

Evidence-Based Public Policy for Support of Cold Fusion (LENR) Development

Thomas W. Grimshaw, PhD, MPAff

Research Fellow, Center for International Energy and Environmental Policy
The University of Texas at Austin, Texas, USA, thomaswgrimshaw@gmail.com

Abstract – Cold fusion (LENR) has enormous potential public welfare benefit. The level of public support for its development should be determined by evidence-based policymaking. The CF/LENR level of evidence mandates its support with other emerging energy technologies. The evidence may even indicate that a crash program is the most rational policy.

Index Terms – LENR public welfare benefit, evidence-based policymaking for LENR, LENR levels of evidence, LENR crash program

I. INTRODUCTION

CF/LENR[A] has the potential for immense benefit as a virtually unlimited and very low cost source of energy. However, the claimed phenomenon was rejected by mainstream science within a year of its announcement by Martin Fleischmann and Stanley Pons in 1989. Despite continued successful experimental results and public demonstrations, CF/LENR is not yet widely accepted by conventional science. The continued rejection of CF/LENR represent a major challenge for making rational public policy for realizing its very high potential public welfare benefit. A promising way of meeting this policy challenge is to rely on evidence-based policymaking (EBP). This paper is a summary of a short presentation at the ICCF-17 poster session.

II. WHAT IS THE POTENTIAL PUBLIC WELFARE BENEFIT OF CF/LENR?

In addition to the obvious and long-recognized benefits of cheap and unlimited energy, CF/LENR has many direct and indirect side benefits. Examples of direct benefits are low capital and operation costs, ease of operation and refueling, safe and silent operation, and portable generation units. Potential indirect benefits include reduction of environmental impacts of production from conventional energy sources (e.g., coal, oil and gas, nuclear), minimal input requirements and associated impacts, ready availability of clean water in poor areas of

[A] Cold fusion refers to nuclear fusion achieved at relatively low temperatures (compared to the very high temperatures of plasma fusion) with large releases of energy. The term low energy nuclear reactions (LENR) is now preferred by most researchers in the field, but cold fusion continues to be more widely known. The combined acronym CF/LENR is therefore used here.

the world, improved geopolitical conditions associated with the location of petroleum resources, and increased levels of research in a new scientific field having great economic significance. Nagel[1] has listed no fewer than 40 potential advantages and impacts of CF/LENR deployment.

III. WHAT IS EVIDENCE-BASED POLICYMAKING?

Evidence-based policymaking (EBP) involves making decisions for the public welfare benefit using factual information. A primary philosophic underpinning of EBP is realism, with a focus on actual conditions or context and clear-eyed acceptance of what can in reality be achieved. Thus a second underpinning is that of pragmatism – focusing on what works. Making public policy decisions on a particular topic based on the best available evidence is arguably the most rational principal for responsible officials.

IV. WHAT ARE THE LEVELS OF EVIDENCE TO GUIDE RATIONAL POLICYMAKING?

Although EBP may be a superior policymaking approach conceptually, concrete tools are needed to implement the concept in the real world. One way of making the concept more concrete for practical application is to borrow terminology from the legal field and, to the extent possible, attach quantitative values to the terms. The public generally, and policymakers in particular (many of whom have a legal background), can readily relate to the following levels of evidence and associated probabilities when making decisions, for example, on whether to support an emerging technology:

| Level | | Probability |
|-------------------------------|-----|-------------|
| Insufficient Evidence | ISE | <50% |
| Preponderance of Evidence | POE | 50-70% |
| Clear and Convincing Evidence | CCE | 70-90% |
| Beyond a Reasonable Doubt | BRD | >90% |

V. WHAT ARE THE POLICY RESPONSES TO THE LEVELS OF EVIDENCE?

These readily understood levels of evidence can be further utilized to select specific policy stances or actions regarding emerging technologies. The following are rational policy responses for the increasing levels of evidence of technologies having large potential public welfare benefit:

| | |
|-----|--------------------------------|
| ISE | Little (if any) public support |
| POE | Normal research support |
| CCE | Accelerated support |
| BRD | Crash program |

VI. WHAT IS THE LEVEL OF EVIDENCE FOR CF/LENR REALITY?

The evidence for the reality of CF/LENR has increased greatly since it was rejected in 1989 and 1990. Even during the months that it was being evaluated, Beaudette[2] found no fewer than seven instances of successful replication of CF/LENR by different experimenters, methods, and laboratories during the period 1989 to 1991. Storms[3] conducted a review of experimental reports for the period 1989 to 2004 and found more than 300 reports of excess heat (a primary signature of CF/LENR), elemental transmutation, and anomalous radiation. And in 2011 Andrea Rossi[4] conducted at least six single-unit demonstrations of CF/LENR-based steam generating units from January to October leading up to a multiple-reactor (over 50 units) test on October 28. The single-unit tests appeared to be successful, and the multiple-reactor configuration apparently produced steam with an energy content equivalent to more than 70 gallons of gasoline in a 5½-hour test with no energy input.

In parallel with Rossi's demonstrations, Defkalion Green Technologies has claimed development of reactors, which they call Hyperions, based on materials and methods similar to those of Rossi. Current plans call for availability of Hyperions in 2012[5]. Since Rossi's apparent 2011 successes, a number of additional claims of successful CR/LENR (or related phenomena) applications have emerged, including Miley's LENUCO[6], Schwartz's NANOR[7], Brillouin's CECR[8], and Blacklight Power's CIHT[9].

These experimental and public demonstration successes may be rationally interpreted in terms of levels of evidence as follows:

| | |
|--|-----|
| Beaudette: seven early successes | POE |
| Storms: over 300 verifications to 2004 | CCE |
| Rossi: public demonstrations in 2011 | BRD |

VII. WHAT SHOULD BE THE EVIDENCE-BASED POLICY FOR CF/LENR SUPPORT?

The level of public support for development of CF/LENR should rationally depend on the level of evidence of its existence – and its potential for realization as an energy source. The levels of evidence and appropriate levels of public support are summarized as follows:

| | |
|-----|---|
| ISE | No change in current negative policy |
| POE | Reinstate and pursue with peers |
| CCE | Support on a par with hot fusion research |
| BRD | Institute crash program |

If there is not a preponderance of evidence for its existence, current policies of little public support may be appropriate. If, however, there is a preponderance of evidence as shown by Beaudette, CF/LENR should be reinstated and rigorously pursued along with other emerging energy technologies. If there is clear and convincing evidence as indicated by Storms, CF/LENR should receive support on a par with hot fusion as it has been provided in the decades since the first fusion thermonuclear bomb. If CF/LENR is established beyond a reasonable doubt as demonstrated by Rossi and others, a crash program comparable to the Manhattan Project (which resulted in development of the atomic bomb) should be undertaken.

VIII. CF/LENR POLICYMAKING SUMMARY

The policy implications of analysis for support of CF/LENR for the public welfare benefit are profound. It seems clear that CF/LENR probably should never have been rejected and certainly should now be reinstated at a minimum. It may further be cogently argued that based on the successes in the years since rejection, CF/LENR should be pursued and supported at least on a par with hot fusion support – and at levels of past decades rather than today's lower levels. If the demonstrations of Rossi and a number of others prove to be valid and sustainable, it is rational that a crash program should be undertaken as soon as possible.

IX. REFERENCES

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