DECOMMISSIONING

What happens to the wind tower when it becomes obsolete or otherwise uneconomical to operate?

If the tower is no longer generating income for the landowner, it becomes a nuisance for normal farming operations and should be removed.

Does the agreement/contract between the developer and the landowner specify how soon the tower and other structures, including access roads will be removed and who will be responsible for the cost? The removal cost will be substantial. Is the owner/operator of the facility responsible for removal?

Public Service Commissions in the US have made administrative rulings dealing with decommissioning of wind turbines since 2008 and have placed the responsibility for removing wind turbines and related facilities when no longer useful on the owner or operator of the commercial wind energy conversion facility. The Commissions have ordered a bond or other financial assurances that will fully cover the costs of dismantling and decommissioning of these wind energy facilities.

It is sincerely recommended that landowners and Government must insist that decommissioning costs be covered by cash bonds held by independent third parties because many wind farm "owners" turn out to be limited liability companies (LLC's) with few assets. Because tax breaks for wind are heavily front-loaded (depreciation 5 to 6 years; production tax credit – 10 years), there are huge incentives for sales of facilities after tax breaks are used, or for abandonment if costs of maintenance, repair and/or replacement rise substantially. There is little protection for landowners or even the community if surety bonds that rely on premium payments or cash bonds held by an LLC owner – in case of insolvency or abandonment.

Decommissioning and abandonment are specialized activities that require meticulous planning and the best use of technology equipment and resources to control costs, ensure safety at the worksite and protect the environment, as well as cause minimal disruption for the community at large. Very little information is provided by the developer in its submission regarding decommissioning of the wind turbines and associated activities, which gives rise for concern at the long term objectives of the company Infigen and its motives.

Hazardous Materials and Waste Management:

Substantial amounts of solid and industrial wastes would be generated during the decommissioning and dismantling of the wind energy facility. Much of the solid material could be recycled and sold as scrap however, the remaining non hazardous waste would be sent to permitted disposal facilities.

Industrial wastes (lubricating oils, hydraulic fluids, battery electrolytes, dielectric fluids, coolants, solvents, purging solutions and cleaning agents) would be treated similarly to maintenance wastes during operations (put in containers, characterized and labeled, possibly stored briefly and transported

by a licensed service provider to an appropriate permitted offsite disposal facility). Severe impacts could result if these wastes were not properly handled and were released to the environment.

There are numerous cases in the US that have identified the shortcomings of any decommissioning plans that have been submitted; all suggesting initially that the scrap value will more than cover the costs of dismantling and decommissioning wind turbine facilities. Unfortunately the wind farm industry is not yet old enough to have any real data to sufficiently identify and validate the costs. A good examples is identified as follows:

Tom Hewson from Energy Ventures Analysis ("EVA") was hired by the citizen's group, Mountain Communities for Responsible Energy, to evaluate a decommissioning cost report prepared for the Beech Ridge Energy Project – a 124 turbine project proposed for Greenbrier County, West Virginia.

The project wind developer Invenergy had argued that the scrap value of the wind turbines would far exceed the cost to decommission the wind project and thus, bonding only US$2,500 per turbine that would slowly escalate to US$25,000 per turbine by year 16 would be more than adequate.

The applicants consultant estimated that its salvage value credit would reach US$12.64 million (US$101,900/turbine) in their decommissioning fund study based upon application of general scrap factors and prices. This scrap value credit would more than offset their estimated demolition costs (US$8.68 million; US$70,000/turbine).

EVA completed an independent assessment of the salvage value of Beech Ridge Wind turbines by first contacting the major regional scrap yards directly and obtaining current scrap prices for steel, copper and transport. From these data, EVA developed a Beech Ridge project specific salvage credit estimate of only US$ 2.63 million i.e., US$10.01 million less than the original applicants study. They also uncovered several major flaws in the applicant study, methodology and pricing. The developer not only used old scrap prices but failed to take into account costs related to transporting scrap to a yard. In addition, to obtain the posted scrap price they would need to break down the tower into 1 metre lengths otherwise the quoted price would be significantly less.

In addition, the copper materials must also have their insulation stripped and/or copper pieces separated to obtain their posted copper price. If not, their scrap value would be far less than the common posted price. Given the large drop in scrap prices in recent years (>40%), EVA found that scrap value would no longer cover decommissioning costs.

Several other projects were compared and found that the costs to decommission wind turbines were severely underestimated by more than 50%, by not taking into account crane rental rates, assuming low earthmoving costs and assuming high productivity rates (6 turbines/day).

The bottom line is that even if the permitting agency allow the salvage credit, the total net cost of decommissioning the Beech Ridge project would be US$10.4 million (US$83,900/turbine). EVA's analysis quantified the large scrap price and demolition cost escalation risk being assumed by the local community.

To protect the community, the permitting agency should require a bond of a minimum US$100,000 per turbine to capture true demolition cost escalation risk. It is up to the wind developer to convince the bonding company of the high salvage value, then they should be able to negotiate a lower rate for the bond.

"THE RISK SHOULD STAY WITH THE DEVELOPER AND THE BONDING COMPANY .....AND NOT THE COMMUNITY".

(Links to this report BeechRidgeEnergyDecommissioning.pdf)

DECOMMISSIONING ESTIMATES:

(Based on an independent decommissioning assessment prepared by LVI Environmental Services for the Stony Creek Wind Farm Project – Town of Orangeville, Wyoming County, New York). The project is of a similar size to the Flyers Creek Wind Farm project.

Turbine Equipment Removal

Remove Blades/Hub (2 days)					
Sr.	**Item**	**Quantity**	**Unit**	**Unit Cost $**	**Extended**
1.	Supervision	16	hours	75.00	1,200.00
2.	Crane with operator	2	day	2,400.00	4,800.00
3.	Operators	32	hour	40.00	1,280.00
4.	Labour	32	hour	30.00	960.00
5.	Support Equipment	2	day	3,000.00	6,000.00
6.	Consumables/Fuel	16	hours	200.00	3,200.00
7.	C & D Waste Disposal	25	tonne	50.00	1,250.00
8.	Steel Salvage	0	tonne	(150.00)	0.00
9.	Aluminum Cable Salvage	0	Kilogram	(1.00)	0.00
10.	Copper Cable Salvage	0	Kilogram	(3.00)	0.00
11.	Component Salvage	0	each	0.00	0.00
				Sub Total	18,690.00

Remove Nacelle (1 day)					
Sr.	**Item**	**Quantity**	**Unit**	**Unit Cost $**	**Extended**
1.	Supervision	8	hours	75.00	600.00
2.	Crane with operator	1	day	2,400.00	2,400.00
3.	Operators	16	hour	40.00	640.00
4.	Labour	8	hour	30.00	240.00
5.	Support Equipment	1	day	3,000.00	3,000.00
6.	Consumables/Fuel	8	hours	200.00	1,600.00
7.	Waste Handling/Disposal (oils)	0	tonne	allow	1,000.00
8.	Steel Salvage	0	tonne	(150.00)	0.00
9.	Aluminum Cable Salvage	75	Kilogram	(1.00)	(75.00)
10.	Copper Cable Salvage	25	Kilogram	(3.00)	(75.00)
11.	Component Salvage	0	each	0.00	0.00
				Sub Total	9,330.00

Dismantle Tower (10 days)					
Sr.	**Item**	**Quantity**	**Unit**	**Unit Cost $**	**Extended**
1.	Supervision	0	hours	75.00	6,000.00
2.	Crane with operator	10	day	2,400.00	24,000.00
3.	Operators	160	hour	40.00	6,400.00
4.	Labour	160	hour	30.00	4,800.00
5.	Support Equipment	10	day	3,000.00	30,000.00
6.	Consumables/Fuel	80	hours	200.00	16,000.00
7.	C & D Waste Disposal	0	tonne	77.00	0.00
8.	Steel Salvage	138	tonne	(150.00)	(20,700.00)
9.	Aluminum Cable Salvage	235	Kilogram	(1.00)	(235.00)
10.	Copper Cable Salvage	65	Kilogram	(3.00)	(195.00)
11.	Component Salvage	0	each		0.00
				Sub Total	66,070.00

Foundation Removal to 1 metre below surface (2 days)					
Sr.	**Item**	**Quantity**	**Unit**	**Unit Cost $**	**Extended**
1.	Supervision	16	hours	75.00	1,200.00
2.	Crane with operator	0	day	2,400.00	0.00
3.	Operators	32	hour	40.00	1,280.00
4.	Labour	0	hour	30.00	0.00
5.	Support Equipment	2	day	3,000.00	3,000.00
6.	Consumables/Fuel	16	hours	200.00	3,200.00
7.	Concrete/Clean Fill	44	tonne	100.00	4,400.00
8.	Steel Salvage	1	tonne	150.00	(150.00)
9.	Aluminum Cable Salvage	0	Kilogram	(1.00)	0.00
10.	Copper Cable Salvage	0	Kilogram	(3.00)	0.00
11.	Component Salvage	0	each	0.00	0.00
				Sub Total	12,930.00

Backfill Restoration (1 day)					
Sr.	**Item**	**Quantity**	**Unit**	**Unit Cost $**	**Extended**
1.	Supervision	8	hours	75.00	600.00
2.	Crane with operator	0	day	2,400.00	0.00
3.	Operators	16	Hour	40.00	640.00
4.	Labour	16	Hour	30.00	480.00
5.	Support Equipment	1	day	3,000.00	3,000.00
6.	Consumables/Fuel	8	hours	200.00	720.00
7.	Topsoil	30	cbm	30.00	900.00
8.	Reseed Vegetation	400	Sq.m	2.00	800.00
9.	Aluminum Cable Salvage	0	Kilogram	0.00	0.00
10.	Copper Cable Salvage	0	Kilogram	0.00	0.00
11.	Component Salvage	0	each	0.00	0.00
				Sub Total	7,140.00

Remove Blades/Hub	18,690.00
Remove Nacelle	9,330.00
Dismantle Tower	66,070.00
Foundation Removal	12,930.00
Backfill Restoration	7,140.00
Total Per Tower/Turbine	95,488.69
Number of Towers/Turbines	44
Total for Towers/Turbines	**$ 4,201,502.36**

** Scrap prices vary frequently and cannot be accepted as a reliable factor.

DECOMMISSIONING BOND:

To ensure funds are available to the Blayney Shire Council to cover costs of decommissioning, Flyers Creek Wind Farm developers should post a surety bond or equivalent financial security instrument that would be in place on or before the date thirty (30) days after the commencement of pouring of concrete for the first wind turbine foundation, and would be in place for the life of the project. The security would be renewed by FCWF annually, or another schedule agreed to by the Blayney Shire Council and the Flyers Creek Wind Farm developers.

The amount of the financial security should be at least $100,000 per turbine based on the figures demonstrated above, and as referenced to the requirements in the United States of America. Terms of the security should include:

- Designation of Blayney Shire Council as beneficiary;
- Terms under which funds would be dispersed;

- A provision that Blayney Shire Council could draw 50% of the funds if FCWF does not renew the security instrument prior to its expiration date; and
- An escalating factor to ensure that the full costs are covered when decommissioning occurs and/or abandonment of the project.

Every three years an independent engineering firm agreed to by both parties, will review the nett decommissioning costs in a report to the Shire Council. Any adjustment to the security value recommended by the engineer's report would be in place within ninety (90) days of delivery of the report to the Blayney Shire Council.

CONCLUSION:

This report has been prepared by me as an affected resident of the proposed Flyers Creek Wind Farm development, and in my capacity as a professional waste and contracts management specialist with over 30 years of experience. The opinions expressed in this report are my own and have been researched carefully by me to ensure clarity and perspective. It is hoped that the NSW Government will also share my opinion and take extreme caution in dealing with this application by Infigen, for an outdated and otherwise ineffective method of renewable energy.

John Schneider
Head of Contracts
The Center of waste Management – Abu Dhabi

References:

BeechRidgeEnergyDecommissioning.pdf
www.wind-watch.org/..wind-decommissioning
invenergyllc.com/stonycreek/
Comfrey Wind Energy
Wind Farm Decommissioning – David Burraston
NSW Legislative Council 5.128 Decommissioning

WASTE MANAGEMENT:

Producers of waste have a **"Duty of Care"** to ensure that waste is properly managed. There are various types of waste produced on the wind farm site including:

Construction Stage - clearing the site of debris including trees, shrubs, and possibly other types of farm waste. Concrete and rubble generated during the construction of the towers and foundations.

Operation Stage – maintenance of the turbines will require oils for lubrication as well as hydraulic fluids, and the storage of materials on the site.

Decommissioning Stage – it is assumed that most wind turbines and substation components will be reused, recycled, or sold as scrap. Oils and other fluids that may be considered hazardous should be handled and disposed of according to waste management regulations.

There needs to be a clear waste management plan that identifies the wastes that will be generated on the site during the various stages listed above. The plan should identify the nearest disposal facilities and the type and quantity of waste that will be disposed of at these facilities. Hazardous wastes should be handled with the utmost care.

Other considerations should include:

- Waste minimization and a "just in time" procurement policy to encourage minimal storage of goods on site;
- Separation of waste at source to maximize opportunities for reuse and recycling;
- Appropriate storage and disposal;
- Environmental Management Systems (EMS) should be demonstrated by all major contractors on site and satisfactory audit of systems carried out;
- Management of domestic waste, domestic refuse and sewage; and
- Management of concrete waste and oils with appropriate bunding and reference to the Environmental Management Plan and Pollution Prevention Plan.

It is critical to minimize negative impacts on the environment, therefore plans for management and disposal of infrastructure removed from the site will favour reuse and recycling of materials where possible, and should follow best practices for waste disposal .