Four Analogies to Clean Energy

From "Four analogies to clean energy," SPARC Open Access Newsletter, February 2, 2010.

http://dash.harvard.edu/handle/1/4315928

When I think about the political fortunes of open access, I find that I compare them privately to the political fortunes of clean energy. I know there are differences, but I keep returning to the similarities.

I'm not ready to say that the similarities are more salient than the differences. But it's time to get these analogies out in the open.

(1) The gap between breakthrough and uptake

Lots of smart and well-funded people are looking for a source of energy that is renewable, inexpensive, efficient, low-impact to produce, low-impact to use, and doesn't require a police state to keep byproducts out of the hands of terrorists. Suppose they succeed. That would be a momentous breakthrough.

This is already a key difference between OA and clean energy. On the energy side, we're well-embarked but still moiling through primary difficulties of physics and engineering, trying to raise efficiencies and lower prices. But on the OA side, the breakthrough is in hand, and has been since the birth of the internet. We've long since replaced the difficulties of engineering with the difficulties of uptake and persuasion.

As I argued in 2002, "If asked for a precedent for the kind of revolution represented by [open access], we might first mention the Gutenberg Press. But it isn't a very good fit. It's a technological advance, and all the technology required for [OA] already exists. We're trying to bring about an economic change that will take advantage of existing technology."

http://www.earlham.edu/~peters/fos/newsletter/03-11-02.htm#analogies

But suppose we had a clean energy breakthrough. Would it change the world overnight? Or would it need something more like a decade?

We might draw an optimistic distinction: We could recognize the superiority of the new technology immediately, and still need some time to embrace it and switch over.

The experience of OA makes me respond, "Maybe, at best." […] I wonder whether we'd need serious time even to recognize the superiority of the breakthrough technology. "We" here means everyone in a position to make a relevant decision, from policymakers and manufacturers to consumers.

The question suggests a pessimism that may not be warranted. Some useful new technologies, like cell phones, spread far, wide, and fast. We know that doesn't happen for all useful new technologies, like plug-in electric cars. Rapid adoption is not automatic, and it's not a simple function of the technology's utility or value.

Of course the internet was widely and quickly adopted. But for taking full advantage of the internet in individual domains, such as music or peer-reviewed research literature, we're already in our second decade.

One variable seems to be whether the new technology makes an easy fit with existing business models and businesses. If the cell phone threatened to bankrupt phone companies, rather than enrich them, it would not have spread as quickly. If VoIP were as accommodating or convergent as cell phones, it would be spreading faster.

OA isn't held back because it isn't useful enough, but because a bewildering array of interests and incentives pull against it, by no means limited to commercial business interests (see #2 below). Of course many other interests and incentives pull for it, but that matters much less here. The interests pulling against it clog the path with obstacles, and the mere existence of obstacles slows down uptake and adoption.

A breakthrough energy technology might require widespread infrastructure before it could be widely adopted—for example, neighborhood hydrogen stations for hydrogen-powered cars or capacity to transport and store wind and solar power for use in places that are not windy or sunny. These infrastructure prerequisites are expensive and time-consuming add-ons to the original energy breakthrough and can certainly slow down adoption. By contrast, the infrastructure required for OA is much lighter, at least once the internet is in place. The software for launching journals and repositories, maintaining them, and searching them, are all in hand, even if all are undergoing constant refinement.

Just a few years ago, publishers who were not ready to adopt OA themselves were often willing to recognize its superiority. Even publishers lobbying against it were willing to say in public that OA was better than TA for research, and that the only problem was paying for it. (Publishers who cheerfully made this concession five years ago have apparently been advised by their PR departments not to do it again.) The real problem has been the slow growth in the group of people paying attention to OA. Even today study after study shows that most publishing researchers know very little about it or labor under misunderstandings.

OA depends on thousands of distributed author decisions. That's an advantage when authors are ahead of the curve and can decide to submit their work to OA journals, deposit it in OA repositories, or retain key rights, without waiting for deep changes in markets, legislation, or institutional policy. But it's a disadvantage when the worldwide growth of OA depends on educating thousands of authors individually.

Clean energy has a way around that problem. If utility companies adopt the breakthrough technology, then their customers and consumers automatically adopt it at the same time. In OA, we can approximate this advantage by recruiting institutions in a position to influence author decisions: funding agencies and universities. When they adopt OA policies, the assistance is decisive. But while the number of funders and universities adopting OA policies is sharply up, and will continue to climb, each new policy is a new struggle, especially at universities which decide (wisely) to adopt OA policies through faculty votes rather than administrative edicts.

But I'm still wondering: will it take roughly as long to persuade the world's utility companies to adopt a breakthrough energy technology as it's taking to persuade the world's funding agencies and universities to adopt OA? I don't know the constraints on utility companies, but I imagine there are many: from legacy facilities optimized for coal or oil to long-term contracts with suppliers and the skills in the local labor market.

When I'm pessimistic, Howard Aiken captures the mood perfectly: "Don't worry about people stealing your ideas. If your ideas are any good, you'll have to ram them down people's throats."

(2) Putting obstacles in our way

Imagine the same breakthrough in efficient, inexpensive, clean energy. Now imagine that during the age of dirty energy we had adopted laws and practices which turn out to deter the development, uptake, and use of the spectacular new technology. Some of the obstacles clogging the path to adoption are of our own making.

We might have provided subsidies to dirty energies, which in turn created jobs and revenues, which in turn elected politicians and enriched corporations who now fight to protect those jobs and revenues at the expense of any energy breakthrough. We might have grown to depend on cars, which spawned suburbs, which not only elected politicians but changed the landscape of life for millions of people and now make almost irrelevant any energy breakthrough that doesn't work in cars. We might have grown to depend on cheap oil, which nurtured whole industries and lifestyles which we find it inconceivable to abandon.

During the age of print, the first stirrings of digital allowed us to dream about OA. But now we find ourselves obstructed by laws and practices that evolved during the age of print. University promotion and tenure committees steer authors to high-prestige journals regardless of their access policies. Universities could easily reward publishing in the same journals and require green OA, but few do.

The same committees are addicted to journal impact factors, which they know or ought to know discriminate against new journals, even excellent new journals, and disregard the merits of individual articles, even excellent articles. They could easily distinguish the average citation impact of a journal from the actual quality of the individual articles by candidates up for renewal or tenure, but few do.

Copyright law prevents the wholesale adoption of new technologies for sharing perfect copies with a worldwide audience at zero marginal cost. We could all lobby for copyright reforms to support research and education, but few do. Universities and funders could adopt policies to keep key rights in the hands of those who will consent to OA; but while this position is spreading, it's still the minority position.

We have the technology to abolish information scarcity, but we are reluctant to use it even to advance our own professional interests. Sometimes we're stalled by inertia and overwork. Sometimes we consciously put the professional interests of another industry ahead of our own. We could support our favorite journal and publisher brands, even if TA, and insist on green OA at the same time, but few do.

If we were only obstructed by law, we could work for the vote that would change everything, even if took years and years. But the law is the least of our problems, since we already know how to implement OA lawfully. The problem is that we're also obstructed by our own customs and practices. There's no direct path through this thicket.

What should we do when law and custom prevent us from taking rapid advantage of a momentous boon? Unfortunately it's a serious question.

(3) Slowing down to protect the incumbents

Imagine the same breakthrough technology producing efficient, inexpensive, renewable, clean energy. Imagine that the only downside seemed to be that it would jeopardize the revenue streams of oil companies and coal mines.

Should we hesitate to use it? Should we wait until we can find a way to ensure the survival of the threatened industries? When policy-makers weigh the advantages and disadvantages of the new technology, should the effect on oil companies and coal mines count as a disadvantage? If so, how much environmental and economic good are we willing to forgo in order to prop up the old industries?

When people argue that OA will likely harm existing publishers, this is one thread of my thinking. Maybe they're right about that harm. (And BTW maybe they're not; I've written extensively about this and won't pause here to recap the state of the evidence.) But why should the effect on publishers be a criterion? What about the benefits for authors and readers, researchers and research?

Of course publisher prosperity is a criterion for publishers. It is and it ought to be. The question is whether it should be a criterion for other stakeholders, especially

funding agencies and universities. Funders underwrite research in order to advance knowledge or realize social benefits. Allowing publishers to limit the circulation of that knowledge would undermine those goals. Public funding agencies are structured to put the public interest ahead of private interests, and private funding agencies are charities. In both cases, for similar reasons, they generally decide that if research is worth funding, then it's worth making available to everyone who could make use of it.

Sometimes funders needlessly compromise their public or charitable missions in order to prop up publishers. In this category I put all the "loophole policies" or "loophole mandates" which require OA except when publishers do not allow it, giving the opt-out to publishers rather than authors. However, this problem is more common among universities than funding agencies.

Let's focus on universities for a moment. Should publisher prosperity be a criterion for universities, whose mission is to generate, share, teach, and preserve knowledge?

An undeniable part of the background is that publishers have played a central role in generating, sharing, teaching, and preserving knowledge. So the question is nicely complicated, and we shouldn't oversimplify it. (Hence, before you write in, I'm not saying that slowing down the progress of OA to protect publishers is like slowing down the progress of green energy to protect oil companies, or that publishers are to knowledge what oil companies are to the environment.) One tempting answer, then, is that institutions like funders and universities should try to preserve publishers, as acknowledged allies, even if the same funders and universities are determined to put knowledge ahead of profit. But that position doesn't answer the original question. What if we had efficient, inexpensive, renewable, and clean energy whose *only* downside was its threat to the revenue of oil companies and coal mines? What if the *only* downside to OA was its threat to the revenue of existing publishers?

If the question itself carries dubious assumptions, drawing on analogy and conjecture, let's put it to one side. Publishers are allies in the distribution of knowledge. But publishers who require access barriers for cost recovery have interests which actually limit the distribution of knowledge. Hence, to support them is not like supporting other kinds of allies who pull with and never against the forward motion. And there's now clear and convincing evidence that publishers needn't require access barriers for cost recovery.

There are shoals to avoid on both sides. We oversimplify if we don't acknowledge the role of publishers in the distribution of knowledge. The past role has been indispensable, and the future role could be as large and central. But it doesn't follow that we must compromise the progress of OA in order to prop up publishers. We oversimplify on the other side as soon as we say that the only viable business models for publishers is to erect access barriers, that solicitude for existing brands is better for research than removing access barriers, or that the valuable role of publishers can only be provided by TA publishers.

Just last month BioMed Central put the position lucidly in its submission to the Obama White House Office of Science and Technology Policy:

http://blogs.openaccesscentral.com/blogs/bmcblog/entry/biomed_central_s_comments_in

> BioMed Central supports both the goal of open access and the goal of ensuring that the value added by publishers is properly recompensed. … [W]e do not feel there is a need to 'balance' these two goals as we do not feel that they are in opposition. … [O]pen access need not threaten the role of STM publishers. The open access publishing model, in which publishers are paid directly for the service of publication, is proving in practice to be just as viable a business model … as the traditional model whereby publishers recover the costs associated with publication by taking exclusive rights and then selling access via subscriptions. Given that there is a viable business model for publishing scholarly research that does not depend on restricting access, we do not feel that the US government needs to arbitrarily limit the extent and reach of its open access deposit requirements attached to its research funding. We therefore recommend that the mandatory Public Access Policy which has operated successfully with respect to National Institutes of Health funding since 2008, be extended to cover all federally funded research. …

OA publishers are not threatened by the rise of OA, and at least two different OA business models are already producing profits or surpluses: the no-fee model at Medknow and the fee-based models at Hindawi, BMC, PLoS ONE, and the Optical Society of America. Only the publishers who choose to meter out knowledge to paying customers, or to depend on artificial scarcity, are threatened by the rise of OA and can call for compromise.

As Tim O'Reilly pointed out, OA doesn't threaten publishing, just (some) existing publishers. We can add the converse: OA would have to compromise to protect (some) existing publishers, but not to protect publishing.

Some publishers are adapting while others are resisting. That difference makes all the difference, and here the advantage belongs to OA. It may be easier for TA publishers to adapt to OA (not necessarily to adopt OA themselves but to coexist with it) than for oil companies and coal mines to adapt to the new world of clean energy. But if oil and coal companies could adapt to a world of clean energy, and perhaps even take a leadership role in it, then full steam ahead for clean energy. If they resist, and if we allow their survival and prosperity become criteria for public policy, then we will run out of steam. Or whatever takes the place of steam.

What if oil companies only wanted temporary shackles on Wonder Power to give them time to adapt? The delay would be hard to justify, given the urgent need for clean energy and the mounting harm of doing without it. But there might be a case for it if the transformed companies could give more material aid to the energy metamorphosis than they would subtract by slowing it down.

The Canadian Library Association took a similar position in May 2008 when it called on Canadian libraries to support OA: "If delay or embargo periods are permitted to accommodate publisher concerns, these should be considered temporary, to provide

publishers with an opportunity to adjust, and a review period should be built in, with a view to decreasing or eliminating any delay or embargo period."

http://www.cla.ca/AM/Template.cfm?Section=Position_Statements&Template=/CM/ContentDisplay.cfm&ContentID=5306

But to slow down Wonder Power to prop up incumbent industries without any expectation that they will adapt is the worst of both worlds.

(4) Some pay for all

The economics of wind power are peculiar. The benefits are global (reduced reliance on oil, reduced greenhouse gas emissions) but the costs are local (expense, sight, sound, wildlife damage). The costs and benefits largely affect different groups. Some other clean sources of energy, and some dirty ones, share the same peculiarity.

So do OA resources, and especially OA journals. The benefits are global (barrier-free access for everyone, increased research productivity) but the costs are local (expense, labor). Moreover, the costs and benefits largely affect different groups. The costs are borne by the publisher and those who support it through publication fees or subsidies. The benefits are enjoyed by researchers everywhere.

I often point out that not all (and not even most) OA journals charge publication fees …

http://www.earlham.edu/~peters/fos/newsletter/11-02-06.htm#nofee

… and that there are many different business models for OA journals,

http://oad.simmons.edu/oadwiki/OA_journal_business_models

But one thing that all OA journal business models have in common is the "some pay for all" principle.

http://www.earlham.edu/~peters/writing/acrl.htm

"Some pay for all" (SPA) applies equally to fee-based and no-fee OA journals. It also covers green OA as well as gold OA. The cost of a repository is borne by the institution hosting it, and perhaps a few benefactors elsewhere such as foundations or consortial peers. But the benefits are global.

SPA has the obvious advantage of allowing free access for end users. The paying subset pays, of course. But if it pays all the production costs, then the journal or repository can meet its expenses without charging end users. Broadcast television and radio proved that SPA can work. OA is simply applying or adapting the model to research literature, a domain where costs are far lower than news and entertainment, and where the creative talent even gives away its work.

The major disadvantage of SPA is that members of the subset asked to pay may be unable or unwilling to pay, a problem that is more serious for gold OA than green OA. We've evolved a family of solutions and partial solutions to this problem: for example, funders paying on behalf of grantees; universities paying on behalf of faculty; waiving fees in cases of economic hardship; discounting fees for authors affiliated with institutional members; at hybrid journals, discounting fees for authors affiliated with institutional subscribers; and eliminating fees in favor of institutional subsidies. Some sophisticated variations on these solutions are still evolving, such as the Rowsean flip and CERN's SCOAP3.

http://www.earlham.edu/~peters/fos/newsletter/10-02-07.htm#flip

http://www.scoap3.org/

On the bright side, SPA can deliver OA research and wind power, when the local groups that would bear the costs are willing to bear them. On the other side, SPA can halt OA research and wind power when those local groups are not.

Is SPA easier to pull off for OA than clean energy? I don't know, and of course there's need to know. We only have to know whether to keep trying when we've been unsuccessful. A locality might welcome a wind farm, despite the local costs, because it will make its own energy green—and, under the hypothesis, less expensive. Important players in a locality might pony up the money to support an OA journal or repository because they want to see the research disseminated—because they paid for the research, because the research was done at their institution, because it advances their field, or because it promises important social benefits.

If a wind farm really can lower the local price of energy, then there are local costs and local benefits to weigh against one another. OA resources may be in the same boat: there are local costs (to pay for the resource) and local benefits (if it advances the interests of the people or institutions paying for the resource), entirely apart from the global benefits.

Broadcast TV and radio made SPA work because they could find deep-enough pockets with an interest in disseminating the shows: advertisers. OA projects make SPA work, when it works, because they can find stakeholders with an interest in disseminating the research: authors and author sponsors such as employers or funders. Economically, an OA journal or repository is like a lighthouse: supported by local ports because it benefits local ports, but also benefiting everyone who sails nearby, even those who don't use local ports.

It's tempting to say that even TA journals use SPA, since those paying the subscription fees are just a subset of users. (They may not even be users at all.) But this would change the meaning of "all." Subscription fees may cover more users than the subscription payers, but they don't pay for "all" the way OA business models do.

By contrast, dirty energy uses SPA, just as wind power does. The pollution from a coal-fired power plant may spread far and wide, and the greenhouse cases may cause

global harms. But there's no doubt that the local harm is even greater than the global harm. Yet the electricity can be enjoyed as widely as that generated by a wind farm. Hence the shift from dirty to clean energy is not a shift from non-SPA to SPA. It's a shift from burdening one locale in a certain way to burdening another locale in a different way. It's a gain not by lifting all burdens, or by shifting them, but by lightening them.

Here's another difference: It's hard for the public to share the particular burden of wind power. The windmills can't be in *everyone's* back yard. But it's easy for the public to share the burden of green and gold OA. It's just a monetary cost, which can be spread as evenly as we like. For example, the cost of implementing the NIH policy (about 0.01% of the NIH budget) is spread among all US taxpayers. The cost of arXiv, which was formerly borne by Cornell alone, is now spread among Cornell and 20+ other universities.

http://communications.library.cornell.edu/news/arxiv

The monetary cost of wind power can be spread widely, since everyone who uses the power can be asked to pay for it. Only the effects on sightlines and wildlife remain stubbornly local. Unfortunately that local increment can be enough to derail a project. By contrast, most OA resources are spared this problem. They impose local costs, but these are almost wholly monetary. If we spread those costs far enough to succeed in raising the needed funds (which sometimes needn't be far at all), then there need be no stubbornly local residue to go without support. However, many OA projects launch before their fees or subsidies are adequate to cover their costs, and the unpaid portion becomes a local burden which, unfortunately, can be enough to derail a project.

A year ago this month, the US Congress agreed to fund the State Children's Health Insurance Program (SCHIP) with a new tax on tobacco.

http://www.cms.hhs.gov/home/schip.asp

http://content.nejm.org/cgi/content/full/NEJMp0900461

This is an SPA program in which the payors—smokers—are not volunteering. There is a slim argument that it makes sense to fund health insurance by charging smokers, who create ill-health for themselves and others. But since most American children today grow up in smoke-free households, relatively few smokers endanger the health of children covered by SCHIP. We may just have to admit that SCHIP subsidizes a good thing (children's health insurance) by taxing an unrelated or marginally related bad thing that we want to discourage for independent reasons. If the logic transferred, then we could support OA by taxing scientific ignorance.

(I'm sorely tempted to explore this playful hypothesis further, and already have a few ideas for carrying it out that are more than half-serious. But there are better SPA models for OA than SCHIP.)

Even if you support SCHIP, as I do, we can admit that it rests on some slippage between the "some" who pay and the "all" who benefit. It would be more elegant if the "some" were a subset of the "all," so that all who paid were at least beneficiaries of the program they were funding.

Can we find a way to charge all and only those who *benefit* from energy or research, and minimize SCHIP-style slippage?

Unfortunately, as long as wind farms impose unavoidable local costs, then we can't follow this model except perversely by limiting the benefits to the same locale. (Otherwise some beneficiaries would be spared the costs.) That might work for wind farms in windy places, but it would foreclose the possibility of sending wind-generated electricity elsewhere. The problems are even worse on the OA side. Since authors and readers both benefit from the distribution of knowledge, we'd have to charge both. But as soon as we charge readers, we give up on OA. Hence, spreading the costs among all the beneficiaries could fund restricted access to knowledge but it couldn't fund unrestricted access.

Note that the problem doesn't lie in trying to charge *only* beneficiaries, but in trying to charge *all* beneficiaries. If we retreat from trying to charge all of them, then there are two large families of solutions: author-side charges and reader-side charges. Both charge a class of beneficiaries, both leave a class of beneficiaries uncharged, and hence, both ask one class of beneficiaries to pay for others. But if we don't retreat, then we can't apply the model to support of clean energy or OA.

The question then becomes whether the benefits of OA are worth the asymmetry in which some beneficiaries pay for others. My answer is yes, certainly, and for four reasons. First, the two major classes of beneficiaries in this domain—authors and readers—overlap significantly. Second, nothing in the model prevents the beneficiaries who do pay from getting their money's worth. (Clearly there are ways for some to pay for all in which the "some" don't get their money's worth, but we needn't defend them.) Third, nothing in the model or in the asymmetry itself requires an injustice. For example, there's nothing unfair or unjust in having advertisers rather than viewers pay the costs of broadcast TV, even though both groups are beneficiaries. (Clearly there are unjust ways to make some pay for all, but we needn't defend them.)

Finally, the benefits are huge. We're not talking sitcoms and talk shows here, but the research on which our health, safety, technology, and prosperity depend. That includes the research which will bring us closer, if anything can, to efficient, inexpensive, clean energy.

This is a section of doi:10.7551/mitpress/8479.001.0001

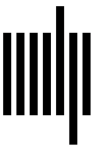
Knowledge Unbound

Selected Writings on Open Access, 2002–2011

By: Peter Suber

Citation:

Knowledge Unbound: Selected Writings on Open Access, 2002–2011
By: Peter Suber
DOI: 10.7551/mitpress/8479.001.0001
ISBN (electronic): 9780262329552
Publisher: The MIT Press
Published: 2016



The MIT Press

This book was set in ITC Stone by Toppan Best-set Premedia Limited. Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data.

Names: Suber, Peter, author.
Title: Knowledge unbound : selected writings on open access, 2002-2011 / Peter Suber ; foreword by Robert Darnton.
Description: Cambridge, MA ; London, England : The MIT Press, [2015] | Selection of writings, mostly from the author's SPARC open access newsletter. | Includes index.
Identifiers: LCCN 2015038285 | ISBN 9780262029902 (hardcover : alk. paper) | ISBN 9780262528498 (pbk. : alk. paper)
Subjects: LCSH: Open access publishing. | Communication in learning and scholarship—Technological innovations.
Classification: LCC Z286.O63 S822 2015 | DDC 070.5/7973—dc23 LC record available at http://lccn.loc.gov/2015038285

10 9 8 7 6 5 4 3 2 1