

GREEN POWER FOR MOBILE

Power Infrastructure sharing in Myanmar

May 2014

IRRAWADDY TOWERS
Myanmar

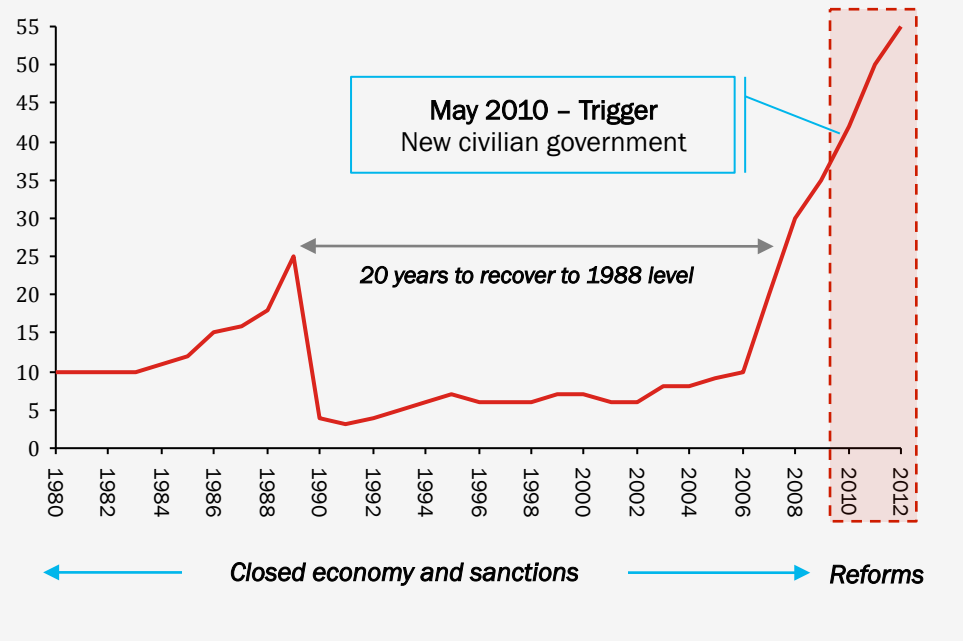
WHO WE ARE

- Irrawaddy Green Towers (I.G.T)
- JV between the founders of Golden Towers and SREI Infrastructure (owner of Viom)
- We are one of the 4 tower companies selected by Telenor & Ooredoo for their initial launch phase
- We are contracted to build 2,000 sites for Telenor this year across the country
- Key characteristic of our service offering: full scope of passive infrastructure and services provided on our sites
  - Tower and power equipment leasing
  - Tower and Power sharing
  - Refueling
  - Corrective and preventative maintenance on power equipment
  - Power sharing management

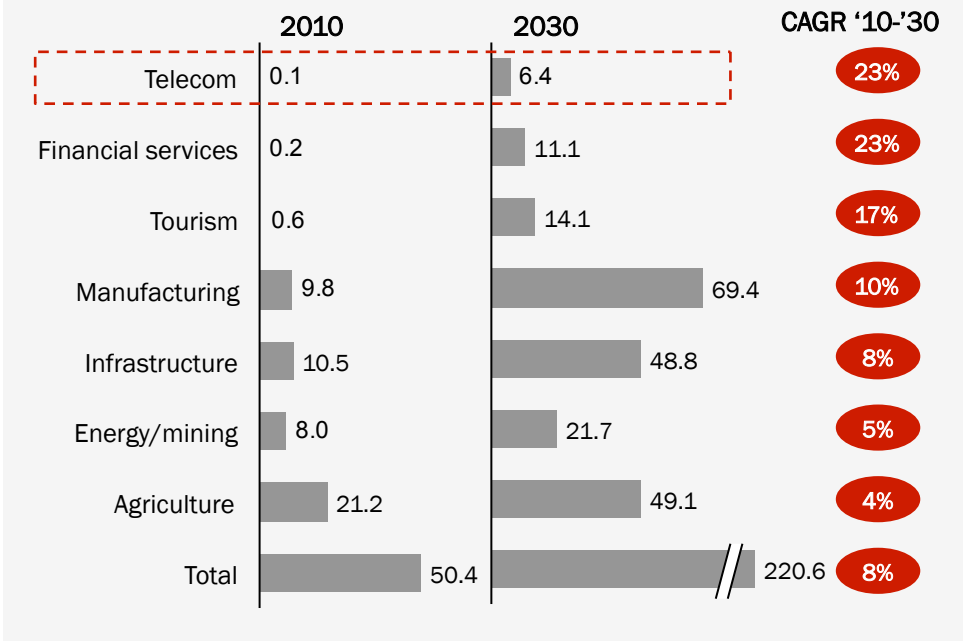
Opportunities for Telecom Tower Companies

The opening economy is leading to investment and uptake in GDP

GDP evolution (US$ bn current prices)



GDP forecast (US$ bn)

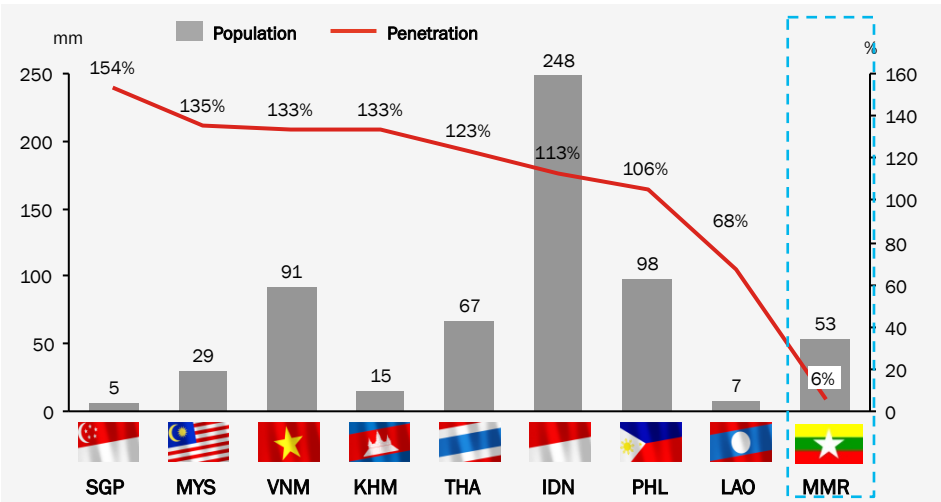


Source: Broker reports

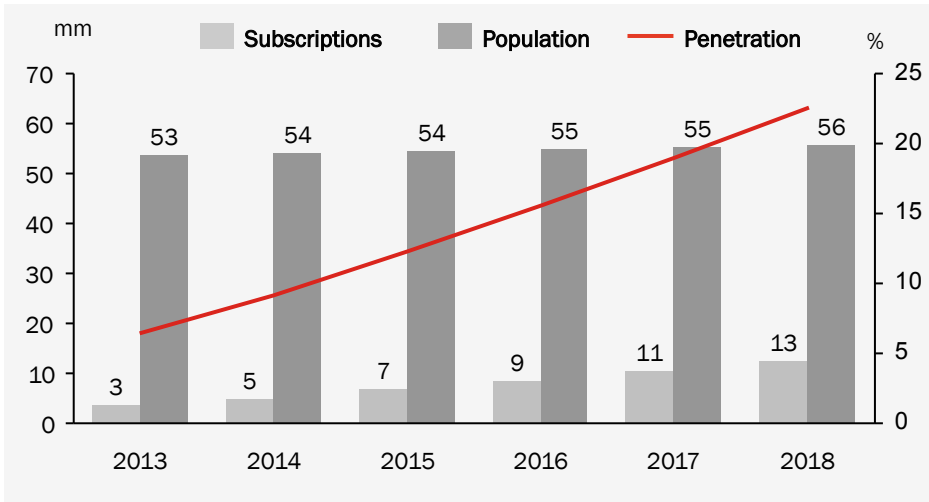
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Overview of telecom market in Myanmar

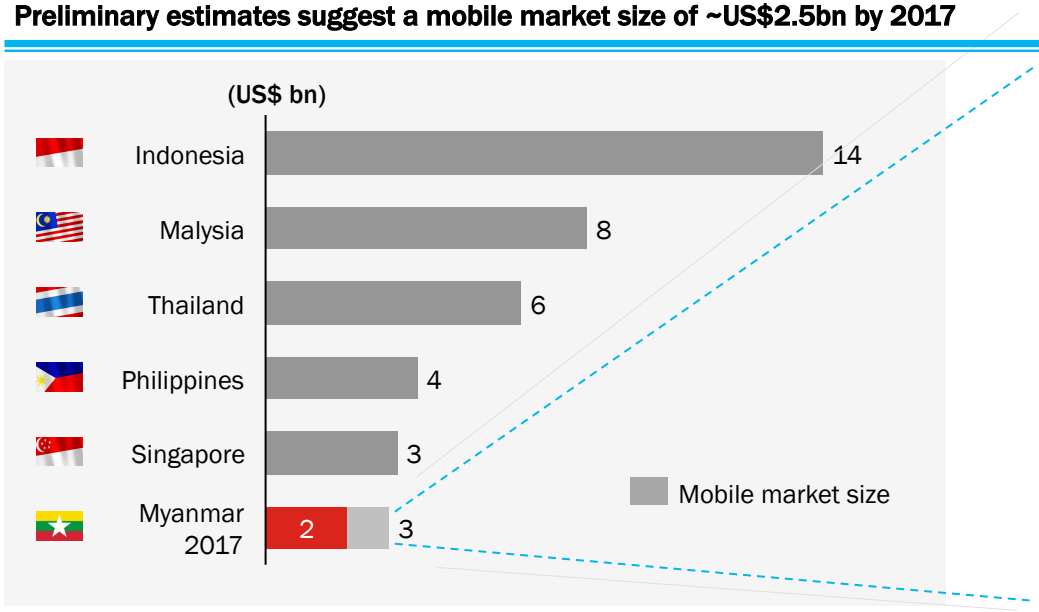
Myanmar is severely underpenetrated for wireless telecom services...



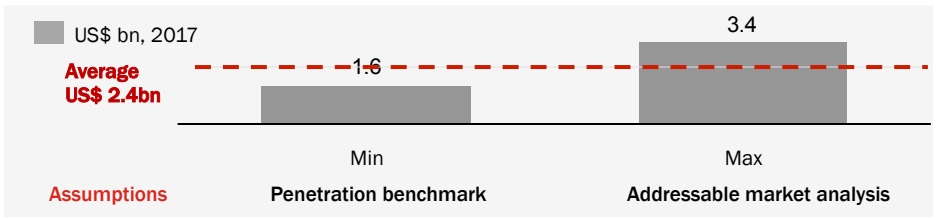
...implying an explosion of growth over the next 5 yrs



Preliminary estimates suggest a mobile market size of ~US$2.5bn by 2017



Bottom-up estimate



Assumptions	Penetration benchmark	Addressable market analysis

Top-down estimate



Assumptions	Telco %GDP: 3%	Telco %GDP: 5%

Source: Broker reports

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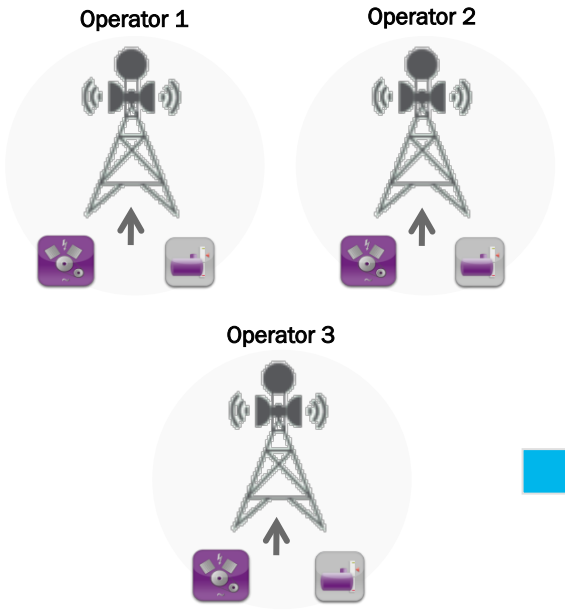
… however full of challenges

- Seller's market
- Limited telecom ecosystem
- Evolving regulations
- Have never been done in the country with private players
- Sophisticated infrastructure sharing model from day 1
- Land and site acquisition
- Build permit process
- Power connectivity

A new business model is emerging: Managed Power

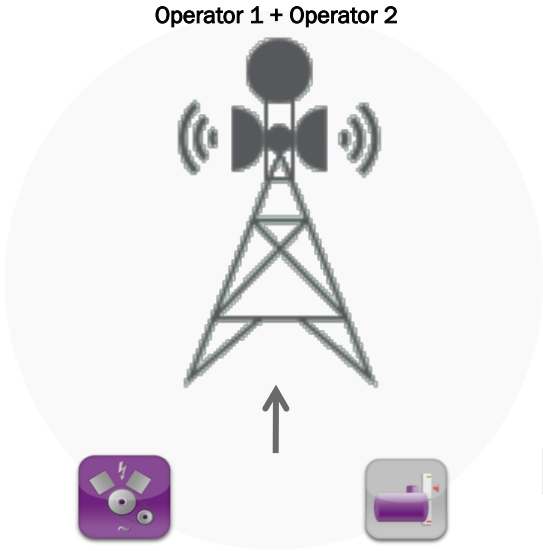
Business model trend

Operator model



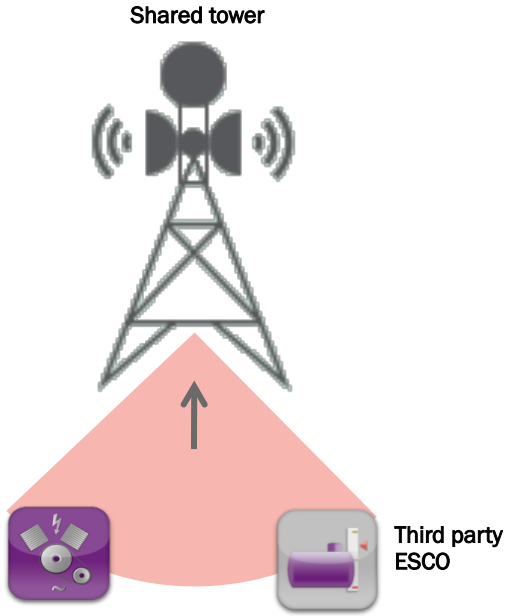
- Operators traditionally wanted to keep ownership of their assets
- Little sharing was made

TowerCo model



- Operators, as market matures, are less concerned about coverage than before
- They are increasingly looking at outsourcing their tower infrastructure to tower company & reduce their spend by sharing with others

TowerCo + PowerCo model



- Tower companies themselves are trying to outsource power since this is not their core area of expertise
- Hence PowerCo offers to convert power CAPEX into OPEX model

Power responsibility shift

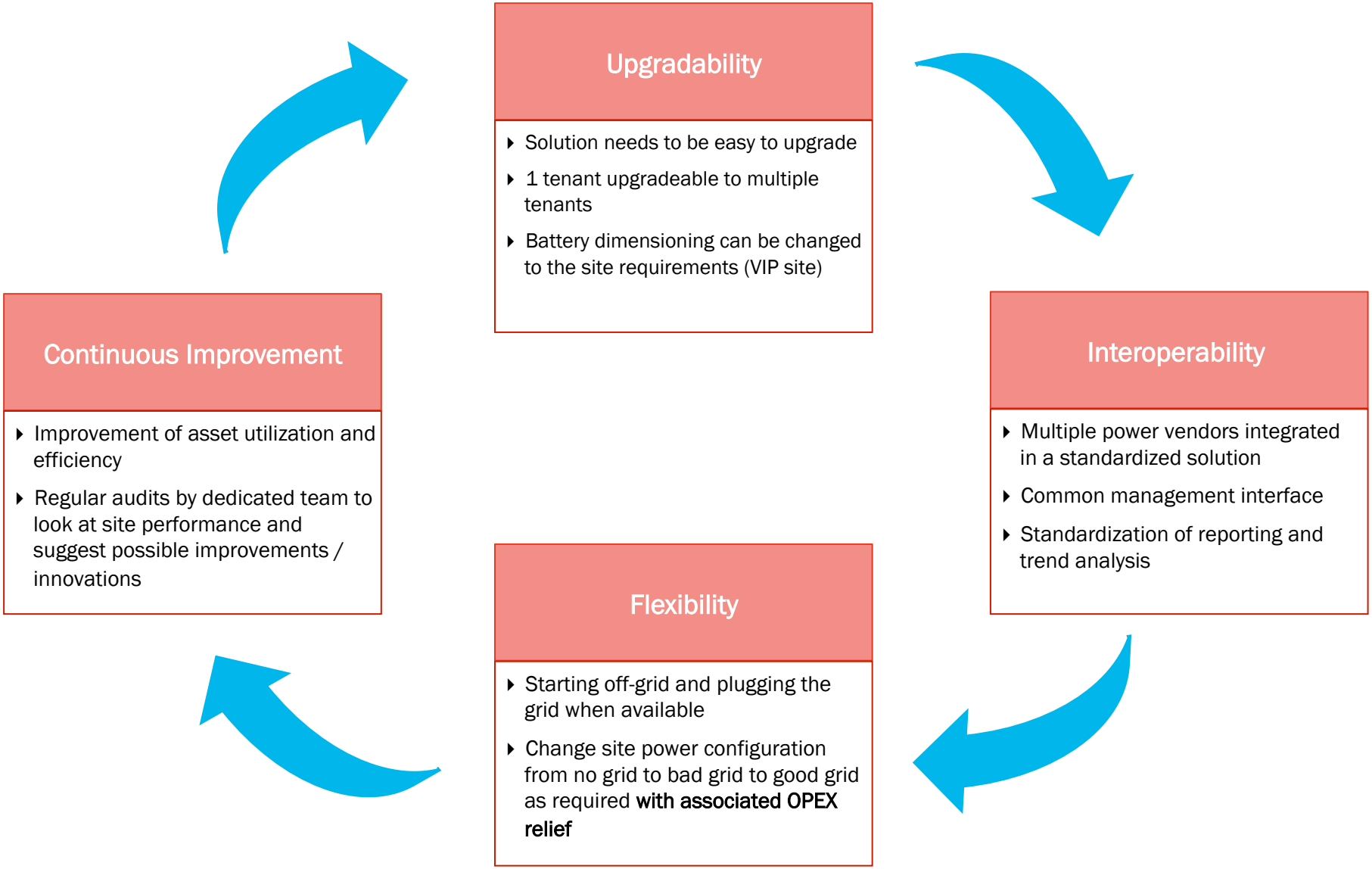
Operators → Tower company → Power company

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Estimated power consumption in a multi-tenancy scenario

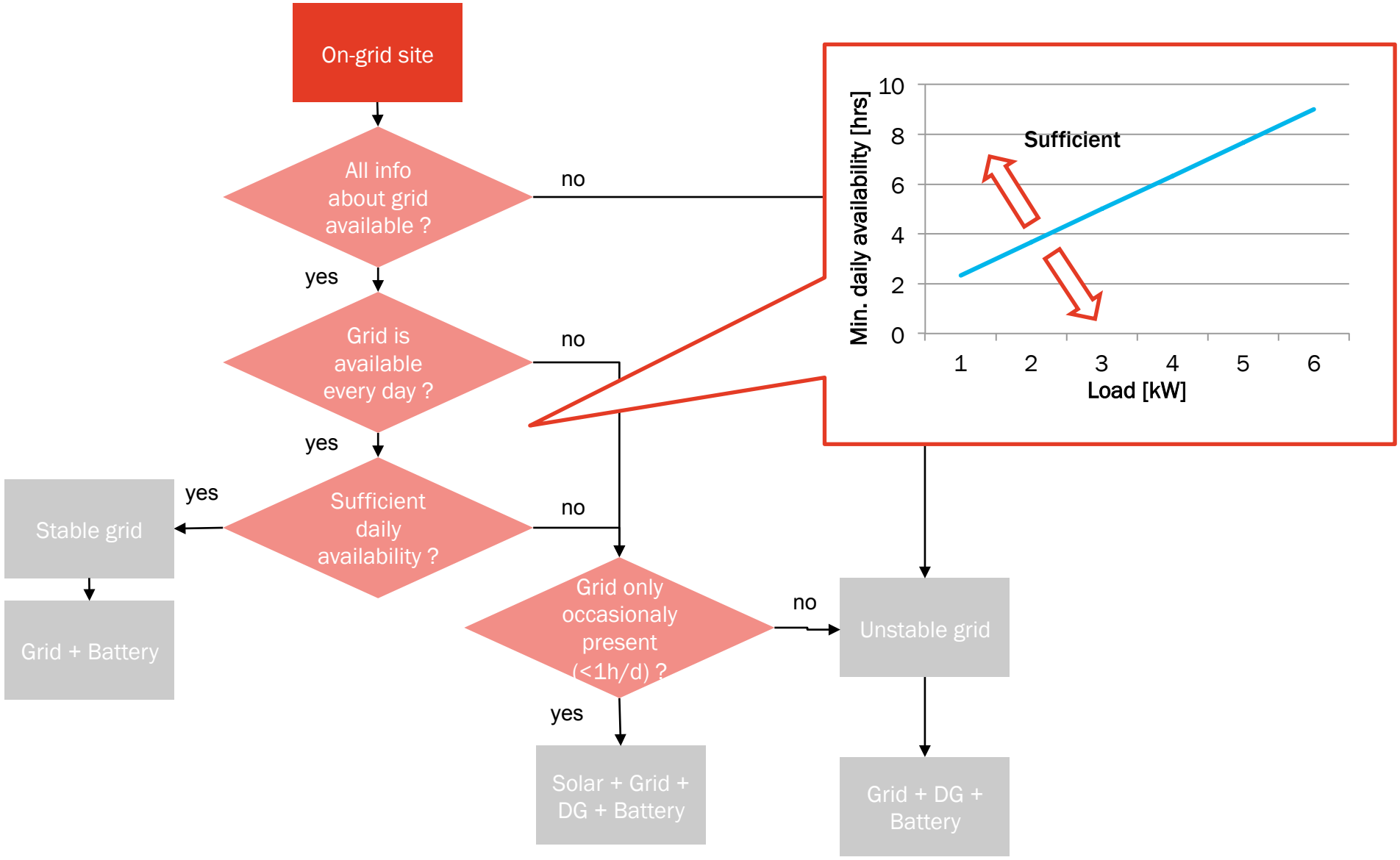
Indicative Power Consumption

Operator	Site Type	Model 1: Grid Power + Battery		Model 2: Grid Power + Solar + Battery		Model 3: Solar + Battery		Model 4: Solar + Generator + Battery		Model 5: Grid + Generator + Battery		Model 6: Grid + Wind + Solar + Generator + Battery		Model 7: Generator + Battery (CDC)	
Power requirement (KW)		Max	Typical	Max	Typical	Max	Typical	Max	Typical	Max	Typical	Max	Typical	Max	Typical
Operator 1	Non BSC/Hub Site	2	1.7	2	1.7	0.6	0.5	1.5	1.1	2	1.7	2	1.7	1.5	1.1
	Hub Site	3	2.2	3	2.2	NA	NA	2.8	1.8	3	2.2	3	2.2	3	2.2
Operator 2	Non BSC/Hub Site	4.5	2.5	NA	NA	NA	NA	2.5	1.5	4.5	2.5	NA	NA	4.5	2.5
	Hub Site	5	3	NA	NA	NA	NA	NA	NA	5	3	NA	NA	5	3
Total	Non BSC/Hub Site	6.5	4.2	NA	NA	NA	NA	4	2.6	6.5	4.2	NA	NA	6	3.6
	Hub Site	8	5.2	NA	NA	NA	NA	NA	NA	8	5.2	NA	NA	8	5.2



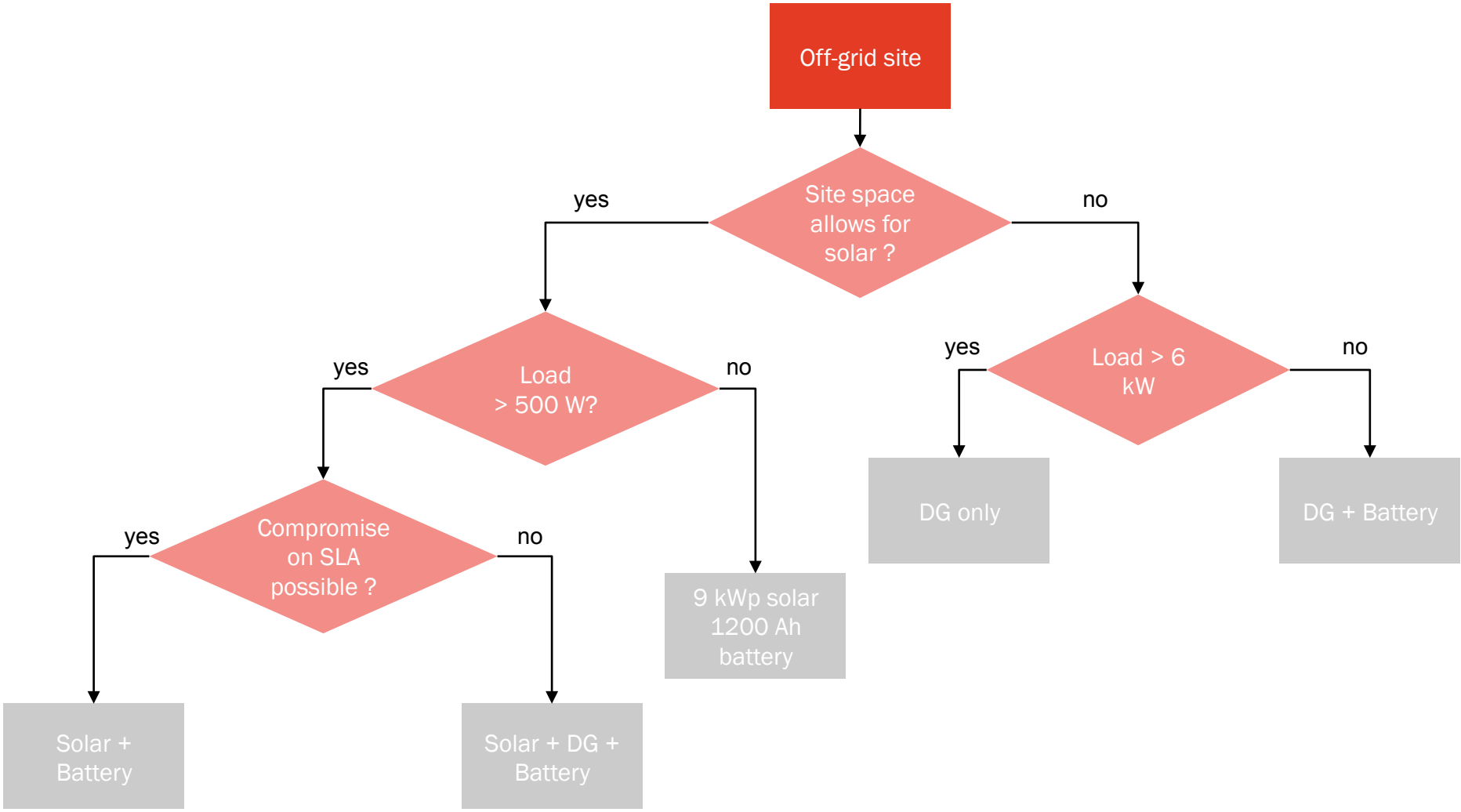
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On grid sites – Selection Criteria



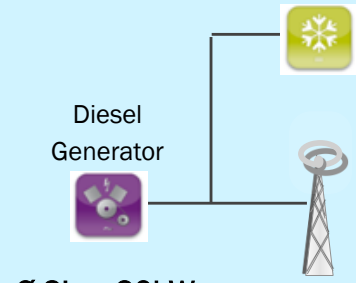
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Offgrid – Site Selection Criteria



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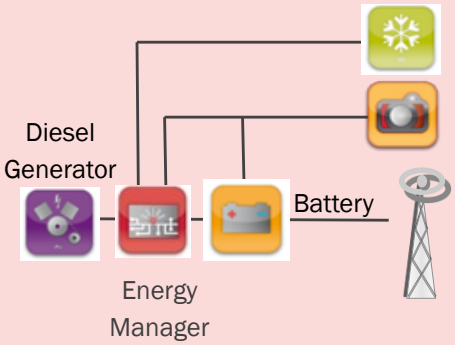
CONVENTIONAL SETUP



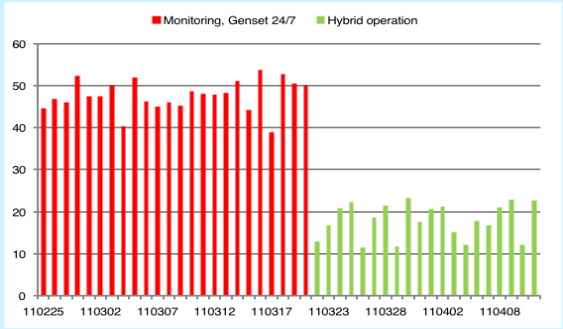
Ø Size: 20kW

Ø Load:
1-4kW

DAGON TOWER SETUP

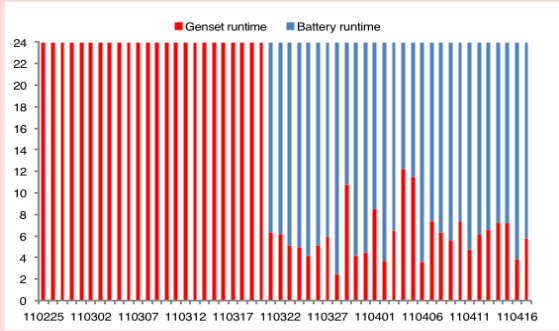


FUEL CONSUMPTION



Up to 75% reduction of diesel consumption

GENSET RUNTIME



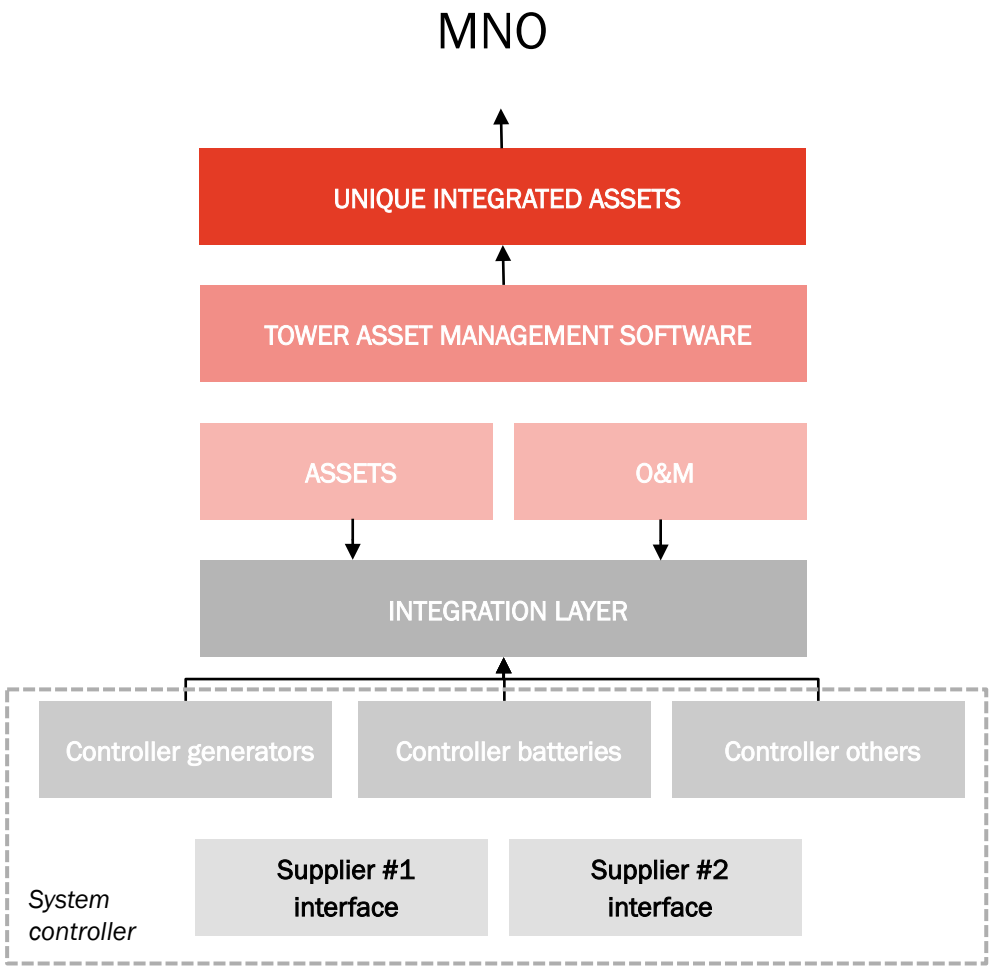
Up to 75% reduction of genset runtime and maintenance cost

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Typical operational challenges for power

- Identify sites which are running on high diesel cost
- Change in diesel consumed (as compared with last year same month)
- Total number of hours (DG + Battery + Grid) exceed 24
- Meters (EB/DG) faulty for many days
- Sudden change in run hours/consumption as compared to site average
- Site cost exceeding budget as on date
- CPH value exceeding standard defined CPH
- Sensor disconnected
- Battery and DG running at the same time
- DG running when grid supply is there
- Diesel filled on site not matched with what is withdrawn
- Compliance of beat plan to be followed by people
- Surplus diesel remaining in vehicles after filling
- Accurate picture of site status

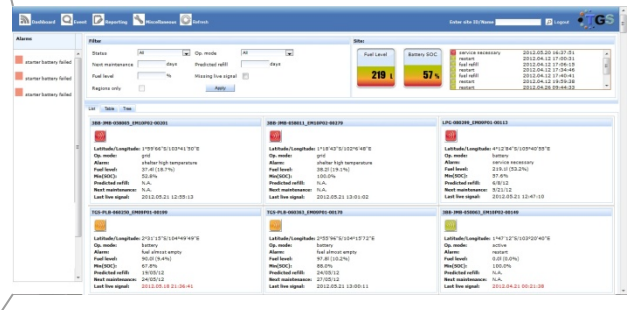
Holistic view of asset utilization and monitoring

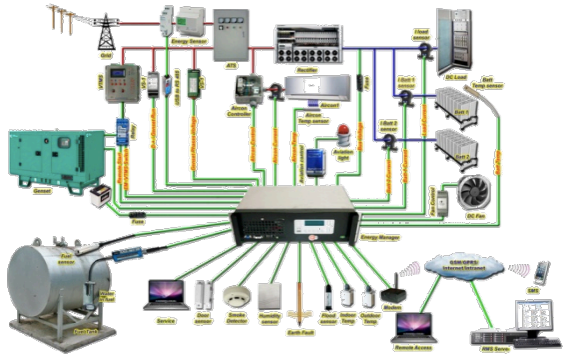


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Tower Operation Center

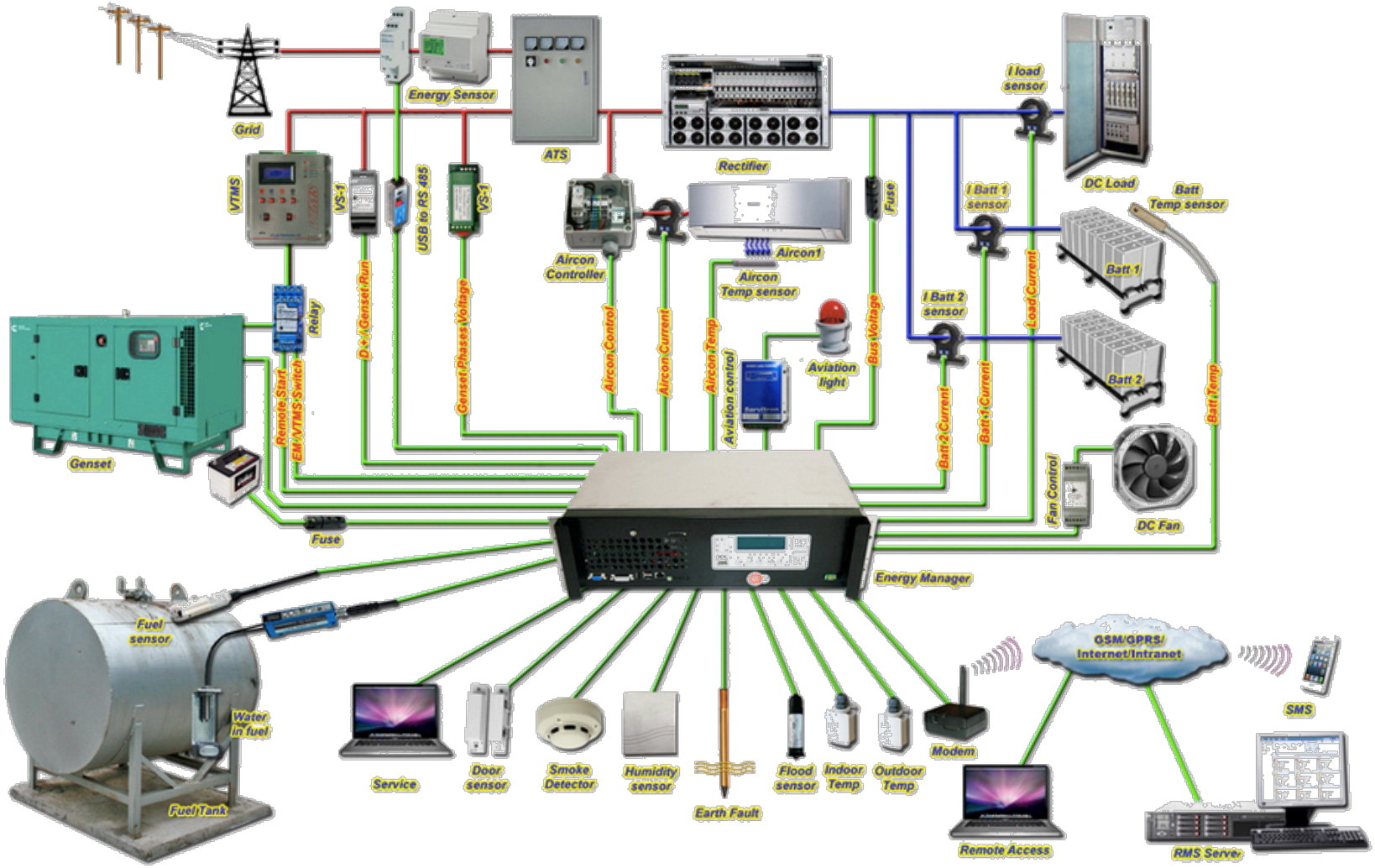






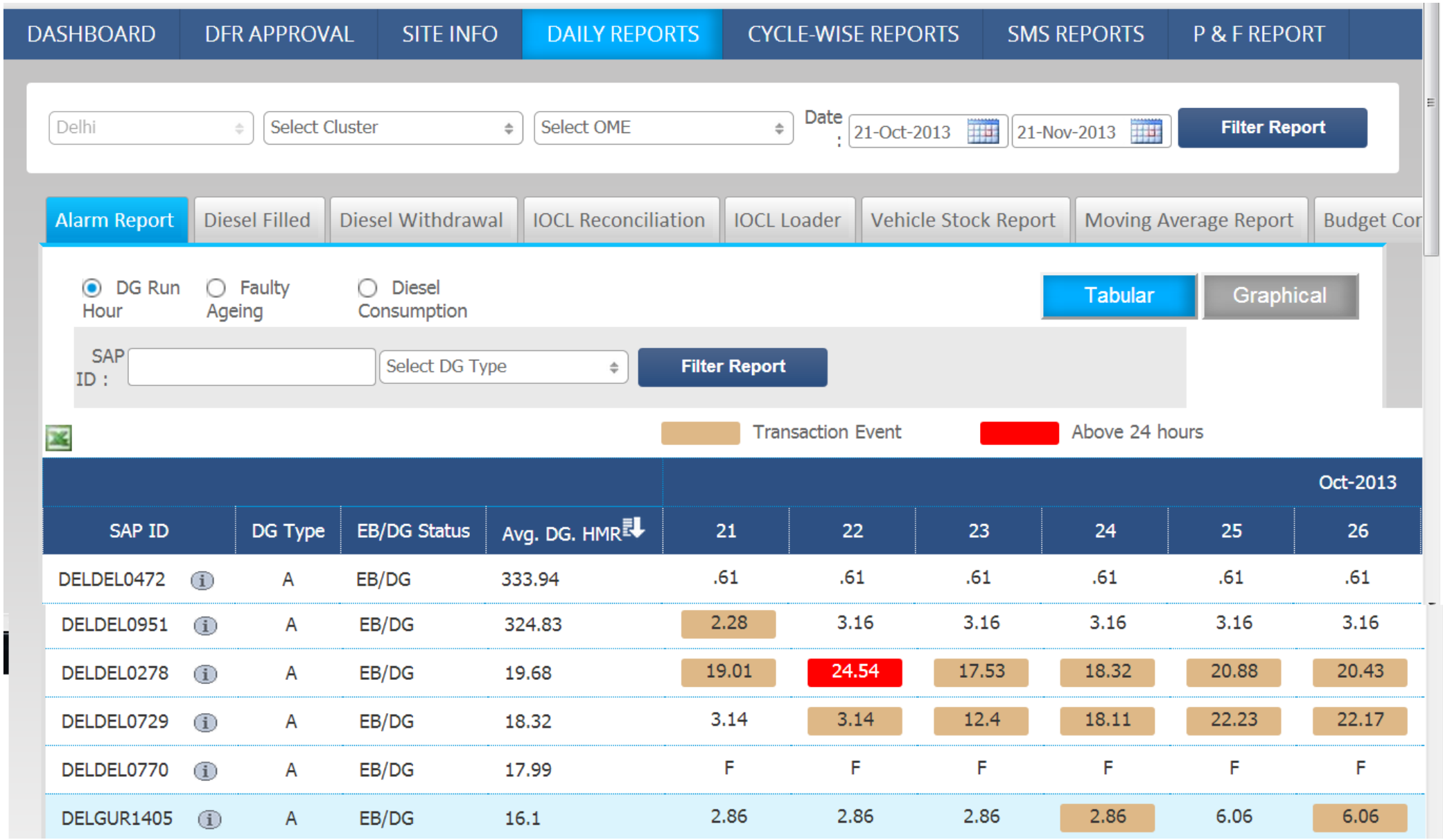
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Complex and heterogonous ecosystem



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INFORMATION TECHNOLOGY DRIVEN POWER MANAGEMENT



				Oct-2013					
SAP ID	DG Type	EB/DG Status	Avg. DG. HMR	21	22	23	24	25	26
DELDEL0472	A	EB/DG	333.94	.61	.61	.61	.61	.61	.61
DELDEL0951	A	EB/DG	324.83	2.28	3.16	3.16	3.16	3.16	3.16
DELDEL0278	A	EB/DG	19.68	19.01	24.54	17.53	18.32	20.88	20.43
DELDEL0729	A	EB/DG	18.32	3.14	3.14	12.4	18.11	22.23	22.17
DELDEL0770	A	EB/DG	17.99	F	F	F	F	F	F
DELGUR1405	A	EB/DG	16.1	2.86	2.86	2.86	2.86	6.06	6.06

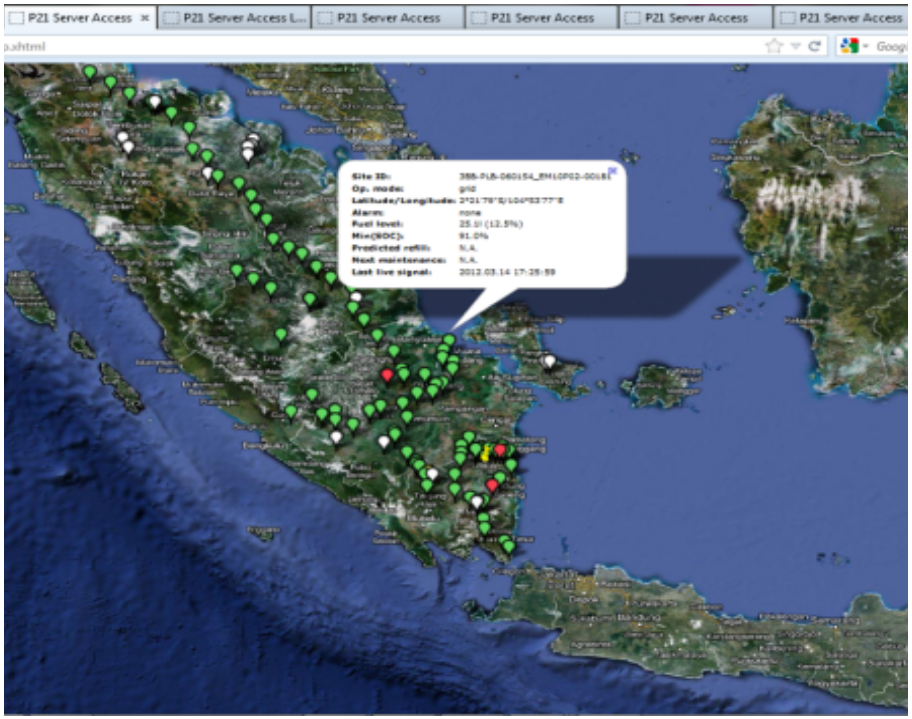
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Full visibility using energy managers



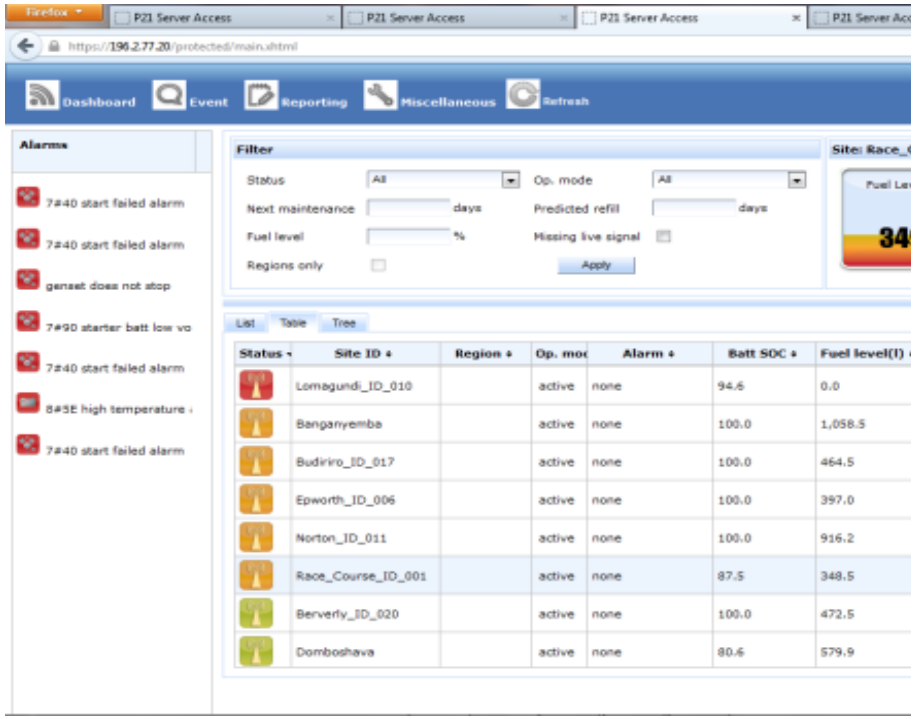
Data via
2G/3G

Site overview & status



User Interface

Real-time site status



User Interface

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