

1 energy credit trading and windpower siting ordinances. Recent accomplishments
2 include persuading We Energies to adopt a renewable energy target that exceeds
3 the state requirement, and forming a collaborative to guide that utility's renewable
4 resource acquisitions. I represent RENEW on Governor Doyle's Task Force on
5 Energy Efficiency and Renewable Energy, and serve as a co-chair of the
6 Renewables Workgroup. In addition to producing the organization's official
7 newsletter, I periodically write and circulate "Petroleum and Natural Gas Watch,"
8 a journal that tracks the supply-demand balance of conventional energy sources
9 that are subject to depletion. RENEW's web site includes a section (The End of
10 Cheap Oil) that compiles relevant articles and commentary. During MGE's West
11 Campus Cogeneration Facility proceeding (05-CE-121) RENEW submitted
12 testimony supporting the view that an expansion of natural gas supplies in the
13 United States to meet growing demand is not likely to occur in the foreseeable
14 future, and thus utilities and regulators should expect prices to increase, not
15 decrease, as the decade wears on. RENEW's testimony catalogued the physical
16 and structural reasons that point to declining supplies of natural gas (relative to
17 demand).

18

19 **Q. What is the purpose of your testimony?**

20 A. The purpose of my testimony is to call attention to a major omission in the Final
21 Environmental Impact Statement on Wisconsin Public Service Corporation's
22 proposed Weston 4 generating station. The analysis performed on this facility is
23 devoid of any references to an impending milestone that will have a huge and

1 very likely a traumatic impact on the U.S. economy as well as the electric power
2 industry. That milestone is Peak Oil, and some reliable estimates suggest that it
3 will occur between now and 2008. It is a phenomenon that is very much related to
4 the problems plaguing the supply of natural gas available to the United States.
5 The one big difference is that natural gas is an energy resource that usually
6 remains in the continent from which it is extracted, whereas petroleum can be
7 easily shipped around the world via tankers. It is RENEW's contention that any
8 decrease in the amount of petroleum available for export will have a profoundly
9 unsettling impact on the American economy, which in turn will affect fuel price
10 behavior and demand for both primary energy sources and electricity. Such a
11 momentous event needs to be accounted for in the Weston 4 EIS.

12

13 **Q. What is Peak Oil?**

14 A. Peak Oil—sometimes referred to as the Hubbert Peak after the
15 geophysicist M. King Hubbert, who developed this theory in the 1950s--is a term
16 used to describe a maximum reached in the production of oil. The concept applies
17 at both the local level when an individual well or oil field reaches a production
18 peak, and at the aggregate level for a larger group of fields.

19 According to the Hubbert Peak for World Oil web site, the Hubbert's
20 theory posits that oil is a finite resource, and that there are basic observations to
21 be drawn from the depletion of any finite resource.

- 22
- Production (or extraction) starts at zero;

- 1 ▪ Production (or extraction) then rises to a peak, which can never be
- 2 surpassed; and
- 3 ▪ Once the peak has been passed, production (or extraction declines until the
- 4 resource is depleted).

5 Hubbert’s observations apply to any relevant resource, including the world’s

6 petroleum resources. It is important to note that the point of maximum of

7 production (or extraction) tends to coincide with the midpoint of depletion of

8 the resource under consideration. In the case of oil, this means that when the

9 Hubbert Peak is reached, humans **will have used half of all recoverable oil**

10 **that ever existed on our planet** (emphasis in original). (See

11 <http://www.oilcrisis.com/summary.htm>)

12 As Marshall Auerback of PrudentBear.com explains in a column dated

13 July 13, 2004, “the basic reasons for a bell curve in any plot of production over

14 time are that exploration is not a random process and that oil and gas are depleting

15 assets. When exploration of an area begins, the largest reservoirs are the easiest to

16 find. Total production rises as they are brought into production, while exploration

17 for smaller reservoirs continues. Eventually enough smaller reservoirs cannot be

18 found to offset the declines in production from the depleting large reservoirs.

19 Prices and technology affect the area under the curve -- the total amount of oil and

20 gas recovered over time -- but not the shape of the curve.”

21 (See <http://www.prudentbear.com/internationalperspective.asp>)

22

23 **Q. Why is Peak Oil relevant to Commission review of this capacity addition?**

1 A. The economic analysis that appears in the Weston 4 EIS assumes that the rest of
2 this decade and the decades that follow will proceed in a linear fashion from the
3 1990s. That decade witnessed a combination of very low fossil fuel prices and
4 strong load growth. Apart from a brief blip in the winter of 1990-1991, fuel price
5 behavior during that decade was remarkably calm, which ushered in a period of
6 sustained economic growth and higher demand for electricity.

7 Those who believe that Peak Oil will be a profoundly disruptive event that
8 will fundamentally alter energy consumption patterns rest their beliefs on the
9 following observations:

- 10 ▪ Oil is the world's premier source of energy and is fundamental to
11 almost every important function of modern life.
- 12 ▪ Global demand for oil has increased seven-fold over the past half-century
13 due to rapid population growth and industrial expansion.
- 14 ▪ Oil industry leaders acknowledge that new sources of oil are becoming
15 increasingly difficult to find and more costly to exploit.
- 16 ▪ The industry's ability to locate and recover ever-smaller volumes of oil has
17 improved significantly but the physical limitations of the resource are
18 inescapable.
- 19 ▪ The world has now consumed almost half the total amount of conventional
20 oil most experts estimate will ever be available for recovery.
- 21 ▪ A growing number of experts now foresee a permanent downturn in global
22 oil production rates within a number of years.

- 1 ▪ As growing demand exceeds available supplies, oil prices will rise
- 2 substantially and the effects will be felt throughout the global economy.
- 3 ▪ The world will become increasingly dependent on oil from the Middle
- 4 East as supplies from elsewhere decline.
- 5 ▪ The productive capacity of Middle East oilfields is uncertain and the risks
- 6 of supply disruptions are heightened by continuing political instability in
- 7 the region.
- 8 ▪ The era of cheap, plentiful supplies of oil is coming to an end, requiring
- 9 fundamental restructuring of the world's energy systems. (See
- 10 <http://www.odac-info.org> (Overview section))

11 RENEW believes any large increment of fossil generating capacity needs

12 to be evaluated against a backdrop where Peak Oil is treated as an inescapable

13 part of the landscape. That is not the case in this EIS. The default assumption here

14 is that future economic conditions will accommodate growth in jobs, income,

15 population, and demand for electricity. In other words, the future will be a mirror

16 of the past, oil will remain cheap, natural gas will not become scarce, and loads

17 will keep growing in a linear fashion.

18 As one might expect, growth in demand is an integral part of the financial

19 calculus in recovering WPS's investment in Weston 4. Should that demand

20 growth not materialize, WPS would have to seek large rate increases to make up

21 the difference. Because of Weston 4's size, it will take several decades to recover

22 the capital costs associated with this project.

1 Whether the amount of petroleum available for export starts to contract
2 this year, next year or 2010, this event will happen either during the construction
3 of this coal plant or during its first years of operation. It is difficult to believe that
4 a reduction in petroleum usage will not wreak havoc on many segments of this
5 country. Large-scale capital-intensive development projects, in particular, would
6 be particularly vulnerable to economic disruptions triggered by spiraling inflation,
7 geopolitical strife, or enforced reductions in energy use. Failing to model the
8 potential impact that Peak Oil will have on electricity demand, fuel price behavior
9 and future economic growth within WPS's service territory understates the
10 financial risk that Weston 4 poses to ratepayers. Unless the Applicant or the
11 Commission can demonstrate that the onset of Peak Oil will not trigger a
12 protracted global economic downturn during the useful life of Weston 4, an
13 analysis of Peak Oil impacts needs to be undertaken here. This evaluation ought
14 to be a standard feature of any fossil fuel power plant greater than 100 MW that is
15 owned by or leased to a regulated utility in Wisconsin.

16

17 **What should be included in this analysis?**

18 The years between 2006 and 2010 would be a good starting point for factoring in
19 the manifestations of this non-linear event. These dates are consistent with the
20 projections that were advanced at the May 2004 conference held by the
21 Association for the Study of Peak Oil (ASPO). If 2008 is selected as the ultimate
22 peak in extraction volumes, then the analysis should anticipate a decline of
23 1%/year starting in 2009. The study would need to make some assumptions

1 regarding natural gas supplies. I would suggest that the analysis model natural gas
2 supplies (extraction volumes + imports) to remain flat during the study period.

3 Using those basic inputs, the study should model the effects of Peak Oil
4 and Gas on the following areas relevant to Weston 4:

- 5 ■ effects of oil/natural gas price increases on business activity in WPS
6 territory;
- 7 ■ effects of oil/natural gas price increases on future electricity rates in WPS
8 territory;
- 9 ■ effects of oil/natural gas price increases on other generation sources (coal,
10 renewables, etc.); and
- 11 ■ effects from all of the above on future demand for electricity in WPS
12 territory.

13 If the results from the above suggest slower load growth or a reduction in
14 demand that would impair the ability of WPS to recover the capital costs
15 associated with Weston 4, the study should attempt to quantify those effects.

16 This analysis will be very helpful in estimating the risk premium to be
17 encountered by building a large coal plant on the downslope of hydrocarbon
18 fuel availability.

19

20 **Where can the Commission learn more about Peak Oil?**

21 Among books, I recommend reading *The Coming Oil Crisis*, by Colin Campbell
22 (originally published in 1997, reprinted in 2004); *Hubbert's Peak*, by Kenneth
23 Deffeyes (2001); and *The Party's Over*, by Richard Heinberg (2003).

1 The very best web sites dedicated to this issue are:

2 (1) <http://www.peakoil.net> – This site, operated by Association for the Study of
3 Peak Oil, a network of scientists, affiliated with European institutions and
4 universities, having an interest in determining the date and impact of the peak and
5 decline of oil and gas, due to resource constraints.

6 (2) <http://www.simmonsco-intl.com> – This site, operated by Simmons &
7 Company, a Houston-based investment banking service specializing in the energy
8 industry, has several excellent slide shows produced by company president
9 Matthew Simmons. (Go to Our Research, then to Speeches.)

10 (3) <http://www.odac-info.org> – This site, operated by the Oil Depletion Analysis
11 Centre, is an independent, United Kingdom-registered educational charity
12 working to raise international awareness and promote better understanding of the
13 world’s oil-depletion problem.

14 Among magazine articles, I recommend reading “The End of Cheap Oil,”
15 by Colin Campbell and Jean Laherrere, in the March 1998 issue of Scientific
16 American and “**When Will the Joyride End,**” by Randy Udall (1997, revised
17 2000) (available on-line at
18 <http://www.aspencore.org/joy%20ride%20good%20one.pdf>). The cover story
19 on the June 2004 issue of National Geographic, titled “The End of Cheap Oil,”
20 represents one of the first serious treatments of Peak Oil by a mainstream U.S.
21 publication.

22 **Q. Does this complete your testimony?**

23 A. Yes it does.