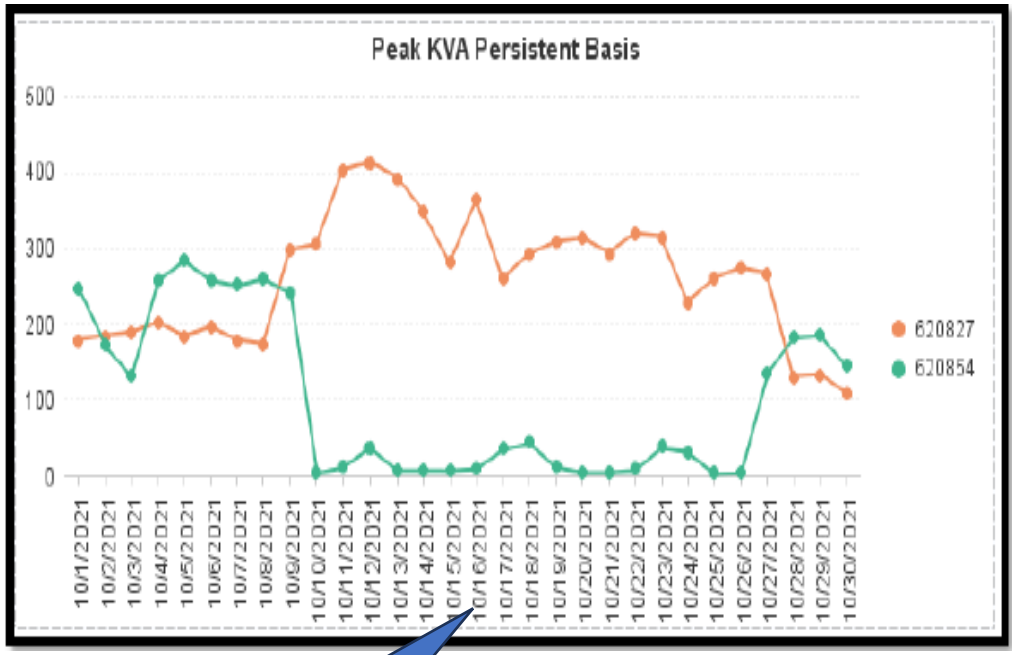
Solutions

Development of Virtual metering Dashboard using consumer smart meter data.

CONTEXT



Loading report of non-metered DTs with integration of MDMs, GIS, SAP and utilizes the Big Data.

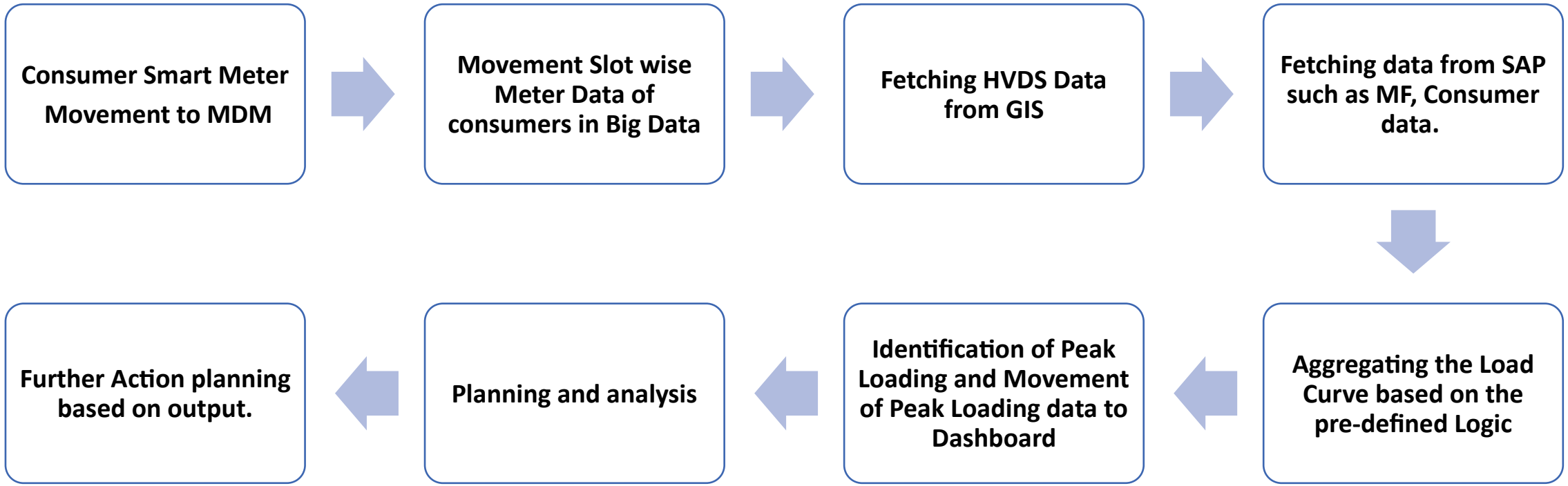


Feature of Load Curve Analysis and comparative analysis of DTs enable us in comparing the loading pattern of two DTs. .

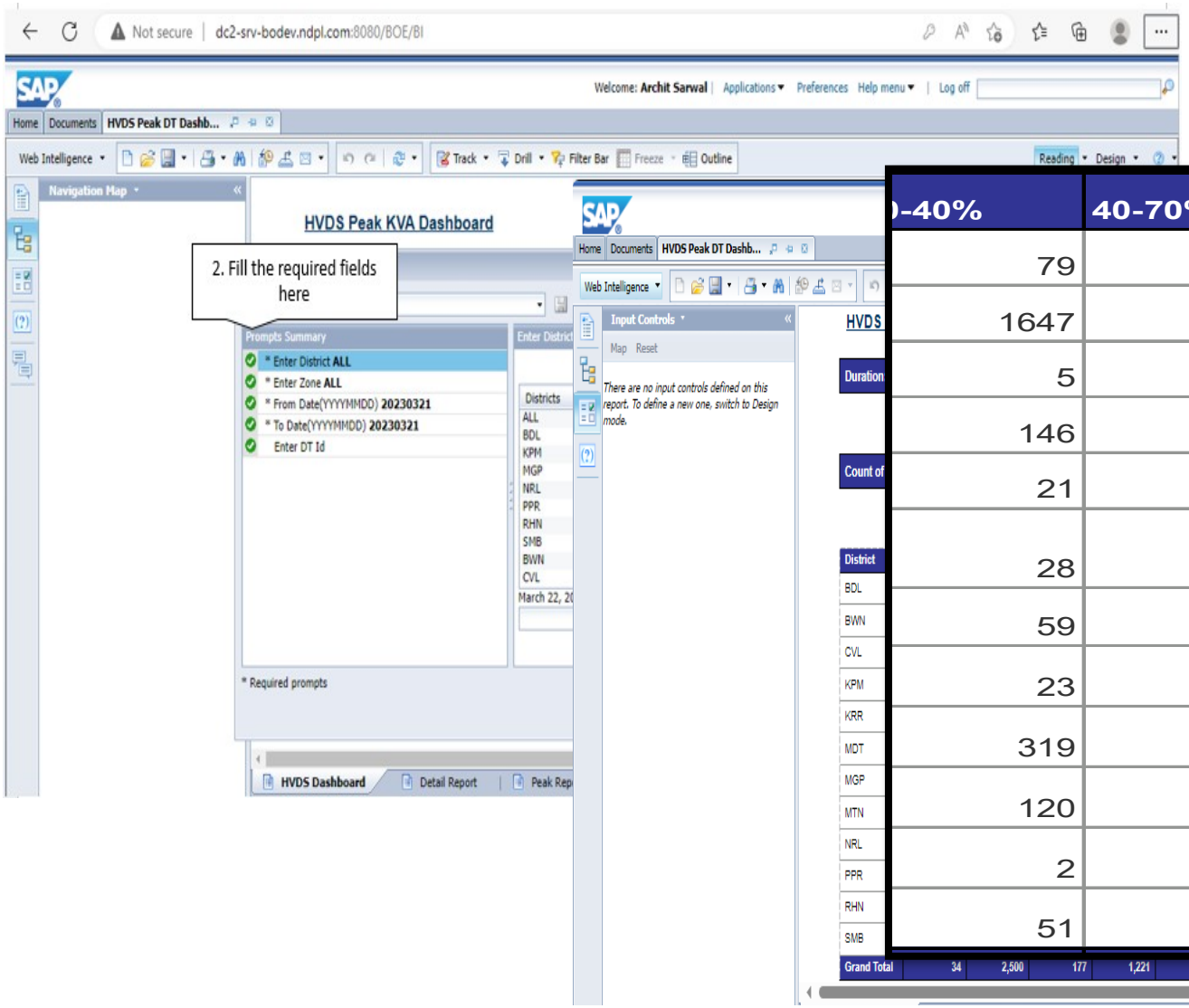
RELEVANCE

- With the implementation of the virtual metering concept such unmetered DTs with all the connected downstream smart consumers can have the load curves from this data.
- Offering insights into loading patterns of different transformer ratings and its utilization.
- A table generated by the Virtual DT Metering Dashboard helps in asset management by identifying lightly loaded DTs and overloaded areas.
- Manual clamp metering is eliminated, enhancing safety and efficiency in DT planning
- Physical metering for such DTs are not required.
- Planning of such DTs can be done easily and lightly loaded, overloaded and optimal loading of the DTs can be identified accurately.

DEVELOPMENT METHODOLOGY



VIRTUAL METERING PORTAL OUTPUT



0-40%	40-70%	70-90%	90-100%	>100%
79	30	6	1	4
1647	901	186	47	128
5				
146	37	9		8
21	2	1		
28	1			1
59	13	3	1	4
23	5	2		
319	165	24	11	23
120	57	12	3	8
2	1			
51	9	3		1

USE CASE / CASE STUDY

Cases on which DT meters are not installed

District	Zone	DT Id	DT Name	Co...mer	Sanctioned Load (KW)	DT Capacity ...VA)	PEAK KVA (Persistent Basis-2Hrs) by HVDS portal.	Sum of MDI of Downstream consumers
BWN	521	23041907	HT521-...		...26	400	35.6	72
BWN	521	23042390	HT521-45/43			400	125.6	199

Overplanning of DTs avoided.

Cases on which DT meters are installed

District	Zone	DT ID	DT Loading _ Meter is installed			DT Loading_Virtual metering		
			DT capacity (kVA)	Loading (kVA)	...loading	DT Capacity (kVA)	Loading (kVA)	% loading
BDL	572	227478981	160	122.0...		160	118.91	**74.32**
SMB	503	249485734	160	2...		160	24.01	**15.01**
MDT	505	179648148	250	41...	**16.41**	250	41.45	**16.58**
MTN	1302	240631499	400	74.17	**18.54**	400	66.25	**16.56**
KPM	501	23055133	500	253.14	**50.63**	500	254.24	**50.85**

Benefits of Virtual metering.

USE CASE / CASE STUDY

District	Zone	DT ID	DT Loading _DT Meter is installed			DT Loading _ Virtual metering			Remarks
			DT capacity (kVA)	Loading (kVA)		DT capacity (kVA)	Loading (kVA)	% loading	
MDT	515	252019383	160			160	24.81	**15.51**	**Possible theft**
BWN	533	259396277	160	131	**81.93**	160	110.66	**69.16**	**Possible theft**

Possible theft can be identified.

- In this case, consumer meters loading is lesser than the DT meters recorded. Hence, possible theft can be identified in such scenarios

District	Zone	DT Id	DT Loading _DT Meter is i			DT Loa _ Virtual metering			Remarks
			DT capacity (kVA)	Loadin		apacity (kVA)	Loading (kVA)	% loading	
SMB	503	153136951	160	52.90		0	89.51	55.94	**GIS indexing**
MDT	515	267224282	100	13.57		100	20.09	20.09	**GIS indexing**
KPM	501	281334318	250	79.00	31.60	250	101.42	63.39	**GIS indexing**

GIS indexing can be improved.

- In this case, consumer meters loading is higher than the DT meters recorded. Hence, GIS indexing/mapping can be improved for such cases.

KEY TAKEAWAYS / RECOMMENDATIONS

- Accurate Calculation of Peak Loading of Non-Metered DTs.
- Possible potentials of lightly loaded DTs can be identified for swapping.
- Repeated activity of manually taking loading has been eliminated.
- Manhours savings and avoiding Un-safe situation & overall Asset utilization and DT utilization factor shall be improved.
- Consumer mapping/indexing shall be improved.
- Possible theft on the DTs can be identified.
- CAPEX saving of INR 17070/- DT meter.

THANK YOU