WIND INTO WINE

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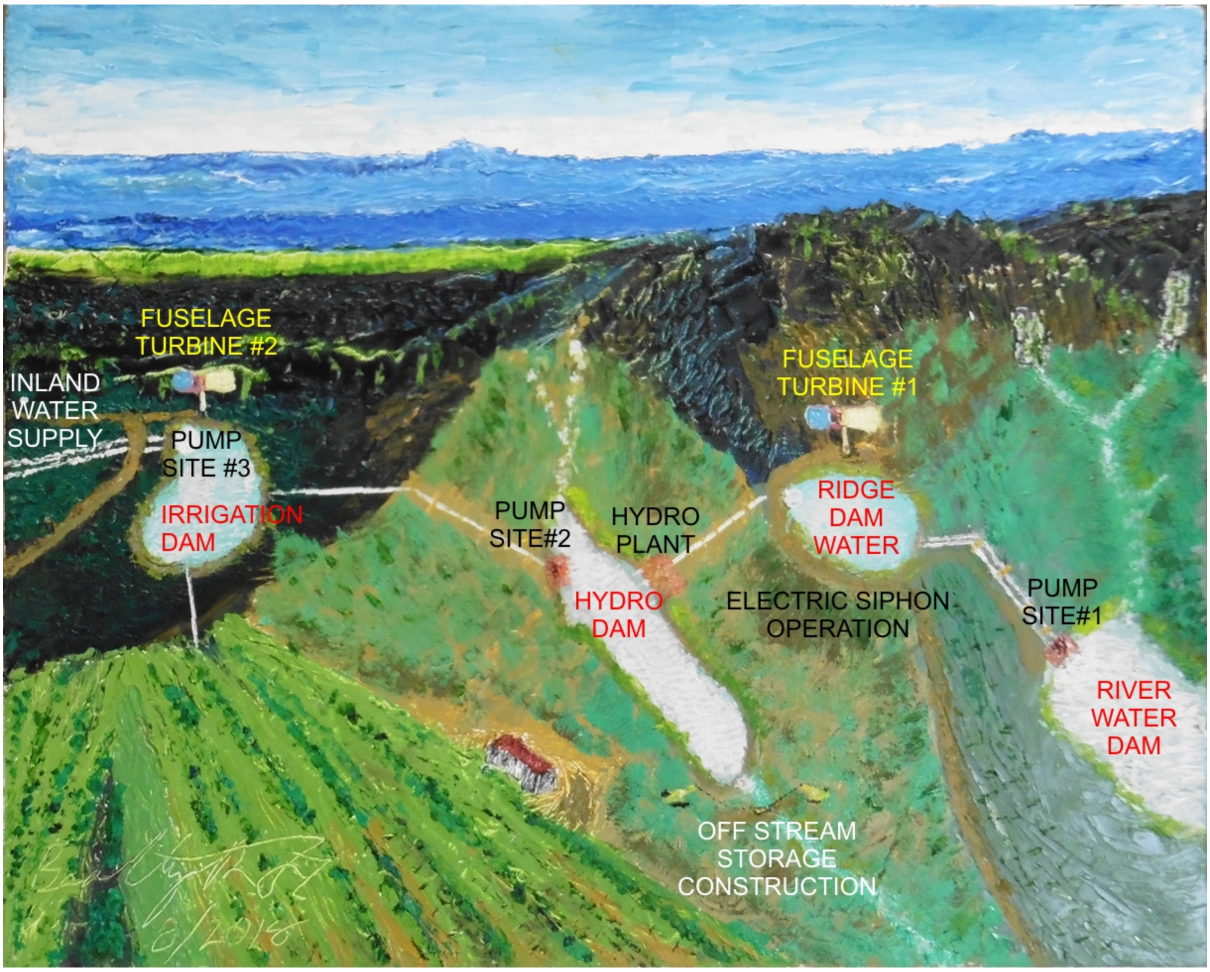
Robert A. Beatty BE (Minerals) FAusIMM(CP)
BobBeatty@bosmin.com

ABSTRACT
The document is an artistic interpretation of the paper *Great Dividing Range Wind Pumping Sites*,[1] and includes a mosaic of innovative engineering techniques. Methodologies include; Fuselage Turbine, Electric Siphon, Dry Land Irrigation, Overburden Slusher, and Off Stream Reservoir maintenance and construction. References lead to engineering reports covering each topic. The examples cited are Australian in nature, but the techniques illustrated have international application.

1) Introduction:

"A picture is worth a thousand words" so the old idiom goes. This paper attempts to prove this statement by starting from Exhibit 1 "*Wind Into Wine*":

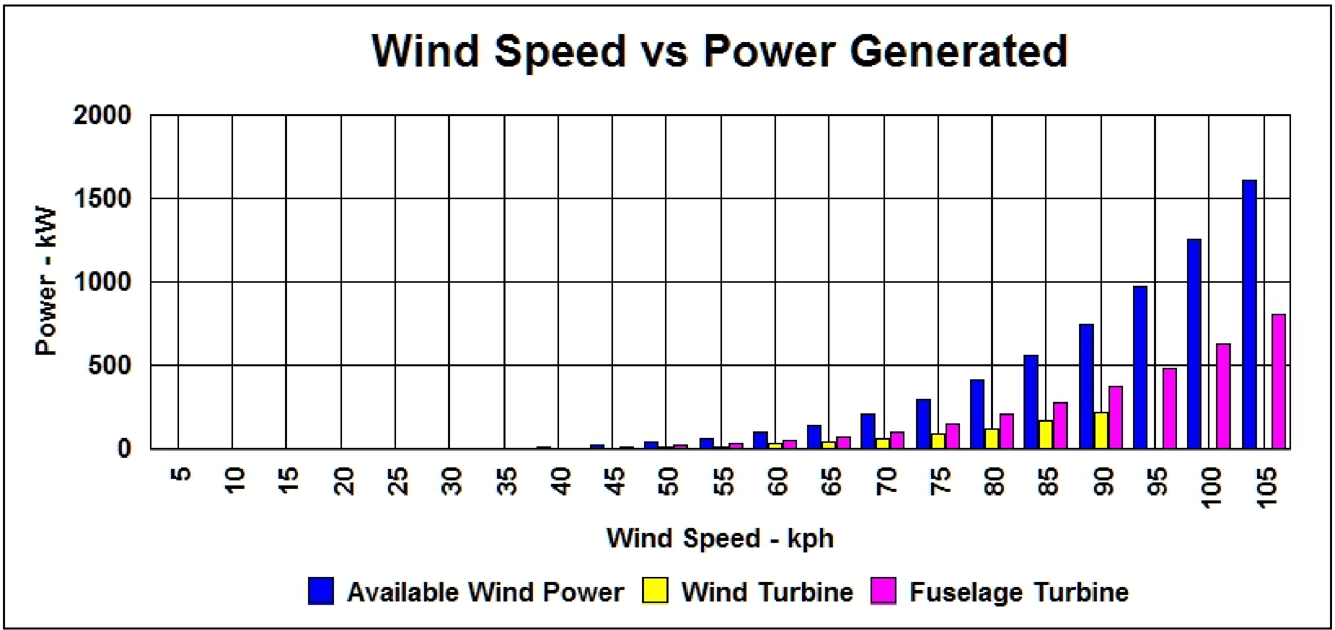


- Exhibit 1 shows several engineering concepts compiled into a mosaic of action. Reading from the right hand side we see water entering the "River Water Dam" from mountains in the background.

- Water from the dam is pumped up a slope pipeline into the “Ridge Dam” from “Pump Site #1”.
- Drive power for the pump comes from wind energy captured in “Fuselage Turbine #1”.
- Elevated water in the “Ridge Dam” flows through a penstock system to power the “Hydro Plant”, then feeds the tail race flow into the “Hydro Dam” storage.
- Some power from the “Hydro Plant” is reticulated back over the ridge to add power to “Pump Site #1” thereby ensuring stored wind power is added to current wind power to enhance the flow of water.
- This method for pumping, storing, and generating is referred to as an “Electric Siphon” and helps to mitigate an intermittent wind velocity. This technique may be used for efficiently transferring water from one valley to the next, instead of tunnelling through the mountain.
- Other power generated from the “Hydro Plant” is despatchable, and finds use at distant industrial sites.
- Exhibit 1 shows water from the “Hydro Dam” entering “Pump Site #2” where again it is elevated up the ridge to enter the “Irrigation Dam”.
- Wind power for this sequence is supplied from “Fuselage Turbine #2”.
- Water from the “Irrigation Dam” is available for crop watering, as illustrated in the left foreground of Exhibit 1.
- “Fuselage Turbine #2” also supplies power for “Pump Site #3” which forms the start of the “Inland Water Supply” pipelines. These pipelines can transfer water over long distances, using a sequence of Electric Siphons to feed water from low level dams to higher level dams, with additional wind power supplied to the system as the geography allows. Storage dams along the inland pipelines also provide facility for lateral distribution of water, to meet local demand.
- This system for water distribution involves construction and maintenance of several storage dams, many at elevated locations. A efficient excavation system is required for this task, and the Overburden Slusher (OS) is a recommended method. The OS system of excavation shows in the foreground of Exhibit 1, and is digging an “Off Stream Storage” dam. Off Stream storage is preferred for dam construction, because water from the river can be stored without interfering dramatically with normal river flow. Off Stream storages also provide dam locations virtually anywhere along the river bed, without the need for first identifying a suitable dam abutment site. Water flows into Off Stream storages at times of river flooding, and may be led through a sand filter along the river bank thereby reducing ecological impacts on the river system.

2) Fuselage Turbines (FT).[2]

FT units are described in the referenced paper which suggests that traditional wind turbines (WT) suffer significant operational limitations, many of which can be mitigated by using fuselage turbines instead. FT is also capable of generating more power than WT as illustrated in Exhibit 2 "*Wind Speed vs Power Generated*".



Low frequency noise generation appears to be a significant problem at some WT sites as discussed at Principia Scientific International paper *Wind Power: Is the Fuselage Turbine a Better Design?*.[3]

3) Overburden Slushers (OS).

OS was originally designed for open cut stripping as described in *BOSMIN® Overburden Slushers - The Future in Open Cut Mining*.[4] The basic mechanical principle applied in designing the OS is that; *it is easier to shift a large load over a short distance by dragging it across the ground rather than by lifting and carrying it*.

A further benefit of OS is the ability to excavate under water. This feature has application in de-silting existing dams as well as constructing off-stream water storages along the banks of a river. These aspects are further discussed at *BOSMIN® Review of Australian Water Reservoirs*. [5]

4) References:

1. http://www.bosmin.com/ICS/WindIntoWater.pdf

2. www.bosmin.com/turbine/bturbine.pdf

3. https://principia-scientific.org/wind-power-is-the-fuselage-turbine-a-better-design/

4. www.bosmin.com/OS/osbrochure2.pdf

5. http://www.bosmin.com/Reservoirs.pdf