

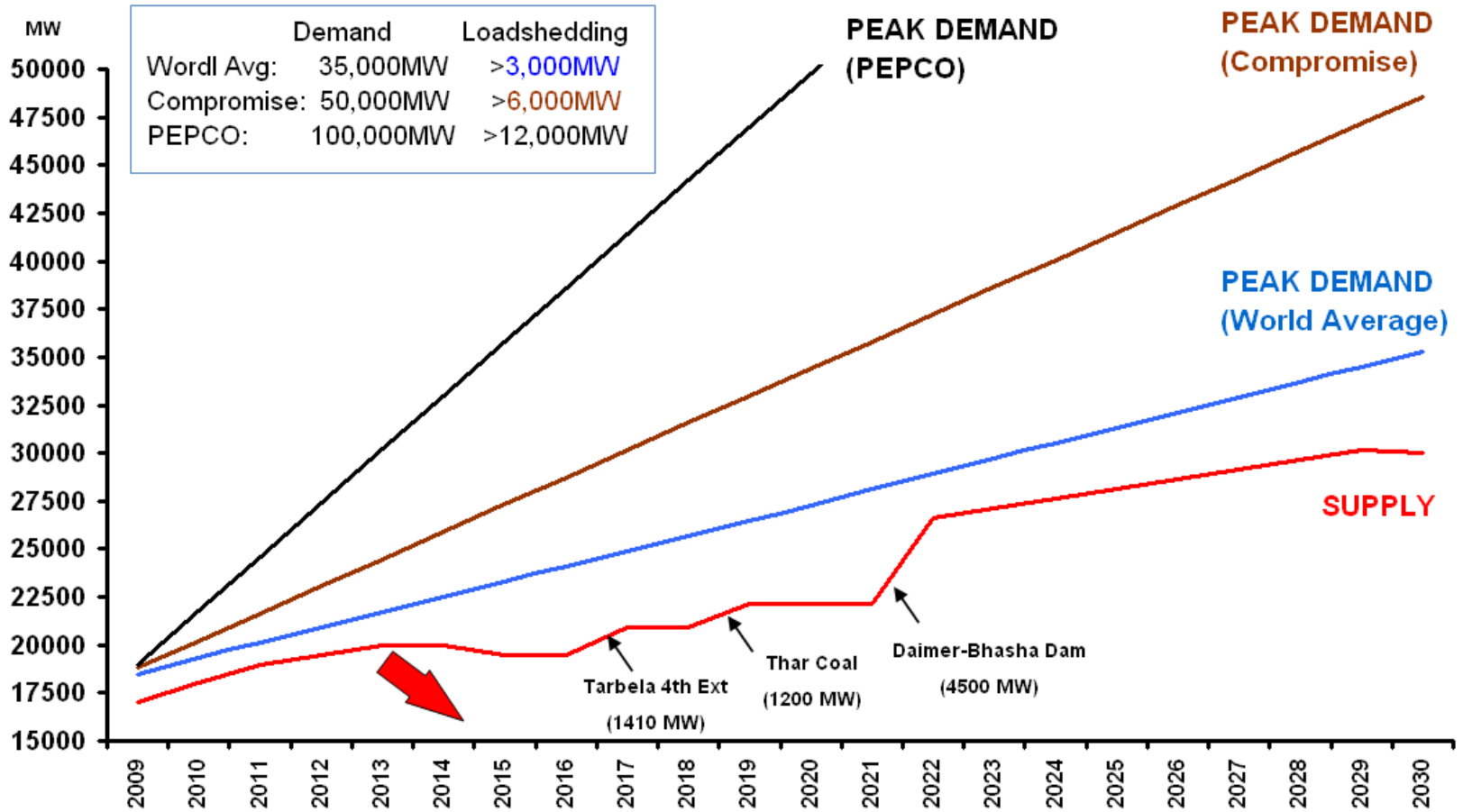
# Wind Power Evacuation

## Issues and Solutions



# Pakistan Power Demand and Supply Projections

*There is an urgent requirement of Renewable Energies*



# What are the responsible doing to meet the challenge?

*Dishing out good news !!*

DAWN 21-01-13

## ‘Work under way on 2,000MW wind energy projects’

KARACHI, Jan 20: The meeting on renewable energy organised by the IUCN-Sindh government is working on 40 different projects in its wind corridor with a total generation capacity of 2,000 megawatts in next two years, said the provincial secretary of environment and alternative energy department.

**KARACHI, Jan 20: The Sindh government is working on 40 different power projects in its wind corridor with a total generation capacity of 2,000 megawatts in next two years, said the provincial secretary of environment and alternative energy department.**

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able energy, Carl Pope, in his presentation on "Renewable energy cheaper in the long run" said that presently over 1.3 billion people in the world were estimated to be living without electricity.

One billion of these people, including 700 million residents of South Asia would remain without electricity until 2030, if the switchover to alternative energy was not made, he warned.—APP



# What are “the more responsible” doing?

## *Passing executive orders*

Dawn 27-02-13

Dawn 27-02-13

# Wind power share in energy mix

By Our Reporter

Ahmed Mukhtar issued directives to expedite completion of 1000MW wind power generation projects so that cheaper electricity could be added in the national grid at the earliest.

ISLAMABAD, Feb 26: The government has decided to increase share of wind power generation in national grid energy mix from five per cent to 10 per cent as over 1000MW from wind power

ISLAMABAD, Feb 26: The government has decided to increase share of wind power generation in national grid energy mix from five per cent to 10 per cent as over 1000MW from wind power would be added during the fiscal year 2013-14.

enhanced under the grid code of this sector.

Ahmed Mukhtar issued directives to expedite completion of 1000MW wind power generation projects so that cheaper electricity could be added in the national grid at the earliest.

The meeting was informed that a wind power project of 56.5MW located at Jhampir has been completed and is on test run for inauguration next month. Three projects of 150 MW are under construction while 12 projects of 1100 mw would achieve financial close by 2013-14.

being built by a Chinese company.

**The actual status - HESCO letter dated 20.10.12**  
**Wind farms are ready but power cannot be evacuated**



**HYDERABAD ELECTRIC SUPPLY COMPANY**

OFFICE OF THE CHIEF EXECUTIVE OFFICER HESCO HYDERABAD

No. CEO/HESCO/CE(P&E)/DM(SPP) 5691-700

Dated: 20.10.2012

Managing Director (NTDC)

Diary No. 2057

Date: 20.10.2012

Chief Operating Officer  
CPPA, WAPDA House  
Lahore.

Subject: INTERCONNECTION OF WIND POWER PLANTS AT JHAMPIR WITH EXISTING HESCO NETWORK

As per available information 13 Wind Power Plants are to be established in the Jhampir Wind Farm, for which NTDC/CPPA has issued LOI to 11 No Wind Power Plants. NTDC/CPPA made first ever correspondence with HESCO about the Wind Projects through letter No. COO/CPPA/CE-II/MT-IV/FFCL/1818-23 Dated 13 July 2012.

NTDC/CPPA has not designed any transmission lines from these Wind Power Plants. Instead they are connected to the existing HESCO network.

A brief about the status of Existing Power Houses and Upcoming Power Houses submitted to HESCO.

The Fig 1 shows the existing Power Network around Jhampir.

NTDC has the network of 220 KV Double Circuit Transmission Lines connecting KDA-33 and 500KV Jamshoro Grid Station via Nooriabad. It will be more appropriate that NTDC may construct 220KV Grid Station at Jhampir and connect it to the existing Double Circuit Transmission Line at Nooriabad, which can evacuate 1500MW to 2000MW of Power. Time required will be less than the time required for replacement of HESCO Power Network around Jhampir.

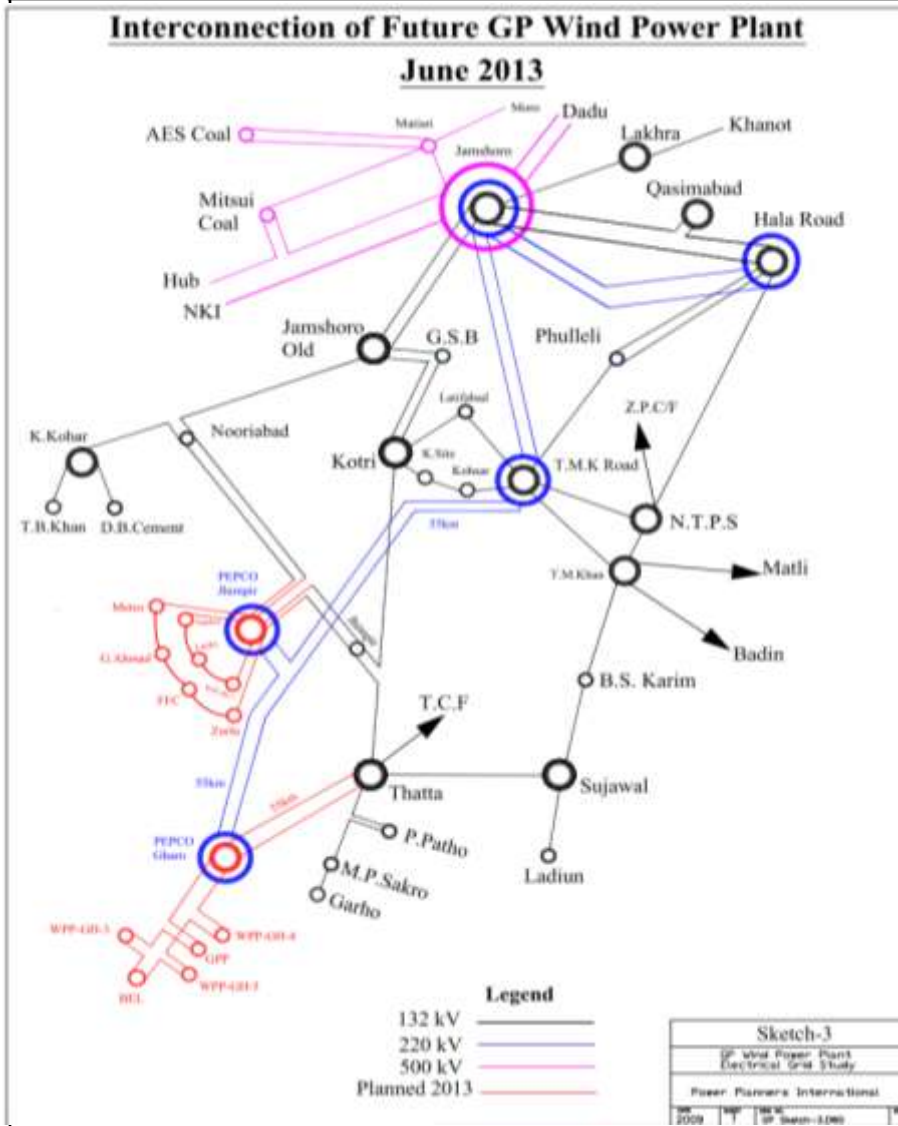
Submitted for your consideration and for necessary action.

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CHIEF ENGINEER (P&E)  
HESCO HYDERABAD

# Proposed power evacuation for mid term scenario in 2013 in NTDC approved Grid Interconnection Study - *Back to the future*



## Scenario 2013 in Sindh (the blue connection) (12X50MW WPPs and 2x1200MW coal fired IPPs)

The output of 12 wind farms at Gharo and Jhimpir clusters would require the network to be upgraded to 220 kV for which a scheme has been proposed as follows;

- 220/132 kV S/S at Gharo
- 220/132 kV S/S at suitable location in Jhimpir Cluster
- 65 kM long 220 kV double circuit from Gharo 220 kV S/S to Jhimpir 220 kV S/S
- 55 kM long double circuit from Jhimpir 220kV S/S to existing T.M. Khan 220/132 kV S/S
- Extend/retrofit 132 kV double circuit in a ring form starting and ending at Jhimpir 220/132 kV grid station connecting seven Wind Farms as shown in Sketch-3.

Loop in-out Khuttikun – Thatta 132 kV D/C at Gharo 220/132 kV S/S

The load flow, short circuit and stability study results of medium term indicate that the proposed scheme of 220 kV network to be built in the medium term horizon for evacuation of wind power from the clusters of Jhimpir and Gharo, is adequate and strong enough to cater the increasing wind power penetration in PEPCO system.



## THE ACTUAL ISSUE

*too hot to handle*

Renewable Energy Integration is a Technical Problem

**Technical problems cannot be solved by executive orders**

سوال کے دوران  
3 ہزار میگا واٹ کا  
اضافہ کیا جا چکا  
بجلی کی غیر نپے لو سڈنگ جلد بحال جائیگی  
وزیر اعظم  
گیلانی

جنوبی پنجاب کے عوام کا احساس محرومی ختم کرینگے، ہماری حکومت مشکل فیصلے کر کے آئیو ای نسلوں کی راہ کے کانٹے چن رہی ہے، مستقبل کی حکومتوں کو کوئی مشکل نہیں ہوگی، مفاہمت کی سیاست کو کمزوری نہ سمجھا جائے  
ملک کو مسائل سے نکالنے کیلئے تمام جماعتیں کردار ادا کریں، کراچی میں بدامنی کے خالق جاننے کیلئے سپیکر فوری پارلیمانی کمیٹی تشکیل دیں، پارلیمنٹ کی بالادستی اور عدلیہ کی آزادی چاہتے ہیں، ملتان اور اسلام آباد میں خطاب

The issues have now become too complex for the others to handle.

The local engineering community has a major share of the blame as they did not provide the **direction and leadership**.

**Entirely new Energy Policy is required to come out of the GRID LOCK**

# Upside down planning - *Generation from Renewables till 2030*

*Electrical infrastructure for transmission & distribution conveniently NOT planned*

## **Hydel (Major problem: politics)**

Potential: 50,000MW

Planned: 30,000MW

Expected Total Cost = 30 bn USD

## **Wind (Major problem: electrical infrastructure)**

Potential: 346,000MW

Planned: 3,500MW

Expected Total Cost = 8.5 bn USD

## **Solar (Major problem: mis-concepts)**

Potential: 1,200,000MW

Planned: 1,000MW

Expected Total Cost = 2.5 bn USD

**Pakistan does not have the money. Neither has the rest of the World.**

One billion \$ are stuck-up in Wind Projects in Sindh, with no results in sight

- 1) Investors have to borrow expensive money which needs to be paid back.
- 2) The above costs are to be recovered as “electricity tariff” from consumers



# Risk Regime of WPPs has become convoluted

*The Stakeholders wants to play it safe – rather individually*

No	TYPE OF RISK	RISK OWNER	COMMENTS
1	WIND RISK	GoP	Wind less than bench mark <b>(No other country has taken wind risk)</b>
2	COUNTRY RISK	ADB First 5 Projects	If Energy Purchaser (NTDC) is unable to pay, ADB will pay <b>(Contracts signed without ADB guarantee)</b>
3	EPC RISKS	EPC CONTRACTOR Mostly WTG SUPPLIERS	Delayed Plant; Plant Availability <b>(Commercial Terms &amp; Conditions and Commissioning Tests etc. out of Norm)</b>
4	PROJECT RISKS	PROJECT DEVELOPER Local & Foreign	Plant compatibility to network <b>(Lenders/Developers want WTG/EPC Contractor to carry a major portion of project risks also)</b>
5	CONTRACT RISK	PROJECT DEVELOPER ENERGY PURCHASER	Contract Act 1872 <b>(Developers/ Energy Purchaser have their own unorthodox mechanisms to avoid this risk. EPA is one major tool used by Energy Purchaser)</b>
6	<b>PAY even if power not evacuated NPMV due to Network failure</b>	DISCO/NTDC	Wind and WPP available but no grid <b>(Major issue for HESCO &amp; NTDC)</b>

# Market Dynamics

*The Wind Energy is a different ball game*

2008/09	2011/12
Sellers Market: WTG Supplier driven	Buyers Market: Lender driven
Soft Grid Code: To attract Sellers	Stringent contractual conditions by Lenders
Financing: Readily available	Debt financing has become scarce
Outdated WTG Technology being offered in Pakistan which could not provide the required support to the Network	<b>Network supporting, state of the art WTG technology available in Pakistan. Investors however fell for much cheaper outdated WTG Technology.</b> <b>RESULT – NO WIND ENERGY</b>

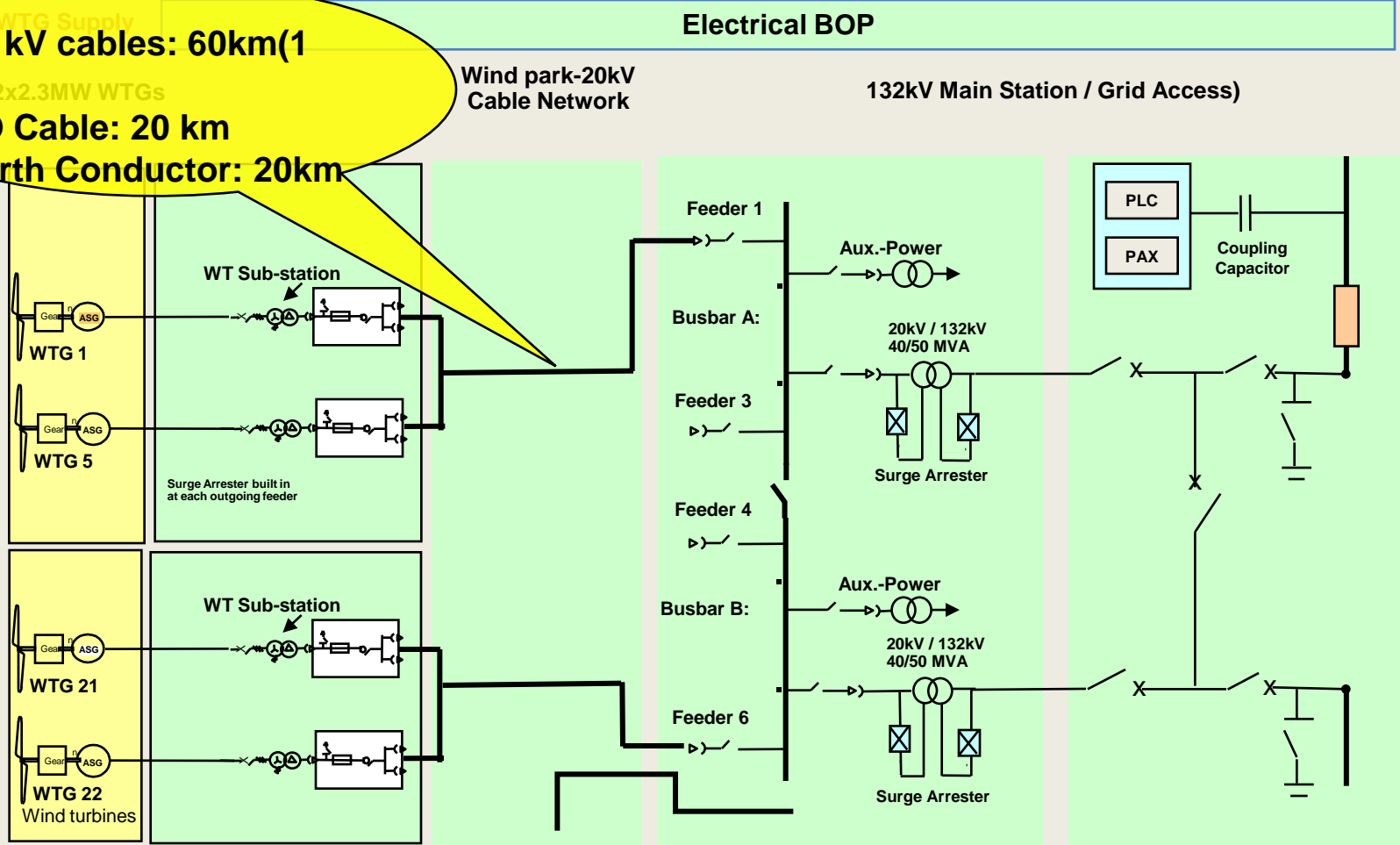
# Local Supply: Electrical BOP (Excluding WTGs)

*Reduce price where possible without compromising reliability*

20 kV cables: 60km(1  
Ø)

FO Cable: 20 km

Earth Conductor: 20km





# What else is hampering wind energy integration?

*A lot more things ....*

## 1) **No network compliant technology**

Grid code (Cl. 3) asks for network compliant technology. HESCO network has serious reactive power deficit and frequency stability issues. The type 3 technology being currently installed will add to these problems.

## 2) **Pseudo AEP Calculations**

All the developers have favored P50 exceedance probability curve while calculating AEP for tariff determination. The quite probable risk of low AEP is transferred to the Energy Purchaser and thus to the end consumer.

## 3) **Circular Risk**

Contract Act of 1872 intrinsically protects foreign suppliers by putting the onus of due-diligence on the buyer. The lenders & investors pass on the project risks to the Energy Purchaser. The Energy Purchaser & Utility Operator ward off Contract risks by putting in difficult clauses in EPA and out of norm requirements.

# Outlining the new strategy

## *What needs to be asked ?*

### 1) Do we have money to support Wind Energy?

A billion USD have been committed by the lenders to the 10 Contracts signed by local investors/developers. Not a single MW has been produced till date. Neither equity nor debt is available now.

### 2) Should we depend on IPPs for RE Projects?

Most of the new IPPs, due to bad experience (circular debt etc.) tend to secure equity recovery up front. This results in lack of ownership and eventual failure of the project .

### 3) Should the Grid Code/**Tariff** be reviewed?

We do need state of the art grid supporting technology. Grid Code should clearly outline the requirements.

**Reactive Power tariff should be introduced**



# Outlining the new Strategy

## *What needs to be done?*

**Energy deficit will not go away easily. A paradigm change is required. A comprehensive energy policy needs to be developed in which:**

- **Each Province to get its share of investment acc. to its GDP/tax base.**
- **The resource utilization and contribution of a Province should be reflected in allocation of the development budget to that province.**
- **Legislative support should be given to renewable energy integration.**
- **Private sector should be adequately supported by the Government in order to play an effective role in setting up generation hubs.**
- **The energy generated at these hubs should be delivered to the investor where required against wheeling charges to the network operator.**
- **Local Value Addition should be increased to a level where exchange rate variation does not effect the base values of a PP in real time.**



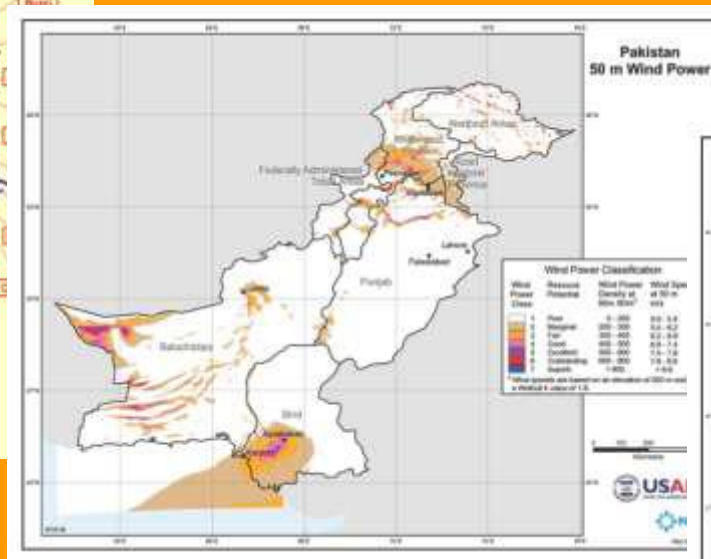
# Utilizing Pakistan Renewable Energy Potential

## Hydro Potential: 60,000 MW

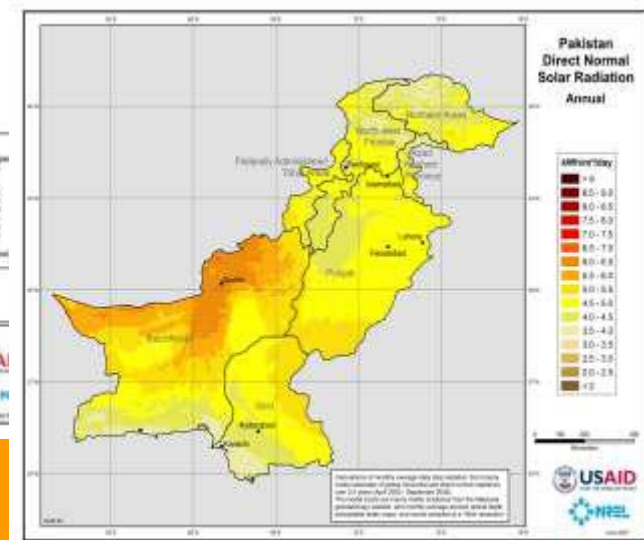
(Does not include the small hydro potential available in all provinces)



## Wind Potential: 346,000 MW



## Solar Potential: 1,200,000 MW Average DNI: 2007 kWh/m<sup>2</sup>/year



The three Renewable Resources (Wind, Solar & Hydro), due to their unique features, make economic sense for Pakistan. Therefore they should be treated at par with each other

*Thank You*

