I’m conducting a case study for a 30 unit off-the-grid residential development. The location is near the chicagoland area. Any information and/or advice is welcome. Thank you.

Robert41,

Is the entire development isolated from the water and electric grid? The energy requirements will have to be thought out carefully if you are completely off the grid for electricity, potable water and wastewater. It is common in remote parts of the world, but one must consider the electrical consumption requirements of the systems in an “energy budget” that estimates, conservatively, the energy production capacity and the electrical needs of the development, particularly when there are extended periods of low solar energy production (like winter in Chicago). Clearly you’ll need a battery backup system, and the battery sizing and amp-hour storage are essential. Wind may be a better candidate, or a supplemental candidate, for alternative power in the . . . windy city. ARCSA is not the best source for that information, but the American Solar Energy Society - www.ases.org - and the American Wind Energy Association - www.awea.org - are terrific resources for those two alternative energy subjects. My home is interconnected with both the water and electric utilities, and we have autonomous capability for both electricity and potable rainwater. Our potable rainwater system is our primary source for drinking, cooking and showering, while the utility water is used where lower quality water will suffice. If forced at gunpoint to give up my photovoltaic system or my rainwater harvesting system, I’d relinquish the former. One can live without electricity.

Off the grid rainwater systems are very doable. A water budget is essential. One must know the conservatively estimated rainfall and the expected uses over a typical year and then calculate the storage capacity that would be needed. It’s done all over the world. One of ARCSA’s stalwarts has a well-known, off-the-grid water system in West Texas (where rainfall is spotty and seasonal) and he has plenty of water for himself, his family, his gardens and many happy birds, frequent visitors and other terrestrial animals.

Calculating the predicted water and energy usage of 30 units in an off-grid development will be a challenge. One of the sociological issues involves the "Tragedy of the Commons," whereby consumers of the shared resource soon learn that there is no incentive to conserve if another with access to the resource can waste it with impunity, leading to rapid depletion of the resource. If all 40 units will be sharing energy and water, either some well defined constraints will be necessary, some financial incentive and penalty system, or a culture of conservation, whereby the residents get bragging rights for their low levels of resource consumption and profligate users are exposed.

Very interesting. Keep us informed.

John

Edited by arcsajohn - 19/Feb/2011 at 12:37pm

The social issue John brought up is very real, and could impact the success of the development. It may be difficult if the development is planned to be a single, large apartment building, but if it is to be town homes or single-family homes then each residency could be independent. You could relegate water-use responsibility to the residents. No one wants to "run out" of water; a managed central reservoir could be used as a backup. . . just in case. A single, large apartment building could use comfortable and engaging
common areas to encourage residents' interactions and sense of community, but understand that this may only appeal to certain folks... younger people with less spending capacity. More info/plans would help!