Solar Energy

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General Benefits of RE Electricity

- Energy independence(Energy Security).
- Environmentally friendly. (CDM)
- “Fuel” is already delivered free everywhere.
- Minimal maintenance.
- Maximum reliability.
- Reduce vulnerability to power loss.
- Systems are easily expanded.
- High Economic Feasibility for rural Electrification.
- Achieving of sustainable Development..

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Existing RE Data and Potential for RE Projects

- Solar resource is exceptional and will support cost effective large and small photovoltaic systems and solar thermal applications.
- Based on limited data, the wind resource looks promising for distributed near- term small wind projects and longer – term large wind farms connected to the grid.
- Significant opportunity to use low-temperature geothermal resources.
- High Potential of Waste to Energy.

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Iraq Benefits from RE Electricity

- High Potential of Solar Energy (1790 kWh/m^2/Year).
- Good Potential of Wind in specific Locations (5-6 m/s).
- Electricity Supplying for Isolated Regions from NG (off-Grid).
- Enhancing the NG by on-Grid Connection Especially in peak Load.
- Capacity Building for current and new Technology.
- Data Acquisition and Performance evaluation for large scale Investment
- Highly cost of electricity Production by conventional Technology.
- Efficiency of RE Technology go up, while Prices go down.

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Iraq Benefits from RE Electricity

- Return Of Investment (ROI)
- Mitigation of the Environmental Impact and obtaining Credit from CDM.
- RE awareness over the country (15 Sites, 8 Governorates).
- Supporting the efforts of R&D for all Iraqi Universities and institutes.
- Preparation for Next Phase (Self Generation & Net Metering).
- Activation of EE and Conservation Plan.
- Creation of a new job.

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❖Challenges of Investment in RE Electricity

- Big Shortage of Electricity Supplying.
- Minimum pricing of electricity, (1.7cent / kWh).
- Absence of Regulatory Body, (RE code).
- Difficulty in meeting environmental requirements.
- Serious lack of awareness of RE in Iraq, very limited resource data, and few RE projects.
- Shortage of Experience in RE Electricity Field.

MOE Plan of RE

- The short & medium term plan

  - Generation Side Plan
    (Solar , Wind & Waste) plants.

  - Distribution Side Plan
    Demand Side management.

Stage-One (2013)

- Off - grid (Rural Electrification)
  15 Sites.
  10 Sites PV Solar, 4 Sites Hybrid &1 Site PV Tracking
  8-Governorates.
  1-11 MW : Solar & Wind plants.

- Total 50 MW.
  38 MW Solar & 12 MW wind.


15 Iraqi RE Sites
Syria
Al-Waleed
Trelbeel
Baghdad
Iraq
Al-Nukhaib
Al-Rahmania
Iskandarona
Bazirgan
Al-Sheeb
Al-Dawaia
Al-Khairy
Shbaka
Al-Salman
Al-Khuasa
Shalamcha
Al Jawf
Northern Borders

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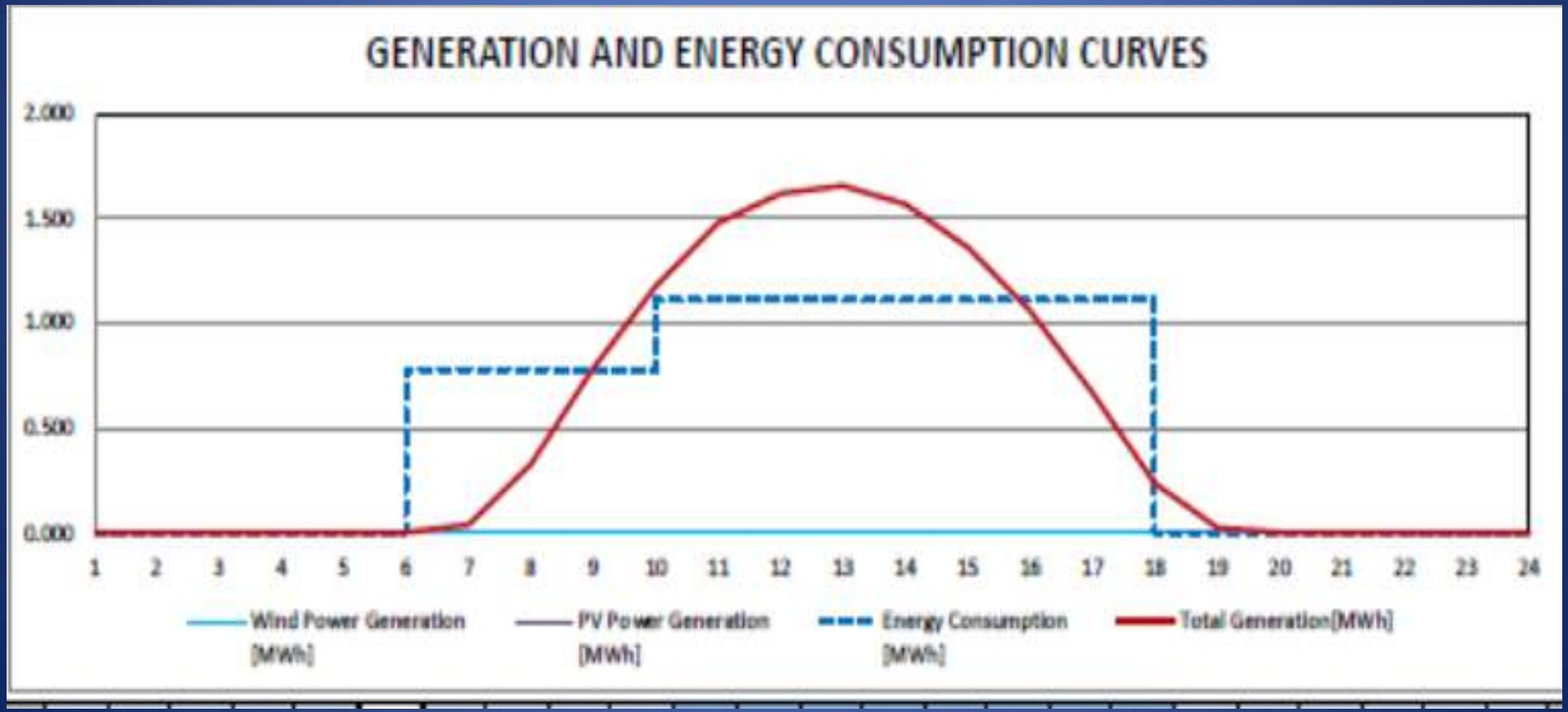
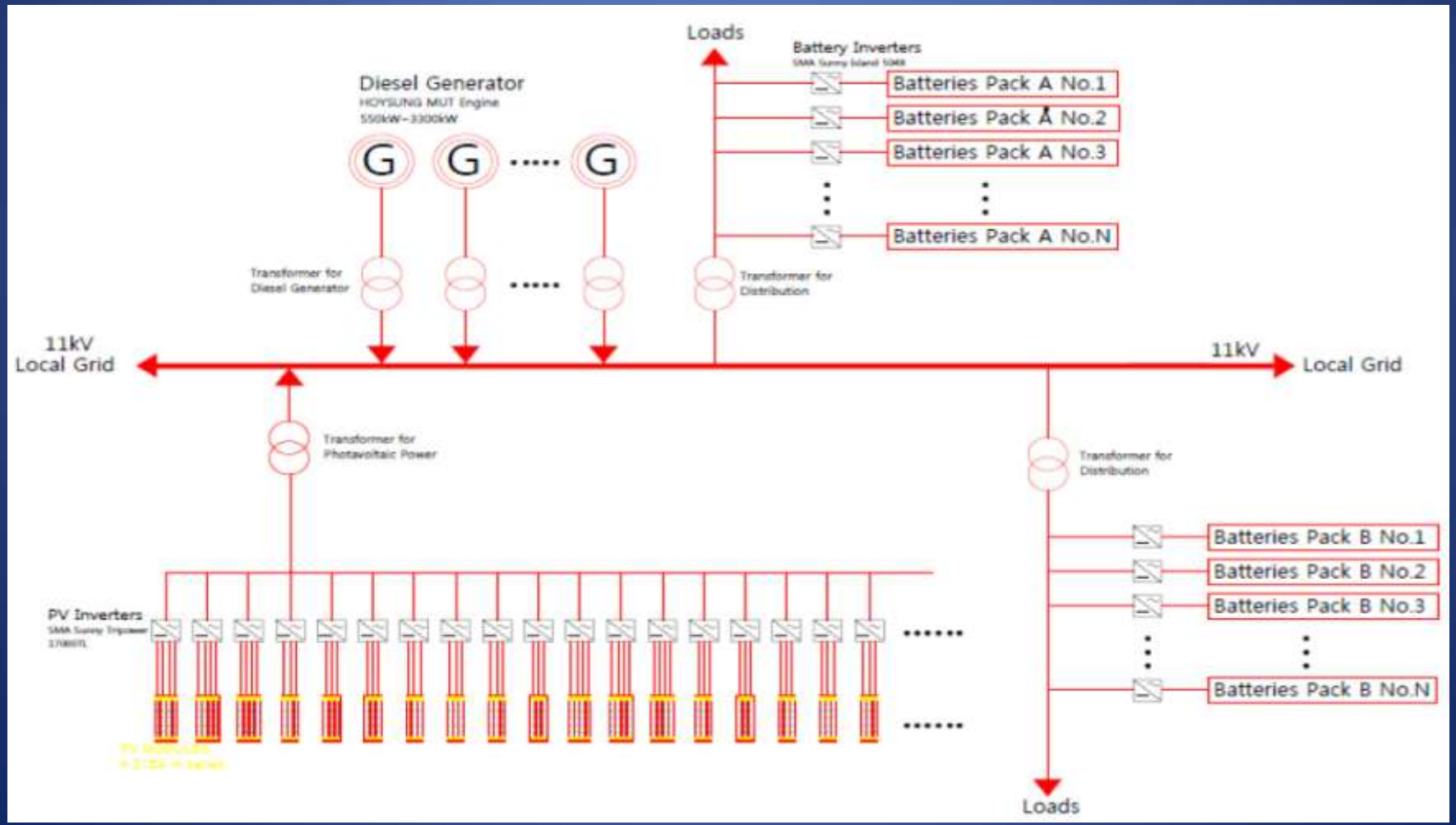
No	Sites	MWh	PV MW	Wind MW	Max Load MW	DG MW	Technology	SWH
1	AL-WALEED	22	5	-	2	4X0.5	100% PV	100
2	TREIBEEL	22	3.5	3	2	4X0.5	70% PV, 30%Wind	25
3	AL-NUKHEIB	22	5	-	2	4X0.5	100% PV	500
4	AL-SALMAN	40	6	5	3.6	5X0.75	70% PV, 30%Wind	700
5	AL-RUFFIA	4	1	-	0.37	2X0.25	100% PV	75
6	AL-KHAIRY	10	2	-	0.9	2X0.5	100% PV	225
7	AL-KHUASA	5	1	-	0.45	2X0.25	100% PV	125
8	AL-DAWAIA	5	1	-	0.45	2X0.25	100% PV	100
9	SHBAKA	10	2.1	-	0.9	2X0.5	100% PV	100
10	AL-SHEEB	12	2.5	-	1.15	3X0. 5	100% PV	20
11	BAZIRGAN	4	1	-	0.37	2X0.25	100% PV	75
12	SHALAMCHA	12	2.5	-	1.2	3X0.5	100% PV	20
13	RAHMANIA	20	3	2. 5	1.8	4X0.5	70% PV, 30%Wind	250
14	ISKANDARONA	10	2	1.5	0.9	2X0.5	70% PV, 30%Wind	175
15	TRACKING	-		-			100% PV movable	-

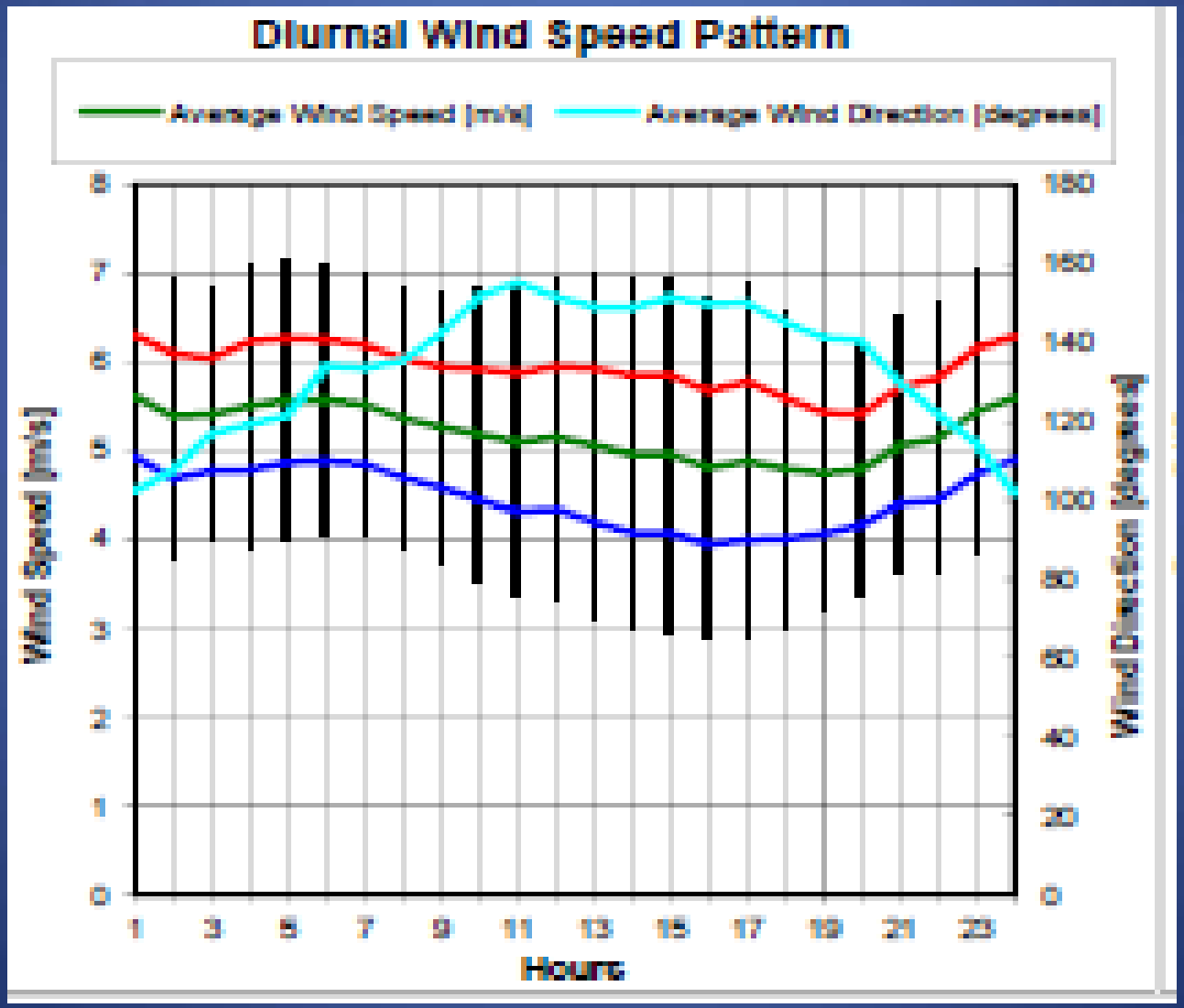
AL-Shalamcha Site



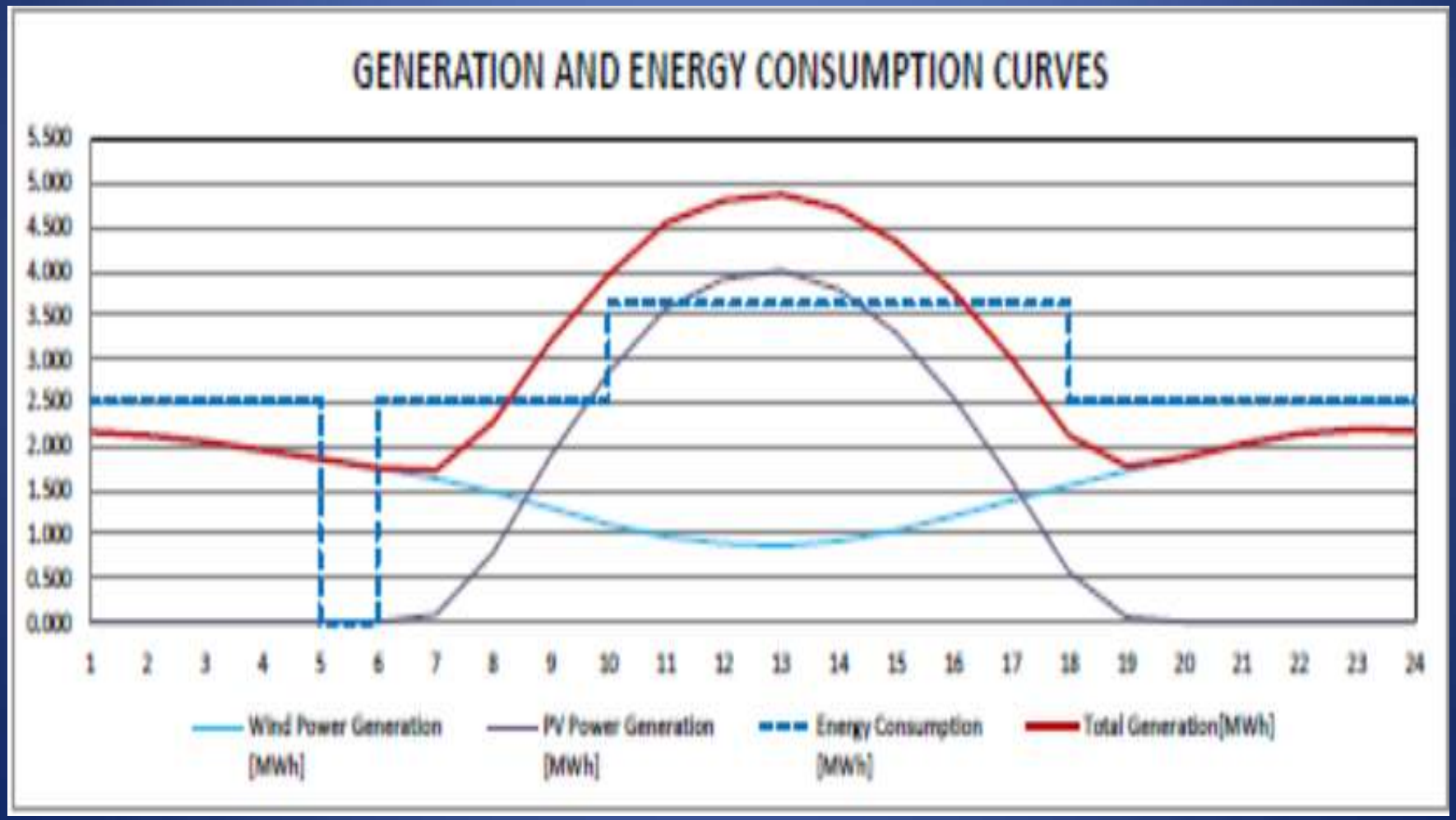
SLD of Solar PV Plant



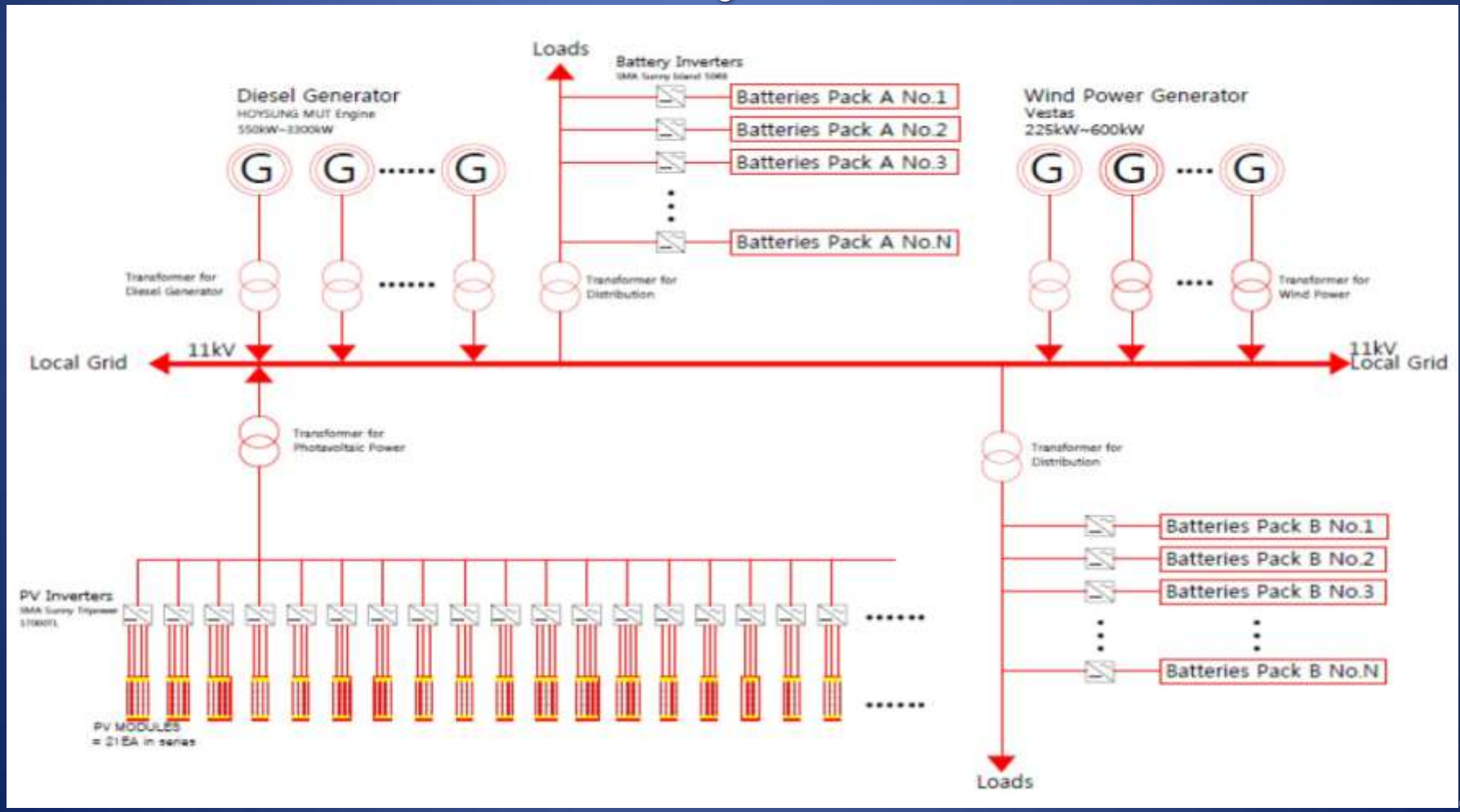
AL-Salman Site



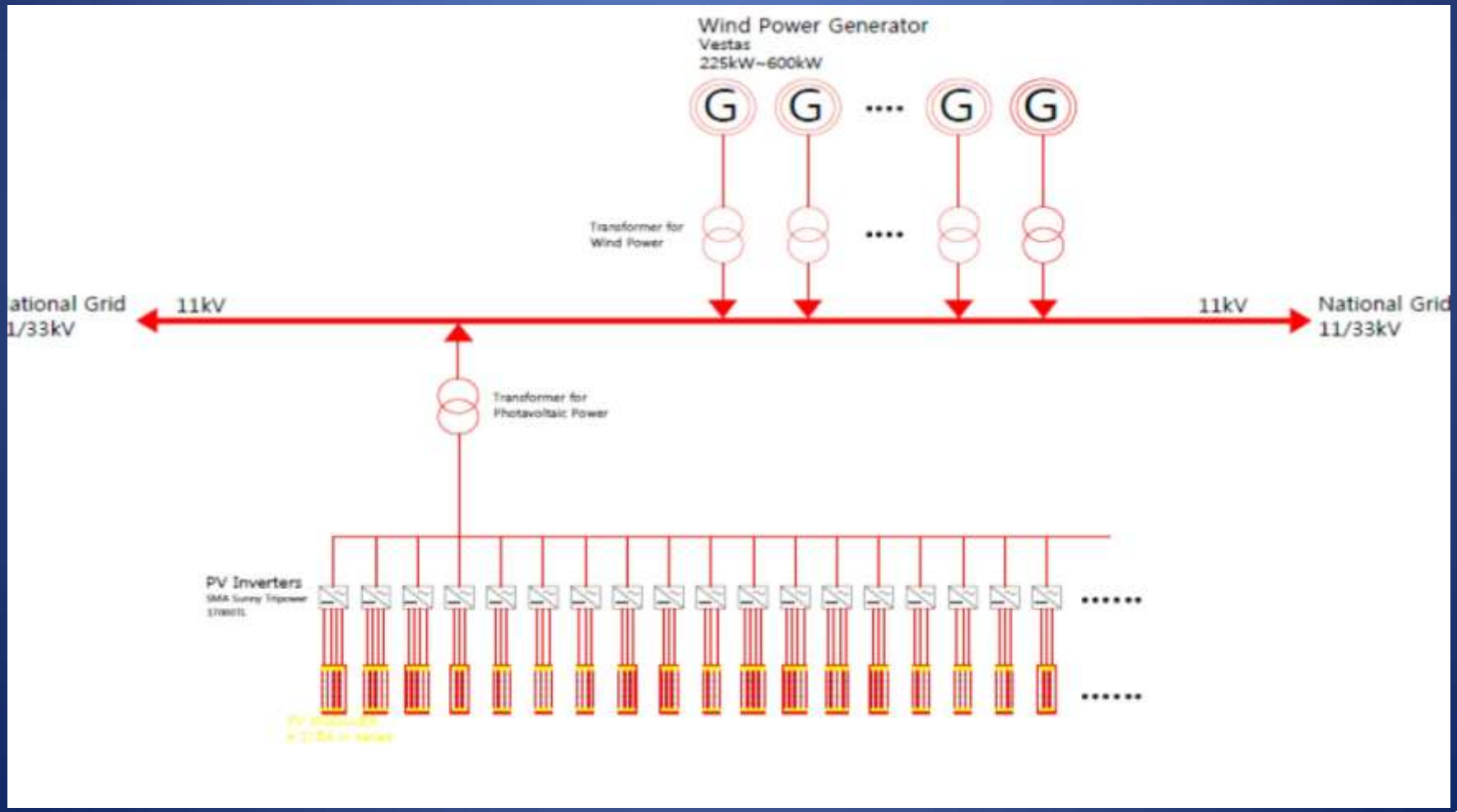
AL-Salman Site



SLD of Hybrid Plant



SLD of On-Grid Hybrid Plant



Pilot Project 2013 (2-axis Tracking System)

Stage-Two (2014-2015)

- On-grid (Solar plants).

  10-30 MW capacity.

- Total capacity 150 MW.

Stage-Three (2016-2017)

- On-grid (Solar plants & Wind Farms).

  10-40 MW capacity.
  CSP (10-50 MW).

- Total Capacity 150MW

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❖ Demand Side Management

- Solar Water heaters.
- Self Generation
- Net Metering & Feed in Tariff
- Solar Air-conditioning.
- L.E.D Lighting.

Installation : PV Plant & Wind Turbine

- PV Plant construction
- Wind turbine Plant construction

Step 1 : Preparation / Site Clearing & Earth Work

Step 2 : Pilling (if necessary)

Step 3 : Support Structure

Step 4: Modules Installation

Step 5 : Electrical Works

Step 6 : Inspection

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Step 7 : Complete

Wind turbine Plant construction

Step 1 : Transport

Step 2 : Assembly (Blade + Turbine)

Step 3 : Wind turbine Installation

Step 4 : Completion

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Thank you