

Fukuoka office Presentation  
**Environmental Technology**



*November 2012*



**ADAPTIVE CONSTRUCTION  
TECHNOLOGIES FOR DRR AND  
ENERGY EFFICIENT HOUSING**

# Major Recent Earthquakes in Pakistan

Area	Magnitude	Year	Deaths	Injured	Buildings damaged
North Pakistan	7.6	2005	73,300	128,474	600,000
Baluchistan	6.4	2008	169	170	9,881

- Massive destruction due to poorly constructed buildings
- How to build safe and low cost buildings
- Promotion of traditional earthquake-safe buildings

# Low-Cost Earthquake Resistant Buildings

Timber frame stone infill (Dhajji)



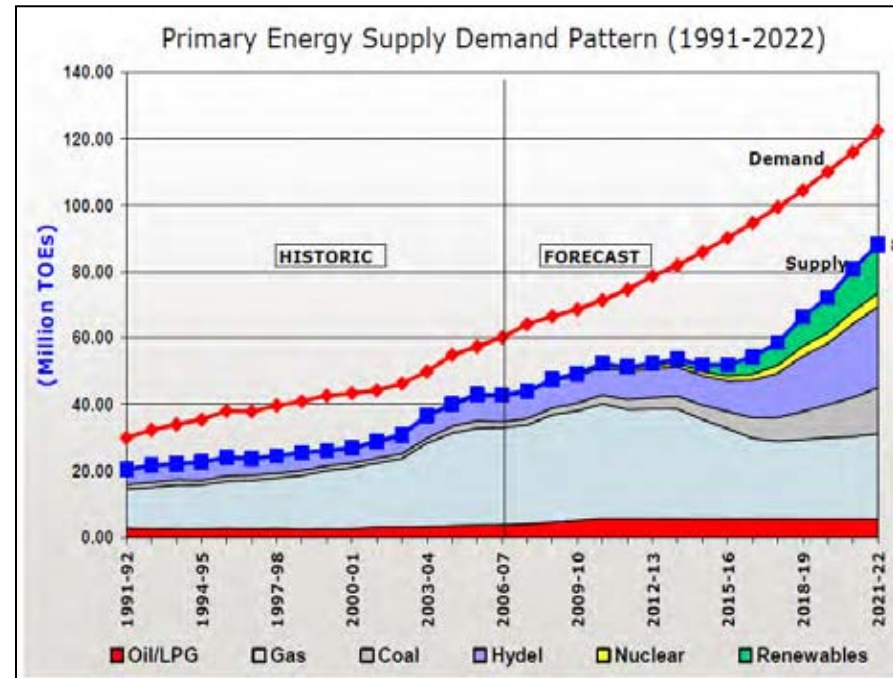
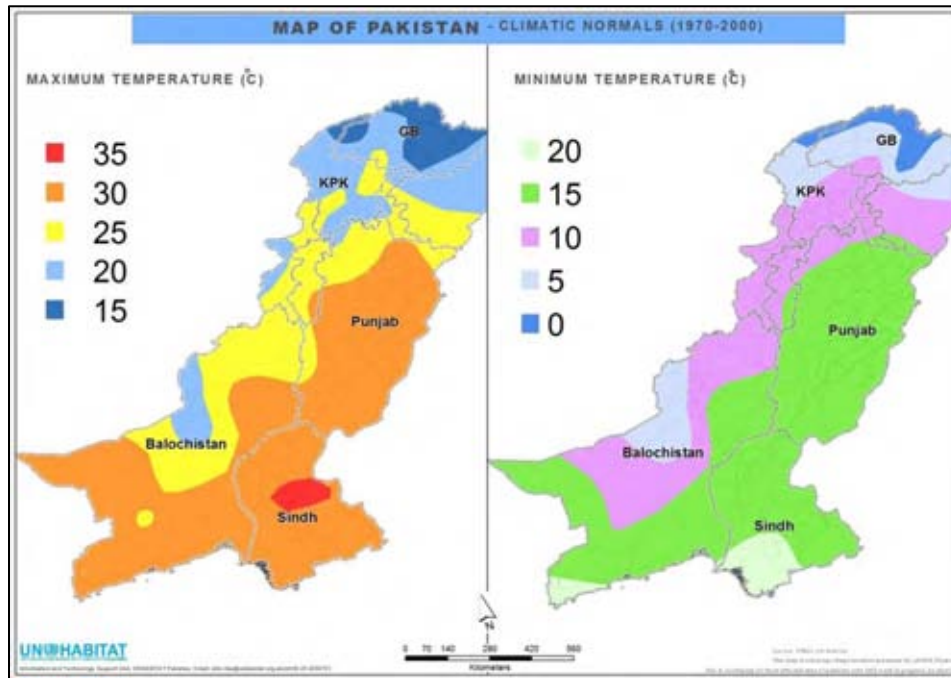
Timber reinforced dry stone masonry (Bhattar)



Out of 600,000 houses, 128,000 units were reconstructed with Dhajji technique



# Extreme Temperatures & Energy Crises.



- **Buildings consume significant energy.**
- **Need for promotion of renewable energy options and energy conservation techniques in buildings.**

# Energy Efficient Buildings



- Natural day lighting, Solar energy used for lighting, heating & appliances
- Rainwater
- Harvesting
- 20% additional cost for energy efficiency.
- Advocacy for energy conservation in buildings

# Opportunities



**Insulation material  
and solar panels**

**Retrofitting  
knowledge and  
technology for  
earthquake and  
energy efficient  
buildings**



**Thank You**