

# Recommendations on Topics that the Los Alamos County Council Subcommittee on Utility Issues Might Investigate

Andrew M. Fraser

March 18, 2015

## 1 Introduction

On Friday March 6, 2015, I met with Susan O’Leary over lunch, and she told me that the County Council had established a committee to look into issues concerning the Department of Public Utilities (DPU). The members of the committee are Councilors Steven Girrens, Susan O’Leary and Rick Reiss. The Council will choose both a small number of topics to investigate and a mechanism for funding the investigations. At the Council Leadership Meeting on the Monday following my lunch with O’Leary, Councilors Reiss and O’Leary asked that members of the Board of Public Utilities (BPU) individually suggest topics to the committee. Here, I address several topics that occur to me. In order of importance, I recommend the following topics:

**Utility rates for schools:** The Leidos study[1] provided estimates of rates that cover the cost of providing electric service to each customer class and suggested new rates. With minor modifications, those rates were passed by the board and council this winter. The Leidos study said that the rate that we charge the schools is less than what is required to cover the cost of providing the service. The Board and the Council should decide if we will continue that practice.

**Broadband as a public utility:** Comcast is the primary provider of internet access to residents in the county. The service is a *natural monopoly*<sup>1</sup>, and it is not regulated as a utility.

---

<sup>1</sup>*Natural monopoly* is a term of art in economics. Quoting

The county should understand the costs to our residents of monopoly pricing and terms of service. We should also evaluate alternative service options.

**Constraints on DPU hiring and compensation:**

I met with John Arrowsmith over lunch on February 11<sup>th</sup> to get his perspective as former head of the department. He said that the most important challenge for the department is hiring and retaining staff. For example, he said that we could not hire Rafael De LaTorre under the current county policies. We should understand how damaging county employment policies are to the department and how we can mitigate that damage.

While the following topics are important, the previous three should be studied first.

**Our San Juan Chama water rights:** We should understand the value of our water rights. At LANL, I have heard that expansion of computing power here will be constrained by the water available for evaporative cooling, while at BPU meetings, I hear that we must annually sell our San Juan Chama allocation carefully to preserve ownership.

**Putting all utilities underground:** I suspect that underground wires are more robust and

---

Wikipedia[2] “A natural monopoly is a monopoly in an industry in which it is most efficient (involving the lowest long-run average cost) for production to be permanently concentrated in a single firm rather than contested competitively.”

safe than wires on poles. When shopping for homes, I have chosen to not buy particular properties because of ugly utility poles. Friends and colleagues with quite varied political and ideological identities have told me that they want utilities underground countywide. We should know how much that would cost and have some quantitative measure of the benefits.

Finally, I recommend that the committee not investigate the following topics:

**Payments by DPU to the County:** The practice of transferring 5% of some income categories from the DPU to the county is a political and legal issue. The County Attorney's office can explain the legal aspects and the political aspects must be negotiated between the Council and the Board.

**Distributed power generation:** In part as a response to the objections raised by rooftop solar PV owners to the *wires charge* in the initially proposed new electric rates, the board has appointed an ad hoc committee to study some aspects of distributed power generation. Worldwide, the key questions (not part of the charge to the ad hoc committee) are the degree (or perhaps degrees) of human influence on climate change and the appropriate distribution of the estimated costs of carbon emissions. Nationwide, people choose to believe facts and hold opinions concerning these questions based on group identity. Study of those issues by the county will not persuade enough people to be valuable. At the county level we must choose policies while we continue to disagree about the facts.

**The price performance frontier:** We can roughly choose a balance between utility rates and quality of service. It would be nice to have a quantitative characterization of the best quality possible for each price. We could use such a characterization to select where on the boundary we want to operate and to evaluate the performance of the department. Although I think of our choices in such terms, getting

a useful quantitative estimate of the frontier would be expensive. It would cost more than it is worth.

**The power pool:** The county and LANL operate a joint power pool. While we should understand and document if and how our participation in the pool benefits the county, we are bound by contract to stay in the pool until 2025. We should spend money and effort on studying the power pool when we anticipate being able to use that information to guide action.

## 2 Perspective

In a public comment (I believe that it was made by Will Fox) at a BPU meeting last fall, a citizen suggested that the BPU should act like the board of an investor owned utility; we should act in the interests of the owners (the citizens of the county)<sup>2</sup>. In this section, I describe some essential characteristics of our community. We need that perspective to know what is appropriate for our community and exploiting those characteristics is key to any sort of development including economic development. The following points characterize both citizens of the county and the best opportunities we have for development:

**LANL:** Most of our citizens came here to work at LANL or came with a family member who did. The county exists because of LANL and the community here continues to economically depend on LANL. Conversely, LANL's most important resource is its uniquely qualified staff. For LANL to function well, it must be able to recruit first rate scientists<sup>3</sup>, and that ability depends on having attractive living and lifestyle options within commuting distance of LANL.

**Creative technically and scientifically:** In addition to the work done at LANL, many of our

---

<sup>2</sup>While I agree with the comment, I know that interests and wishes differ between citizens. In weighing all of those interests and wishes, we should emphasize the wishes of the majority.

<sup>3</sup>LANL relies on a wide variety of skills from people with diverse educational degrees. I will misuse the word scientist to describe these uniquely skilled and talented people.

citizens have skills, expertise and interests that are portable and get expressed elsewhere. Lauren Earls, who sold us our home, repeatedly complained about the amateur experimental architecture projects that showed up in her selling challenges. Our citizens have things around the house like astronomical observatories, machine shops, amateur radio stations and compute servers. For their income levels, they are too frequently found working under their cars.

**Intellectuals:** The scientists who come here are not young college graduates. They have finished graduate school and perhaps have even more advanced scientific or academic careers. Often they come as families with two scientists or a scientist and a spouse who has an advanced degree in an other area. Since such families encourage intellectual development and interests in their children, the whole community is unusually intellectual. We have more than our share of authors.

**Uniform medium high income:** Our median income is high because LANL salaries are more uniform across it's workforce than for many employers and most of the LANL employees who live in the county are highly educated and in the upper part of the pay range.

I like living here because my work at LANL is interesting and my access to intellectually exciting colleagues is superb. I also like the outdoor recreation, the physical beauty and having a home on a canyon edge. Shopping here I might run into someone who wonders (and asks) if the sequence number on a receipt is prime or someone who thinks functional uncertainty is like the shadow of an essence in Plato's Republic.

I've lived in Boston, Mountain View, Austin and Portland Oregon. In each of those places, an economy has developed that is supported by the kind of scientific talent we have here, and with the exception of Boston I remember when scientific skill and talent was not the essential community asset that it is now. As County leaders, the Council and the Board should ensure that we continue to attract and retain people

who constitute that asset and exploit that asset to develop the community.

## 2.1 Hostility to Government

Skepticism is an essential characteristic of science. Last week when I used 2.7 as a floating point value in demonstrating an idea to a young colleague, she asked "Is that like the Indiana value of  $e$ ?" I laughed and said "Maybe." She was alluding to the story of Indiana legislating a rational value for  $\pi$ . I don't know if the story is true, but it is part of the lore of our culture that includes persecution of scientists for contradicting clerical and government dogma on science.

Since I was appointed to the BPU last July, I have asked colleagues and acquaintances for their opinions about policy issues that the Board must address. I've found a pervasive suspicion of and hostility to government in general and of county government (including the BPU) in particular. A typical comment is, "When *they* get funding for one thing *they* always use it for something else." While the sentiment may grow from healthy scientific skepticism, now that I am among *them*, I am more aware of the hostility. I believe that the proposed County Charter revisions failed to pass because of such skepticism.

Beyond worrying about hurt feelings, we must address the skepticism and hostility by being transparent and restrained to be effective.

## 3 Elaboration

In the next two subsections I elaborate on the first two topics that I have asked the Council subcommittee to study and connect those topics to the strengths and characteristics that I listed in the previous section.

### 3.1 Utility Rates for Schools

Excellent schools are synergistic with the intellectual nature of our community. We want to pass our skills, knowledge, values and culture to our children, and having excellent schools helps us recruit new talent to

the county. Although we can afford excellent schools, state law prevents us from funding such schools by taxes.

A possible mechanism for supporting our schools that is consistent with state law, is to charge the schools reduced rates for utilities and compensate by having higher residential rates. While such a practice might feed the hostility I described in Section 2.1, it would be consistent with the intellectual character of our community. Having a transparent well explained policy might mitigate the hostility. Before making such a decision, we should be sure that the state legislature will not react to it as an attempt to circumvent their intent, and we should ensure that we have broad community support.

### 3.2 Broadband as a Public Utility

People with the scientific talent and skill that I described in Section 2 as essential for the vitality of our community rely on the internet. We must recruit and retain young scientists who are more internet savvy than I am. They will have demands on home access that include and extend beyond the following activities for which I rely on the internet daily:

**Work coordination:** I use a variety of platforms and I use internet connections to enable me to work on single projects from more than one platform. At LANL, I use open and secure super computers and desktop machines, and outside of LANL, I use portable devices, a desktop computer in my home office and a compute server in my basement.

**Answer questions:** When I encounter work related technical questions or questions in other areas, my first reaction is to do an internet search. Simply pasting error messages produced by software bugs into Google usually leads to discussions by others who have encountered and solved the same error.

**Search for and access software:** For new tasks and problems, I search for descriptions of solutions others have developed for the same or

similar tasks. Often, those searches locate software that I can either use directly or modify to accomplish my task.

**Search for and access published research:**

Similarly, I use the internet to find and fetch scholarly articles and books on topics that I want to learn about.

**Personal business and communication:** I use email and web interfaces to manage my finances and communicate with lawyers, etc. I have used internet video technology to maintain personal relationships over spatial separations.

**News:** I use the internet for access to news about and analysis of current events.

Two main characterizations of a communication link are capacity (bits per second) and latency (seconds). While the capacity of my home internet link varies over the course of every day, it is usually adequate for most of the uses I've described. Yesterday, I measured the round trip delay between computers at home and LANL to be roughly 90 milliseconds. That latency makes some applications such as interactive editing of files unusable. Using the *traceroute* application, I found that my connection ran through 20 intermediate nodes including one called be-10915-cr01.losangeles.ca.ibone.comcast.net.

Led by the department of defense and the scientific community, the internet has replaced print as a means of communication. I find it threatening that my access to that means of communication is controlled by an unregulated monopoly whose goal is profit maximization and whose emphasis is entertainment. I fear and find that when any of my uses of communication do not fit Comcast's business model, those uses will be and are prohibited.

The book *Captive Audience: The Telecom Industry and Monopoly Power in the New Gilded Age*[3] describes how cable companies leverage the natural monopoly of last mile connectivity into ownership of essential content<sup>4</sup>. The merger of Time Warner and Comcast, proposed since that book was published,

<sup>4</sup>The book claims that control of sports programming is particularly powerful.

threatens additional consolidation and control over content.

In the past year Comcast has extracted payment from Netflix for *access to their customers*<sup>5</sup>, and the FCC has begun moves towards using its authority to enforce *net neutrality*. While those events have brought some of the relevant issues to national attention, they are also leading to an unhelpful partisan alignment of positions.

While I want a national policy of public control or ownership of the common means of communication that the internet has become as a matter of intellectual freedom first and economic efficiency second, I know that even in Los Alamos my values are not widely shared. However, my values and interests in free use of the internet are most common among the young computer savvy scientists we want to attract and retain in our community.

I conjecture that new capacity requirements driven primarily by video on demand (Netflix, content from Amazon, etc.) will eventually lead to installation of fiber to most urban homes, and that citizens of communities that install and own that fiber will avoid the monopoly rents and restraints on communication that entertainment driven cable companies may impose. Citizens of those communities will enjoy those benefits regardless of the timing and nature of changes in national policy. I suggest that the County Council subcommittee on utility issues investigate that conjecture, and if confirmed, propose an action plan. In particular, the committee can command or purchase the expertise needed to estimate the monopoly rents that Comcast may be extracting from our community over time.

I offer three pieces of evidence that suggest that installing fiber is financially viable: First, LA-Net is doing it in Los Alamos now<sup>6</sup>. Second, I've heard that the community fiber installation in Chattanooga, TN is working out<sup>7</sup>. Third, Google is installing fiber in a

few mid-sized cities<sup>8</sup> around the country.

## References

- [1] Leidos Engineering. Electric utility cost of service analysis and rate study. Technical report, Los Alamos County Department of Public Utilities, November 2014.
- [2] Wikipedia. Natural monopoly — Wikipedia, the free encyclopedia, 2015. [Online; accessed 18-March-2015].
- [3] S.P. Crawford. *Captive Audience: The Telecom Industry and Monopoly Power in the New Gilded Age*. Yale University Press, 2013.

---

<sup>5</sup>This phrasing fits Comcast's position. In my view it is customer's access of content not controlled by Comcast for which Comcast is extracting an additional monopoly rent.

<sup>6</sup>I am disappointed to hear that they have been laying fiber without appropriate contracts.

<sup>7</sup>It is amusing to recall that a Qwest spokesman raised Chattanooga as a cautionary tale at a public meeting in Los

---

Alamos a few years ago.

<sup>8</sup>In Austin, Google is using poles owned by the public utility.