

Vol. 14, No. 1, Fall 2010

# THE CURRENT

The Public Policy Journal  
of the Cornell Institute for Public Affairs

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*Policies and Implications of Unsustainable  
Harvesting*

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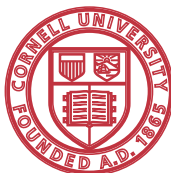
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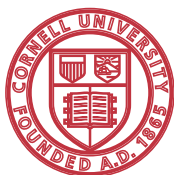
Cornell University  
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## Mission Statement

As the public policy journal of the Cornell Institute for Public Affairs (CIPA), *The Current* provides a platform for discourse through the work of CIPA Fellows, their mentors, and peers with contributions from the public affairs community.

## Editor's Note

The staff of *The Current* is privileged to present the fall 2010 edition. In this issue, we offer a series of articles that address public concerns with unique solutions. Some of our authors detail enduring policy predicaments – common pool resource depletion, race-based housing discrimination, bribery and tax evasion in goods trading, and the provision of quality childcare. Other authors question how we will collectively manage new problems that require innovative solutions – the evolution of personal property rights under New Life Sciences, emerging carbon capture practices, and realizing energy savings for municipal services while reducing greenhouse emissions.

The Cornell Institute for Public Affairs has experienced fantastic growth in recent years. To match that growth, *The Current* will be sponsoring a special publication focused on the University's role in public engagement. We have also planned the launch of a new Online Journal, and all of our readers are encouraged to join the debate there.

I would like to thank each of our authors for their contributions; their ideas will drive future policy. I also thank *The Current's* Editorial Board and our entire staff, as well as the CIPA staff for their continued dedication to advancing the aims of this journal. Perla Parra, our Senior Managing Editor, deserves special recognition for her lasting contribution.

Very truly yours,

Sean W. Murphy  
Editor-In-Chief

*The Current* reflects the diverse political, cultural, and personal experiences of CIPA Fellows and faculty. The views presented are not necessarily the opinions of *The Current*, the Cornell Institute for Public Affairs or Cornell University.

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# **Mediterranean Tuna Fisheries**

## *Policies and Implications of Unsustainable Harvesting*

*Eric Reker*

### **ABSTRACT**

*The rapid decline of the Mediterranean bluefin tuna stock has raised questions about the viability of sustainably harvesting the fish among rising global demand. This paper discusses the issues surrounding the Mediterranean tuna trade and specifically looks at: (1) the history of the bluefin tuna in the Mediterranean, (2) the Mediterranean bluefin tuna species, and (3) the dynamics of the tuna market. This paper analyzes the economic and biological situations through the Gordon-Schaefer Bio-Economic Model. Finally, the paper concludes by offering possible suggestions to avert the decline of this prized and important species to the Mediterranean. The research suggests that avoiding the extinction of the Mediterranean bluefin tuna will require a multi-faceted and multiple-tiered policy approach that will require international collaboration and effective enforcement among Mediterranean countries.*

**I**n recent years, scientists and activists have scrutinized Mediterranean bluefin tuna fisheries for their mismanagement, unsustainable practices, and illegal activities. Such actions have come to worry governments, citizens and policymakers. Biomass sampling shows that bluefin tuna fisheries in the Mediterranean have experienced a significant downward trend in the past twelve years and are spiraling towards dangerously low levels. During this short period, catch sizes shrank as much as 80% while more destructive methods of fishing this endangered population commenced, and demand for tuna as a luxury food item in high-end restaurants continued to rise. In particular, Japan and the growing worldwide sushi market have imposed unsustainable demands, providing lucrative profit margins for any individual or company able to supply fresh tuna. In January 2010, a single tuna fish sold for more than \$181,000 in the world-famous Tsukiji Fish Market in Tokyo, Japan.

The global response to the decline in Mediterranean tuna stock has been slow. In 1996, Mediterranean country governments established the International Commission for the Conservation of Atlantic Tuna (ICCAT) to protect all species of tuna, including the Atlantic bluefin. The Commission has not secured sufficient international support to enforce sound policy for sustainable fishery management in response

to the decline of tuna.<sup>1</sup> ICCAT teamed up with the scientific community to undertake the necessary steps to institute a moratorium on the Mediterranean tuna fisheries, but fishers and governments engaged in the tuna trade ignored the request.<sup>2</sup> Further attempts to disseminate empirically-based information that maximum sustainable yields are between 8,000 and 15,500 tons did little to alter the levels of tuna fishing. Scientists directly involved in conserving the Mediterranean Sea biomass endorsed the pressing need to allow the stocks to replenish. In an attempt to find compromise, and with the backing of the United States, United Kingdom, Turkey and other European Union countries, ICCAT pleaded with the Mediterranean fisheries to limit their catch to 20,000 tons in the 2009 season.<sup>3</sup> Fishing boats and companies with vested interests in the tuna trade continued to ignore the catch limit despite a quota enforcement at port harbors. Some vessels skirted the enforcement efforts by dropping live tuna in catch pens off the coast; the catch pen tuna were left out of the catch quotas. Others turned to bribery or sold tuna on the black market, corrupting a market that was already experiencing high demand due to scarce supplies.

Hoping to create awareness about the severity of the tuna stock decline, activists and policymakers organized conferences including the Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES) to discuss the sustainability of the bluefin tuna fishery. Though convention attendees received a wealth of information, few took the recommended steps of action. Some parties, including the Japanese, Spanish and Libyan chief ministers of fishery management, threatened political sanctions regarding trade agreements if ICCAT quota limits did not soften and become more flexible. In response, ICCAT raised the quota from the scientific maximum of 15,500 tons to 22,000 tons in 2009. In response, Xavier Pastor, executive director of Oceana, a European nonprofit group for ocean conservation, stated, "ICCAT's credibility has been destroyed by the negotiating countries who opposed responsible management measures for bluefin tuna."<sup>4</sup> Intense debate in academic, scientific and political communities followed.

This paper aims to offer further clarification on the Mediterranean bluefin tuna fishery issue from an open-access economic perspective. It begins with an overview of the affected species, and provides a discussion of the dynamics of the fishery issue, including the motivators and market forces exacerbating the overfishing problem. The next section assesses the topic through the Gordon-Schaefer Sustained Yield model for biological matter to elucidate the biological sensitivity and dynamic nature of the issue. The paper concludes with a discussion of the implications of current policy prescriptions and future considerations.

## The Mediterranean Sea and Atlantic Bluefin Tuna

**M**any countries rely heavily on the Mediterranean Sea as an economic driver. The finite resources available in the open sea, the lack of established property rights in the open sea, and the lack of effective regulatory enforcement exemplifies an open-access resource dilemma, more commonly referred to as the issue of the commons.

The Atlantic bluefin tuna (*Thunnus thynnus*) exhibits unique characteristics that illustrate the inherent problems with open-access fishing. Bluefin tuna are a highly resilient migratory species, and the Mediterranean provides a prime location for them to breed. They typically travel from birth in the Mediterranean to the Gulf of Mexico and return to spawn at the age of four or five years. ICCAT and other interest groups have undertaken special efforts to protect Mediterranean spawning grounds,<sup>5</sup> but the bluefin is considered one of the highest quality tuna and as such suffers from heavy overfishing. Attempts to limit the annual harvest continue to fail as piracy, black markets and loopholes in international law consistently enable fishers to maintain profits. Between 1958 and 2007, tuna stocks fell from more than 305,000 metric tons (mt) to 79,000 mt, an absolute decline of 74%.<sup>6</sup> In turn, the remaining smaller stocks of tuna have failed to reproduce quickly enough to replenish the population in the Mediterranean.

Concurrent with this decline in tuna stocks, the world price of bluefin tuna continued to rise as new markets developed in countries with rising relative incomes. Countries including Singapore, Malaysia, and China (including Hong Kong) became larger players in the tuna market.<sup>7</sup> These new markets add to the strain from Japan, which is the world's leading consumer of tuna. The largest tuna fish market in the world is in Tsukiji, Tokyo, where tuna is sold six days a week to distributors and restaurant owners at up to \$100 per pound. A single large bluefin tuna will regularly sell for \$50,000, making the bluefin a lucrative fish.<sup>8</sup> The rapidly increasing value has made the market the prime determinant of the future of the species, overshadowing environmental and biological concerns posed by scientists and citizens.

### ***Tuna Market Dynamics***

The market for Atlantic bluefin tuna is unique. The combination of a common resource good and the high revenues per fish creates a volatile but rewarding market. As the fishing season arrives in mid-summer, fishing boats embark in the Mediterranean to fill their hulls with as many fish as possible. The high value of the tuna significantly distorts the market: as tuna become scarcer with rising demand, prices rise; as prices rise, the common resource good retains no barriers to entry and creates incentive for new entrants into the market. As the

absolute number of players in the market rises, stocks fall further. The market should theoretically reach equilibrium such that long-term sustainability becomes feasible, but the continual rise in prices drives market suppliers to exhaust more resources. With the falling stocks, fishermen struggle to find tuna, but when falling stocks are coupled with the rising international demand, market prices skyrocket. Consumers usually tend to divert away from a consumer good as prices rise, yet in the case of tuna, the development of middle-income country economies and the relative inelasticity of Japanese consumer demand for the fish drive the market.

In response to the high market prices, tuna fishers employ new methods of finding these prized fish, further degrading the remaining stock. As this cycle continues, it makes more expensive technological fishing methods feasible and applicable. Today, the historically sacred art of the tuna catch relies heavily on airplane monitoring, which surpasses the use of sonar and traditional fishing techniques.<sup>9</sup> As consumer demand grew in the 1980s, vessels throughout the world began employing new techniques to track migratory maritime species. In the 1990s, airplane monitoring was first used to follow tuna in particular. The huge impact of this technique on fishing yields aided in the destruction of the Pacific tuna species previously found in abundance off the coast of Australia. Soon after, the technology quickly transferred to the Mediterranean. Although ICCAT countries outlawed airplane monitoring, this method maximized the catch for corporate vessels.

Making matters worse, as the stocks diminish, more vessels are catching smaller and younger tuna, forcing fishermen to catch a larger overall number of fish to fill their weight quotas. This contributes to the further decline in the number of fish for the following year, as these younger fish are potential breeders for future stock. Yearly stock samples are shrinking, pushing prices to rise again, exacerbating the decline in tuna.

A recent World Wildlife Federation (WWF) study examining the Atlantic bluefin tuna spawning biomass found evidence of a significant decrease of wild stocks in sampling areas since the mid 1990s. The WWF reported that in 2007, the spawning biomass had shrunk to under 80,000 mt, and it continues to trend downward.<sup>10</sup> In 2008, ICCAT reported that the most optimistic scientific models revealed that stock numbers were shrinking dramatically to around 45,000 mt.<sup>11</sup> According to the WWF, the result of current harvesting practices suggested the extinction of the Atlantic bluefin tuna in the Mediterranean as a real possibility by 2012.

When considering the long-term sustainability of the Mediterranean tuna fishery, we must consider present and future benefits of stocks. Evaluating present and future benefits serves as a proxy for the overall value of the resource. A rational actor in the market would then try to

maximize the present value of both current and future returns to the investment of time and money in the current term. If we take present value into consideration, the future value of sustainable yields, higher stock levels and long-term existence of the Mediterranean tuna fisheries all become relevant. However, in the case of tuna resource extraction, the present value maximization function is violated. Current practices depict a static short-term economic view aimed solely at maximizing immediate benefits where the future value of a fishery becomes moot. The discount factor of future tuna-fishing viability is so high that the market suppliers value all potential future benefits at close to zero. The excessively high profit margins of current prices distort the market such that without regulation, the fish population will invariably succumb to extinction.

The replenishment rates simply cannot keep up with the high harvesting rates. The extensive measures by harvesters to follow tuna migration by airplane have all but eliminated any barriers of protection for the fish. Fishers bypass or ignore ICCAT's yearly quotas for allowable yield as lucrative profits outweigh any risk of penalty. The market is simply unable to correct itself. This suggests a market failure.

### **Gordon-Schaefer Bio-Economic Model**

To fully understand the open-access fishery model, it is important to be clear about the characteristics and assumptions that underlie the economic theory. The Gordon-Schaefer Bio-Economic Model<sup>12</sup> shares two characteristics of the conventional perfect competition model: (1) the fishery is commercially exploited by a large number of independent fishing vessels and firms, and (2) there are no barriers to entry or exit. Each firm is assumed to react to the market price and holds no commanding influence over price. Implicit in the open-access fishery model, however, is that free entry does not allow or guarantee an enforceable property right to fishery resources — such as the fish in the water. No company can lay claim to any goods in an open-access model. Each firm or vessel is entitled to whatever it can harvest. In the event that a boat operator does choose to leave fish in the ocean for growth in future stocks, that owner retains no enforceable property rights for the future returns of that “investment.”

In developing the bio-economic model, there are two sub-models. The biological sub-model describes the natural growth of the fishery, while the economic sub-model depicts fishery production as a function of the effort put in to harvest as well as the stock available. All subsequent economic cost, benefit, revenue and growth functions derive from this equation. The bio-economic model posits that as a species located in an area continues to reproduce, carrying capacity will eventually be reached due to various stressors and environmental factors. If

harvesters extract the amount of biomass that is reproduced every year, maximum sustainable equilibrium will be reached. Economically, the decision to limit harvest to such a quantity would also ensure maximum profit in the long term.

Yet rising tuna prices, holding all other factors constant, encourage fishing vessels to harvest by ensuring high returns to immediate harvesting. Thus, annual extractions of tuna from the Mediterranean exceed the natural replenishment rate, causing stocks to dwindle towards zero. Press (2008) estimated the growth coefficient, which is the rate at which tuna are able to replenish, to be  $1.21171 \times 10^{-7}$  — an extremely small number.<sup>13</sup> The small growth coefficient means that stock must be extraordinarily large to ensure long-term viability for harvesting. Since Mediterranean tuna have a small coefficient compounded by a rapidly declining stock, the bio-economic model indicates that the species is tending towards zero at an extremely fast rate.

The Gordon-Schaefer Bio-Economic Model applied to the case of the Atlantic bluefin tuna in the Mediterranean simply reaffirms the findings of biologists who suggest fishing vessels harvest tuna at an unsustainable rate. Similarly, the numbers proposed by Press suggest a remarkably slow reproductive cycle of the tuna, providing further evidence that a moratorium may be necessary to save the species. The bio-economic model's primary contribution to the tuna fishery issue is its ability to quantify—in both a biological and an economic sense—the efficient sustainable harvesting capacity of the Mediterranean tuna fishery. If stocks are to replenish for increased future consumption capacity, the Gordon-Schaefer Model explicitly states that we must reassess harvesting levels and allow the stocks sufficient time to redevelop. All that will remain will be decisions regarding policies to determine best practices on how to redevelop tuna stocks.

## Existing Policies and Implications

**C**urrent policies to redevelop tuna stocks and protect the species are ineffective and inefficient. Scientists are begging for a moratorium on the fishing of bluefin tuna to allow for stock replenishment,<sup>14</sup> as estimates suggest that more than 10 years may be necessary for complete recovery.<sup>15</sup> If a moratorium is not a feasible option, biologists plead for reduced catches and smaller quotas to allow for the fish to replenish. Some scientists go so far as to predict that the stock numbers may already be depleted to such low levels that extinction is inevitable.<sup>16</sup> In any case, intervention must take place immediately if any chance for survival of the Atlantic bluefin tuna exists.

Scientists, concerned interest groups, and ICCAT have held numerous conferences to determine the most adequate and effective



policies to alleviate the pressure on the bluefin tuna, but each conference concludes with little agreement. While many countries retain a vested interest in the tuna industry, Japan, more than any other country, exercises political dominance in this arena. An estimated 80% of all Mediterranean tuna is being bought or sold in the Japanese market.<sup>17</sup>

Talks on bans of the worldwide tuna trade recently started in hopes of beginning a movement to save the Atlantic bluefin. In March 2010, CITES convened in Qatar primarily to discuss the fate of the Atlantic bluefin. Unfortunately, prior to the convention, Hirotaka Akamatsu, the Japanese Minister of Agriculture, Forestry, and Fisheries announced: "...that if any restrictions were imposed ... Japan would probably ignore them."<sup>18</sup> Japan exercises considerable political authority over much of the Mediterranean tuna market. When ICCAT countries voted on tuna restrictions, Japan threatened to cut development funding to numerous states in North Africa and Eastern Europe if these countries voted for a moratorium.<sup>19</sup> As a result, each moratorium vote failed and Japan continued to receive exports from the Mediterranean region.

Akamatsu deliberately chose not to enforce quotas and regulate the fish trade upon boat arrival to Japanese ports.<sup>20</sup> International law dictates that the government of the country that displays its national flag on a ship must enforce regulations on the ship's passengers and cargo. This law significantly debilitates regulatory power, as the majority of ships that port in Japanese fishing harbors come from Central America. Firms and illegal pirate fishermen looking to capitalize on the tuna trade can unload onto Japanese soil to take the goods to market without issue.

In an attempt to further skirt the catch quotas, Japan developed a supply chain that employs large boats to enter the Mediterranean, catch a large number of small bluefin, and transfer them to open sea pens in remote areas where the fish fatten up before becoming market-ready.<sup>21</sup> The ICCAT catch quota is administered by weight, which means the firms report the young tuna they catch rather than the older and heavier tuna they sell. Not only does this technique hinder adequate quota enforcement, but the ecological damage of the daily feeding to engage the tuna destroys the ecosystem as excessive amounts of feed and waste create concentrated hypoxic areas.<sup>22</sup>

## Possible Solutions and Suggestions

**G**iven the many political, social and economic implications of any policy recommendation for the Mediterranean bluefin tuna fishery, policy makers and Mediterranean constituents must take careful consideration to assess and develop economically sensitive and culturally feasible solutions. This section will discuss five possible

solutions, which are in no way exclusionary or exhaustive. Any single idea or combination may be more applicable depending on the situation.

### ***United Control Scheme***

A united control scheme proposes a sea-wide limitation on all fishers in the Mediterranean Sea. To implement such a policy, all boats in the Mediterranean must port and declare all catches by size and weight prior to export. Such a mandate would allow for more careful controlling and adherence to the ICCAT quota. The forced porting of all boats within the Mediterranean would enable extensive control over the under-reporting currently taking place as ships port outside of the Mediterranean.

This method of monitoring and control hinges on some critical assumptions. Given the expanse of the sea and the numerous countries abutting the Mediterranean, unified enforcement operations would be elemental. Countries must strike a political balance and solidify international relations. They must also implement a balanced, non-partisan, multi-national enforcement regime, which will become difficult if political favoring comes into play. This process also requires inclusion of multiple ports in all the Mediterranean countries, in multiple locations. Such requirements may strain national governments financially, especially if they are all geared toward the trade of only one species. Still, countries cannot overlook the need for overarching enforcement, as insufficient infrastructure can boost piracy and the black market.

### ***Moratorium***

Though proposed unsuccessfully in the past, a moratorium seems more necessary now as current yields continue to plummet. A moratorium would be difficult to pass, though, as countries face political pressures. Votes on policy interventions in the Mediterranean often have multiple political considerations, such as how development funding from Japan will affect voting results in the bargaining rounds. Despite these constraints, the most recent vote of 68 against, 20 for and 30 in abstention of the moratorium suggests that there exists a healthy opposition that may swing the vote if other political elements are not exercised. Of the 68 countries voting against, a large proportion of countries are tied to Japan through development funding but retain interest in protecting the Mediterranean. Stakeholder countries will need to ramp up enforcement—most likely to a lesser degree than a united control scheme requires—to ensure that stock populations are given due time to repopulate and recover. Japan must also take the lead to ensure that no one sells Mediterranean tuna on their market. Though this seems rather unlikely, moratorium ultimately will hinge significantly on the actions of the Japanese government and citizens. If

ICCAT can develop an effective international enforcement department to make actions and decisions transparent, a moratorium may prove the best and most viable option.

### ***Private Property Rights***

Assessing private property rights on fisheries has proven an effective option in the past. Providing private quota rights to fishing companies hampered past fishery stock disasters such as those found in New Zealand, Iceland and Alaska. Individual Transferrable Quotas (ITQ) alleviated overfishing issues in these areas by asserting private property rights to fishing vessel companies, allotting control of the resource such that the owner can decide the most effective means of allocating the resource. According to theory, private property owners will do their utmost to maximize total present value, implying that owners will take into consideration future yields as they would like to create a sustainable enterprise. To maximize total economic gains, owners will develop and enforce regulations limiting all who partake in the exploitation of the natural resource. Applying this theory to fisheries could elicit a regulatory scheduling plan such that stocks would be protected from overexploitation.

The primary concern with private property theory quickly becomes who will hold the initial rights and how the governing organization will allocate these rights. There is currently no governing body over the Mediterranean that can adequately take on this role, and international commissions such as ICCAT or CITES do not have the fundamental support from all the countries of the Mediterranean or the infrastructure to implement such rules. Countries will not easily allow others to hold rights if they have a vested economic interest in the tuna trade. The political repercussions and obstacles of implementing such a policy would be treacherous and difficult. Finding consensus is necessary, but no doubt a long and arduous task.

We must also consider that property rights are fixed in time and space — yet tuna are migratory. There is no way to track specific tuna and determine the origin and subsequent property rights of the fish, which makes private property rights a far more complex issue. Tuna are also unevenly distributed, which means that areas with highly populated tuna stocks can receive greater benefits. Although equity is ideal, finding an equitable allocation of tuna will prove difficult.

### ***Protected Areas***

Safeguarding areas critical to the growth and sustainability of bluefin tuna could be a viable option in the fight against extinction. No policies currently limit exploitation of the areas where bluefin breed in the Mediterranean. Though tuna are a migratory species, particular attributes of specific areas of the Mediterranean Sea provide optimal

conditions to mate. A mandate protecting such areas can provide a haven to enable the fish to breed securely.

Again, determining who will protect these areas becomes an immediate issue. Protection and enforcement cost money, and no firm or country may be willing to invest the financial capital necessary to protect the resource, especially with no guaranteed return on investment. Breeding occurs all over the Mediterranean, so determining all the areas where the fish mate will be difficult. Moreover, it is unlikely that any group would be willing to fund the protection of multiple sites.

### ***Political Pressure***

Countries around the world may look to pressure and threaten sanctions against the Japanese government until more sustainable practices are put into place. Since 80% of the Mediterranean tuna travels through the Japanese market, Japan retains extensive control over the tuna market. At the same time, because the Japanese government currently does not take a hard stance against the practices of the tuna industry, it seems unlikely that Japan would abate the lucrative tuna market, unless some measure—internal or external—changes the consumption habits of the Japanese people.

Countries may be unwilling to take the first step in applying political pressure to Japan because Japan's economic effects on the global market remain extensive. Many countries are dependent on Japan's net import status as well as the innovative high technology and capital-intensive Japanese market for their own economic prosperity. However, if a country like the United States can take a staunch stance on this topic against Japan, other countries may be more willing to follow and support pressures to alter Japanese consumer habits.

### **Conclusion**

**T**he future of the Atlantic bluefin tuna is dismal. As the peak tuna harvesting season approaches, the coming year will prove pivotal in the future of the sustainability of the Mediterranean tuna fishery. ICCAT hosted an international conference between ICCAT and EU representatives in November 2010 that the media labeled as monumental for the future of the bluefin tuna. The EU Minister of Fisheries has already demanded a drastic cut in quotas to half of the 2009 figures, much to the chagrin of the French, Spanish and Turkish governments. The preliminary negotiations suggest that quota limits will be set close to the high end of the scientifically determined sustainable yield, near 12,900 mt. With concerns about excess reserve stocks developing, there may be substantial pressure to drop quotas to much lower levels. New information suggests that due to the global economic downturn, over 10,200 tons of bluefin from 2009 are still unsold, living

in cages in the Mediterranean. The figure, almost 80% of the quota from 2009, suggests a shift in worldwide demand patterns. However, if national governments fail to act and maximum yields continue to be taken for short-term economic benefit, the Mediterranean bluefin tuna fishery will fall into irreversible conditions within a matter of years.

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*Eric Reker is a second year fellow at the Cornell Institute for Public Affairs. He is currently pursuing his Master of Public Administration with a concentration in environmental policy. Eric's research interests are in the field of environmental economics and natural resource management and also include public goods areas. To his great fortune, Eric has had many opportunities to work with fishermen in various locations in hopes of helping to alleviate pressures faced by fisheries around the world. The information presented in this paper is as recent as the publication date in Fall 2010.*

#### Editor's Note

*Details of Eric's model and calculations are available through The Current's Online Journal, [www.thecurrent.cipa.cornell.edu](http://www.thecurrent.cipa.cornell.edu).*

### Endnotes

1 Paul R Armsworth et al, "The Economic Efficiency of a Time-Area Closure to Protect Spawning Bluefin Tuna," *Journal of Applied Ecology*, 2010: 36-46; ICCAT. *Report of the Standing Committee on Research and Statistics*, Madrid: International Commission for the Conservation of Atlantic Tunas, 2007.

2 Alana Herro, "Bluefin Tuna Fishery at Risk of Collapse." *World Watch*, 2006: 5; Brasor, Phillip, "Japan's Press Play the Food Card in Bluefin Tuna Row," *Japan Times*, March 21, 2010, <<http://search.japantimes.co.jp/cgi-bin/fd20100321pb.html>> (accessed May 02, 2010).

3 Braser, 2010; Armsworth et al, 2010.

4 Williams and Nigel, "Anger Over Bluefin Tuna Decision," *Current Biology* 2009: R1110.

5 Arkive, 2010, <<http://www.arkive.org/northern-bluefin-tuna/thunnus-thynnus/threats-and-conservation.html>> (accessed May 08, 2010).

6 Rogers and David, "Adieu, Atlantic Bluefin Tuna? Global Governance Has Failed to Protect Biodiversity," *Yale Global* 2010.

7 Arkive, 2010.

8 Greenpeace, "Where Have All the Tuna Gone? How Tuna Ranching and Pirate Fishing Are Wiping Out Bluefin Tuna in the Mediterranean Sea." *Greenpeace International*, 2006.

9 Herro and Alana, "Bluefin Tuna Fishery at Risk of Collapse," *World Watch* 2006: 5.

10 ICCAT, 2007.

11 Ibid.

- 12 Perman et al, *Natural Resource and Environmental Economics* (Harlow: Pearson Education Limited, 2003).
- 13 Michael S Press, "Bio-economic Modeling of Contaminated Bluefin Tuna and Atlantic Mackerel Fisheries Dynamics," (Masters Project, Durham: Duke University, 2009).
- 14 ICCAT, 2007; Rogers and David, 2010; Arkive, 2010.
- 15 ICCAT, 2007.
- 16 Carl Safina and Dane H. Klinger, "Collapse of Bluefin Tuna in the Western Atlantic." *Conservation Biology* 2008: 243-246.
- 17 Baser, 2010.
- 18 Ibid.
- 19 Rogers and David, 2010.
- 20 Rogers and David, 2010; Greenpeace, 2006.
- 21 Arkive, 2007.
- 22 Greenpeace, 2006.
- 23 "Fisheries Policy," *Seeker Blog*, November 29, 2010, <<http://seekerblog.com/archives/20100608/itq-private-property-rights-save-the-fisheries/>> (accessed November 30, 2010).
- 24 The World Fishing, "Greenpeace: Thousands of Bluefin Unsold," *World Fishing and Agriculture*, November 2010, <<http://www.worldfishing.net/news101/greenpeace-thousands-of-bluefin-unsold>> (accessed November 20, 2010).

# Pre-Shipment Inspections and Customs Automation Systems

## *Effectiveness in Deterring Customs Evasion*

Chamnan Sieng

### ABSTRACT

*Many studies on the subject of tariff evasion have demonstrated the importance of institutional capacity for effectively abating corruption. This paper attempts to examine the effectiveness of Cambodia's pre-shipment inspection (PSI) program and its new Automated System for Customs Data (ASYCUDA) for deterring customs evasion. Trade data between Cambodia and Thailand from 2004 to 2009 suggests smugglers were extremely responsive to the increase in enforcement and are more likely to evade customs completely when the cost of doing so is less than alternative methods. Despite tariff reform efforts in recent years, evasion and smuggling continue to be rampant in Cambodia. Between 2004 and mid-2009, evasion accounted for almost 65 percent of the reported exports from Thailand. This is equivalent to approximately \$420 million in lost revenue. Finally, regardless of whether or not the PSI program and ASYCUDA process are successful in facilitating reliable international trade, the question of their cost-effectiveness remains.*

In developing countries like Cambodia, tariffs may account for much of the government's tax revenue. According to Cambodia's 2008 budget, its tax revenue accounted for 84 percent of all tax and non-tax revenue.<sup>1</sup> When taxation is no longer an effective tool to collect revenue, customs evasion threatens the proper functioning of the public sector.<sup>2</sup> Ultimately, this places constraints on long-term policies and distorts market competitiveness at the expense of honest players. The Royal Government of Cambodia (RGC) adopted a new pre-shipment inspection (PSI) in March of 2006 and an Automated System for Customs Data (ASYCUDA) program two years later in an effort to reduce customs corruption and facilitate reliable international trade. The strategic objectives of these programs are to enhance the capacity of customs officers, strengthen enforcement to combat fraud and illegal activities, and reduce the cost of participating in international trade.

Many studies have examined the impact of the PSI program in deterring tariff evasion; however, little analysis has examined the PSI and ASYCUDA's performance together.<sup>3</sup> Further, no research has ever

focused on Cambodia, a nation which offers a unique perspective on the effectiveness of pre-shipment inspections and customs automation systems in deterring customs evasion. This paper contributes to the growing literature by examining the effects of tariff rates and customs evasion, specifically in Cambodia. While new policies have been implemented to combat customs corruption, this paper provides evidence suggesting that PSI and ASUCYDA are ineffective in deterring smuggling and corruption—and might even encourage some importers to choose smuggling.

## **Assessing and Measuring Evasion**

**I**n tax literature, compliance refers to true reporting of the tax base, correct tax liability calculation, and timely filing and payment. The vast majority of tax evasion literature concentrates on reporting the tax base. Franzoni defines tax evasion as an individual's deliberate failure to comply with his or her tax obligations to increase personal profit.<sup>4</sup> Noncompliance refers to the deliberate or unintentional avoidance of the proper tax payments according to Madzarevic-Sujster.<sup>5</sup> In contrast to evasion, the literature considers "tax avoidance" as an individual's lawful avoidance of tax liability. Hence, one significant difference between tax evasion and tax avoidance is that in the latter, the taxpayers make use of the opportunities and loopholes enabled by legislation and laws, while tax evasion is illegal.

There are several types of tariff evasion. The most common type is for an importer to under-report the value of an incoming shipment to avoid paying full import duties, which can occur when customs officials are bribed. This method is commonly known as underinvoicing. Goods may also be smuggled to avoid all import duties. The third type of tariff evasion is the practice of declassifying goods, where an importer declares the shipment of goods under a different tariff category in order to avoid paying the higher import duties. This type of evasion also involves bribing customs officials. Effective enforcement of trade regulations depends on the lawful activity of traders and government officials.

Compliance literature points to several factors that influence the decision to evade taxes. These factors include: "[individual's] disposition towards public institution", perception of the fairness of taxes, prevailing social norms, and the level of enforcement and its punishment when caught.<sup>6</sup> According to Robert McGee, if an individual despises public institutions, it is unlikely that this person will comply with their rules and regulations, and when tax evasion is perceived as a social norm, there is a greater incentive for individuals to not comply.<sup>7</sup>

Economic theory posits that a firm's decision to engage in criminal



activity arises from a rational calculation of the costs and benefits of law-breaking.<sup>8</sup> In a related work, Lucas Ronconi points to the cost factors as the probability of being inspected multiplied the level of expected penalty.<sup>9</sup> Imperfect information increases the likelihood of tariff evasion. To correctly set and enforce tax obligations, tax auditors must have access to all income and sales data for individual traders.<sup>10</sup> The problem is that tax auditors do not have cost-effective tools to measure an individual's true tax liabilities. Therefore, traders can abuse this information asymmetry to minimize their liability and evade taxation.

Tax compliance is broad and complex, and measuring it is problematic. Recent works have relied on gaps in matched-partner trade statistics, popularized by Fisman and Wei.<sup>11</sup> The most common measurement is to compare the records declared by export and import countries; underinvoicing produces discrepancies between the exporting and importing records between countries. Although Fisman and Wei have defended their model, Anson points to several problems with this method of measurement.<sup>12</sup> While Fisman and Wei argue that exporters have less incentive to engage in overvaluation fraud because they are legally liable for their declarations to customs, Anson believes that the lack of customs monitoring in the export process could produce measurement errors. He also suggests that auditing conducted by a home country would be considered a breach of tax laws.

In a later study based on Fisman and Wei's model, Yang assessed the Philippines' PSI program and suggested that any enforcement policy that only targeted a subset of methods used in smuggling may not be effective.<sup>13</sup> Yang argues that displacement should respond positively to the size of illegal smuggling targeted by enforcement. He states that when enforcement targets specific smuggling methods, those smugglers simply switch to alternative, untargeted methods. His empirical analysis of smuggling displacement in the Philippines found the total displacement amounted to 2.7 percent of the total imports from treatment countries, and displacement was greater for products with higher tariff rates and import volume. Therefore, greater enforcement may not deter smuggling—and it could even rise—if smugglers can readily switch to an alternative method.<sup>14</sup> If the problems of noncompliance and corruption are prevalent, what are the underlying causes and what can the government do to mitigate them?

## Overview of Customs Modernization in Cambodia

Customs corruption has become prevalent in Cambodia. After decades of civil war and political violence, Cambodia has achieved economic and political stability within the last 13 years. With the assistance of international organizations, the Royal Government of Cambodia has engaged in many reforms to enhance institutional capacity and build better governance. With the newly passed Anti-Corruption Law, the RGC hopes that the new mechanism to monitor corruption will deter public officials from engaging in illegal activities.

Despite promises, the law is unlikely to have an immediate impact on the culture of noncompliance, where citizens are taught from an earlier age to “pay a little extra” to get things done. For instance, it is not uncommon for teachers to violate school rules and regulations by selling lecture notes and formula sheets to students as a way to compensate low salaries.<sup>15</sup> Understanding the major challenges of widespread poverty and systemic corruption, the RGC is committed to building the necessary legal and institutional framework to combat such challenges.

One of these challenges is the ineffectiveness of enforcement to mobilize revenue collection, particularly with customs corruption. When customs officers collude with importers, underinvoicing and smuggling go without penalty or report, depriving the government of much needed tax revenue and contributing to the deterioration of the country’s tax system. Moreover, ineffective enforcement and poor operational standards act as trade barriers, undermining fair competition and punishing honest traders. In an effort to mitigate these challenges and facilitate international trade, the RGC has developed strategies to strengthen revenue collection, enhance legal framework, and various customs services. Among the programs implemented, a new pre-shipment inspection (PSI) was required for all imports between April 2006 and April 2009. In addition, with sponsorship from the World Bank, an Automated System for Customs Data (ASYCUDA) was put into operation in January 2008.

Individual imports valued over the minimum threshold of 4,500 USD are subject to PSI.<sup>16</sup> Typically, an importer must provide a certified PSI firm in the country of origin with a detailed description of the shipment. Upon inspection, the PSI firm assesses the tariff classification, quantity, and the total value of the shipment. The firm can issue the shipment a Clean Report of Finding or a Discrepancy Report. The PSI firm then calculates the full import duties and forwards the information to the receiving port’s customs office. Shipments that are not accompanied by a PSI report are x-rayed or physically inspected at the port of embarkation. It is not uncommon for customs agents to conduct a secondary inspection in addition to PSI.<sup>17</sup>

One of the most common practices of customs officials is to

accept bribes in return for allowing importation to take place without acknowledging the number of goods being unloaded. In such an instance, an importer intentionally underinvoices and/or misclassifies the contents of the shipment in order to avoid paying full customs duties. Knowing this, customs inspectors agree to clear the shipments in return for a bribe. PSI programs should combat customs corruption and smuggling. Another tactic utilized by customs officials is to prolong the clearance time or to delay paperwork, forcing honest importers to bribe officials to expedite export or import procedures. To solve this second critical problem, most governments have introduced customs automation to reduce and simplify paperwork.

The purpose of the ASYCUDA system is to streamline customs procedures and standardize trade documents to accelerate the clearance of goods. The system allows declarations to be processed electronically, reducing the opportunity for customs officials to extort bribes. Aside from streamlining customs clearance procedures, other key objectives of the system include strengthening customs operational efficiency by providing modern tools and techniques, strengthening customs data management by collecting accurate statistics on foreign trade and revenue for fiscal and policy purposes, reinforcing institutional capacity, and increasing transparency of customs operations to reduce opportunity for fraud.

While the PSI and ASYCUDA programs have certainly reduced corrupt practices and rewarded honest traders in Cambodia, they have not deterred evasion and smuggling. As Yang suggested, a policy targeting only a subset of the methods used by smugglers may backfire as smugglers can simply resort to an alternative mode of entry as in the case of the Philippines, where the PSI policy increased evasion.<sup>18</sup>

### ***Methodology and Measurement***

The sources of data were obtained directly from the Thai Customs Department and the Cambodian General Department of Customs and Excise (GDCE). Other sources were used, but only to verify tariff rates and export volume from Thailand on a yearly basis. Both the World Trade Solution (WITS) and United Nations COMTRADE provide information about the direction and volume of trade between Cambodia and Thailand. Approximated import tariff rates are derived by dividing the values of “customs duty” over “customs value” declared by imports.<sup>19</sup> Data for Thai exports were obtained through the Customs Department of Thailand’s website, and import data relating to Cambodia was retrieved from the GDCE’s main server upon request.<sup>20</sup>

The rest of this study focuses entirely on bilateral trade between Thailand and Cambodia between January 2004 and June 2009.<sup>21</sup> This period has many variables that make Cambodia a prime case

for future studies: trade liberalization and customs modernization occurred during this period; the government reduced nearly all of its customs duties on goods as required by the ASEAN Free Trade Area; and both PSI and ASYCUDA were implemented. In the case of PSI, it was terminated early, providing interesting overlapping periods to examine. These four interesting time periods are: pre-PSI, which began from January 2004 and ended in March 2006, between April 2006 and March 2008, during which the PSI was solely implemented, April 2008 to April 2009, when both PSI and ASUCYDA were in place, and the post-PSI and post-ASYCUDA period, which began in May 2009 and is currently operating.

The purpose of this paper is to determine if the PSI and ASYCUDA systems are effective in deterring customs evasion. If they are effective, how have these programs altered the methods of smuggling? To measure the effectiveness, the Fisman and Wei model will be used to measure the amount of customs evasion taking place between Thailand and Cambodia between 2004 and June of 2009.<sup>22</sup> Incorporating Yang's displacement model and Mishra's cost evasion model will help show the impact of PSI and ASYCUDA on smuggling displacement.

In this section, two different measures of evasion are presented to analyze the level of evasion. First, following the Fisman and Wei model, customs evasion is defined as:

$$EV_{pm} = \log(\text{Exports}_{pm}) - \log(\text{Imports}_{pm}) \quad (1)$$

where  $EV_{pm}$  is the measurement for the interested variable.  $\text{Exports}_{pm}$  is the value of exports of product  $p$  reported by Thailand at month  $m$ .  $\text{Imports}_{pm}$  is the value of imports reported by the Cambodian Customs of the same product  $p$  at month  $m$ . In the absence of evasion,  $EV_{pm}$  should have a value of zero. Equation (1) produces a value for the evasion taking place within the time period. Controlling for product (at the AHTN 8-digit level) and time implies the estimates are more likely to be refined and provide more details, considering more observations would be made as compared to the traditional HS code of 6-digit.

To capture the sample that appears on the Thai customs' record, but was not reported by the Cambodian counterpart, we assume in the model that there is complete smuggling, which is the second measure.<sup>23</sup> In the case of a discrepancy, where the AHTN code at the 8-digit does not match, the import value assumes a zero value, leaving only the export values reported by the Thai customs. Wherever the AHTN code at the 8-digit level does not match, complete smuggling is defined as:<sup>24</sup>

$$CEV_{pm} = \log(1 + \text{Exports}_{pm}) - \log(1 + \text{Imports}_{pm}) \quad (2)$$

Thus,

$$EV_{pm} = \alpha + \beta * T_{pm} + \varepsilon_{pm} \quad (3)$$

and

$$CEV_{pm} = \alpha_2 + \beta_2 * T_{pm} + \varepsilon_{2pm} \tag{4}$$

Here, the main coefficient of interest is  $\beta$ —the elasticity of evasion with respect to  $T_{pm}$ , which is the tariff rate for the specific product. For equations 5 and 6, economic intuition suggests there should be a positive correlation between tariff rates and the amount of evasion. In response to higher tariff rates, evaders have more incentive to engage in smuggling.

To incorporate the enforcement factors—PSI and ASYCUDA (ASY), a new equation is derived as:

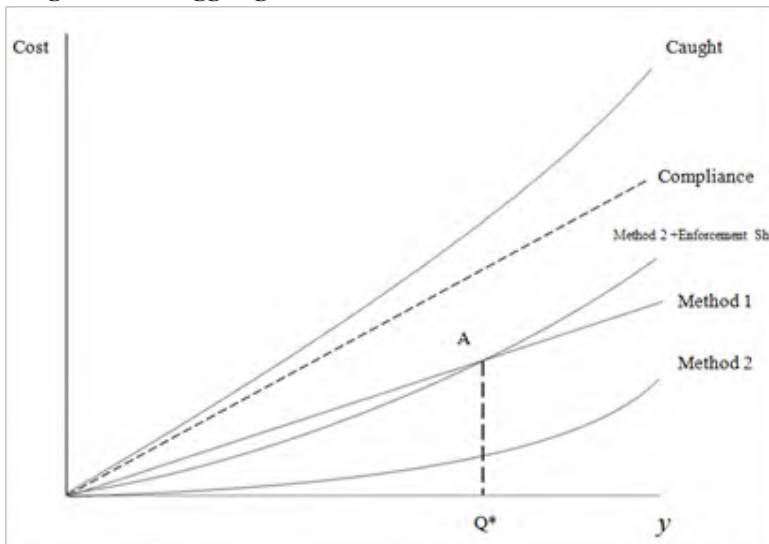
$$EV_{pm} = \alpha + \beta * T_{pm} + \lambda * \log(1+PSI) + \pi * \log(1+ASY) + \Omega * \log(1+ASYPSI) + \varepsilon_{pm} \tag{5}$$

$$CEV_{pm} = \alpha_2 + \beta_2 * T_{pm} + \lambda_2 * \log(1+PSI) + \pi_2 * \log(1+ASY) + \Omega_2 * \log(1+ASYPSI) + \varepsilon_{2pm} \tag{6}$$

In both equations (5) and (6), the objective is to observe the coefficient of  $\alpha$ ,  $\lambda$ ,  $\pi$ , and  $\Omega$ . During the periods when PSI and ASYCUDA were not implemented,  $\log(1+PSI)$  and  $\log(1+ASY)$  will assume a zero value and the value of 1 for when either program is in operation. Similarly, when both PSI and ASYCUDA were implemented together,  $\log(1+ASYPSI)$  assumes the value of 1; otherwise, the term will assume a value of zero.

To observe the effect that increasing enforcement has on eliminating smuggling, the following model is an incorporation of Yang’s displacement model and a modification of the Mishra model of willingness to evade.

**Figure 1: Smuggling Cost**



In Figure 1, consider two profit-oriented smugglers—A and B, and assume the enforcement is asymmetrical. Suppose in METHOD 1, smuggler A can neutralize the risk of getting caught by bribing corrupt customs officials. Subsequently, the quality and level of enforcement is no longer relevant. In other words, the smuggler has eliminated the uncertainty of enforcement. The cost function for engaging in smuggling METHOD 1 is now a function of the costs of bribery and the fraction of shipment that is to be smuggled. In METHOD 2, smuggler B chooses not to bribe customs officials and must bear the risks of getting caught. The most important assumption of the new model is the freedom to choose between bribing or not. Both smugglers can switch between the two methods of smuggling.

Therefore, the profit functions for smuggling METHOD 1 and 2 are as follow:

$$\text{METHOD 1: } \Pi_1 = M - (1-y)*M *T- C(y, cc) - v \quad (7)$$

$$\text{METHOD 2: } \Pi_2 = M - (1-y)*M *T- C(y, E) - v \quad (8)$$

As illustrated in Figure 1, the dotted diagonal line represents the cost of compliance. Starting from the bottom line, it represents the cost of engaging in METHOD 2 of smuggling, where the curve is convex as enforcement targets larger smuggling operations efforts rather than smaller operations. As illustrated, the cost of smuggling is much less than compliance, assuming that the smuggler will not get caught. Otherwise, the smuggling cost is represented by the top line, which includes the penalties and full import duties.<sup>25</sup> The second line from the bottom represents the cost of smuggling using METHOD 2 when there is a positive shock of enforcement. For example, in the event that the level of enforcement is increased through PSI or ASYCUDA programs, the cost of METHOD 2 increases dramatically; however, it is still lower than compliance. Finally, the third line from the bottom line represents the cost of using METHOD 1 of smuggling.<sup>26</sup>

The original framework set forth by Mishra offers the cost-benefit analysis from the perspective of smugglers without taking into account factors such as the “corruptibility” of public servants and the behavioral aspect of smugglers. The modification that incorporates the risk premium as a function of the smuggling cost allows the possibility for risk adverse smugglers to engage in riskier decisions. With the elimination of enforcement uncertainty, importers have the option now to engage in complete smuggling. To measure this, a simple analysis of the ratio of the tariff evasion and complete smuggling over time should be sufficient.

With the implementation of the PSI and ASYCUDA programs, evasion is deterred, in theory. If so, the programs make it more difficult to commit fraud, and the probability of getting caught would increase,

making smuggling through this method more costly. Therefore, the expectation is that if both enforcement programs are effective, the value of  $1\text{Customs}_{\text{corruption}}$  should be decreasing over time. Further, if the cost of evading is more than simply bribing customs officers, the rate of growth of  $2\text{Customs}_{\text{corruption}}$  should be exponential as smugglers can completely evade import duties by colluding with customs officials.

### Results and Discussions

PSI and ASYCUDA are expected to suppress fraud and corruption. Table 1 provides the summary statistics for the entire sample in four different specific time intervals. Comparing evasion and complete evasion, the latter represented a small portion of all evasion. In the case of tariff evasion, it represented over 63 percent of the declared exports by Thailand prior to the PSI program provided by the firm BIVAC was implemented. Following the agreement with BIVAC, evasion increased to 66.36 percent of the declared exports. Though this may seem like an insignificant increase, a closer examination of the aggregate data proves otherwise. The average monthly evasion during the PSI period was 74 percent more than the PRE-PSI period. Although Cambodia saw a small decrease of 2.37 percent in evasion following the introduction of the ASYCUDA system with the existing PSI program, the total volume of evasion continued to grow.

**Table 1: Descriptive Statistics**

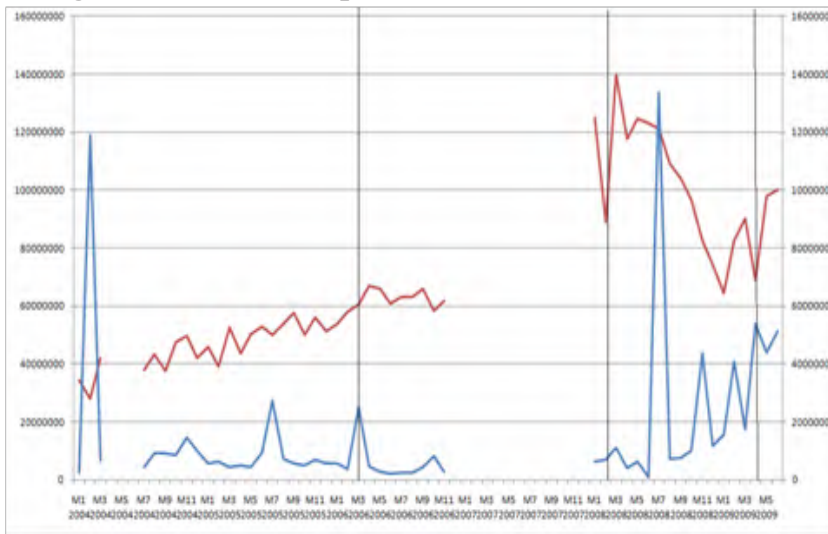
USDS\$	Pre-PSI	PSI	ASYPSI	ASY
<b>Evasion</b>	<b>1,077,198,974</b>	<b>977,157,479</b>	<b>1,141,466,641</b>	<b>198,048,442</b>
<i>Avg. per month</i>	<i>46,834,738</i>	<i>81,429,790</i>	<i>95,122,220</i>	<i>99,024,221</i>
<i>% of Export</i>	<i>63.01</i>	<i>66.36</i>	<i>63.99</i>	<i>71.60</i>
% Change first month	--	10.25	5.97	42.28
<b>Complete Smuggling</b>	<b>28,662,238</b>	<b>5,859,865</b>	<b>34,898,219</b>	<b>9,520,169</b>
<i>Avg. per month</i>	<i>1,246,184</i>	<i>488,322</i>	<i>2,908,184</i>	<i>4,760,085</i>
<i>% of Export</i>	<i>1.67</i>	<i>0.39</i>	<i>1.96</i>	<i>3.44</i>
% Change first month	--	-80.97	49.34	-18.23
<b>Total Evasion</b>	<b>1,108,563,564</b>	<b>983,229,771</b>	<b>1,178,082,377</b>	<b>208,466,521</b>
<i>Avg. per month</i>	<i>48,198,415</i>	<i>81,935,814</i>	<i>98,173,531</i>	<i>104,233,260</i>
<i>% of Export</i>	<i>64.84</i>	<i>66.77</i>	<i>66.05</i>	<i>75.37</i>
% Change first month	--	6.67	5.56	36.57

Source: Department of Customs, Thailand; GDCE, Cambodia

Aggregately, we saw a decrease in evasion with the introduction of PSI by BIVAC; however, that figure increased during the period when both PSI and ASYCUDA were jointly implemented. One explanation for this occurrence could be that evasion and the volume of declared exports from Thailand are highly correlated. Evasion closely mirrored the volume of imports. A one percent increase in the declared export from Thailand leads to a 1.47 percent increase in evasion.

One problem in evaluating the effectiveness of the PSI and ASYCUDA based on interval average is the assumption that smuggler behavior is remains static. As discussed in equations 3 and 4, smugglers are free to choose between bribing customs officials and the alternative methods of taking full risks. Hence, in response to stronger enforcement, we expect sudden positive shock to cost evasion, shifting the curve upward, as illustrated in Figure 2.

**Figure 2: Evasion - Complete Evasion**

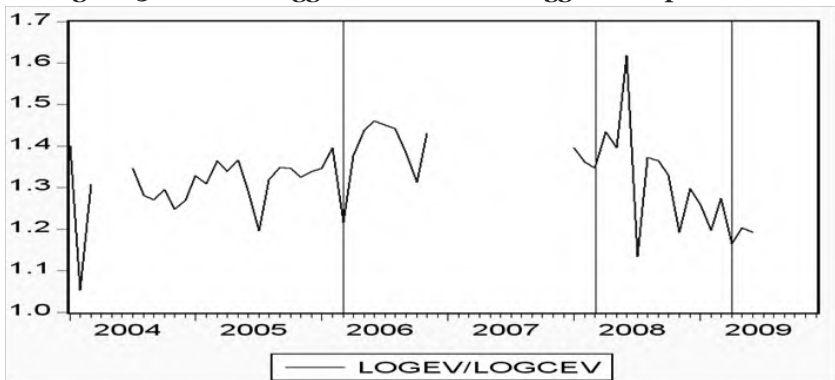


In Figure 2, we notice that these two variables responded immediately to changes in customs enforcement. When the PSI program was initiated, we saw complete evasion dropped significantly (almost 81 percent) in the first month. On the contrary, evasion increased by 10.25 percent in the first month of the PSI period, accumulating an increase of 6.67 percent in the total volume of evasion. Unlike the PSI period, when the ASYCUDA was first introduced, complete evasion swelled almost 50 percent while evasion increased close to 6 percent in the first month of operation. A final observation is in the first month after the PSI program was terminated, evasion increased by 42 percent while complete evasion was reduced by 18.23 percent.



Initially, this study expected to see the level of complete evasion to increase when the government strengthened enforcement through the implementation of the PSI program and the ASYCUDA system. The evidence suggests the opposite. Figure 3 illustrates the ratio of evasion and complete evasion. As an increase in enforcement was applied through the PSI program, we expect smugglers to move away from evasion because the risk increases; yet, as shown early in this period, smuggling seemed to favor evasion over complete evasion. It seems reasonable to assume that they saw fraudulent practices, such as underinvoicing and misclassification, as more cost-effective methods. This trend reversed when the ASYCUDA system was first introduced. During this period, a declining trend in evasion became apparent along with a shift toward complete evasion. As expected, the level of complete smuggling increased in the third interval period when both programs were implemented simultaneously, suggesting that smugglers would switch between these 2 methods depending on the costs.

**Figure 3: Ratio of logged Evasion over logged Complete Evasion**



To study the relationship between the variable EV with CEV, Tariff Rate and Enforcement, the results of the regression of equations (5) and (6) are provided in the appendix. Holding all else constant, a 1 percent increase in complete evasion leads to a 0.03 percent decrease in the volume of evasion. With respect to enforcement, there is a weak correlation between this and evasion. Furthermore, it is important to determine whether or not evasion is responsive to tariff rates. In Table 2, it is evident that a 1 percent rise in the tariff rate correlates to a 0.18 percent increase in evasion.

**Table 2: Regression Analysis of Tariff Rate to Evasion**

Variable	Coefficient	Std. Error	t-Statistic	Probability
TARIFFRATE	0.177191	0.022817	7.765851	0.0000
R-squared	-1.304787	Mean dependent var		0.953549
Adj. R-squared	-1.304787	S.D. dependent var		0.812953
S.E. of regression	1.234186	Akaike info criterion		3.259216
Sum squared resid	2951.991	Schwarz criterion		3.262089
Log likelihood	-3158.810	Durbin-Watson stat		0.745476

Similarly, Table 3 shows a high correlation between complete evasion and tariff rate. For a 1 percent increase in the tariff rate, complete evasion is expected to increase by almost 0.7 percent. Moreover, between PSI, ASYPSI and ASY periods, complete evasion is more correlated with the latter 2 periods, conforming to the expectation that more smugglers chose to evade customs completely as enforcement increased. When the tariff rate of a particular product rises, the product is subject to more targeting by customs officials, making the risk premium much higher. The penalty and punishment are also much higher than before since the level of punishment is characterized as an exponential function. If the cost of engaging in evasion is higher than the cost of bribing the customs officials, then smugglers would choose the second option and completely smuggle the goods into domestic market.

**Table 3: Regression Analysis of Tariff Rate to Complete Evasion**

Variable	Coefficient	Std. Error	t-Statistic	Probability
TARIFFRATE	0.695074	0.190826	3.642441	0.0003
R-squared	16.313350	Mean dependent var		4.013157
Adj. R-squared	16.313350	S.D. dependent var		0.980393
S.E. of regression	4.079347	Akaike info criterion		5.651823
Sum squared resid	8004.355	Schwarz criterion		5.660491
Log likelihood	-1361.089	Durbin-Watson stat		0.286810

### **Limitations**

While the findings of this study have shed new understanding on the relationship between tariff rates and evasion, they are not generalizable for all countries. The first challenge is the conversion rate between local currencies and the U.S. dollar. While the exchange rates were obtained from credible sources, reconversion of currencies is bound to have minor errors. For instance, the value of imports into Cambodia is declared in U.S. dollars. Importers must first convert the value into the local Riel denomination. Similarly, Thai shipments bound for Cambodia

are valued in Thai Baht. Local importers must convert the Baht into the Riel, which might have contributed to some of the trade discrepancies.

The second limitation relates to the case of Thailand as a trading partner. Evaluation of the effectiveness of these two programs was based entirely on bilateral trade statistics between Cambodia and Thailand which may not be appropriate since both countries share a common border that provides multiple points of entry for smuggling. Because the sample size is limited, the findings are only relevant for countries bordering Cambodia (Vietnam and Laos). Shipments from other countries are largely loaded at Cambodia's only major seaport, so they are subject to tighter control with fewer opportunities to evade. Nonetheless, this may not mean that customs evasion is not prevalent among their trading countries.

The third challenge has to do with the limitation and availability of the trade data. While the data between Cambodia and Thailand exists, export records are at the aggregate level (2 digits of AHTN commodity); to match this format, a transformation is needed to reformat import records from Cambodia. For instance, for all products with the commodity code starting with 12 was summed into an aggregate value, displaying only the 12.000.000. Cambodia, on the other hand, has much more detailed data, consisting of all products at the 8 digit AHTN code (12.123.123). Therefore, the study summed all the products all the imports products under the same 2 digit AHTN code.

## Policy Recommendations

Evidence suggests that the Cambodian government must engage in a new policy, focusing on reducing customs corruption by equipping the force with modern tools to combat smuggling. There are two main factors in smugglers' willingness to engage in evasion: policy enforcement and corruption level of customs officials. A government such as Cambodia's could have the most effective enforcement technology, but without reliable customs officials, the effort would be ineffective. Similarly, a country could have the most honest customs officials, but without modern tools and techniques, the system would simply be ineffective and inefficient. For these reasons, the following five recommends are suggested.

First, the Cambodia government should expand the existing Single Customs Window (SCW). SCW would complement the ASYCUDA system aim to reduce bureaucracy and opportunities for corruption in the import and export trade. Cambodian customs would minimize its exposure to risk through more reliable sources of information and it could realize manpower and time savings, allowing agents to concentrate on high-risk shipments. Importers benefit by moving their shipments through customs more quickly, avoiding unnecessary

handling and storage charges.

Second, strengthening enforcement and imposing a zero tolerance approach to corruption will aid in reforming customs programs. All parties need to understand that impunity will not be tolerated at any level, and they need to believe the real risks associated with resorting to corruption practices. Random checks of personnel and procedures need to be carried out by management, and sanctions need to be enforced to send a strong signal that abuse will not be tolerated.

Third, the introduction of personnel rotation policies would reduce the likelihood that customs employees could develop relationships with smugglers. The implementation of merit-based reward system would increase customs efficiency and transparency and draw qualified employees.

Fourth, high ranking government officials must begin to demonstrate a long-term commitment to resolving deficiencies in customs governance and law enforcement. Without such commitment, reforms are likely to be unsuccessful, regardless of the quality of their design or implementation. As such, political will and commitment are the fundamental criteria for combating corruption and fostering the capacity to build effective policies.

Fifth, Cambodia must strengthen revenue collection through cooperation between Customs and Tax administration by exchanging information about trading firms. Cooperation with military, police, and local authorities will further enhance enforcement quality.

Improving the quality of customs service is critical to economic growth. This can be achieved through the development of human resources and recruitment strategies through comprehensive training programs. Modernizing physical infrastructure and equipping customs agents with adequate facilities, equipment, and enforcement tools are critical for the customs administration to carry out its responsibilities.

## Conclusion

This study set out to determine whether there was a significant relationship between the tariff rate and evasion through isolating the tariff rate as the only independent variable. The results of this study show there is moderate correlation between the tariff rate, complete evasion, and evasion. Counter-intuitive to existing literature, the case of Cambodia illustrates the need to redesign the economic framework analyzing the relationship between enforcement and evasion. While both the PSI and ASYCUDA programs have reduced the burden on honest importers, they have had little effect on customs evasion in Cambodian imports from Thailand. As such, if smugglers began resorting to smuggling due to better enforcement, the government would lose tax revenue. Better enforcement alone, without

additional policies such as those mentioned above, not only presents costs to the government, but it also reduces customs revenue. Finally, the question remains as to whether or not the benefits from the PSI and ASYCUDA programs justify the costs of implementation.

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#### Editor's Note

*Details of Chamnan's calculations are available through *The Current's* Online Journal, [www.thecurrent.cipa.cornell.edu](http://www.thecurrent.cipa.cornell.edu).*

### Endnotes

1 Asia Development Bank statistics, <<http://www.adb.org/Statistics>>

2 Luigi A Franzoni, "Tax Evasion and Tax Compliance," September 1, 1998.

3 Fisman, Raymond and Shang-Jin Wei, "Tax Rates and Tax Evasion: Evidence from 'Missing Imports' in China," *Journal of Political Economy*, No. 112 Vol. 2, pp. 471-496.

4 Franzoni, 1998.

5 Sanja Madzarevic-Sujster, "An Estimate of Tax Evasion in Croatia," *IPF Occasional Paper*, No. 13, Institute of Public Finance, Zagreb, Croatia, April 2002.

6 Franzoni, 1998.

7 Robert W McGee, "Views Toward Tax Evasion: A Comparative Study of Moldova and Romania," *The IUP Journal of Public Finance*, IUP Publications, vol. 0(3 & 4), pages 7-24, August 2009.

8 Dean Yang, "Can enforcement backfire? Crime displacement in the context of customs reform in the Philippines," *Review of Economics and Statistics* 90:1-14.

9 Lucas Ronconi, "Enforcement and Compliance with Labor Regulations." Working paper.

10 Franzoni, 1998.

11 Fishman and Wei, 2004.

12 Jose Anson et al, "Tariff Evasion and Customs Corruption: Does Pre-Shipment Inspection Help?," *The B.E. Journal of Economic Analysis & Policy*, Berkeley Electronic Press, vol. 0(1), 2006.

13 Dean Yang, "How Easily do Lawbreakers Adapt to Increased Enforcement? Philippine Smugglers Responses to a Common Customs Reform"; mimeo, Harvard, 2003.

14 Ibid.

15 Integrated Regional Information Networks (IRIN), *Cambodia: Children miss out on school because of corruption*, 5 December 2008, <<http://www.unhcr.org/refworld/docid/4938f32214.html>> (accessed 6 January 2011).

16 Website of General Department of Customs and Excise, <<http://www.customs.gov.kh>>

17 Ibid.

18 Yang, 2003.

19 A secondary verification was done with the Cambodian import tariff schedule.

20 Website of General Department of Customs and Excise, <<http://www.customs.go.th/Customs-Eng/indexEng.jsp>>

21 So far, availability of data only extend to June of 2009, but another request has been made to GDCE for the remaining data in question.

22 Restriction on the data is due to data availability as discussed more in the limitation discussion.

23 Both the UN and World Bank utilizes a commodity code system, commonly known as the Harmonized System Codes (HS) with 6-digit identifications.

However, in the countries of interested, they utilize the AHTN 8-digit code, a part of the ASEAN trade effort to simplify commodity code. The first 6 digits of the AHTN would correspond to the HS code. The 7th and 8th digit further define the trading commodity.

24 Both measurements of evasion consist of issues that will be explained more in detail later of the paper. Both measurements of evasion consist of issues that will be explained more in detail in later section of the paper.

25 The penalties are much higher for repeated offenders.

26 Under this assumption, PSI and ASYCUDA are presumed to have less than 100 percent effective rate in catching evasion. Otherwise, this positive shock in enforcement, with 100 percent effectiveness, could shift the line between the penalty line and the dull import duties line.

# Are Intellectual Property Rights Evolving Towards the Enclosure of the ‘Intangible Commons’?<sup>1</sup>

*Rafael Escalona Reynoso*

## **ABSTRACT**

*Advancements in the areas of Information Technologies (IT) and the New Life Sciences (NLS) are helping redefine the boundaries of Intellectual Property Rights (IPRs). Although the fast growth of these technological areas may very well be fueled by the existence of the IPR system itself, in recent years there has been a shift in the IPR systems moving “upstream” in the research cycle, a movement which may actually discourage future research and innovation. This document addresses some of the most recent public policy issues surrounding IPRs and delves into the case of biotechnology (biotech) to provide examples of how advancements in this area are helping redefine concepts like ownership, property, and rights over things and ideas. Lastly, it presents arguments to suggest that in an era where information has become the most valuable asset, alternative forms of IPR protection in which numerous proprietors share rights simultaneously could help better promote a steady expansion of scientific activity and artistic expression.*

**A**mong legal and economics scholars there is an increasing concern about the effects the current expansion of the boundaries of property rights will have on the future of research and development activities.<sup>2</sup> Evidence suggests that recent advancements in science and technology have prompted property rights — mostly in the form of Intellectual Property Rights (IPRs) — to move “upstream” in the research cycle towards areas where their allocation is less conventional, both fueling these concerns and calling for a faster evolution of the policies and institutions associated with these rights.<sup>3</sup> This expansion has introduced property rights over information and subject matter — such as traditionally available knowledge or gene sequences information — that were previously believed to be ‘uncommodifiable’ or part of the common heritage of mankind.<sup>4</sup> To find more evidence of how technological change is helping reshape the general property system and the public policies that derive from it, this document first identifies a series of elements deemed central to any property allocation system and the dimensions in which each of these operate. The article then addresses some of the most recent public policy issues surrounding IPRs in general and further delves into the case of modern

biotechnology to provide examples of how advancements in this area are helping redefine concepts like ownership, property, and rights over things and ideas.<sup>5</sup> Lastly, it presents arguments to suggest that in an era where information has become the most valuable asset, alternative forms of IPR protection in which numerous proprietors share rights simultaneously could help better promote a steady expansion of scientific activity and artistic expression.

### **Property: Five Dimensions**

Property rights exist where law, economics, and society intersect. These rights stem from policies that provide rules to guide decisions on the limits of what can be appropriable, who can possess such rights, how to allocate such rights, and the difference between these rules when applied to either tangible or intangible things. These policies, the principles behind them, and the frameworks they help establish have remained in constant evolution; within earlier frameworks ‘righteous’ proprietors could claim uncontested dominion over anything imaginable in a quest to exclude others from trying to exert any control over the things deemed as “property.”<sup>6</sup> Later these rights were justified by claiming that the allocation of private property “saved lives” by reducing overuse and underinvestment and inducing greater efficiency and innovation, highlighting the weight that collective views had over their scope and reach.<sup>7</sup> Today, innovation and scientific advancements are contesting the limits of what is appropriable, forcing a re-evaluation of the fundamentals of the property rights systems and the policies that define them.

Identifying the central elements composed within a property allocation system further explains how property rights are defined, granted, exchanged, used, and policed. According to Carruthers & Ariovich a property system should display the following five elements: i) the objects of property (stating what can be owned); ii) the subjects of property (addressing who can claim ownership); iii) the uses of property (establishing what can be done with it); iv) the enforcement of rights (defining how property rules are maintained); and v) the transfer of property (setting the guidelines on how property rights are exchanged).<sup>8</sup> Each element is essential to guarantee the enforcement and fair allocation of such rights and to ensure that any exchange mechanisms defined within these systems function appropriately and within legally. Yet each also requires a degree of flexibility to cope with a continuously expanding frontier of the appropriable, facilitate the free circulation of rights within these systems, and allow for collective views to help define social objectives.



### ***Intellectual Property: Where to Draw the Line?***

Intellectual property introduces a new dimension to the already complex property system; it not only stresses the notion of intangibility but also opens the door to the possibility of obtaining rights over anything that can be produced by the human mind. This way, ideas and concepts — as long as they comply with certain principles and standards — can be enclosed and protected from external use by the property rights enforcement system. This has induced a boom in the appropriation of the intangible, creating new areas of human development where, through the use of IPR schemes such as copyrights, trade secrets and patents, specific rights are granted over ideas, processes or discoveries. Though intellectual property protection is not a new concept, the rate of scientific discovery in the past three centuries has required its fundamentals to adapt at a much faster pace.<sup>9</sup> There has been an even greater necessity to do so in recent years due to the Information Technologies revolution and constant advancements in areas of the New Life Sciences, like genome sequencing and genetic engineering.

Although the fast growth of these technological areas may very well be fueled by the existence of the IPR system itself, there are voices suggesting that such IP expansion is just the reflection of the political, economic, legal, and cultural processes through which property rules in capitalist economies are extended into new realms. These suggestions clearly criticize the way in which rights operate to provide a temporary monopoly over information and ideas and promote the advancement of science and technology.<sup>10</sup> Yet it cannot be denied that scientific development has recently witnessed a more systematic “enclosure” of the less tangible or a more systematic “enclosure of the intangible commons of the mind”<sup>11</sup> as well as a movement of IPR that can be considered as going too far “upstream” in the research cycle.<sup>12</sup> This shift from bounding the rights of the tangible to those of the intangible is partially rooted in a deeper public policy rationale, one that altered the intellectual property protection regimen “to spur innovation and speed the translation of basic science into marketable products,” and encourage policymakers to design policies that facilitate the commoditization of knowledge, build links between academia and industry, and expand the scope of intellectual property protection.”<sup>13 14</sup>

As the epitome of the IT revolution, the Internet came to be an innovative information-exchange system that not only played a pivotal role in the expansion of technologies derived from the NLS, but also defined the pace at which the IPR system evolves to keep up with the rate of information production. From this particular advancement in information exchange processes, IP has witnessed two key efficiency-inducing paradigm shifts; information can now be rapidly exchanged and replicated almost ad-infinitum, both at nearly zero transaction

costs.<sup>15</sup> Due to these shifts, information has become the prime subject of IPR protection and subsequently, one of the motors behind these changes. This technological advancement and the efficiencies derived from it have also induced a faster pace in the search for original and more widely wider patentable information derived from basic resources (especially biological resources), turning it into a race for attaining the competitive advantages provided by the temporal monopolies that IPR offered, a race that resembles the North American Frontier expansion.<sup>16</sup>

These advancements, however, also come with drawbacks. On the one hand, efficiency-inducing advantages are the source of the information exchange system's biggest weakness by making information (now mostly available in electronic format) extremely difficult to protect. This flaw has numerous legislative and IT experts working overtime on ways to better protect information — either within the system (codifying) or through external regulatory measures (policing) — in order to continue reaping the benefits of low transaction and replication costs. On the other hand, property rules operating within this system are making more evident the fact that having property rights over information (or tangible things like some biological resources) is becoming more like having a segment of a “thicket of rights” that is collectively shared by multiple righteous owners, similar to how a single company stock is shared among multiple stockholders.

Policies appear to be designed to ease the commoditization of knowledge, build links between academia and industry, and expand the scope of intellectual property protection to encourage innovation and speed the translation of basic science into marketable products. The mainstream scientific advancement model is designed to promote knowledge and its derivative technologies through incentive-based IPR systems.<sup>17</sup> As previously mentioned, it appears as if the new property system promotes property rights to “move up the stream” of scientific and technical development, providing consent for the allocation of property rights over things that traditionally are, have been, or may be considered as in the public domain. This movement towards appropriation of the less tangible also denotes that these rules are aimed at turning things that clearly display both public good characteristics of non-rivalry and non-exclusivity into appropriable commodities, without considering that the allocation of property rights over these will be extremely hard, if not impossible, to enforce. Furthermore, this movement has made some of these now appropriable things (such as living, genetically modified organisms and genetic sequences) behave in the real world in a manner that is similar to unprotected information within the information exchange system represented by the Internet.

## IPR in Biotech

**A**n example of how IPR protection is enforced over intangibles in these innovation areas can provide a better view of the similarities and differences between conventional and intellectual property rights protection and how these are evolving. Consider the following: As the head of a research team at one of the top New Life Sciences research centers within the umbrella of a large multinational corporation, you are working on the development of a genetically modified pest-resistant, high-sugar corn that can provide the company an edge in the thriving biofuel market. For the past four years, you and your team have been working on the multimillion-dollar project on the introduction of specific characteristics of a ubiquitous species of bacteria, *Bacillus thuringiensis* (or Bt), found in nearly any sample of crop soil around the world, into a particular variety of sweet corn (*Zea mays*). Meticulous note taking and experimenting produces the final genetically modified corn, ensuring that you — as head of the team — provide a confirmation that states that the experiments described were performed in the date, time, and fashion described. In addition, over this period you also made sure that all procedures and results used for the gene sequencing and trait insertion processes were saved in electronic files and the computer simulations were also properly stored. An essential part of the project relies on the software that developers in India helped design. This software and IT expert group that operates it, with whom you exchanged information on a daily basis, also aided in the codification of the programs used and the management of the information produced throughout the research. After all this work you are finally witnessing the success of the experiment in the form of a living, genetically transformed corn. The new plant variety produces higher levels of ethanol-generating sugars than any competing product available. It is also projected that in the upcoming years its seeds will be exported to nations where agricultural costs (and IPRs protection) are fewer than those in the United States.

An analysis of what it is that the company has property rights over, and how these rights are allocated, will answer multiple questions. For instance, will the company have property rights over the entire population of high-sugar, pest-resistant corn that will soon be available? Not really. The company will only be granted property rights over the new genetic sequence conformed by the corn and the bacterial genes that allow the new variety of corn to develop pest resistance against certain pests susceptible to the Bt's toxins. From this statement, it would be easy to think that now the company "owns" the genes of both a ubiquitous bacteria and a common corn. Yet this is also false. The gene sequence contained within the new corn — and that taken from the bacteria — do not belong to the company; through the allocation of

property rights the company has a right to exclude others from using the combination of bacteria and plant genes in the newly arranged sequence that produces the particular pest-resistant trait in that type of corn. In other words, if another individual or entity uses exactly the same genes but in a different order (a different new sequence) to express completely different traits in corn or bacteria it would not be infringing any property rights held by the company. More than the genes or their sequence in the new DNA chain, what the company has rights over is information about the genes' (partial) behavior and that of the newly created sequence they helped create, the processes of manipulating and transferring them; and the instruments to do so, including computer software designed for sequencing genes and the algorithms composing such programs, as well as the information these produce during the research processes.

Property rights appear to be a collectively held "thicket of rights" over something, in this case, mostly information. The types of IPR that can be accessed here diverge into three types: patents, copyrights, and trade secrets. In this example, copyrights are filed for all information attained and processes used, patents are filed over the new genetic sequence, and trade secrets over information are kept secluded from other competitors. From earlier examples it is easy to picture how property rights can be enforced over the copyrighted material. This is not an easy task as you, the team leader, will have to rely on numerous electronic and legal instruments to avoid any "spillovers" of the knowledge produced and attained by the participant scientists.<sup>18</sup> Now the question that arises is how property rights over the genetic sequence contained in each corn will be protected? This is an unknown that takes us back to the two main downsides of the current information-exchange system: Although the 'space' in which the corn carrying the new genetic information is an open one (the natural environment where this type of corn can grow) as opposed to that of the Internet (considered a closed information-exchange system), many instruments allow the information contained within the corn's DNA to be effortlessly exchanged and replicated. Moreover, as corn is a living organism that relies on air currents and other organisms for its pollination, guaranteeing a natural environment where the possibility of such an exchange is eliminated is a complex, if not impossible task. Through cross-pollination the information contained within the genetic sequence of the new corn variety could transfer to non-genetically modified varieties of itself or to other corn varieties. This gene exchange could occur with other plants through cross-variety pollination. This intellectual property loss process or "spillover" is almost perfectly analogous to the loss facing unprotected information within the new information-exchange systems, leading to pose questions like: why should the company invest resources in research when property rights enforcement is so complex in areas like biotech?

Again, answers to this type of question will come from the capacity to develop adequate systems and regulation adjustments, some beyond the scope of IPR. In this case, protecting the information produced throughout the research process would require adjustments similar to those previously suggested, such as more intricate codification and tighter data encryption. In the case of the modified corn as product, these adjustments to protect information might require the design and inclusion of specific genetic traits (like induced seed sterility), as well as changes to the environment (such as designated zones for harvesting these types of products). In addition, trying to provide a clean-cut answer to the latter question would also require addressing whether scientific research should be promoted through government subsidies that compensate for such losses and whether science and knowledge itself can be considered as a quasi-public good that is difficult to protect. All these questions can provide for the development of an entire new document beyond this one. One obvious downside of trying to follow these prescriptive solutions 'by the book,' especially under the auspices of advancing property rights protection, is the possibility of turning the information-exchange systems (particularly the Internet) into a "black box" that only a privileged few would have access. This would have repercussions beyond scientific development, altering the way many ideas and forms of artistic expression are created and made available today and in days to come.

### ***Some Policy Implications of Intellectual Property Protection for Biotech***

Biotech is at the forefront of technological advancement, helping to redefine the limits of basic and applied research and enabling the innovations that challenge the boundaries of property. As a scientific process that both produces and heavily relies on information, biotech has encouraged the design of guidelines emphasizing that property in this area of scientific research should be defined as having a segment of a collectively held 'thicket of rights' over information. As a technological sector, it has exerted further pressure on the IPR system by inducing adjustments to the rules that apply over more tangible resources, promoting an expansion of the boundaries of the appropriable in a quest to maintain the validity of the 'incentives for research.' Further, it has been associated with a series of contentious patent-related issues, all of which are redefining other policy areas beyond the IPR system.

As the previous example suggests, developing a new product through the use of biotech can be an extremely complex and resource-consuming endeavor. The average product that reaches full development from the university or private lab to the marketplace averages stratospheric costs and requires years for regulatory approval.<sup>19</sup> The liberal state theory suggests that without the use of quasi-monopolistic powers that the patent holder exerts, there would be hardly any connection

between basic research and development in this or any information-intensive research area. This may or may not be the case. Maintaining this market-driven incentive has been one of the central premises behind the design of policies that enable IPRs to move up the stream of scientific and technical development. Inevitably, keeping these incentives as the central motor of biotech requires addressing issues on whether the fruits of biotech are patentable (more than answering how suitable these economic incentives are for promoting the advancement of science), whether such products are new (as opposed to those found in nature), and whether or not patents should be granted over living organisms. Answers to some of these issues, as well as more evidence to assert that biotech is truly advancing at a faster pace than the policies and institutions affecting it, are found within some of the decisions amending IP law associated to it.

Earlier in the development of the US pharmaceutical industry, the decision in the case *Parke Davis & Co. v. H.K. Mulford & Co.* (196 F. 496 (2d Cir. 1912)) made it possible for patents to be granted over methods for isolating and purifying “natural” substances into useful, isolated, and pure forms not found in nature.<sup>20</sup> The case provided the grounds to justify why a substance found in nature that has been subject to specific alterations, and the process to induce such transformations, can be subject to IPR protection. This decision, made almost 100 years ago, also provided grounds to support granting IPR over certain biological products obtained or generated through the use of biotech, enabling it to move forward during its initial development stage.

Biotech found itself one step ahead of IP regulation for the first time in 1980, when Ananda Chakrabarty used cell fusion techniques to transform a living organism into a previously non-existent one believed to be capable of breaking down components of crude oil spills. In a move that altered 35 USC §101, the Supreme Court, in a 5-4 ruling, maintained that the Patent Act protected Chakrabarty.<sup>21</sup> The section, which defines what inventions are patentable, allowed for patents to be filled for certain living organisms. *Diamond v. Chakrabarty* (447 US 303 (1980)) not only changed the outlook of the biotech industry but also helped establish other associated areas of great significance for its development, mainly those associated with the safety assessment and management of living GM organisms.<sup>22</sup> Chakrabarty, however, happens to be only the beginning of such patent regulation revision.

Rapid advancements in biotech research allowed for genetic modifications of multi-cellular higher organisms and for further alterations to 35 USC §101. The United States Patent and Trademark Office (USPTO) later ruled in *In Re Allen* (2 USPQ 2d 1425, Bd. Pat. App. 1985) that non-human multi-cell organisms could also be patented. Yet it did not issue clear specifications for those organisms that contained human DNA or any derivatives of it. Scientific development in biotech

proved to be one step ahead of the IP system once more when Philip Leder at Harvard University filed for a patent for a higher organism in the form of a transgenic mouse expressing a human oncogene (a cancer-related variant of a gene involved in cell growth and replication). Again, the ruling of the USPTO was favorable, allowing the claim to the mouse (US Pat. 4,736,866) and soon after issuing another for the process for making transgenic mammals (US Pat. 4,873,191). These decisions, however, were not fully embraced by the international community, becoming the first in a long line of discrepancies associated with biotech between the United States and other countries.

Contrasting with these decisions, the European Union's (EU's) position regarding the patentability of animals displayed a more cautionary approach as long as these were not limited to one species. The EU also allowed claims to methods using genetically modified (GM) animals, subject to the limitation that the method must be applicable to more than one species. Yet it would not allow patents over "species," and established the authority to deny claims when these processes appear to cause the animal suffering without any substantial medical benefit to humans or the animal.<sup>23</sup> In a similar tone, the Canadian Supreme Court ultimately decided that genetically engineered animals were not patentable subject matter, thus negating patents over the "oncomouse" and its associated processes.

Advancements in biotech research have also shown the limitations of individual ownership when the boundaries between tangible and intangible become blurry. This, at least for the time being, happens to be evident in the case of filing patents for gene sequences. Under § 101, a patentable invention must be useful, the applicant must set forth a use of the invention, and this use has to be substantial, specific, and credible.<sup>24</sup> Substantial utility is a requirement that guarantees that the applicant has knowledge beforehand of a true application for her invention. In the era of biotech and genomics, the sequencing of the genes is done on a mechanical rather than a target-driven basis, turning the utility requirement into a hurdle for patent filing.<sup>25</sup> This discrepancy exposes the fact that privately funded efforts to sequence genes and then file for patent protection over their sequence are often futile due to the complexity of determining beforehand the relationship between the gene sequence and the gene product's function.<sup>26</sup> This undefined relation between gene sequence and gene product's function has had enormous consequences over the scope of IPR.

A clear implication of the effects of this undefined relationship is that — due to the fact that genes within DNA are generally involved in several protein processes simultaneously — complying with the requirements of "substantial" and "specific" utility in filing a patent may result in having to issue "overlapping" or "simultaneous" rights over particular gene sequences to multiple entities. This means that

multiple individuals filing for property rights over the same gene sequence, each claiming a different (and equally valid) substantial, specific, and credible utility over these, might end up having to share the entitlements that compose the full bundle of rights that apply over such sequences. Therefore, making evident the almost-public good nature (non-rivalry with partial excludability) of these tangibles and helping support the assertion that biotech is helping define property for certain types of information and biological resources that is closer in essence to having a segment of a collectively held “thicket of rights.”

Another palpable example is the clear reduction of resource investment for basic research in the area of genomics stemming from the fact that processes for mapping a chromosome, or assessing whether an individual has a variant of a particular gene, are the only certain applications suitable for IPR protection.<sup>27</sup> Additionally, these particular activities (chromosome mapping and gene identification) have triggered debates over the management of private information adding further stress to the subject’s future prospects.

This undefined relationship between sequence and function has also added thrust to the practice of scientific advisors shaping new policy, which Sheila Jasanoff defines as the “fifth branch.”<sup>28</sup> This is the result of relying on experts to determine whether or not new gene sequencing patents credibly uphold their claimed utility, thereby establishing the limits of IPR. This will also affect future policies associated to human capital formation, as the demand for individuals with more technical and scientific sophistication increases with each biotech breakthrough, demanding changes to the IPRs system.

In addition to issues associated to the limits of property, the speed at which IPR evolves, and those issues stemming from some of the patent filing requirements, biotech has been subject to many other patent-related issues with substantial policy implications. Issues of equitable ownership of products derived from human tissue, issues related to inventions that draw on traditional knowledge of indigenous peoples, the patenting of animals (especially farm animals), and broad claims to “disease pathways” are controversial and substantial enough to develop papers to address each individually.

## Final Thoughts

**A**s mentioned throughout this paper, property has traditionally been conceived as having complete and individual ownership over specific tangible or intangible things. Carrying this notion into an era where the exchange and replication of goods and technology is extremely easy adds complexity to the discussions of what should or should not be the object of such rights. The recent Information Technology revolution has, once again, called for a review of the policies



behind property allocation, making a shift towards establishing a definition of property that is closer in essence to owning a segment of a 'bundle of rights' rather than individual, absolute, irrefutable, and unrestricted ownership. In many cases the entitlements composing these 'bundles of rights' can be distributed among various individuals or entities, similar to the way that company stock can be shared among various stockholders. Furthermore, advancements in scientific research may allow in the not-so-distant future, for some of these segments to be 'owned' by multiple 'righteous proprietors' simultaneously. Property, in this sense, more than establishing an artificially constructed relationship between people and things, like the Blackstonian definition suggests, is moving toward highlighting the establishment of relationships between people as sharing information and biological resources. Furthermore, the scope and value of these rights as commodities are also developing from such social interactions.

Additionally, the proposition that a property rights system should consider five essential elements addressing particular issues — what can be owned, who can own, what can be done with it, what rules for the enforcement of rights of property, and how property moves between different owners — facilitates understanding of the paradigm change that the system is currently experiencing. This analytical framework clarifies how technological advancement, particularly in Information Technologies and the New Life Sciences, is shifting the concept of what the object of property rights can be as well as the mechanisms to enforce property rights over particular things. Technological advancement has allowed information to become the essential input of what can be considered a property rights allocation system in continuous evolution. Furthermore, this shift has helped considerably reduce the transaction costs of replicating and exchanging information, allowing higher levels of efficiency to be displayed by these information exchange systems. Nevertheless, these changes keep undermining the current scheme by adding more stress to its current property rights enforcement framework, exposing the fact that these — the physical information exchange systems and the guidelines that define and enforce property — are not evolving at the same pace as technology. This dissonance appears to have special repercussions on the previously mentioned areas of knowledge — IT and biotech — and in areas of artistic expressions also covered by IPR making them both benefit and suffer from the newly attained low transaction costs that simple replication and exchange provide. There will be a need to further design policies and instruments that can help accelerate the pace at which these systems adapt to change. It will also be necessary to promote research that allows a better understanding of the concept of property rights and its limitations to keep the current IPR protection system from becoming obsolete. These new guidelines should be flexible enough

to embrace the essence of existing rules based on traditional private property theory, allow for a permanent dialog about the limits of the boundaries of property rights, and preserve the incentives nature of IPRs to continue promoting the advancement of technology and culture in an era where information and genes are the most valuable commodities.

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## Endnotes

1 The inspiration for this title comes from James Boyle's paper "The Second Enclosure Movement and the Construction of the Public Domain," *Law & Contemporary Problems*, no. 66, (Winter/Spring 2003) 33-74.

2 In recent years, law review articles have described an information arms race from various perspectives, with multiple sides battling for larger shares of the global knowledge pool. Charlotte Hess and Elinor Ostrom, "Ideas, Artifacts, and Facilities: Information as a Common-Pool Source," *Law and Contemporary Problems*, vol. 66 (Winter/Spring 2003) 111.

3 James Boyle, "The Second Enclosure Movement And The Construction Of The Public Domain," *Law & Contemporary Problems* no.33 (Winter/Spring 2003) 33-74; James Boyle, "Enclosing the Genome: What the Squabbles over Genetic Patents Could Teach Us," *Perspectives on Properties of the Human Genome Project*, ed. F. Scott Kieff (San Diego, Calif.: Elsevier Academic Press, 2003b), 97-118; Bruce G. Carruthers and Laura Ariovich, "The Sociology of Property Rights," *Annual Review of Sociology* 30 (2004) 23-46; Sheila Jasanoff, "Designs on Nature: Science and Democracy in Europe and the United States." (Princeton University Press, 2006), 13-38; and Keith E. Maskus and Jerome H. Reichman, "The Globalization of Private Knowledge and the Privatization of Global Public Goods," *Journal of Economic Law* 7 no.2 (2004) 279-320.

4 Although views are mixed on the possible outcomes of this property rights expansion many authors suggest there are parallels between this movement

and the process of fencing off common land and turning it into private property known as the English enclosure movement. James Boyle, "Fencing Off Ideas," *DAEDALUS* 13 (Spring 2002), 14.

5 The Cartagena Protocol on Biosafety defines Modern Biotechnology as: "The application of: a) In vitro nucleic acid techniques, including recombinant deoxyribonucleic acid (DNA) and direct injection of nucleic acid into cells or organelles, or b) Fusion of cells beyond the taxonomic family, that overcome natural physiological reproductive or recombination barriers and that are not techniques used in traditional breeding and selection." UNEP, Cartagena Protocol on Biosafety (Secretariat of the Convention on Biological Diversity, 2002), Art. 3 (i).

6 In the Eighteenth Century Sir William Blackstone defined property as: "That sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe" (Sir William Blackstone, *Commentaries on the Laws of England*, vol. 2. (Chicago: Univ. Chicago Press, 1979), 2.

7 In the view of enclosure defenders, the strong private property rights and single entity control that were introduced during the English enclosure of the common lands avoided the "tragedy of the commons" by reducing overuse and underinvestment. Boyle, "Second," 36.

8 Carruthers and Ariovich, "Sociology," 24-31.

9 The enactment of the first IPRs Law took place in Venice, Italy in 1474. *Ibid.* 37.

10 *Ibid.* 37.

11 Boyle, "Second," 37.

12 Boyle, "Enclosing," 105.

13 Steven Hilgartner, "Acceptable Intellectual Property," *Journal of Molecular Biology* 319 no.4 (2002), 944.

14 Of course this principle also affects areas beyond scientific development — such as the creative arts — making them vulnerable to market forces and heavy property right protection. Lawrence Lessig, *Free Culture: How Big Media Uses Technology and Law to Lock Down Culture and Control Creativity* (New York, Penguin Press, 2004), 188-207.

5 This virtually transforms information into a public good by allowing it to be: 1) partially excludable (as opposed to non-excludable), and 2) non-rival.

16 Boyle, "Second," 41.

17 *Ibid.* 42.

8 Other IPR instruments that could apply for this example are licenses and material transfer agreements. USPTO Online, "Patents," Laws, Regulations, Policies & Procedures, <<http://www.uspto.gov/patents/law/index.jsp>> (accessed on November 12, 2010).

9 If it requires authorization by the FDA for clinical trials and good manufacturing practices, the process can reach levels of more than \$800 million for a single product. Robert A. Bohrer, *A Guide to Biotechnology Law and Business* (Carolina Academic Press, 2007), 71.

20 Bohrer, "Guide," 72.

21 Chakrabarty was not the only case of this type helping define property over genetically modified (GM) organisms; In re Bergy is considered its companion case involving an antibiotic producing microbial strain. Bohrer, "Guide," 79.

22 The most relevant is biosafety of GM organisms, which helped establish new management rules for these types of organisms, especially those that

were able to reproduce.

23 Although the oncomouse patent was allowed by the European Patent Office (Eur. Pat. Off. V 0006-92), it was only after a long discussion on whether or not the suffering of the resultant mice could be justified in terms of the overall need for experimentation and the reduction in the actual number of these type of mice needed when compared to conventional rodent cancer studies. Bohrer, "Guide," 78.

24 USPTO, "Laws," § 101.

25 Bohrer, "Guide," 80.

26 Furthermore, the results of these efforts could end up entirely in the public domain if similar endeavors over specific genes are conducted simultaneously or in tandem with public enterprises required to make their results available for public access.

27 In an effort that could be described using the term "catch-all kitchen sink" the course taken by some sequencers has been to file an application with as much of a specific function of the gene as could be determined from the homology to other genes and the type of tissue expressing the gene, while hoping that experimentation during the year allowed for amendment after provisionally filing for examination will provide enough data to support credibility of at least one of the claimed utilities. Bohrer, "Guide," 81.

28 Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policymakers* (Cambridge Mass.: Harvard University Press, 1990), 3.

# Housing Discrimination and Craigslist

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## **ABSTRACT**

*Housing discrimination has long been a problem in the United States. Though the Internet is changing the housing search dramatically and has the potential to make the housing search easier for groups that have traditionally experienced the brunt of housing discrimination, especially blacks. Current laws and policies to prevent housing discrimination are largely inappropriate or inapplicable to housing searches performed on the Internet. More research is necessary to inform policymaking and legislation that will make Americans' housing searches easier and more effective.*

## **How is the Internet Affecting the Housing Search?**

**H**ousing discrimination in the United States was routine for most of the country's history. Courts legally enforced discrimination, most perniciously on the basis of race. The country began to reject housing discrimination in 1948 when the US Supreme Court ruled racially restrictive covenants unconstitutional in *Shelley v. Kraemer*.<sup>1</sup> Twenty years later, the Fair Housing Act (FHA), part of the 1968 Civil Rights Act, made it illegal to discriminate on the basis of race, color, religion, or national origin (the so-called protected classes) when selling or renting housing. Twenty years after the FHA's passage, Congress amended the Act to boost enforcement measures and penalties, and added family status and physical disability to the list of protected classes.<sup>2</sup> In the past few decades numerous states have passed laws that prohibit housing discrimination on the basis of sexual orientation. Though laws and policies at the federal and state level have been effective, recent research shows that housing discrimination, particularly against blacks, is still a problem.<sup>3</sup>

The Internet is changing the way that housing searches are conducted and the ways that housing discrimination occurs. The increasing importance of the Internet potentially requires an entirely new legal framework that will redefine the assumptions underlying many fair housing policies. Remarkably little published research exists on the effect of the Internet in the housing search of groups of Americans who have traditionally been discriminated against. This gap in knowledge should be filled as the Internet becomes a more widely used tool in the housing search. If policymakers rely on old assumptions about legality

and ethics in the housing search, opportunities to make the housing search easier and more effective for everyone will be missed.

One of the most important differences between the Internet and traditional sources of housing information is the Internet's extremely low barrier to entry for searchers and advertisers. Newspapers may have been just five cents in the 1940s, but five minutes on a public library computer today will yield exponentially more listings for free. The difference is even more extreme for advertisers. Brokers are costly. Using social networks is free, but spreads information to a limited pool of housing searchers. Posting an ad on popular housing sites is free and spreads information to a gigantic pool of searchers. The ever-lowering barriers to entry are the Internet's greatest promise in the housing search.

Housing sites that most fully exploit the Internet's advantages are also those most open to disseminating false or illegal housing information. Sites such as Craigslist that rely entirely on user-generated content hold the promise of revealing critical housing information to those who might not otherwise have the means to access it. In practice, though, these sites have contained explicitly discriminatory information that may impede or frustrate housing searchers. Compared with traditional housing information sources, the Internet is a cornucopia of beneficial, dubious, and hateful information. A comprehensive effort to examine how the Internet affects housing discrimination will help policymakers propose measures that will help millions of disadvantaged housing searchers find the homes they want.

Discriminatory housing advertising on the Internet falls within the purview of both the FHA and the Communications Decency Act (CDA). The FHA promises liability to publishers who display discriminatory ads, while the CDA promises immunity to websites that display discriminatory ads. Recent case law hints at the boundaries between liability and immunity, but does not reveal clear boundaries between the two. A salvo of legal notes in law journals hints at an open and ambiguous legal situation whose resolution could further any one of a number of visions.

Visions and legal theories should be backed up by research that shows how the Internet affects the housing search, particularly the housing searches of groups that have traditionally discriminated against. Partially because of the glacial pace of academic publishing, this research is scant and inadequate to support expansive conclusions. Timely data may always be scarce because the Internet is so mutable. Currently, the Internet is swiftly becoming more important in the housing search. In March 2008 Craigslist operated websites for 450 cities.<sup>4</sup> Seventeen months later, Craigslist operated in over 700 cities.<sup>5</sup> Though some conclusions can be drawn from currently available data,

more research is necessary to produce justifiable legal and policy positions.

### **What is the Current Statutory and Case Law?**

**W**bsites that provide housing information fall into a new legal category. They have a much more hands-off approach to content than newspapers, which edit and screen advertisements. Two statutes, the FHA and the CDA, determine housing websites' potential liability. The first, § 804 (a) of the Fair Housing Act, states that it is illegal to:

... make, print, or publish, or cause to be made, printed, or published any notice, statement, or advertisement, with respect to the sale or rental of a dwelling that indicates any preference, limitation, or discrimination based on race, color, religion, sex, handicap, familial status, or national origin, or an intention to make any such preference, limitation, or discrimination.<sup>6</sup>

Though the words “print” and “publish” have nebulous meanings on the Internet, the Act should make websites wary of unmonitored third-party content. Any discriminatory statement (not only an advertisement) relating to housing could leave the website liable under the FHA.

The second statute, section 230 (c) of the Communications Decency Act, states:

No provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider.<sup>7</sup>

The CDA was designed specifically to immunize websites that featured user-generated content, though Congress did not notice this law's conflict with the FHA when it was drafted. Section 230 corrected a perverse incentive that arose from a decision in *Stratton-Oakmont Inc. v. Prodigy Services Co.*<sup>8</sup> The case held Prodigy, an Internet Service Provider, liable for defamatory postings on an online bulletin board because it “implemented ... control through an automatic software screening program.” This decision encouraged websites to exert no oversight whatsoever over third-party content, lest they run the risk of being held liable for it. Congress responded with section 230 (c) of the CDA, which was meant to “protect ... ‘Good Samaritan’ blocking and screening of offensive material.” The first case to cite this provision

of the CDA was *Zeran v. America Online, Inc.* in 1997.<sup>9</sup> The case was similar to *Stratton Oakmont*, but held AOL immune. *Zeran* became the most commonly cited precedent for CDA cases that involved liability for third-party content.

The first case to pit the immunity granted by the CDA against the FHA's promise of liability for advertisers occurred in 2007 when the Chicago Lawyers' Committee for Civil Rights Under Law (CLC) Inc. sued Craigslist Inc. Craigslist operated a completely open forum requiring that advertisers need only provide a title, description and e-mail address for their ads. They were sued for advertisements that clearly violated the FHA, such as an ad that mentioned "African Americans and Arabians tend to clash with me so that won't work out." In a unanimous decision, the Seventh Circuit Court of Appeals held Craigslist immune under the CDA. The Court ruled that though the CDA did not offer "a general prohibition of civil liability for website operators," it did provide immunity from liability for third-party content unless the site was designed to help illegal acts. The Court held that Craigslist did not "cause [the illegal statements] to be made ... [any more than] people who save money in a bank 'cause' bank robbery," and clearly believed that, at least in this case, the CDA took precedence over the FHA.<sup>10</sup>

While the Craigslist case clearly followed from *Zeran*, a CDA/FHA case immediately on its heels was significantly more nuanced, and complicated the precedent of expansive immunity. *Fair Housing Council of San Fernando Valley, et al v. Roommate.com LLC* hinged on Roommate.com's profile and search features. Advertisers and searchers were required to create profiles that specified their sex, sexual orientation, and whether they would bring children into a household. Advertisers were required to specify whether they currently had "Straight male(s)," "Gay male(s)," "Straight female(s)," or "Lesbians" living in their units. The case was tried in California, which includes sexual orientation in the list of protected classes. Advertisers were also required to specify if they were "willing to live" with any of the above groups or children. Searches and housing alerts were only visible to "matching" users. In a split decision the Court of Appeals for the ninth circuit found that Roommate.com did not qualify for immunity under the CDA, holding that the "grant of immunity [from the CDA] applies only if the interactive computer service provider is not also an 'information content provider.'" Thus Roommate.com was liable for requiring "answering the discriminatory questions a condition of doing business," and for using the answers to those questions in its search feature.<sup>11</sup>

These two cases suggest that the potential for websites to be held liable under the FHA will be based on the extent to which they actively facilitate discriminatory advertising. This basis for liability arose from



judges attempting to reconcile two laws that were drafted without regard to each other, and does not arise from a serious consideration of what basis for liability would make the housing search easier for potential victims of housing discrimination. Until researchers and policy analysts examine Internet housing searches, important decisions like those made in the Craigslist and Rommate.com cases will be made in an ad hoc way with incomplete, outdated information and assumptions.

### **How Does Current Research Hint at the Effect of the Internet?**

Little academic literature has been published on how the Internet is changing the housing search with regards to housing discrimination. Most of this research focuses on racial discrimination, traditionally the most virulent and problematic form of housing discrimination. A literature search revealed only two directly relevant articles: a 2004 study in Detroit by Maria Krysan and a longitudinal study beginning in 1995 in West Hartford, Conn., by the team of Dougherty, et al. There is a more robust literature on racial differences in the American housing search, and on the ways that the Internet has changed or not changed the housing search regardless of the race of the searcher. These two bodies of research allow for informed speculation on the effect of race and the Internet in the housing search and reveals fertile ground for further research.

What were the differences between the housing searches of minorities and whites before the Internet became an important tool? Studying Phoenix, Ariz., and Pittsburgh, Pa., in 1982, Francis Cronin found that minority searchers spent more time searching and looked at fewer units in a narrower geographic area than non-minorities. Only small differences were found in the information sources used by blacks and whites.<sup>12</sup> Studying Detroit in 1992, Reynolds Farley discovered that blacks were significantly more likely than whites to use newspapers and social networks as opposed to brokers, and were also much more likely to feel discriminated against by brokers.<sup>13</sup> In the same year in Boston, Harriet Newburger found that prospective black homebuyers used fewer information sources and visited fewer homes than their white counterparts, even after controlling for age, suburban versus urban homes, and whether the searcher was a first-time homebuyer. She hypothesized that this difference in housing searchers' behavior was rooted in another of her findings: Housing information in black neighborhoods was harder to get than information for homes in white neighborhoods.<sup>14</sup>

Taken very broadly, this research reveals that sometimes blacks and whites consult different types of sources in the housing search,

but blacks generally either objectively and/or subjectively have a more difficult time with the process. This is not a surprising result. Regional variation might explain the differences recorded between the types of information used by whites and blacks. National racial issues, possibly arising from discrimination and segregation, appear to lead to a more difficult housing search for blacks than whites. The Internet has the potential to improve this grim situation by providing previously disadvantaged housing searchers with a greater volume of more relevant housing information.

Maria Krysan's study in Detroit revealed racial differences in levels of Internet use between whites and blacks, and supported previous research by showing blacks' relative difficulty searching for housing. Controlling for income, buyers versus renters, age, education level, and sex, Krysan discovered that "being [black] decreases the odds of using the [I]nternet by a factor of .32."<sup>15</sup> Members of either race who did use the Internet did so in similar ways: most searched for listings, but around half retrieved mortgage information and/or general information about the community they were searching within. Krysan also discovered that blacks "submit[ed] more offers/applications for homes, report[ed] more difficulties, and [were] much more likely to feel they were taken advantage of during the search."<sup>16</sup> At least in Detroit in the mid-2000s the Internet had not leveled the playing field for black housing searchers.

Though her data are provide a rare empirical look at how racial differences affect Internet housing searches, it is difficult to draw broad conclusions from Krysan's study. The study was performed in 2004 and considered everyone who "had searched for housing in the past 10 years and were involved at least minimally in that search." These criteria would include the housing searchers of the mid-1990s who would have been extremely unlikely to use the Internet at high rates. Her statistics for Internet use are therefore depressed from real 2004 levels, and mask what is almost certainly the strong upward trend of both races. These Internet-use data are also somewhat suspect because they are so mutable. Individuals could become Internet housing searchers by stopping by the library for 10 minutes. Krysan's limited data beg to be built upon. Is the Internet an effective tool for the housing search? Is the Internet a more effective tool for rental housing searchers or potential homebuyers? Are there differences in the effectiveness of Internet usage in the housing search between racial groups? One question that could be answered from the data Krysan already has: Did blacks who used the Internet during the housing search have a faster, better search than those who did not? Current housing policies allow for blacks to have a harder time finding housing than whites. More research can help policymakers identify how to close this gap.<sup>17</sup>

Those concerns aside, Krysan is right to be concerned about the

“observed racial divide ... given the rapid growth of the [I]nternet in renting and selling housing.”<sup>18</sup> The profusion of rental advertisements on the Internet might be a boon to blacks, who are more likely to be renters than their white counterparts.<sup>19</sup> Black Detroiters’ housing searches are more difficult and involve the Internet less than whites’. Perhaps an increase in Internet use would yield big improvements to their satisfaction with the search. Lastly, Krysan’s thorough multiple regression analysis raises the question: Why is a black person with the same level of education, the same level of income, and of the same age less likely to use the Internet in his or her housing search than his or her white counterpart? Will this difference fade away, or are there underlying persistent causes? Perhaps public education about the utility of the Internet in housing searches will boost usage rates. Incorporating information on the utility of the Internet in housing counseling sessions (which are increasingly a part of affordable housing programs) may also boost rates among all groups of Americans who face the potential of housing discrimination.

In her article Krysan asked: “Does using the [I]nternet expand or restrict the kinds of neighborhoods [searched], vis a vis racial composition?”<sup>20</sup> She broached this question in a subsequent paper co-authored with Michael Bader. This study focused on “community blind spots” – otherwise livable areas that members of different races were unaware of during the housing search. Krysan references the website MoveSmart.org as an example of a service that can shrink community blind spots and thereby reduce racial segregation. Housing websites have tremendous potential to reveal neighborhoods to searchers and, by diminishing the influence of middlemen, reduce racial steering. Unfortunately Krysan did not collect data to see if this effect occurred, or if housing websites have blind spots themselves.<sup>21</sup> Local governments interested in promoting real estate could identify their jurisdictions’ “blind spots” and consider ways of linking interested housing searchers to sellers in those neighborhoods.

The research team of Dougherty, et al. recently produced groundbreaking data tracking the importance of test scores and schools minority student populations on home prices from 1996 to 2005 in West Hartford, Conn.. They documented that before 2001, test scores had a larger impact on home prices than the percentage of minority students in the school, but that this changed after 2001. In their words: “The racial composition of elementary schools became nearly seven times more influential than test scores in the latter half of this study.”<sup>22</sup> Pre-2001, test scores were about six times more influential than racial composition. They attributed this shift to the increasing importance of the Internet in the search for “good” school districts over this time period and the concurrent increase in data reporting requirements due to the No Child Left Behind Act.

They bolstered this conclusion with a number of studies showing how homebuyers use data on the Internet. They relied particularly on a study showing that while researching schools on the Internet, parents valued low minority population schools over schools with high test scores, even when they denied this preference in surveys. Though the team discovered that Internet research had not yet displaced social networks as the primary means of researching schools (35% of the study group used the Internet, while over 50% used social networks), the team suspected that people who searched the Internet might be more vocal and persuasive within their social networks. The authors cited the self-proclaimed “most visited K-12 education Web site in the country,” Greatschools.net as an exemplary website for potential homebuyers with or expecting children.<sup>23</sup> This site provides demographic and test score information free of charge for thousands of public, private, charter and parochial schools and claimed 37 million visitors in 2009.<sup>24</sup>

Though the study has limitations, its dramatic results reveal the racist ways that many housing searchers use the Internet. The study may showcase a non-representative sample of potential homebuyers: West Hartford school districts were undergoing rapid racial changes during this time, which may have exacerbated the racial preferences of homebuyers. Furthermore, though the team used traditionally accepted hedonic pricing models, so many factors influence the price of homes that it is dubious to place a dollar value on a single factor. Nonetheless, the data suggest that newly available demographic information inspired homebuyers to pay more than \$7,000 for a home in a school district with 14 percentage points fewer minority children. Krysan’s hope that the Internet will correct community blind spots is called into question by the potential for the information provided by the Internet to reinforce racial segregation. This finding also emphasizes the close connection between education and housing policy, played out over the Internet. The discrimination here is on the part of the buyers and renters, not the sellers, a type of discrimination that is entirely legal. Modern housing policies need to recognize the increased potential for racial segregation from such unexpected causes such as No Child Left Behind.

Research performed in 2000 by Palm and Denis also casts doubt on Krysan’s hope that the Internet will change the housing search geographically. Examining the homebuying choices of new residents to Wake County, N.C., Palm and Denis found that searchers who used the Internet were no more likely to move farther from their old home than searchers who did not use the Internet. The only significant difference the team could find was that searchers who used the Internet looked at more homes than non-Internet users. Surprisingly, in the study, black homebuyers were just as likely as white homebuyers to use the Internet in their search. Though the study focused only on homebuyers, and the Internet source used was mainly Realtor.com, the study raises the

possibility that among some groups of housing searchers the effect of information provided by the Internet is minimal.<sup>25</sup>

### **What Should the Law Be?**

Currently policymakers are debating how to respond to the increasing importance of the Internet in the housing search. Legal journal contributors in particular have presented a wide range of interpretations of the current and ideal extent of the CDA. A selection of three law journal articles by Rachel Kurth, Kevin Wilemon, and James Shanahan provides insight into the current state of the law and includes legislative recommendations to update fair housing laws. These three authors are uncomfortable with the current balance of the CDA and FHA, and draw the boundaries of CDA immunity based on their understanding of how the Internet should function legally.

Writing before the final judgment in the Roommate.com case, Rachel Kurth repines on websites' apparent total immunity to the FHA. She expresses particular chagrin that Craigslist claimed protection under the "Good Samaritan" section of the CDA (§ 230) without demonstrating any characteristics of a Good Samaritan. She quotes the author of section 230 who stated that its purpose is to protect websites "who take steps to screen indecency and offensive material for their customers." Kurth concludes that courts should give ISPs immunity only if they take "good faith efforts to block ads that would violate the FHA."<sup>26</sup>

Kurth wants editorial oversight of Internet communications, a goal that ignores the character of the Internet. The primary advantage of the Internet in the search for housing is the extremely low barrier to communication the medium affords. Relevant case law before and after the CDA frequently discusses the dilemma ISPs face when they consider editing user-generated content. Affordable editing options are ineffective and irresponsible, while responsible editing options erect barriers to communication. Cheap editing techniques like prohibiting the words "white" and "Muslims" result in oddly colorless picket fences and references to "M-u-s-l-i-m-s." Responsible editing requires knowledgeable, human editors. If Craigslist assumed this role, the company and the service would change completely. Currently Craigslist employs 30 people and hosts a monthly volume of 50 million advertisements, many of which are for housing. Kurth wants to preserve the openness and availability of housing information on the Internet and have responsible editing of that information, but does not explain how this could be realistically done. Her example of a "good faith effort" – prohibiting the use of the word "minority" in housing advertisements – suggests that it will not take much good faith to qualify as a Samaritan.

Responsibility should lie partly with the website, Kurth writes,

because “users post anonymously, ... [so] an injured party may be left not knowing whom to sue.” Anonymity on the Internet has historically been a problem for those seeking redress, but there is no medium where advertisements can be entirely anonymous. *Dart v. Craigslist* revealed that “law enforcement officials [in Cook County, Ill.] regularly conduct prostitution stings using information culled from advertisements in Craigslist’s [now-defunct] erotic-services category.” The judge continued, “[b]y his own count plaintiff [the Sheriff of Cook County] has arrested over 200 people through Craigslist since January of 2007.”<sup>27</sup> Fair housing testers could easily follow the sheriff’s lead and would even be spared the laborious process of establishing a pattern of discrimination. After discovering an advertisement in violation of the FHA, a representative of a fair housing organization could simply attend the advertiser’s open house and serve them with papers.

Furthermore, Kurth does not seriously consider the editing system that Craigslist did have in place. Any visitor to the website could “flag” with a single click any ad that “violated Craigslist Terms of Use or other guidelines.” Craigslist would automatically eliminate content that a critical mass of its users flagged. Kurth acknowledges this system, but does not question whether it is effective. This is unfortunate because websites that allow for user-generated content and user editing might have great potential to enforce commonly understood and accepted rules. Wikipedia’s reliance on user-generated content and editing has made it a hugely popular and useful source of information even though many of its users treat that information with some skepticism. Ideally the thousands of people that would be required to edit the millions of advertisements would be the housing searchers already looking through those ads.

Kevin Wilemon focuses his discussion on § 3603 of the FHA, the so-called “Mrs. Murphy exception,” revealing a complication within the FHA itself. The exemption allows for the discrimination of the protected classes in “rooms or units in dwellings containing living quarters occupied or intended to be occupied by no more than four families living independently of each other, if the owner actually maintains and occupies one of such living quarters as his [or her] residence.”<sup>28</sup> Thus “Mrs. Murphy” could exclude anyone she chose from living in her four-unit boarding house. The justification for this exemption is that choosing a tenant for so few units, in a structure where the landlord lives, makes the act more like “intimate association,” which is protected, than “commercial speech,” which is more regulated. Critically, though, Mrs. Murphy could not advertise or publish a statement that she discriminated, as the ad or statement would still violate section 3601 of the FHA. Mrs. Murphy discrimination is legal, though Mrs. Murphy advertisement is illegal.<sup>29</sup>

Wilemon believes that legalizing Mrs. Murphy advertisements

would make housing searches on the Internet faster and more effective, particularly for roommate searches. He begins by discussing “positive discrimination,” such as two Orthodox Jews who want to live with a third Jew, or Chinese or Indian immigrants who “pool resources” in the face of discrimination by more enfranchised groups. Legalizing Mrs. Murphy ads in this context might allow disenfranchised groups to coalesce. Instead of a mean-spirited Mrs. Murphy, a well-intentioned Mrs. Reddy could freely advertise that her boarding house would only open to recent immigrants from India. This ad would make the Indian immigrant’s housing search easier and faster, and would save non-Indians time that might otherwise be lost responding to Mrs. Reddy’s non-discriminatory, expurgated ad.

The Internet is better suited to roommate and small-scale landlord advertisers than traditional media, so it is legitimate to ask whether the FHA, now more than 40 years old, still effectively facilitates the housing search for members of the protected classes. Roommate.com’s designers added discriminatory features because they knew many users would use sex, sexual orientation, and family status as primary factors when searching for a roommate. If Mrs. Murphy advertisements were legalized, it seems reasonable to assume that housing service websites would be flooded with discriminatory postings. This deluge would present the question of how to distinguish between the legitimate and the illegitimate Mrs. Murphys. Because there is no way to reasonably make this distinction solely over the Internet, user-editing would be ineffective and the task would probably fall to fair housing testers, who would be overwhelmed by the volume of ads. Allowing Mrs. Murphy ads might also confuse housing searchers and advertisers of when discrimination is legal. Despite Wilemon’s hypothetical “positive discrimination,” blacks and immigrants are overrepresented in the rental housing market (almost certainly the vast majority of Mrs. Murphy situations), and are among those most likely to be discriminated against. Furthermore, Roommate.com, when it was sued, hosted 150,000 ads and “received about a million page views a day.” Do hundreds of thousands of acts of “intimate association” add up to a single act of commercial speech? Wilemon correctly points out the absurdity of prohibiting Mrs. Murphy advertisements, but doesn’t question Mrs. Murphy’s right to discriminate in the first place.

James Shanahan, also writing before the Roommate.com case, was concerned about the “emasculatation” of the FHA, and proposed a legislative solution. Referring to the potential “monopoly in the market for discriminatory housing advertisements” of the Internet, he envisioned a future where the biggest information source for housing was entirely outside the purview of the FHA. His solution was to have Congress add an exemption to the CDA for FHA complaints, concluding that the reason for this omission was “the result of an oversight.”

“Congress must decide if the value of FHA protections outweighs the potential costs of restricting the supply of housing advertisement forums,” he writes. “In 1968 they answered this question in the affirmative.”<sup>30</sup>

By proposing a change to legislation Shanahan opens a much broader question than Kurth: Regardless of the current state of the FHA and CDA, what should Congress do to reconcile the intentions of the two laws? What law could leave the Internet “unfettered by Federal or State regulation” and still “protect and increase housing choices of individuals who may otherwise be discriminated against because of their ‘status.’ ... [and] eliminate prejudices based on ... [status] in the housing market?” With access to the Internet broadening across social and racial boundaries, and more housing information moving from traditional media to the Internet, does a laissez-faire regulatory approach to Internet communications increase housing choices of the protected classes even as it exposes them to more discriminatory ads? Do user editing and the incorporation of an FHA tutorial into sites like Craigslist help eliminate prejudices that some users might have been ignorant of themselves? Unfortunately these are still open questions that need more research to be answered convincingly.

The debate around the Internet and housing discrimination currently revolves around the tension between the FHA and the CDA. This debate largely leaves out problems that involve neither law. The policy debate needs to incorporate both the legal situation and relevant research that may raise concerns that are not currently addressed by laws, policies, or programs. Current studies point the ways that new research can begin to coalesce around a set of actions and policies. Some of the most important questions are the legitimacy of the Mrs. Murphy exemption, the ways in which information retrieved over the Internet is used in the housing search, and the effectiveness of user editing in housing websites. Detailed studies of these questions are feasible and essential.

Who is Mrs. Murphy, and what does she want? Sites like Roommate.com offer a ready pool of advertisers to be studied, most of whom would fall under the Mrs. Murphy exemption. Is “positive discrimination” common and for what groups? Studies on this topic would begin to reveal who would benefit and who might be harmed by legalizing Mrs. Murphy ads. A detailed study of Mrs. Murphys across the US could also tease out the reasons that these rooms or homes were being rented or sold. Are the acts truly ones of intimate association or are they in fact commercial acts? Is the exemption still legitimate?

Dougherty, et al.’s research on how housing searchers use information on the Internet begs to be expanded upon. Their citation of research showing information used to increase racial segregation should be backed up by thorough studies looking at the difference between the



housing choices of well-informed searchers versus less well-informed searchers. Are there racial differences in how blacks and whites use the Internet? Lastly, studies could also include the other side of the market: How do different housing advertisers use the Internet? The interface between the two parties should also be explored: How do advertisers deal with the deluge of responses, and how does the Internet affect the advertisers and searchers interact with each other? Government policy has traditionally allowed for discrimination on the part of the searcher, but prohibited sellers from being discriminatory. While a law requiring mixed neighborhoods is inconceivable, there is justification for policy to promote mixed neighborhoods.

The prevalence of user editing distinguishes the Internet from traditional sources of housing information and should be studied. Craigslist almost certainly keeps data about the prevalence of flagging. A record of what ads get flagged would also help to reveal why certain ads are flagged. Studies should also pay attention to the level of information that sites provide about the FHA. Is user editing more prevalent on Craigslist than on Roommates.com because of the former's useful primers on what constitutes a discriminatory ad? It is well within the federal government's power to mandate that any website that hosts housing ads include such primers.

Websites are already changing in response to litigation, and the threat of litigation. Craigslist now features detailed, clear information on the FHA to all housing advertisers and searchers who use the site. Roommates.com no longer asks questions requiring that advertisers or searchers specify their sexual orientation or familial status, and has added a "Male/Female" option identifying a person's sex. These changes highlight the effectiveness of laws at changing the companies' behavior, and thereby changing millions of people's housing searches.

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## **Endnotes**

1 Shelley v. Kraemer. 334 U.S. 1 (Supreme Court of the United States, 1948).

2 Alex Schwartz, *Housing Policy in the United States*, (New York: Routledge, 2006), 239-241.

3 M. A. Turner et al, *Discrimination in Metropolitan Housing Markets: National Results from Phase 1 HDS 2000*, (2002) Washington, DC: U.S. Department of Housing and Urban Development.

- 4 Chi. Lawyers' Comm. for Civ. Rights Under the Law, Inc. v. Craigslist, Inc., 519 F.3d 666 (United States Court of Appeals for the Seventh Circuit, 2008).
- 5 "Craigslist, About, Factsheet," last modified Nov 29th 2010, <<http://www.craigslist.org/about/factsheet>> (accessed December 9, 2010).
- 6 Fair Housing Act of 1968, 42 U.S.C. § 3604 (1968).
- 7 Communications Decency Act of 1996, 47 U.S.C. § 230 (1996).
- 8 Stratton-Oakmont Inc. v. Prodigy Services Co., 1995 WL 323710 (Supreme Court of New York, 1995).
- 9 Zeran v. America Online, 129 F.3d 327 (United States Court of Appeals for the Fourth Circuit, 1997).
- 10 Craigslist, 519 F.3d 666 at 13.
- 11 Fair Hous. Council v. Roommates.com, LLC, 521 F.3d 1157 (United States Court of Appeals for the Ninth Circuit, 2008).
- 12 Francis Cronin, "Racial Differences in the Search for Housing," in Modeling Housing Market Search, ed. W.A.V. Clark (New York: St. Martin's Press, 1982), 81-105.
- 13 Reynolds Farley, "Racial Differences in the search for Housing: Do Whites and Blacks use the Same Techniques to Find Housing?" *Housing Policy Debate*, (1996): 357-386.
- 14 Harriet Newberger, "Sources of Differences in Information Used by Black and Whites Housing Seekers: An Exploratory Analysis." *Urban Studies*, (1995): 445-471.
- 15 Maria Krysan, "Does race matter in the search for housing? An exploratory study of search strategies, experiences, and locations." *Social Science Research* 37(2008): 592.
- 16 Maria Krysan, "Does race matter in the search for housing?" 598.
- 17 Maria Krysan, "Does race matter in the search for housing?" 601.
- 18 Maria Krysan, "Does race matter in the search for housing?" 598.
- 19 An unscientific survey of the Craigslist for the Washington, DC metro area revealed over 1,800 rental listings for December 9, 2010, compared to about 800 for-sale listings.
- 20 Maria Krysan, "Does race matter in the search for housing?" 601.
- 21 Maria Krysan & Michael D. M. Bader, "Racial Blind Spots: Black-White-Latino Differences in Community Knowledge" *Social Problems* 56 (2009): 677-701.
- 22 Jack Dougherty et al, "School Choice in Suburbia: Test Scores, Race, and Housing Markets." *American Journal Of Education* 115 (2009): 540.
- 23 "GreatSchools Frequently Asked Questions," accessed December 14, 2009, <http://www.greatschools.net/about/gsFaq.page?state=NY>.
- 24 "GreatSchools Partner Opportunities," <<http://www.greatschools.org/about/partnerOpportunities.page#advertise>> (accessed December 8, 2010).
- 25 Risa Palm and Michelle A. Danis, "Residential mobility: The impacts of Web-based information on the search process and spatial housing choice patterns." *Urban Geography*, 22 (2001): 641-655.
- 26 Rachel Kurth, "Striking A Balance Between Protecting Civil Rights And Free Speech On The Internet: The Fair Housing Act Vs. The Communications Decency Act," *Cardozo Arts & Entertainment Law Journal*, 25 (2007): 805-836.
- 27 Thomas Dart, Sheriff Of Cook County, V. Craigslist Inc., 665 F. Supp. 2d 961 (United States District Court For The Northern District Of

Illinois, Eastern Division, 2009).

28 Fair Housing Act of 1968, 42 § 3603 (b) (1996).

29 Kevin M. Wilemon, "The Fair Housing Act, the Communications Decency Act, and the Right of Roommate Seekers to Discriminate Online," *Washington University Journal of Law & Policy* 29 (2009): 375-401.

30 James D. Shanahan, "Rethinking the Communications Decency Act: Eliminating Statutory Protections of Discriminatory Housing Advertisements on the Internet." *Federal Communications Law Journal*. 60 (2007): 135-156.



# The Starting Early Starting Right Act

## *Analyzing the Social Issue of High-Cost Childcare*

*Meghan Anaya and Dawn Vogel*

### **ABSTRACT**

*The social issue of affordability and accessibility to childcare is one that resonates with all parents and families in the United States. Due to factors such as high costs of childcare, parent employment needs, and severely underfunded childcare assistance programs, many families are left unable to afford any, let alone quality, childcare. The Starting Early Starting Right Act seeks to remedy potential gaps in childcare assistance in the United States. However, problems with funding, service-delivery, and state versus federal power present roadblocks to implementing this much need public policy. Potential remedies include restructuring current childcare assistance programs in order to align with the goals of the Starting Early Starting Right Act as well as examining potential areas of improvement in funding allocations and the structure of current offices designed to assist American families and children.*

**L**ow-cost childcare is an essential need for families. According to the National Survey of American Families, childcare costs, on average, account for over 22 percent of family earnings.<sup>1</sup> Childcare is necessary for a variety of family types, including single parents or families with two working parents. Difficulties arise when families become financially strained due to childcare needs and working parents end up working more in order to pay for childcare. This cycle can be damaging and creates the social problem of an inability to pay for increased childcare costs. There are four areas one can explore as contributing factors to the shortage of affordable childcare: high childcare rates, family employment, family dynamics, and the Temporary Assistance for Needy Families program (TANF). It is evident that in order to alleviate the social problem of childcare costs, social policies must facilitate change. The Starting Right Starting Early Act (SESRA), proposed in both the United States Senate and the United States House of Representatives, may present a possible solution to the lack of affordable childcare.

### ***High Childcare Rates***

Childcare costs can be very high in comparison to how much a family spends on food, shelter, and clothing. The National Association for Child Care Resource and Referral Agencies (NACCRRA) reports “the average annual price of care for two children (one infant and one four-year-old child) ranges from 48 percent to 102 percent of the state median income for single parents.”<sup>2</sup> These costs are higher on average than the amount a family spends on food per month; additionally, they exceed the average monthly rent in almost every state and the average monthly mortgage payment in nine states.<sup>3</sup> Childcare costs are not only out of reach for single parent households, but for two-parent households as well. Single parents must face the decision of where to place their child while at work or whether to work at all. Two-parent households must decide if the benefits of having both parents work outside the home outweigh the benefits of having one parent stay home to provide childcare. C.L. Baum estimates that 27 percent of a low-income family’s monthly income is dedicated to childcare costs.<sup>4</sup> This finding demonstrates an overwhelming need for a low-cost childcare assistance program in the United States.

### ***Family Dynamics***

Family dynamics also play a role in how families value childcare. Social learning theory explains that people learn a task by observing others performing it without being directly rewarded or punished.<sup>5</sup> Families sharing socially suboptimal generation trends, such as having children out of wedlock, having children at an early age, having multiple children, working low-paying jobs or being unemployed, are according to social learning theory, more likely to repeat these patterns. Families that experience these patterns often continue to receive government support throughout several generations.

### ***Temporary Assistance for Needy Families***

The rules and regulations for the Temporary Assistance for Needy Families (TANF) program contribute to the high costs of childcare. In 1996, the Aid to Families with Dependent Children (AFDC) federal welfare program was restructured to form TANF.<sup>6</sup> In comparison to AFDC, TANF was more accessible to individual states and gave states greater autonomy around implementing individual programs. Other reconfigured aspects included establishing a five year lifetime limit for receiving program benefits, packaging TANF in a block grant format, and requiring the majority of cash assistance beneficiaries to participate in work activities.<sup>7</sup>

In the reconfiguring of the federal welfare program, TANF was created with four goals in mind:

1. Assisting needy families so that children can be cared for in their own homes;
2. Reducing the dependency of needy parents by promoting job preparation, work, and marriage;
3. Preventing out-of-wedlock pregnancies; and
4. Encouraging the formation and maintenance of two-parent families.<sup>8</sup>

These four goals aim to promote traditional married, two-parent, working households. The new TANF work requirements and the five year limit on services were specifically designed to achieve these goals.

Another factor impeding low-cost childcare under the new TANF rules is stricter federal welfare work requirements. Request rates for low-income childcare assistance have steadily increased since 2006. Under TANF, parents are required to move from welfare to work.<sup>9</sup> This increase in requests, coupled with declining federal funds, has led to a drop in the number of children who receive low-income childcare assistance. Reports issued by the Child Care and Development Block Grant (CCDBG) administrator's project estimated that the number of children that received assistance decreased by 150,000 between 2000 and 2006. Administrators predict that without additional funding, the number of children receiving childcare assistance will decline by an additional 300,000 by the year 2010.<sup>10</sup>

## Funding and Child-Care Costs

There are two primary sources of funding for childcare assistance in the United States: the CCDBG and the TANF block grant program.<sup>11</sup> The majority of money for childcare assistance programs comes from the federally funded CCDBG. Over \$4.9 billion was allotted for childcare assistance in the 2006 fiscal year, up from \$4.8 billion the previous year. Inflation was not included into the budget calculation, however, and consequently the amount funded in 2007 was below the amount budgeted for the 2002 fiscal year. The result is that today fewer children are receiving childcare assistance than in previous years.<sup>12</sup> At the federal level, childcare funding has been capped while inflation and the financial needs of American families have steadily increased. Adding to this problem of gross underfunding is the issue of escalating childcare costs. Because federal funding has declined and TANF has been restructured, fewer children and their families are being offered affordable childcare. One possible solution to the chronic underfunding of childcare in the United States might be found in the Starting Early Starting Right Act.

### ***The Starting Early Starting Right Act***

On May 5, 2008, Senator Bob Casey began the legislative policy process of amending the CCDBG by introducing SESRA. This act seeks to significantly increase funding for childcare in America for children between birth and 13 years old in low-income homes.<sup>13</sup> SESRA includes an increase in federal funding for childcare by \$50 billion dollars over the next five years. It also addresses the quality issue by ensuring that childcare providers are thoroughly trained and that childcare centers are properly supervised. It will develop a Quality Rating and Improvement Systems (QRIS) of checks and balances and increase the accessibility and quality of childcare for toddlers and infants by insisting states hold back 30 percent of their federal funding for this specific group. Lastly, SESRA will create a specific office of childcare within the Administration for Children and Families to manage overall implementations and regulations.<sup>14</sup>

### ***Funding***

In analyzing the policy from a funding perspective, one must evaluate three points: where the funding is coming from, how much funding to distribute, and where best to distribute the funds.<sup>15</sup> There are currently no reports showing where the funding for SESRA will come from. This is a serious concern. Of additional concern is the amount of funding to be allotted. In the case of SESRA the amount has been clearly set at \$50 billion, which is above and beyond what is currently being used. The \$50 billion is to be issued over the next five years.<sup>16</sup> Regarding the distribution of funds, 30 percent has been earmarked for quality childcare for toddlers and infants.<sup>17</sup> Lastly, Chambers and Wedel underscore the importance of looking at what approaches are taken to fund policies or in what format benefits will be dispersed.<sup>19</sup> In relation to the SESRA, federally funded monies would be dispersed to individual states and then divided up into grants.<sup>19</sup> These grants would provide funding for childcare providers to meet criteria under the QRIS. They would also provide assistance for licensing and continuous training and help care providers that currently do require licensing to meet QRIS standards.<sup>20</sup>

### ***Administrative***

A final point of SESRA relates to the development of a specific office of childcare within the Administration for Children and Families. This provision implies that states have mismanaged the CCDBG funds and that the United States childcare system needs a unifying focus and directional influence. It also implies that individual states have not been adequately overseeing their own childcare facilities.<sup>21</sup> As Dolbelstein points out, investments that produce results by the most economical



means are what SESRA will need.<sup>22</sup> By instituting an overall review committee or administrative office, funding will be closely tracked and monitored and effectiveness will be measured and adjusted as needed.<sup>23</sup>

Although many factors have been a catalyst for SESRA and have contributed to the importance for understanding the social problem of low-cost childcare, none have been as important as the children themselves. According to Carol Bellamy, Executive Director of UNICEF, "...investment in the development and care of our youngest children is the most fundamental form of good leadership."<sup>24</sup> Echoing those sentiments, Senator Casey stated, "When America supports high quality child care, we encourage children, families and our nation to reach their full potential."<sup>25</sup>

### ***Social Policy Critique***

Social policies require critical examination for potential problems during the implementation process. SESRA has several limitations that may not have been considered during the creation of this bill. On the surface, the bill appears to be satisfactory in that its mission is "to improve access to high quality early learning and childcare for low-income children and working families."<sup>26</sup> However, problems emerge when the bill is more closely examined. Criticisms of the policy surround the actual TANF program structure, where the funding for the policy will come from, reorganization of the funding structure and potential problems with service-delivery, and state versus federal power. These are all areas of concern.

Since the creation of TANF in 1996, there have been multiple problems, including funding and program execution. SESRA seeks to increase funding for the TANF program, yet does not change any already existing problems. The first major problem with TANF is its strict eligibility requirements for those families seeking welfare aid. To be eligible for cash assistance, the Arizona Department of Economic Security (DES) states that a family's income, which includes income from every source available to the family, must be less than 36 percent of the 1992 federal poverty level.<sup>27</sup> This means that on average, single parent families have to make less than \$7,032 per year to qualify for cash assistance.<sup>28</sup> Arizona has traditionally been conservative, setting income rates that many families exceed. Because the CCDBG is distributed to states from the federal government and states choose how to spend block grant money, there is a high level of variability between income requirements, ranging from as low as \$3,000 year in Arkansas and Alabama to as high as \$16,200 a year in Alaska and \$19,700 a year in Hawaii.<sup>29</sup> It is likely that there are many factors to be considered when determining income eligibility rates, including cost of living, geographic location, and state political climate. A problem

still exists for families making too much money to qualify for TANF cash assistance, but who still need childcare help. Similarly, families with two parents are also affected by strict TANF income eligibility requirements in that they can only receive aid if one of the parents is incapacitated or unemployed.<sup>30</sup>

Other problems with strict eligibility include work requirements. TANF recipients must participate in work activities, which include employment, job training, up to six weeks of job search, or vocational or high school education.<sup>31</sup> Individuals with children over six years of age are required to work 30 hours per week, while those with children under six years need to work 20 hours a week.<sup>32</sup> Job training and education opportunities are only present in some states and last for up to one year, yet families must continue to meet work requirements beyond that year.<sup>33</sup> Although beneficial in teaching families how to become more self-sufficient, work requirements can be hard on families with young children and also present no opportunities for post-secondary education.

Another TANF problem that coincides with SESRA is its current reauthorization status. Funding for CCDBG expired in 2002 and has been operating under short-term extensions and reauthorizations that are determined by Congress.<sup>34</sup> TANF was reauthorized for five years in 2006 and is set to expire in 2011. SESRA promises increased TANF funding through 2014. If TANF is changed, or not reauthorized, there will be a three year gap during which promised funds vary or may not be available. Without reauthorization, states lack the ability to properly balance, predict, or plan for state budgets.<sup>35</sup>

Another critique of TANF is the actual distribution of the funds and guaranteeing that this money will go towards rectifying the social problem of high-cost childcare. TANF is a huge umbrella under which many state programs operate, including cash assistance, hunger and homelessness, domestic violence prevention, adoption, foster care, child protective services, and childcare assistance.<sup>36</sup> The burden of judgment is placed on states in determining how to distribute funds among these programs, which may be value-based or need-based. It is uncertain whether the states will equally devote resources across programs, causing a blurring in equity versus equality for public programs.

A final critique of the TANF program concerns the eligibility status of families to receive childcare assistance. Under TANF, there is a five year (60 month) lifetime limit on benefits.<sup>37</sup> After receiving benefits for this time period, families are cut off and there is no requirement that states provide continued childcare assistance to families that become ineligible. This limit can be damaging to clients who begin receiving assistance when their children are very young. For example, if a single parent with two children who are ages two and four begins

to receive assistance and receives it consecutively due to financial hardship, the the parent becomes ineligible when the children are ages seven and nine. At these ages childcare is still a necessity for working parents. Thus, clients who actually need services may not be receiving them as a result of caps and timelines on benefits.

### *Funding Structure*

SESRA amends TANF to increase childcare grant appropriations by \$50 billion in mandatory childcare funds over the next five years.<sup>38</sup> This would triple the amount of money that states currently receive from the federal government. The 2008 economic crisis affected funding at both the state and federal level and, as a result, providing an additional \$50 billion to childcare services may not be feasible. Due to budget concerns and economic crises, the amount of money being dedicated to childcare continues to decline and may continue to do so.<sup>39</sup> There may not be enough money to fund this policy. The declining economic environment also affects childcare providers who cannot keep up with rising costs related to labor, food, facilities, and fuel.<sup>40</sup> This demonstrates a gap between childcare needs and available resources for increased funding to childcare agencies that may be impossible to fill due to stressful economic times.

### *Service-Delivery*

If SESRA is passed, there would be creation of a new office at the federal level within the Administration for Children and Families called the Office of Child Care, which would advise on issues regarding state-funded childcare programs.<sup>41</sup> The bill specifies that the Office of Child Care is responsible for developing legislative, regulatory, and budgetary proposals, presenting operational planning objectives and initiatives related to childcare, overseeing the progress of approved activities, providing leadership and coordination within the Administration for Children and Families, and providing connections with other agencies on childcare issues at the federal, state, and local levels.<sup>42</sup> This requires tangible changes, such as constructing new office buildings, hiring staff to run the new office, and providing employee training. There are also intangible requirements such as time and education, which are just as valuable. Absent institutional change, the addition of yet another office to the already compartmentalized funding scheme for childcare and create yet more problems in effective service delivery.

### *State vs. Federal*

A final critique of the social policy of the Starting Early Starting Right Act is the imbalance of federal power versus state power that may occur if this bill is passed. This policy takes away some state power in determining how block grant money is appropriated through

federal mandates regarding CCDBG spending, including licensing, documentation, and training.<sup>43</sup> By dictating how block grant money is spent, SESRA may open the door for too much federal involvement in tasks or programs that have been delegated to the state and cause problems with other future policies that include federal involvement in state level programs.

## Potential Remedies

**R**emedying the social implications of the Starting Early Starting Right Act requires some examination of previous legislation, as this bill has not been passed. Two possible options require reexamining TANF's structuring. TANF was passed in 1996 under the Welfare Reform Act, and under the previous AFDC bill, there were three particular aspects which could be reinstated under TANF to help alleviate potential problems: eligibility requirements, length of time of receiving benefits, and entitlement. Eligibility requirements, specifically those related to income and work, are very strict and cause people to struggle with the affordability of childcare. One potential remedy would be to lower income eligibility requirements so that more people who need access to low-cost childcare are able to receive assistance. Another remedy to TANF would be to reevaluate the five year lifetime cap on receiving benefits. Because of unforeseen financial hardships, such as loss of employment or medical problems, having a five year cap on benefits is often unrealistic for low-income families. By reevaluating the five year cap and determining the length of time to receive benefits on a more individual level, current families that become ineligible for childcare assistance may benefit.

A third potential policy remedy is to return to an entitlement program, such as it was under the AFDC. The entitlement program guarantees that all eligible families will receive benefits. Under TANF, the program is cash assistance, meaning that even though families and individuals may qualify, it does not guarantee that they will receive benefits. Returning to an entitlement program would allow everyone who needs assistance to receive it. The realities of changing the TANF structure, however, would include political involvement in changing the Welfare Reform Act, which takes significant effort and does not appear to be a Congressional priority at this time.

Another potential policy remedy would be to create a Central State Office that deals only with childcare assistance. This would mean that the money would come from the federal government directly to this new office and then to the consumer. This could potentially eliminate extra hands in the funding pot and guarantee that the money is going to the correct recipients. On a political level, this would also alleviate concerns

regarding too much federal involvement in programs designated to the state by guaranteeing that federal block grant money is spent where it is most needed.

A final potential policy remedy for SESRA deals with the criticism that not all families who need continued childcare assistance will receive it because of rules around the discontinuation of benefits after families become ineligible. Currently, families who become ineligible to receive childcare assistance are cut off immediately. This may be too much of a burden on those families that are used to having aid. A potential fix would be to create a buffer system for families. A buffer system would allow for partial assistance during post-eligibility or would involve creating some type of system in which families would be tapered off from receiving benefits to eventually being completely unassisted. This would alleviate some of the problems around families that are sent immediately into having no childcare because they are ineligible to receive assistance and have not developed an alternative plan for childcare. Under AFDC, families were able to receive assistance for 12 months post-eligibility and perhaps a way to help out families would be to return to a similar system. The hope is that families would be less likely to rely on government assistance in the future because they are able to be self-sufficient without negative consequences.

Although these potential policy remedies may alleviate some concerns regarding the social problem of high-cost childcare, there are political, fiscal, and ideological concerns that may inhibit not only the passing of the bill, but the fixing of any problems if the bill were to pass. Political concerns revolve around a difference in the social perception of childcare assistance and how much value politicians place on the social problem of high-cost childcare. Fiscal problems include finding the funding to support the bill and then make any necessary changes in the structure of the program. Ideological problems may occur when trying to gain public support in aiding low-income families, particularly with the economic crisis affecting all families at some level.

## Conclusion

**T**he major findings indicate that there is an overwhelming need for childcare assistance. There are many families that are caught in the income bracket where they earn too much money for government assistance, but do not earn enough to be above the poverty line. These families are in high need of receiving such assistance. The need for low-cost childcare is in great demand. The social policy of the Starting Early Starting Right Act seeks to remedy the social problem of lack of access to and quality of childcare programs by increasing funding for childcare assistance and creating regulations to monitor the quality of services provided. However, due to the current global and

national fiscal crises, the viability of implementing the Starting Early Starting Right Act is uncertain. Problems with the implementation of the policy center on achieving an increase to state block grant money from the federal government; however, cultural and societal values stress the importance of providing for children and data supports the overwhelming need for childcare assistance. The Starting Early Starting Right Act is a positive step toward providing a bridge between what is and what should be and supporting American families and children.

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## Endnotes

1 L. Giannarelli & J. Barsimantov, "Child Care Expenses of America's Families: Assessing the New Federalism," Occasional Paper, No. 40 (2000), Urban Institute: Washington, D.C.

2 National Association for Child Care Resource and Referral Agencies, 2008 Child Care in the State of Arizona, NACCRRRA: Arlington, Va., 2008, p. 21.

3 Ibid.

4 C.L. Baum, "A Dynamic Analysis of the Effect of Child Care Costs on the Work Decisions of Low-Income Mothers with Infants," *Demography*, No 39.

5 E. Hutchison, *Dimensions of Human Behavior: Person and Their Environment*, 2d Ed., Sage Publications: Thousand Oaks, Calif., 2003.

6 Executive Summary Performance Audit Report, State of Arizona Office of the Auditor General, 2004, <<http://www.auditor.gen.state.az.us/reports>> (accessed on September 20, 2008).

7 Ibid.

8 Admission for Children and Families, "About TANF", U.S. Department of Health and Human Services, <<http://www.acf.hhs.gov/programs/ofa/tanf/about.html>> (accessed on October 16, 2008).

9 K. Shulman & H. Blank, National Women's Law Center, 2007,

<<http://www.nwlc.org>> (accessed on September 20, 2008).

10 Ibid.

11 Ibid.

12 Ibid.

13 Casey Proposes Major Expansion of Child Care Access and Quality, Senator for Pennsylvania: Newsroom Press Release, <<http://www.casey.senate.gov/newsroom/press/release>> (access on October 28, 2008).

14 SCHA-MI's eBulletin, 2008, <<http://www.schami-org/pages/resources/ebullitin>> (access on November 6, 2008).

15 E.D. Chambers & R.K. Wedel, *Social Policy and Social Programs: A Method for the Practical public Policy Analyst*, 5th Ed., (Pearson: New York, 2009).

16 Ibid.

17 SCHA-MI's eBulletin.

18 Chambers & Wedel, 2009.

19 The Library of Congress, Starting Early Starting Right Act, 2008, <<http://Thomas.loc.gov/cgi-bin/query/C?c110:/temp>> (accessed on November 8, 2008).

20 Ibid.

21 RESULTS, Congressional Legislation Details, 2008, <<http://capwiz.com/results/issues/bills/?bill=11349476&size=full>> (accessed on November 6, 2008).

22 W.A. Dobelstein, *Social Welfare Policy and Analysis*, 3rd Ed., (Brooks/Cole: New York, 2003).

23 The Library of Congress.

24 Cited in Voices in Children, Voices in Children, 2008, <<http://www/childcarecanada.org/voices/index.html>> (accessed on November 8, 2008).

25 Casey, p 7.

26 GovTrack.us. S. 2980—110th Congress, "Starting Early Starting Right Act," GovTrack.us (Database of Federal Legislation), <<http://www.govtrack.us/congress/bill.xpd?bill=s110-2980>> (accessed on October 4, 2008).

27 Arizona State Senate Research Staff, "Temporary Assistance for Needy Families," Arizona State Senate Issue Brief, 2006.

28 National Center for Children in Poverty, Arizona Temporary Assistance for Needy Families (TANF) Cash Assistance, 2007, <[http://www.nccp.org/profiles/AZ\\_profile\\_36.html](http://www.nccp.org/profiles/AZ_profile_36.html)> (accessed on November 19, 2008).

29 Ibid.

30 State policy Documentation Project, "Findings in Brief:Child Care Assistance", TANF Categorical Eligibility, 2005, <<http://www.spdp.org/tanf/childcare/childcaresumm.htm>> (accessed on November 4, 2008).

31 Arizona State Research Staff.

32 RESULTS, Congressional Legislation Details.

33 Ibid.

34 RESULTS, "Temporary Assistance for Needy Families (TANF)," Strategic Goals, 2008, <<http://www.results.org/website/article.asp?id=349>> (accessed on November 4, 2008).

35 Ibid.

36 Arizona Senate Research Staff.

37 RESULTS, Temporary Assistance for Needy Families.

38 GovTrack.us.

39 RESULTS, Safe and Affordable Child Care: The Child Care and Development Block Grant (CCDBG), 2007, <<http://www.results.org/website/article.asp?id=380>> (accessed on October 4, 2008).

40 Arizona Child Care Association, Impact of Arizona's Outdated Child Care Payments, (Arizona Child Care Association: Phoenix, 2007).

41 GovTracks.us. S. 2980—110th Congress.

42 Ibid.

43 Ibid



# Issues of Liability During the Post-Abandonment Phase of Carbon Capture and Storage

## *The Case of Alberta, Canada*

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### ABSTRACT

*Carbon capture and storage (CCS) was proposed, in Alberta, Canada, as a solution to climate change. If legal barriers exist, however, they could delay progress on the development of CCS. Six critical elements of the long-term liability framework for CCS are examined in this paper: (1) ownership of sequestered CO<sub>2</sub>, (2) classification of CO<sub>2</sub>, (3) industry regulations, (4) possibilities for legal action, (5) government assumption of long-term liability, and (6) liability under emissions trading regimes and carbon taxation. This paper finds that Alberta's current framework for assigning the long-term liability for damages arising from CCS is neither clear nor realistic. It concludes with policy recommendations to Alberta's government, including a quick resolution to regulatory uncertainties and an immediate increase in the price of carbon.*

Carbon capture and storage (CCS) is a technique that scrubs CO<sub>2</sub> from the post-combustion exhaust gases of industrial facilities, such as fossil-fuel refineries, and then injects it into geological formations. Since CO<sub>2</sub> is the principal gas responsible for climate change, CCS can mitigate the environmental impact of polluting industry. The government of the Canadian province Alberta has proposed making CCS a key part of Alberta's climate change strategy by providing considerable up-front funding to the energy sector to develop CCS. Alberta is a major oil producer, with many large greenhouse gas emitting facilities and empty oil and gas reservoirs suitable for CO<sub>2</sub> storage. The development of CCS may allow Alberta to continue its fossil fuel production while lowering its overall greenhouse gas emissions.

CCS is not an established technology. In fact, the former Auditor General of Alberta, Fred Dunn, has suggested that CCS projects could potentially waste billions of dollars with little or no greenhouse gas reduction. Other greenhouse gas reduction strategies, such as reduced fossil fuel production or wide-spread energy-efficiency upgrades, are expensive and may thus require Alberta to make program cuts in other areas. Therefore, CCS appears to be the best remaining option if government and citizens are unwilling to make such financial

sacrifices.

Until we construct a framework that addresses the long-term liability problems of CCS, business, government, and citizens will be unlikely to accept CCS. This reluctance is already evident in Alberta: largely because of regulatory and legal uncertainty, Shell's Quest project near Scotford, Alberta, will not start injecting CO<sub>2</sub> before 2015.

## Risks of Carbon Capture Storage

The risks of CCS will vary from site to site, depending on both geology and the purity of the gas injected; however, the risks are likely to decrease over time as the pressure of the stored gas diminishes.<sup>4</sup> The Intergovernmental Panel on Climate Change (IPCC) predicts with 90 to 99 per cent certainty that well-designed reservoirs will hold 99 per cent of CO<sub>2</sub> injected for 100 years.<sup>5</sup> Since there are so many technological unknowns in the field of CCS, however, the risk of leaks must be addressed. While the government-sponsored Alberta CCS Development Council suggests that "extensive experience among government and industry... forms a solid foundation for providing assurances around the safe and reliable storage of CO<sub>2</sub>," it endorses a cautious approach.<sup>6</sup> Inadequate geological analysis and construction could dramatically increase risks. It will be important for Canadian policy-makers to remain as unbiased as possible and make rational, science-based risk assessments when writing regulations for post-abandonment liability.

The effect of a CO<sub>2</sub> leak on human health is the most obvious concern related to CCS. This threat has garnered much public scrutiny due to the 1986 Lake Nyos disaster, when a naturally occurring CO<sub>2</sub> cloud was released from the Cameroonian lake, killing 1,700.<sup>7</sup> A massive leak from a geological storage facility could pose a threat in low-lying areas, though there is a low probability of this happening.<sup>8</sup> A slow CO<sub>2</sub> leak through a wellhead or fracture in a reservoir could also endanger the local wildlife and agriculture industry.<sup>9</sup> Underground seepage of the gas into aquifers could increase their acidity, ruining them as sources of potable water; this acidity could also eat away at the cement of wellheads, resulting in leaks into the environment.<sup>10</sup> The high level of pressure in a CCS reservoir could induce seismic activity even in areas distant to the site.<sup>11</sup> Though Elizabeth Wilson, assistant professor of energy and environmental policy and law at the Hubert H. Humphrey Institute of Public Affairs, characterizes the likelihood of this happening in a well-planned location as small, geophysicist Dave Eaton suggests that injection techniques have caused earthquakes that have almost damaged houses.<sup>12</sup>

The global environment is at risk as well. An accidental release of

CO<sub>2</sub> would result in higher concentrations of atmospheric greenhouse gases, rendering the process counterproductive and increasing the rate at which climate change occurs. Though a catastrophic failure of a reservoir is unlikely, even a slow leak, especially if multiplied over many sites, could substantially diminish the efficiency of the CCS process.

### ***Ownership***

The complexity of CCS projects will require the participation of several organizations, however, determining which party owns the CO<sub>2</sub> and is thus liable for damages will be difficult. While oil-producing corporations who sequester CO<sub>2</sub> after using it for Enhanced Oil Recovery (EOR) operations would likely own and operate all aspects of the process, other smaller industrial operators are unlikely to be as vertically integrated. In such cases, the project operator is the most likely defendant for leaks or other hazards of CCS, but other liable parties might include the owners of the storage space and surface land. Upstream organizations such as the source of CO<sub>2</sub> and the operators of the pipelines or vehicles that transport it to storage might also consider it liable for damages.<sup>13</sup> Due to this uncertainty, some parties will write indemnification clauses into their contracts to restrict their liability. Nigel Bankes, Professor of Law at the University of Calgary, remarks that it would be reasonable for an emitter to demand such indemnity since the risk should be reflected in the operator's charges.<sup>14</sup>

### ***Classification of CO<sub>2</sub>***

The federal Canadian classification of CO<sub>2</sub> could increase liability in the post-abandonment phase of CCS, which will unnecessarily discourage firms from developing CCS projects. While Alberta defines CO<sub>2</sub> under the Climate Change and Emissions Act only as a "gas that traps heat near the earth's surface," the federal government now classifies CO<sub>2</sub> as toxic under the Canadian Environmental Protection Act. Consequently, a CCS operator is strictly liable for leaks, even if it takes "proper care."<sup>15</sup> A similar problem exists in the United States as elucidated with the case of *Massachusetts v. EPA*, where the US Supreme Court defines CO<sub>2</sub> as an "air pollutant" yet a statement before the US Senate Committee On Energy and Natural Resources explains that the CCS industry would be undermined if Congress labeled sequestered CO<sub>2</sub> as 'waste.'<sup>16</sup> Stringent regulations intended to reduce CO<sub>2</sub> emissions could hamper the nascent CCS industry by increasing its liability from CO<sub>2</sub> leaks. Provincial and federal regulations should be standardized in order to facilitate CCS development, but Stefan Bachu from the Alberta Energy and Utilities Board, contends that the Government of Alberta is not willing to negotiate with the federal government on issues relating to the environmental impact of the fossil fuel industry. Bachu stresses that in addition to being an initiative against climate change,

the Climate Change and Emissions Act is also an assertion of provincial rights to regulate in this area.<sup>17</sup>

### ***Regulations for CCS Projects***

The Alberta CCS Development Council suggests that existing regulatory frameworks for other injection techniques are largely adequate for dealing with CCS. The private sector is generally responsible for any costs or remedial action during the active injection period of a storage site.<sup>18</sup> However, the Council flags the potential difficulties in determining long-term liability in the Council's words, the "key gap" in regulation. Bachu points out that in Alberta, the Oil and Gas Conservation Act and the Environmental Protection and Enhancement Act do not clearly account for post-abandonment leaks.<sup>19</sup> Bachu suggests that as long as regulations for CCS projects remain unclear, investors will hesitate to fund the industry for fear of being held liable for health or environmental damages. The timelines certainly require environmental regulations drastically different from those in most industries, and the Alberta CCS Development Council calls for planning thousands of years into the future.<sup>20</sup>

One often-cited analogy to CCS is the injection and storage of acid gas, a refining by-product composed of hydrogen sulfide and CO<sub>2</sub>. When industry is disposing of acid gas in government-owned geological formations, the government claims indemnity.<sup>21</sup> Section 56(2) of the 2009 Alberta Mines and Minerals Act states that "a person who exercises [the right to inject acid gas] shall indemnify the Crown in right of Alberta for loss or damage suffered by the Crown in respect of any claims or demands made by reason of anything done by that person."<sup>22</sup> This requirement remains the same in the post-abandonment period: "abandonment of a well or facility does not relieve the licensee, approval holder or working interest participant from responsibility for the control or further abandonment of the well or facility or from the responsibility for the costs of doing that work."<sup>23</sup> The literature showcases a variety of opinions regarding the applicability of acid gas storage regulations to CCS, but the potentially massive scale at which CO<sub>2</sub> will be sequestered will require new and specific regulations regarding long-term liability. At the same time, current regulations under the Oil and Gas Conservation Act account for leaks through or beside a well but do not necessarily apply to leaks from natural geological faults.<sup>24</sup> Given that CO<sub>2</sub> in storage will be highly compressed, it is possible that the pressure from the sequestered CO<sub>2</sub> will fracture the surrounding rock and allow gas to escape into adjacent geological formations, if not the atmosphere. The International Panel on Climate Change (IPCC), for example, reports that at the experimental CCS facility in Weyburn, Saskatchewan, the sequestered CO<sub>2</sub> reaches up to 90 per cent of the pressure required to

deform the surrounding rock. Albertan regulatory agencies will need to account for this possibility when designing the liability framework for CCS.

### ***Possibilities for Legal Action***

In Alberta, there are multiple causes of action possible for a suit against a CCS project, including negligence, nuisance, and trespass.<sup>25</sup> Several uncertainties exist that must be resolved before CCS development can move forward.

The requirements for negligence include proof that a standard of care has been broken, causing damage to another party.<sup>26</sup> Because the CCS industry and accompanying regulations are so new, standards of care may not be fully established for a court to find that they have been broken.<sup>27</sup> Furthermore, if several CCS projects are built in close proximity, as they may be in Alberta given the high density of tar sands extraction operations, it will be difficult to determine who is responsible for the specific leaks that are causing harm.<sup>28</sup> This concern exists for trespass, as well, which covers property damage from CO<sub>2</sub> gathering in low-lying areas of adjacent properties.<sup>29</sup>

Bachu cautions that public or private nuisance claims may also be filed “when the use and enjoyment of land is unreasonably interfered with” by CCS projects.<sup>30</sup> While Wilson also raises the possibility of nuisance claims, she contends that courts may be inclined to limit the damages for which CCS operators are responsible, given the generally positive nature of CCS: “a balancing test might find the public benefit from mitigating climate change outweighs the harm or cost of the action.”<sup>31</sup>

### **Government Assumption of Liability**

**I**n order for CCS projects in Alberta to proceed, regulations must be altered so that long-term liability from private CCS projects is transferred to the government. The long timeframes involved increase the probability of owner bankruptcy or disappearance, and even long-lived firms often transfer their outstanding liabilities to smaller firms with shorter life spans.<sup>32</sup> The general consensus in the literature, therefore, is that government should assume at least some liability in the CCS process.<sup>33</sup> The Alberta CCS Development Council suggests that government and industry should share liability over the active lifetime of the project, with the government assuming full liability “after an appropriate term” after abandonment.<sup>34</sup> This transfer would require that the safety measures taken at a storage site fully satisfy a government regulator. The Council calls for industry to be responsible for the costs of monitoring a site for a ten-year period after

ceasing to inject CO<sub>2</sub>, with adjustments possible according to specific circumstances and further experience with the safety of commercial CCS.<sup>35</sup> After this period, responsibility would revert to the government.

The Alberta Government is a proponent of CCS as a means to reduce greenhouse gas emissions without crippling the energy industry. Therefore, assuming liability of CCS projects could also simply be a way of subsidizing the industry. The Alberta CCS Council endorses “a sharing of the risk between government and industry to support the development of this technology.”<sup>36</sup> Jeff Sansom from the University Of Alberta School Of Business suggests that since the reduction of greenhouse gases is a public good, the long-term liability for CCS projects should be acknowledged through government assumption of risk.<sup>37</sup> Bachu compares this situation to the nuclear industry in the United States, where the liability of operators is limited under the federal Price-Anderson Nuclear Industries Indemnity Act to encourage investment.<sup>38</sup> Under the Act, industry liability is capped at a specific amount (the current level is just over \$10 billion); this brings the risk to investors down to an acceptable level while ensuring that industry still has a strong incentive to operate safely.<sup>39</sup>

Three major problems exist with government assumption of liability. First, holding industry permanently responsible for all monitoring or remedial costs seems fair. Writing 28 years ago on the nuclear waste disposal industry, the then Economist Associate at the Rand Corporation, Linda Cohen, calls this a “theoretically pleasing solution.”<sup>40</sup> Second, transferring liability away from the operator at any stage of a CCS project will be a disincentive to plan for long-term safety - why build a storage facility that will maintain its integrity for 500 years when one is only liable in the first five? Third, if the government assumed liability over private CCS projects to increase their profitability, it could possibly face a challenge under Canada’s free trade agreements. In particular, World Trade Organization or North American Free Trade Agreement panels might find it problematic that subsidized Albertan CCS projects whose stated purpose is to sequester greenhouse gases can also use their supply of CO<sub>2</sub> to extract additional oil from depleted reservoirs through Enhanced Oil Recovery (EOR) techniques. Subsidized EOR would give Albertan companies a substantial competitive advantage: one source estimates that EOR can increase oil field yields by as much as 15 percent.<sup>41</sup> Skeptical opposition members of Alberta’s legislature assume that CCS is primarily intended to support EOR, one of whom comments that “the government is trying to dress-up an industrial project as a solution to our critical greenhouse gas problem.”<sup>42</sup> Most of these problems, however, can be countered with technical solutions (CCS construction requirements, for example) and should not interfere with government assumption of liability.

If CCS liabilities are transferred to government, different funding regimes can pay some or all of the costs incurred from leaks in the post-abandonment phase so that government does not have to bear all the costs.<sup>43</sup> For example, the Alberta CCS Council proposes that the costs to government of long-term monitoring and liability could be partially offset if each CCS developer paid 50 cents per ton to support each of these.<sup>44</sup> The appropriate size of payment is a technical question that is beyond the scope of this paper, but it is enlightening to note that surcharges on nuclear waste for post-abandonment funds in the early days of the industry were extremely low. In 1971, the most expensive levy on nuclear waste in any American state was only eight cents per cubic foot.<sup>45</sup> Policy-makers must make sure that levies on injected CO<sub>2</sub> are high enough to cover in full the liabilities from CCS. Rates, however, will have to remain well below Alberta's \$15 per ton charge on CO<sub>2</sub> emissions for CCS to be at all economically worthwhile.<sup>46</sup>

Under this framework the size of the total payment would depend solely upon the total tons of CO<sub>2</sub> injected. This poses a risk of unfunded liability. For example, if a site closed prematurely, before the full amount of CO<sub>2</sub> estimated during the approval process has been injected, then the total payment will be smaller than anticipated. This could happen due to unforeseen technological problems, such as increased seismic activity or poorly-sealed storage sites, or operator bankruptcy. Considering the experimental nature of the industry, none of these problems can be ruled out. If the long-term risks rise proportionally with the amount of CO<sub>2</sub> injected, then a lower payment might not be a problem. This might be the case, for example, under a carbon tax where the cost of the tax is directly related to the amount CO<sub>2</sub> leaked, which is in turn related to how much CO<sub>2</sub> was injected before the premature closure of a site. Some costs associated with long-term risks are fixed, such as site monitoring, and might not be fully covered by a 50 cents per ton fund. Cohen points out that just such a gap in funding has hampered the creation of new nuclear waste disposal sites in the United States, since state regulatory agencies hesitate to grant approval to operators without a guaranteed liability-funding process in place.<sup>47</sup>

Should a CCS project cause more environmental or health problems than anticipated, or if a catastrophic event should happen, the payments may simply be inadequate. In this case, Wilson suggests that those affected will file civil suits to reclaim costs over and beyond these 50-cent payments. CCS operators who are already in financial trouble may be unable to pay.<sup>48</sup>

Raising rates under this scheme would be one way to deal with premature closure. A more sophisticated solution, however, might be found in the 'Orphan Fund' set up by Alberta's Oil and Gas Conservation Act.<sup>49</sup> Under the Act, all industry participants pay into a single fund to deal with abandoned oil and gas extraction facilities, thus pooling the risk. If an appropriate levy went into such a fund, with an increased rate for

companies with poor credit ratings or safety records, the government might have a stable source of funding for unexpected damages caused by CCS.

A second possibility for funding long-term liabilities is requiring CCS projects to purchase insurance. Because the coverage the insurance industry will provide remains unclear, government intervention is imperative.<sup>50</sup> There are numerous industries that handle liability through government-mandated insurance or pooled funds; the American nuclear industry under the Price-Anderson Act is one. Wilson suggests, however, that insurability requires, among other criteria, “a sufficient number of similar and uncorrelated events to allow for risk pooling,” “clearly calculable losses,” and “frequent enough losses to calculate premiums.”<sup>51</sup> The nature of the CCS industry is such that each project has unique geological characteristics, and these dissimilarities make risk pooling difficult. Nuclear power plants, by contrast, may be built using slightly different designs but basically have identical risks. Additionally, scientific and regulatory uncertainties regarding global climate change will make the losses from CCS leaks not clearly calculable. Finally, while risks may be more precisely calculated as experience with CCS increases, the newness of the industry means that there are no ‘frequent losses’ to analyze.

## CCS Under Emissions Trading

**A**lberta uses an emissions trading regime, the Offset Credit System, which allows large emitters to reduce their CO<sub>2</sub> emissions through CCS or purchase carbon emission credits from CCS projects. Therefore, before CCS can be developed, government and industry alike will need clarification on how to deal with leaks from CCS facilities. As even well-planned CCS facilities will likely leak at least small amounts of CO<sub>2</sub>, someone will have to be liable for these emissions.<sup>52</sup> Presumably, any leaks in the post-abandonment phase of a CCS project will be the responsibility of the facility and not the purchaser of the credits, but the provincial and federal governments will have to appoint regulators to handle such decisions, regardless of whether trading programs are regional, national, or international in scope.<sup>53</sup> The IPCC points out that regulations for unanticipated leaks are much needed.<sup>54</sup> Furthermore, there have been few formal evaluations or analyses of regulatory policies in this area.

Some authors suggest that the most appropriate way to account for future leaks is to presume a certain annual rate of leakage and deduct it from the initial carbon emission offsets earned by a CCS project, thereby avoiding, or at least diminishing, the question of future liability.<sup>55</sup> Because of the experimental nature of the industry, the specific rate of deduction will have to be adjusted as leakage rates are studied, and



presumably they will be lowered as injection technology improves. The equation is still more complicated, since our timeframe is so large, and it is reasonable to suggest that once we have placed the global economy on a low-carbon trajectory, small leaks from CCS projects over the long term - 100 or 200 years in the future - will be easily handled by the earth's natural carbon sinks. Such leaks will thus be inconsequential. Even if such a sustainable economy is unrealistic, some measures of discounting must surely be applied when considering future leaks from CCS. Despite the many technological and economic uncertainties of CCS, some authors have attempted to estimate a reasonable discount rate. Economists Minh Ha-Duong and David W. Keith use a discount rate of four per cent to calculate that CO<sub>2</sub> sequestered in small-scale projects with one per cent annual leakage rates should be worth 80 per cent of actual carbon reductions.<sup>56</sup> According to IPCC projections, one per cent is a fairly pessimistic number, but this is not a fatal flaw for the model. To encourage CCS operators to surpass the presumed rate of leakage, it would be important for the regulating agency to institute some mechanism for giving out retroactive credit for better-than-expected performance. A rate erring on the high side would simply delay, and not deny, credit for offset emissions. The IPCC calls for just such a "margin of conservativeness" in discounting credits.<sup>57</sup> Rates would have to be adjusted to each individual project according to the specific risk levels they present.

Another option for dealing with CCS reservoirs is to assume that any sequestered CO<sub>2</sub> is permanently stored and then require operators to buy back emission credits as leaks are detected.<sup>58</sup> This method is simpler economically, but as it pushes liability costs into the future, it lengthens the time frame over which owners may go bankrupt. This increases the possibility of unfunded liability. If this method is adopted, CCS operators will likely have to purchase emission credits for their leaks at the current rates rather than the rates that existed when the CO<sub>2</sub> was originally injected. Just because a CCS project's CO<sub>2</sub> was at one point stored doesn't mean it should be treated differently under an emissions trading system.<sup>59</sup> Also, to the extent that the price of carbon rises, holding owners liable at the higher rates gives them added incentive to minimize leaks.

Finally, the Offset Credit System requires that "emission reduction[s] must be real and demonstrable."<sup>60</sup> More significantly, to demonstrate that CO<sub>2</sub> is permanently stored, companies would have to monitor a site for a certain period to confirm that there were no leaks. But how long would that period be? One month, one year, one thousand years? Notwithstanding the enthusiasm for CCS that is written into the Act (the technology fund it creates can specifically subsidize "demonstration and use of specified gas capture, use and storage technology"), giving immediate full credit for sequestered CO<sub>2</sub> may be legally problematic.<sup>61</sup>

## CCS Under Carbon Taxation

Carbon taxes may be set up as taxes on the fossil fuels that produce CO<sub>2</sub>, or they may apply to all emissions generally, excluding those already covered by Cap and Trade programs.<sup>62</sup> The former exist in British Columbia (BC) and Quebec and are gaining popularity globally as simple and effective alternatives to Cap and Trade programs.<sup>63</sup> When these measures do not count emissions but rather the fuels that produce them, they will not directly affect CCS. Because Alberta currently places a \$15 charge on emissions from large stationary facilities, however, the applicability of carbon taxation to the long-term liability of CCS must be resolved.

In their study “A Simple Approach for Bettering the Environment and the Economy: Restructuring the Federal Fuel Excise Tax,” Jack Mintz and Nancy Olewiler stress that tax breaks for CCS projects could help the industry deal with the cost of a carbon tax and ensure regional equity.<sup>64</sup> It is clear that the rate of tax exemption would have to be adjusted to account for CO<sub>2</sub> leakage. The carbon tax in BC allows for tax breaks to be given to CCS projects, but it does not promise that full credit will be given for sequestered CO<sub>2</sub>, thus giving provincial regulators the option to account for leakage. The law “provid[es] for exemptions from the payment of tax, or for refunds of all *or part of* the tax paid, with respect to a fuel or combustible that is the source for greenhouse gas emissions... if equivalent emissions are captured and stored.”<sup>65</sup> While it is thus possible under the law for regulators to account for leakage, they may choose not to exercise this option. For example, a BC government that was particularly zealous about CCS might decide to ignore the possibility of future leaks from CCS projects and give them full credit for all CO<sub>2</sub> injected.

A carbon tax on emissions, by contrast, has deeper implications for CCS since CO<sub>2</sub>-producing companies will look for ways to reduce their emissions and will likely examine CCS as a possibility. The National Round Table on the Environment and the Economy points out that, unlike taxes on fuels, this option would stimulate the development of CCS.<sup>66</sup> Generally, the higher the tax, the more investments in CCS since a higher price on carbon emissions will increase the economic returns to sequestration. Future leaks, however, will in all probability be taxed at the future rate. Therefore, if a potential CCS operator currently faces a low tax on CO<sub>2</sub> emissions, but anticipates that it will quickly rise, they will be seriously discouraged from entering the industry.<sup>67</sup>

Whether a tax increase is realistic, given the current political environment in Alberta, is unclear. The well-respected, Alberta-based Pembina Institute has recently called for Alberta carbon prices to rise to a minimum of \$200 per ton by 2020, over ten times the current rate of \$15 per ton.<sup>68</sup> If a hypothetical million-ton CCS project completed in 2019 saves a CO<sub>2</sub> producer \$15 per ton in taxes but taxes itself for leaking

CO<sub>2</sub> at \$200 per ton in 2020, it will take only 7.75 years<sup>69</sup> for the cost of the leak to outweigh the tax savings, assuming a leakage rate of one percent (see Table 1). This is the rate used by Keith and Ha-Duong, and, as discussed, it is a high but not inconceivable rate.<sup>70</sup> Applying their four per cent discount rate only extends profitability until 2034. It should be noted, however, that CCS projects may inject CO<sub>2</sub> over several years. This will somewhat hedge the risk of a sudden rise in carbon taxes, since the higher rate of tax exemptions earned from injecting CO<sub>2</sub> post-hike will help defray the higher rate at which leaks are penalized. Potential CCS investors will, nonetheless, be seriously concerned about the effect of carbon tax hikes on liability.

**Table 1. Effect of Carbon Tax Hikes on CCS Profitability**

Year	CO <sub>2</sub> leaked in thousands of tons	Cumulative leakage cost in millions (\$) <sup>71</sup>	Tax savings in millions (\$) <sup>72</sup>	Percentage of savings remaining	Cumulative leakage cost in millions (\$) at 4% discount rate	Tax saving in millions (\$) at 4% discount rate	Percentage of savings remaining at 4% discount rate
2019	0	0	15.00	100	0	15.00	100
2020	10.0	2.00	13.00	87	1.92	13.08	87.2
2021	19.9	3.98	11.02	73	3.67	11.33	75.55
2022	29.7	5.94	9.06	60	5.26	9.74	64.96
2023	39.4	7.88	7.12	47	6.69	8.31	55.38
2024	49.0	9.80	5.20	35	7.99	7.01	46.72
2025	58.5	11.70	3.30	22	9.16	5.84	38.92
2026	67.9	13.59	1.41	9	10.21	4.79	31.93
2027	77.2	15.45	<b>-0.45</b>	<b>-3</b>	11.15	3.85	25.69
2028	86.5	17.30	<b>-2.30</b>	<b>-15</b>	11.98	3.02	20.14
2029	95.6	19.12	<b>-4.12</b>	<b>-27</b>	12.71	2.29	15.24
2030	104.7	20.93	<b>-5.93</b>	<b>-40</b>	13.36	1.64	10.93
2031	113.6	22.72	<b>-7.72</b>	<b>-51</b>	13.92	1.08	7.18
2032	122.5	24.50	<b>-9.50</b>	<b>-63</b>	14.41	0.59	3.94
2033	131.2	26.52	<b>-11.52</b>	<b>-75</b>	14.82	0.18	1.18
2034	140.0	27.99	<b>-12.99</b>	<b>-87</b>	15.17	<b>-0.17</b>	<b>-1.15</b>

Investor reluctance is a serious problem, since a CCS project with a slow leak is better than no project at all, and the earlier that global greenhouse gas reductions through CCS are made, the better. If a CCS operator is confident that the risk of leaks from a given site is negligible, tax hikes may not be a deal-breaking issue. A site with greater potential to leak will likely be scrapped if the investors anticipate a rapid rise in the price of CO<sub>2</sub>. Such anticipation could also cause investors to delay their projects because they will make a larger profit from sequestering CO<sub>2</sub> at the higher rate. Clearly, neither of these results are good for the

environment.

The best solution to this dilemma is to raise the carbon tax to a rate that will have a meaningful effect on CO<sub>2</sub> producers. Subsequent increases may then be necessary, but they will hopefully be guaranteed to be moderate so that investors do not face substantial disincentives to enter the CCS industry. To avoid unfairly punishing early movers, it would also be important for policy-makers to raise carbon taxes before any full-scale industrial CCS projects have come online. If projects happen to be built before a carbon tax hike becomes politically feasible, retroactive credits could make up the difference between the low tax rate at which they were credited and the high tax rate at which they are charged for leaks. Finally, if the government assumed liability immediately after abandonment, the problem of an increased carbon tax is not applicable since the revenues from a carbon tax would be going to the government anyway.

## Final Thoughts

**T**he current long-term liability framework in Alberta is neither clear nor reasonable. There are some reasonably effective strategies that Alberta can enact to ensure that damages to the environment, health, and industry will be compensated fairly and appropriately. This paper recommends that the Alberta government adopt these policies in order to eliminate uncertainties about the long-term liability of CCS:

1. Carefully analyze risks to property, health, and the local (and global) environment to develop a strong regulatory framework for CCS. This framework can build on previous industry experience but must account for important differences between CCS and traditional oil and gas operations, including the magnitude and longevity of CCS projects. In particular, ownership of CO<sub>2</sub> during all phases of sequestration must be clarified.

2. The federal 'toxic' classification is too strict. Albertan policy-makers should negotiate with the federal government and other provinces to agree on a less strict, harmonized classification of CO<sub>2</sub> that will acknowledge its danger without forcing CCS projects to face excessive liabilities.

3. Develop a framework for transferring liability from private CCS operators to the government while ensuring that private owners still face much or all of the final cost of liability. The Alberta government has two viable options. First, it could levy a per-ton charge on sequestered CO<sub>2</sub> that is high enough to fund post-abandonment monitoring and liabilities but does not exceed the price of carbon (currently \$15 per ton in Alberta). Second, it could mandate that industry participants pay into an 'Orphan Fund' for abandoned CCS sites. Either option can properly fund CCS liability.

4. Immediately raise the price of carbon. It is important that potential

CCS operators face somewhat stable CO<sub>2</sub> prices so that they are not deterred by the threat of paying for leaked CO<sub>2</sub> at a higher rate than they were paid to sequester it. The current rate in Alberta is too low to be a very effective penalty for emitters.

There are financial and environmental reasons why policymakers should be skeptical of CCS. The technological unknowns are many and will take much time to resolve, while the time for action on climate change is now. If the Alberta government is indeed going to encourage industrial-scale CCS projects a clear and fair liability framework is necessary for investors and citizens alike to have confidence in the future of the industry.

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## Endnotes

- 1 Mary Griffiths, *Closing the Liability Gap* (Drayton Valley: The Pembina Institute, 2008).
- 2 Kelly Cryderman, "Alberta Billions Lead Carbon Fight," *Calgary Herald*, November 18, 2008.
- 3 Bob Weber, "Alberta announces \$850M carbon capture project," *The Record*, October 8, 2009.
- 4 Elizabeth J. Wilson et al, "Assessing a Liability Regime for Carbon Capture and Storage," *Energy Procedia*, 1, (2009).
- 5 International Panel on Climate Change, *Carbon Dioxide Capture and Storage* (Cambridge: Cambridge University Press, 2005).
- 6 Alberta Carbon Capture and Storage Development Council, *Accelerating Carbon Capture and Storage Implementation in Alberta* (Edmonton: by author, 2009).
- 7 Wilson, 2007.
- 8 Nigel Bankes, Jenette Poschwatta, and E. Mitchell Shier, "Legal Framework for Carbon Capture and Storage in Alberta," *Alberta Law Review*, 45, No. 3, (2008).
- 9 Wilson, 2007.
- 10 Curtis M. Oldenburg, "Migration Mechanisms and Potential Impacts of CO<sub>2</sub> Leakage and Seepage," in *Carbon Capture and Sequestration: Integrating Technology, Monitoring, and Regulation*, edited by Elizabeth J. Wilson and David Gerard (Iowa: Blackwell Publishing, 2007); International Energy Agency, CO<sub>2</sub> Capture and Storage: A key carbon abatement option (OECD/IEA: 2008). CCS could also pose risks to mineral rights if stored CO<sub>2</sub> leaks into adjacent oil or gas fields. While this problem will require resolution to encourage CCS development, it has few environmental implications, and as

such will not be further studied in this paper.

11 Stefan Bachu, "Legal and regulatory challenges in the implementation of CO<sub>2</sub> geological storage: An Albertan and Canadian perspective," *International Journal of Greenhouse Gas Control*, 2, (2008).

12 Wilson; CBC News, "Links between oil activity, Alberta quakes studies," by author, November 13, 2009.

13 Bankes, 2008. Also, there is an international dimension to the uncertainty of ownership of the CO<sub>2</sub> in CCS projects. CCS facilities in developing countries may be financed using the Kyoto Protocol's Clean Development Mechanism (CDM), though these countries themselves do not have obligations under the Protocol. If ownership of the projects is fully transferred to those countries, then the liability for any future leaks may be unclear. Presumably, the transfer of ownership ensures that the developing countries themselves are liable for local environmental or health damages, but they may not accept responsibility for this additional contribution to global emissions.

14 Bankes, 2008.

15 Government of Alberta, Climate Change and Emissions Act (Edmonton: by author, 2008); Griffiths.

16 Kip Coddington, statement before the US Senate Committee On Energy and Natural Resources, April 16, 1997.

17 Bachu, 2008.

18 Alberta CCS Council; Griffiths.

19 Bachu, 2008.

20 Alberta CCS Council.

21 Bankes, 2008.

22 Government of Alberta, Mines and Minerals Act (Edmonton: by author, 2009).

23 Government of Alberta, Oil and Gas Conservation Act (Edmonton: by author, 2000).

24 Griffiths, 2008.

25 Ibid.

26 Bachu, 2008.

27 Wilson, 2007.

28 Ibid.

29 Bachu, 2008.

30 Ibid.

31 Wilson, 2007.

32 Ibid.

33 Jeff Sansom, "A Regulatory Perspective on Carbon Capture and Storage in Alberta," unpublished paper (2005).

34 Alberta CCS Council.

35 Ibid.

36 Ibid.

37 Sansom, 2005.

38 Bachu, 2008.

39 American Nuclear Society, The Price-Anderson Act: Background Information (by author, 2005).

40 Linda Cohen, "Who Pays the Bill: Insuring against the Risks from Low Level Nuclear Waste Disposal," *Natural Resources Journal*, 21, No. 4 (1981).

41 Tom Nicholls, *Fundamentals of Carbon Capture and Storage Technology*

(London: The Petroleum Economist Ltd, 2007).

42 Alberta's NDP, "Environment Minister Full of Hot Air," by author, 2006.

43 Griffiths, 2008.

44 Alberta CCS Council.

45 Cohen, 1981.

46 Alberta Energy, "Climate Change and Emissions Management Fund," by author, 2009.

47 Cohen, 1981.

48 Wilson, 2007.

49 Bachu, 2008.

50 Nigel Bankes and Jenette Poschwatta, "Carbon Capture and Storage in Alberta: Learning From the Acid Gas Analogy," *Canadian Institute of Resources Law: Resources*, 97, (2007).

51 Wilson, 2007.

52 Alberta Environment, Carbon Offset Solutions (Edmonton: by author, 2009).

53 Griffiths, 2008.

54 IPCC.

55 Ibid.

56 Minh Ha-Duong and David W. Keith, "Carbon storage: the economic efficiency of storing CO<sub>2</sub> in leaky reservoirs," *Clean Technologies and Environmental Policy*, 5, (2003).

57 IPCC.

58 Ibid.

59 While this is an issue that will not be taken up in this paper, there may be benefits from storing CO<sub>2</sub> even if it is later released, since this gives the economy more time to adopt low-carbon strategies. If this is the case, perhaps the leaked CO<sub>2</sub> from CCS projects should be penalized at a lesser rate than CO<sub>2</sub> from other sources. In any case, there should be some sort of financial recognition of the sequestration, however impermanent.

60 Government of Alberta 2008.

61 Ibid.

62 National Round Table on the Environment and the Economy (NTREE), *Getting to 2050: Canada's Transition to a Low-emission Future* (Ottawa: by author, 2007).

63 Shi-Ling Hsu and Robin Elliot, "Regulating Greenhouse Gases in Canada: Constitutional and Policy Dimensions," *Social Science Research Network* (2008).

64 Jack Mintz and Nancy Olewiler, *A Simple Approach for Bettering the Environment and the Economy: Restructuring the Federal Fuel Excise Tax* (Ottawa: Sustainable Prosperity, 2008)

65 Government of British Columbia, Carbon Tax Act (Victoria: by author, 2008).

66 NTREE, 2007.

67 Such a scenario is possible under emission trading schemes as well: an environmentalist government could sharply restrict the number of emission credits auctioned, driving their price up steeply.

68 Pembina Institute, "New study shows Canada can meet global-warming reduction targets while growing jobs and economy," by author, 2009.

69 Where  $t$  is years elapsed after project completion. Calculations by

Christopher Finlay.

$$1 - 0.99t = 15/200 \quad 0.925 = 0.99t \log(0.925) = t \log(0.99) \quad t = \log(0.925) / \log(0.99) = 7.75 \text{ years}$$

70 Keith, 2003.

71 This cost only includes the taxes due because of the CO<sub>2</sub> leak. In reality, there may be other costs from the leak: compensation to landowners, environmental remediation, etc.

72 Tax savings ignore the costs of sequestration.



# Implementing a Public Goods Charge for Water

*Kassandra Griffin, Greg Leventis and Brian McDonald*

## *ABSTRACT*

*A public goods charge on water was proposed in 2006 by the California Air Resources Board (CARB) for the California Global Warming Solutions Act, AB 32. It was intended to fund specified measures to reduce the amount of energy used to pump, transport, treat and heat water, thereby reducing greenhouse emissions associated with energy generation. This analysis concludes that the public goods charge could achieve that and more. It could also provide a stable funding stream for critical water infrastructure, help institutionalize responsible regional watershed management, and achieve water conservation goals enacted by the Legislature. Additionally, this analysis concludes that greenhouse gas reduction targets can be achieved more efficiently than previously projected by prioritizing the measures that have the highest greenhouse gas savings potential. Paying for critical water infrastructure is a national challenge, as is reducing greenhouse gas emissions. This California-specific proposal can provide a model to other states in how to address both problems.*

In the United States, water and wastewater systems are large energy consumers, accounting for 3 percent of annual electricity consumption.<sup>1</sup> This number grows substantially when end uses such as on-site water heating are included: 10 percent of total U.S. residential electricity consumption is attributable to water heating.<sup>2</sup> The relationship between water and energy use is more pronounced in the Western United States, where surface water supplies are lacking near areas of high demand. This often requires conveyance of water over long distances and reliance on energy-intensive water supplies (e.g. groundwater and desalination). California's State Water Project, which supplies water to two-thirds of the state's population, is the state's single largest user of electricity.<sup>3</sup> Overall, the California Energy Commission estimates that 20 percent of California's electricity use is water-related.<sup>4</sup>

In 2006, California passed ambitious climate change legislation, the California Global Warming Solutions Act, or Assembly Bill 32 (AB 32), to reduce greenhouse gas (GHG) emissions to 1990 levels by 2020. The California Air Resources Board (CARB) was directed to devise and implement additional mitigation measures in addition to the establishment of a cap-and-trade market for GHG. A subsequent Scoping Plan was drafted by CARB and approved by the board in December 2008 to provide strategies for the implementation of AB 32. Many of the measures outlined in the plan are to be implemented by 2011. One sector addressed in the Scoping Plan is water, which is

not included in the cap-and-trade program directly. The Scoping Plan proposes five mitigation measures to reduce the energy used to pump, transport, treat and heat water, reducing the associated greenhouse emissions. A sixth measure recommends a public goods charge to fund the implementation of the other five measures.

A public goods charge is the appropriate tool to fund the measures proposed in the Scoping Plan for three primary reasons:

- 1) It frees up bond funding that could be used for other state needs.
- 2) It is a stable and sustainable revenue source (a constant revenue source that would not be threatened by debt limits, as bonds are) for critical water projects.
- 3) It can be designed to foster regional water planning.

This paper explains these points and makes several recommendations of how to implement a public goods charge on water.

### ***Public Goods Charges and Assembly Bill 32***

A public goods charge (PGC) is a surcharge on a utility bill to fund public-interest programs related to that utility service. (Note that this is an entirely different usage than “public good,” as in ‘non-rival and non-exclusive.’) In California, an energy PGC was adopted in 1996 as part of energy deregulation. It is a surcharge on electricity bills that funds energy-efficiency programs, promotes renewable energy, provides low-income discounts on electricity, and fosters research and development. Water does not currently have a similar charge.

AB 32’s goal is to reduce greenhouse gas emissions in California to 1990 levels by the year 2020, approximately a 30 percent reduction from “business as usual”.<sup>5</sup> The measures included in the Scoping Plan are not *law*, but rather administrative recommendations of how to achieve the law’s goals. On the subject of water, the Scoping Plan recommends six voluntary measures:

- W-1 Water Use Efficiency
- W-2 Water Recycling
- W-3 Water System Energy Efficiency
- W-4 Reuse Urban Runoff
- W-5 Increase Renewable Energy Production
- W-6 Public Goods Charge

The final measure, the public goods charge, is intended as a financing mechanism for the others.

### ***Water, Energy, and the Environment***

Water use and energy use by regions are negatively correlated in California. Rural and agricultural regions have higher water demands but require less energy per unit of water. Urban areas consume less water on a per capita basis, but require larger amounts of energy to pump, heat and treat water. California also has significant population centers in naturally arid regions, necessitating large intra- and interstate water conveyance projects. Water shortages have a two-pronged impact on energy: they constrain the opportunities for low-emissions, hydroelectric power generation, and they necessitate procuring additional water supply through higher-energy means.

### ***Water Utilities and Regulation***

According to professionals in the industry, there are between 3,000 and 6,000 water providers in California. The 100 percent margin of error in this figure is the result of a fragmented regulatory system. Providers are regulated by several state and federal agencies, including the Department of Water Resources (DWR), State Water Resources Control Board (SWRCB), California Public Utilities Commission (CPUC), and Department of Public Health (DPH). No single agency regulates all providers. The majority of water providers are publicly owned utilities with locally elected boards of directors. There is no regulatory oversight of their rates, and because they are publicly owned, they are presumed to act in the best interests of their members/owners. Investor-owned water utilities (IOUs), by contrast, *are* carefully regulated and counted. There are fewer than 150 such providers in California, and most of them are small. Only a handful serve significant numbers of customers, but that handful supplies water to approximately 20 percent of California's residential users. The investor-owned water providers, like investor-owned electricity providers, are regulated by the California Public Utilities Commission in matters of rate-setting and customer protection.

## **Strategic Benefits of Water PGC**

### ***Stable Funding for Five Measures***

Basic operations of most local water utilities are funded through water rates paid by customers. Larger water projects, beyond those typically included in capital improvement budgets (e.g. water recycling) often do not have a clear and adequate long-term funding source. To finance large infrastructure projects, bonds are often issued to borrow money to be repaid later either through taxes (general obligation bonds) or user rates (revenue bonds). In recent years, statewide water projects have been funded through bonds. The \$5.38 billion Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006, (Proposition 84) and the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002

(Proposition 50) provide the bulk of current state water funding for capital projects. These are examples of general obligation bonds.

Using bonds to finance water capital improvements is costly. Bonds are how governments borrow money, so they can spend now and pay later. Bonds are backed by the government, which promises to pay back the bond plus interest through general revenues (i.e. taxes). The interest rate for bonds is determined by the government's credit rating. If a governing body borrows too much, they run the risk of lowering their credit rating, resulting in higher interest rates. Historically, California has had a debt-service ratio around 4 percent, but there was a sharp increase between 2002 and 2006. In 2007, the ratio was projected to be higher than 7 percent, above the California Legislative Analyst's Office recommended maximum of 6 percent.<sup>6</sup> Because the government's credit rating depends on its debt ratio and revenue streams, there is a limit to borrowing. Removing water bond financing from California's general fund obligations would increase funds available for other government services and infrastructure.

Bonds can also be unreliable, because they must be approved by the voters, and during periods of recession, they are often likely to be rejected. In August 2010, the California Legislature voted to postpone the anticipated \$11.1 billion Safe, Clean, and Reliable Drinking Water Supply Act of 2010 bond referendum until 2012. This was the largest bond proposed in California's history and it was postponed out of fear that voters would not pass it.<sup>7</sup>

For water infrastructure planning, Californians would be better-served by a stable, consistent funding source due to the long lifetimes and capital recovery periods of water projects. A PGC can achieve this by structuring the size of the charge to match the future water infrastructure needs of the state. Since this charge will be a known quantity, it can be built into the capital improvement budgets of water agencies with certainty. With planning and foresight, the charge can be used to abide by the pay-as-you-go principle, where projects are not implemented until money is saved. This would reduce total costs by eliminating debt interest payments.

### ***Mitigation and Adaptation***

AB 32 and the subsequent Scoping Plan were written with the goal of reducing greenhouse gas emissions in order to *mitigate* the most severe effects of climate change.<sup>8</sup> Water conservation, water recycling, and stormwater reuse decrease emissions because they are lower-energy alternatives to long-distance conveyance, groundwater pumping, and desalination. Renewable energy and system efficiencies also reduce the energy and carbon intensity of pumping and treating water. Although the scientific evidence points overwhelmingly to the conclusion that climate change is already underway, the measures specified in the

scoping plan are still timely because they are good strategic choices for *adapting* to climate change. Specifically, reducing water demand and securing/creating additional local reliable supplies through water conservation, water recycling, and stormwater reuse, will be critical as weather patterns deviate further from historic norms and as the Sierra Nevada snowpack generates less and less reliable surface runoff for parts of California.

### ***Institutionalize Regional Water Management***

One critical component of effective long-term planning for water is integrated planning and project development within hydrologic regions. A PGC can be used to continue the development of a trend in California toward integrated watershed management. Many water supply and quality issues cross jurisdictional and hydrologic boundaries, yet decisions are often not coordinated among neighboring communities, which leads to depletion of supplies. Furthermore, the 3,000 to 6,000 water utilities have historically made decisions about supply and capital investments independently, which has led to contentious water-rights battles. Regional planning and coordinated efforts can attain economies of scale by pursuing projects that accrue benefits for members at large, as opposed to smaller projects that accrue benefits for only an individual jurisdiction but are less cost-effective.

Voters in 2002 passed Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act, an effort to move toward integrated watershed management. This bond includes \$380 million for grants to support and incentivize Integrated Regional Water Management (IRWM). Regional stakeholders, including utilities, environmental and civic groups, business interests, and municipal governments form IRWM regions with the approval of the California Department of Water Resources (DWR). These regional associations work together to develop regional watershed management plans (IRWMPs), which must be approved by DWR before they can apply for state grants to implement projects. Thus far, approximately 25 of the 46 IRWM regions have developed plans. Interviews with water management professionals reveal a positive view of the regional planning process. However, many also recognize that implementation hinges on long-term funding for IRWM projects, a “carrot” provided by the state (currently through Proposition 50 and 84 grant money). Since the AB 32 water supply measures — conservation, recycling, and stormwater reuse — are often included as projects in IRWMPs, a PGC can be used to finance projects that meet the goals of climate mitigation and adaptation, and foster regional watershed planning.

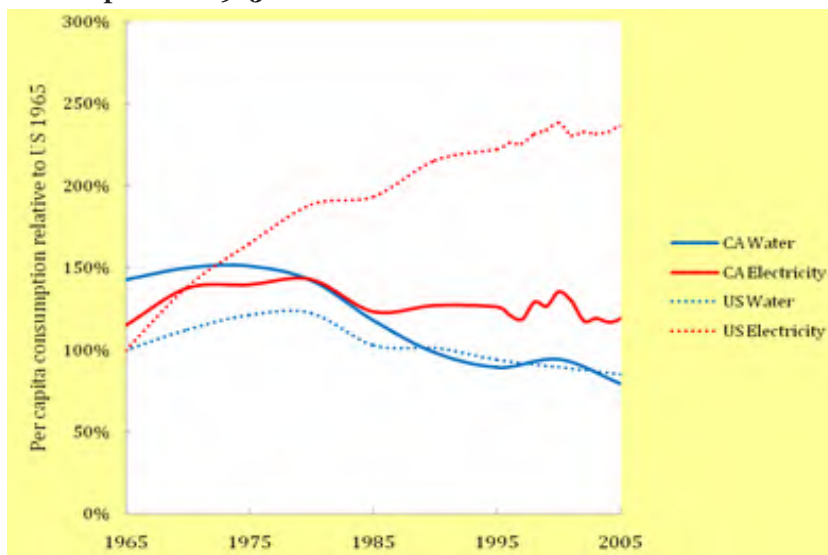
One weakness of the current process is that many of the regions use memorandums of understanding as their only formal interagency contract. Many IRWM regions have recognized this as an acceptable

institutional structure for developing the plan, but an insufficient one when implementing the plan. A more formalized structure is needed to make the tough decisions in raising and allocating money to fund projects in these plans. One benefit of a PGC on water is that it would provide the funding source needed to continue the IRWMP process and incentivize the institutionalization of IRWM regions, which is important for addressing complex and politically sensitive water issues.

### ***Energy Efficiency Programs in California Have Been Very Effective***

Since the 1960s, California has been a leader in conserving energy, maintaining constant per capita consumption while electricity demand for the rest of the U.S. has grown by a factor of 2.5. Figure 1 shows California per capita consumption for each year relative to national consumption in 1965. California’s ability to conserve energy relative to the U.S. is due in part to its history of energy-efficiency programs. Figure 1 also shows per capita water consumption in California and nationally. The per capita water consumption in California has declined more rapidly than in the U.S. as a whole. However, because California used more water on a per-capita basis historically, current consumption is near the U.S. average. California has the opportunity to continue its water conservation efforts and become a leader for the country.

**Figure 1. Comparison of California and U.S. per capita water consumption from 1965 to 2005, indexed to U.S. per capita water consumption in 1965**



Sources: Data from Energy Information Administration. Annual Energy Review. 2009., EIA. State Energy Data System. 2009., and U.S. Geological Survey. Estimated Use of Water in the United States.1968, 1972, 1977, 1983, 1988, 1993, 1998, 2004, 2009.

### ***POU Incentives***

Publicly owned water utilities (POUs) set water rates through votes by their boards of Directors. Board members in general prefer not to raise rates (they are often elected for that reason). Though California water rates have actually increased by around 17 percent on average between 2003 and 2006, they are not raised regularly.<sup>9</sup> The U.S. Government Accountability Office found “about half of the utilities raised their user rates infrequently—once, twice, or not at all—from 1992 to 2001.”<sup>10</sup> The survey also found that more than a quarter of water utilities and 40 percent of wastewater utilities did not recover full costs for operations and maintenance, capital, and debt service.<sup>11</sup> Hence, although utilities have the power to raise rates to fund conservation and efficiency programs without the PGC, they often do not.

## **Implementation Recommendations**

### ***Volumetric Fee on Individual Bills***

The PGC on water should be a volumetric charge on individual water utility bills, in order to reduce costs by reducing consumption. Some communities do not have individual volumetric meters, but all are required to install them by 2025, per 2004’s AB 2572. A flat fee equal to the average estimated volumetric fee can be used in the short term in any service areas that lack individual meters. A volumetric fee is more equitable than a flat fee, which disproportionately impacts the poor, or a percentage fee, which results in people from expensive water areas paying proportionally more for conservation measures. Different rates may be needed for agricultural versus urban users.

### ***Legislate: Non-Bypassable Surcharge***

Legislative approval is necessary to implement a PGC. Although Assembly Bill 32 gave broad implementation authority to the California Air Resources Board, new taxes and charges cannot be imposed without specific legislative approval, and no such approval was included in AB 32. Pending legislative approval, the state *does* have the authority to require Municipal Utility Districts to implement a fee, because the state ultimately owns the water flowing in and under the state. Utilities—public and private—only distribute, and sell that water with the permission of the state.

This proposal will face significant challenges in gaining legislative approval. The dearth of support for the proposed 2010 water bond illustrates the public’s current attitude toward water projects and new taxes. Before November 2010, price increases, called “fees” could be passed with a simple majority vote in the California Legislature, whereas “taxes” required a two-thirds majority. The distinction hinged on whether the revenue was earmarked for a purpose closely tied to the

point of incurrence, and whether the payer received relevant “benefits” in proportion to the amount paid. Proposition 26, passed in November 2010, requires fees to meet the same two-thirds majority threshold. The short-term and long-term impacts of the proposition on existing and future fees are unknown, and Proposition 26 could be struck down by the courts. In the meantime, the passage of a fee in the Legislature has been made more difficult.

A water PGC has the best chance of legislative success if it is bundled along with a relevant and popular bill. The 1996 energy PGC passed as part of a larger energy deregulation bill. The water PGC could be attached to a modified water bond, one that is smaller in scope and less controversial than the abandoned 2010 proposal. This would also convert the bond from a general obligation to a revenue bond, which abides by the “user pays” principle. The plan to legally formalize IRWMPs through joint power authorities is proposed in part to reduce utility opposition to this proposal and to decrease the likelihood that they will lobby to defeat it in the Legislature. Utilities would likely oppose a proposal that involved primary fund management by a state agency. Although passing a fee at the state level presents a formidable political challenge, it is less onerous than the challenge of relying on 6,000 jurisdictions to pass individual fee increases. Proposition 218, passed in 1996, gives voters the right to contest local tax or fee increases. Fear of Proposition 218 challenges adds to the reluctance of municipal utility districts to raise their fees to increase funding for conservation and efficiency programs.

### ***Create IRWM JPAs to Manage Funds***

PGC funds should be managed by Joint Power Authorities (JPAs) created through Integrated Regional Water Management Regions (IRWMs). Individual utilities would collect the fees through bills, but would then pass the total revenue directly to the JPAs. Forming JPAs would formalize the institutions needed for management of these PGC funds. Remediating this legal block will be critical in ensuring that all major stakeholders are involved in the institutionalization of IRWMPs.

Currently, grant funds are available to water providers in regions with IRWMPs through Proposition 50 and Proposition 84, but individual agencies are not eligible to apply on their own. Of the 48 IRWM regions, only a few have taken the next step to transitioning from operating on memorandums of understanding to forming JPAs. For most regions, a single member agency acts as the lead agency/fiscal sponsor of grant applications. This “lead agency” model has an administrative shortcoming: the lead agency has no enforcement power over non-compliant partner agencies.



The formation of JPAs for IRWMP participants will be an important component of planning for a sustainable water and energy-efficient future for California. Integrating the proposed PGC for water into the IRWM framework will provide mutual benefits. The need to manage PGC funds will give regions more incentive to organize, and the opportunity to manage PGC funds at the regional level will improve efficiency over having thousands of member agencies each overseeing their own programs.

### ***DWR Provides Regulatory Oversight***

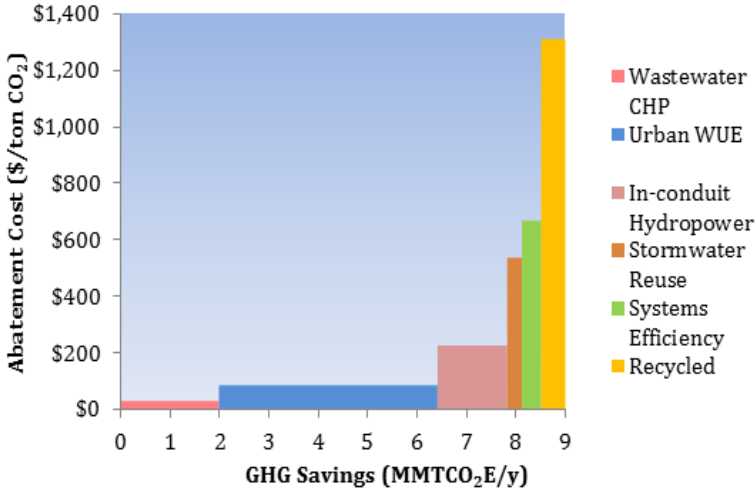
The IRWMP program is officially organized under the Department of Water Resources (DWR), which approves plans and disburses Proposition 84 IRWMP funds. For the sake of administrative consistency, DWR should also oversee implementation of this PGC. DWR's responsibilities will include providing guidance on appropriate programs, and auditing for compliance and performance. Because the PGC will be implemented at the IRWMP level rather than by individual utilities, oversight will not be unduly onerous. Administrative guidelines should also give DWR the authority to take over direct management of the PGC funds for any region that does not create a JPA, *or* in the event that a region's management of the funds does not meet DWR's performance criteria.

### ***Fee Calculations***

The AB 32 Scoping Plan specifies GHG reduction targets for each of the five water-energy measures (see appendix for methodology and references). The tables and figures that follow show that GHG reductions can be achieved for a lower cost using a different distribution of reductions than was specified in the Scoping Plan.

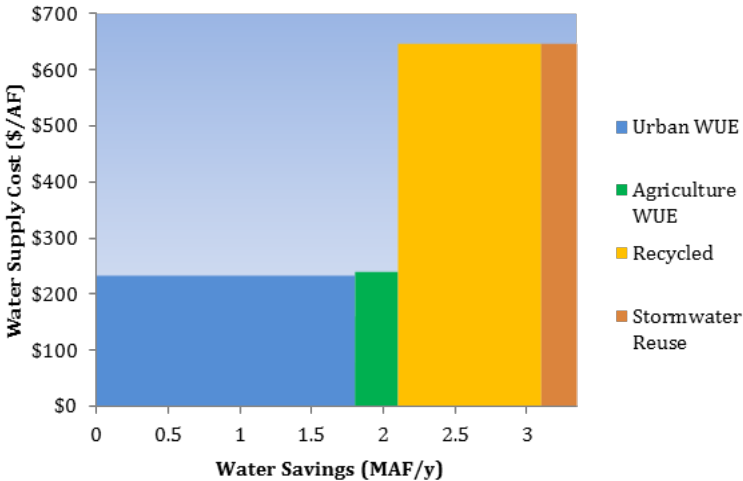
Up to 9 million metric tons of CO<sub>2</sub> can be avoided and 3.6 million acre-feet of water added by 2020. See Figures 2 and 3 and the appendix for documentation. Urban water use efficiency (WUE), especially on heated water, and renewable energy production from combined heat and power (CHP), or biogas, at wastewater facilities, are the most cost-effective means of reducing greenhouse gas emissions. Water recycling is relatively expensive per ton of CO<sub>2</sub>, but can be a cost-effective supply of water. For systems efficiency, using pump replacement as a proxy, the cost is nearly three times that of water conservation and 15 times greater than combined heat and power at wastewater treatment plants. The AB 32 Scoping Plan likely places too much emphasis on this measure. In terms of water supply, water use efficiency projects are the most cost-effective measure.

**Figure 2. 2020 GHG abatement cost curve**



- a. Agricultural water use efficiency is not included in this figure because data is inconclusive and preliminary estimates show greenhouse gas savings to be minimal.
- b. Urban water use efficiency corresponds to the 20x2020 target.

**Figure 3. 2020 water savings cost curve**



The following tables calculate only capital costs. The PGC should fund only a portion of the capital expenses, and ongoing operations and maintenance expenses should be borne by users. The estimates below are not a cost-benefit analysis, as regional conditions may make a more costly measure desirable because the benefits are large. For example, water recycling is a costly greenhouse gas mitigation strategy. However, if additional water supplies are needed for a coastal area, water recycling may prove cost-effective compared with desalination,

which is both costly and energy-intensive. Therefore, the figures are intended to provide an order of magnitude comparison between measures statewide, as opposed to guiding decision-making for individual projects. As a caveat, CARB, the developers of the Scoping Plan, should take care to avoid double-counting the carbon reductions of water-related measures such as wastewater CHP that could be included under other sections of AB 32. Table 1 shows the estimated cost of the original targets for each water measure in the AB 32 Scoping Plan. Left unchanged, an estimated \$850 million in capital costs are needed annually to meet these 2020 targets.

Table 2 shows the minimum cost to achieve the overall AB 32 water sector target of 4.8 MMTCO<sub>2</sub>E. By redistributing the targets to more cost-effective mitigation measures, the cost of achieving the overall AB 32 water sector target can be nearly 7 times less than previously estimated. This can be done by implementing only wastewater CHP and urban water use efficiency. It should be noted that the implementation of the 20x2020 plan (Senate Bill 7-7 [SBX7-7], which calls for a 20 percent reduction in urban water use by 2020)<sup>12</sup> can almost single-handedly meet the overall goals of AB 32. However, pursuing the minimum cost path ignores other strategic goals of the state, specifically the goal of developing a more reliable water supply.

**Table 1. Costs as proposed in AB 32 Scoping Plan**

AB 32 Measures	2020 GHG Targets (MMTCo <sub>2</sub> E)	GHG Unit Cost (\$2004/ton)	Annual Cost <sup>a</sup> (\$2004 M/y)	2020 Water Savings (MAF/y)
Water Use Efficiency <sup>b</sup>	1.4	\$85	\$150	0.5
Water Recycling	0.3	\$1300	\$170	0.6
Stormwater Reuse	0.2	\$540	\$50	0.2
System Efficiency	2	\$670	\$580	
Renewable (only CHP)	0.9	\$30	\$10	
<b>Total</b>	<b>4.8</b>		<b>\$850<sup>c</sup></b>	<b>1.3</b>

a. First the present value of the costs to meet the 2020 abatement and water savings targets for all years, beginning in 2010, was calculated. The present value was then converted to an annuity using an interest rate of 5 percent.

b. Only urban water use efficiency is considered for achieving GHG reductions, see appendix for detailed calculations and assumptions.

c. Rounding errors result in the total not being completely additive.

**Table 2. Minimum cost to meet AB 32 Scoping Plan targets**

AB 32 Measures	2020 GHG Targets (MMTCO <sub>2</sub> E)	GHG Unit Cost (\$2004/ton)	Annual Cost <sup>a</sup> (\$2004 M/y)	2020 Water Savings (MAF/y)
Water Use Efficiency <sup>b</sup>	2.8	\$85	\$100	1.1
Water Recycling	0	\$1300	\$0	
Stormwater Reuse	0	\$540	\$0	
System Efficiency	0	\$670	\$0	
Renewable (only CHP) <sup>c</sup>	2.0	\$30	\$30	
<b>Total</b>	<b>4.8</b>		<b>\$130</b>	<b>1.1</b>

a. First the present value of the costs to meet the 2020 abatement and water savings targets for all years, beginning in 2010, was calculated. The present value was then converted to an annuity using an interest rate of 5 percent.

b. Only urban water use efficiency.

c. The full penetration of wastewater was calculated first because it is the cheapest GHG mitigation measure and the rest of the target is fulfilled by urban WUE.

Our recommended distribution appears in Table 3, which shows higher GHG emissions reductions and increased 2020 water supply, at a lower total cost than Table 1. The cost estimate of \$680 million includes the full implementation of SBX7-7 and the new water recycling policy of the State Water Resources Control Board adopted in 2009. Systems Efficiency should be de-emphasized in favor of renewable energy production, in particular wastewater CHP. This is slightly in excess of the \$100 million-\$500 million estimate of the water PGC in the AB 32 Scoping Plan, but significantly less than our calculation of the true costs of the measures as shown in Table 1. If additional water goals are to be met, then the full amount of \$680 million per year must be raised through a combination of a PGC and local rates. Meeting only the emissions reductions goals of AB 32, however, could be achieved at lower cost (Table 2). We leave it to water and energy managers to determine which targets to use in setting the water PGC rate.

**Table 3. Costs of recommended targets**

AB 32 Measures	2020 GHG Targets (MMTCO <sub>2</sub> E)	GHG Unit Cost (\$2004/ton)	Annual Cost <sup>a</sup> (\$2004 M/y)	2020 Water Savings (MAF/y)
Water Use Efficiency <sup>b</sup>	4.4	\$85	\$180	1.8 <sup>c</sup>
Water Recycling	0.5	\$1300	\$280	1.0 <sup>d</sup>
Stormwater Reuse	0.6	\$540	\$140	0.5 <sup>d</sup>
System Efficiency	0.2	\$670	\$60	
Renewable (only CHP)	2.0	\$30	\$30	
<b>Total</b>	<b>4.8</b>		<b>\$680<sup>e</sup></b>	<b>1.1</b>

a. First the present value of the costs to meet the 2020 abatement and water savings targets for all years, beginning in 2010, was calculated. The present value was then converted to an annuity using an interest rate of 5 percent.

b. Only urban water use efficiency.

c. 1.8 MAF/y is the estimated reduction that will be needed to meet 20x2020 (CARB, 2008: p. C-132).

d. Targets set by SWRCB in newly adopted water recycling policy in 2009.

e. Rounding errors result in the total not being completely additive.

## Final Thoughts

A public goods charge on water could provide funds for infrastructure projects and for efforts to decrease greenhouse gas emissions generated by the water sector's energy use. California currently depends on general obligation bonds to fund water infrastructure projects which are an unstable and unsustainable practice considering California's bleak financial outlook is threatening its ability to borrow. A public goods charge would not rely on the political mood of the day with regards to financing infrastructure, would not tie up money that could be used for other state needs and would not add to the state's debt burden. A public goods charge could also serve as a funding vehicle to improve the implementation and accountability of integrated regional water management planning. Furthermore, paying for critical water infrastructure is a national challenge, as is reducing greenhouse gas emissions. This California-specific proposal can provide a model to other states on how to address similar problems.

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#### Author's Note

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#### Editor's Note

*Additional information regarding the source material utilized in this article is available through The Current's Online Journal, [www.thecurrent.cipa.cornell.edu](http://www.thecurrent.cipa.cornell.edu).*

### **Appendix: Cost Analysis on AB 32 Water-Energy Measures**

Assembly Bill 32 specifies five measures (water use efficiency, water recycling, water system energy efficiency, reuse urban runoff, and increased renewable energy production). A sixth measure, a public goods charge, would finance the other five. For each measure, estimates were made on the unit cost per acre-foot of water (if applicable) and per ton of CO<sub>2</sub> abated, the 2020 potential for new water supply (million acre-feet per year or MAF/y), and 2020 greenhouse gas reductions (million metric tons of CO<sub>2</sub> per year or MMTCO<sub>2</sub>E/y). With this information, the annual costs for meeting 2020 GHG or new water supply targets could be calculated. A key assumption was that GHG reductions or new water supply would increase linearly from 2010 to 2020. Additionally, discounting was set at 5 percent.

#### *Water Use Efficiency*

Estimates were made on both urban and agricultural water use efficiency (WUE) separately. WUE costs (\$/AF) relied on the California Water Plan. Next, the cost for abating a ton of CO<sub>2</sub> was calculated (\$/ton CO<sub>2</sub>). The

embedded energy needed for treating, heating, and transporting water was calculated by end use (indoor heated, indoor unheated, and outdoor) and by region (Northern and Southern California), which represents the energy avoided per unit of WUE (kWh/AF). This was multiplied by the average GHG intensity of California electricity (ton CO<sub>2</sub>/kWh) to get the avoided GHG emissions per unit of WUE (ton CO<sub>2</sub>/AF). The WUE costs (\$/AF) are divided by the avoided GHG emissions (ton CO<sub>2</sub>/AF) to get the abatement cost (\$/ton CO<sub>2</sub>). The potential for new water supply by 2020 from urban and agricultural WUE (MAF/y) were taken from the California Water Plan.

#### *Water Recycling and Reuse Urban Runoff*

Water recycling and urban runoff unit costs were calculated by a similar methodology as WUE. Water recycling costs (\$/AF) came from the California Water Plan. There was a lack of costing information on urban runoff reuse, but a first approximation was to assume it was the same as for water recycling. The embedded energy was calculated differently for Northern and Southern California (kWh/AF), and it was assumed that recycled/reused water would be mostly untreated and for non-potable use. The potential for recycled water by 2020 (MAF/y) was taken from the California Water Plan. Urban runoff potential was taken from a Natural Resources Defense Council report.

#### *Water System Energy Efficiency*

Systems efficiency was approximated by the installation of variable feed pumps, which reduce the amount of energy consumed for pumping. Costs are reported per kWh of energy saved (\$/kWh). The AB 32 Scoping Plan calls for a 20 percent reduction in energy consumption of water systems by 2020.

#### *Renewable Energy Production*

Two technologies were considered for renewable energy production in water: in-conduit hydropower and combined heat and power (CHP) at wastewater treatment plants. In-conduit hydropower refers to the use of small turbines to recover energy in water distribution. Unit costs (\$/kWh) and total generation potential (GWh/y) were estimated by the California Energy Commission. Wastewater CHP refers to the capture of methane gas generated from the treatment process. Food wastes and dairy manure can also be transported to the plant for digestion, which improves the efficiency of energy generation and removes another large source of methane emissions from dairy manure. Unit costs were estimated by the U.S. Environmental Protection Agency and California energy generation potential was estimated by the California Energy Commission. Avoided methane emissions were taken into account for food and dairy wastes.

## **Endnotes**

1Ronnie Cohen, Barry Nelson and Gary Wolff. "Energy Down the Drain: The Hidden Costs of California's Water Supply." National Resources Defense Council and Pacific Institute, August 2004.

2 Energy Information Administration, "End-use consumption of electricity 2001." Table 1: Percent of Electricity Consumption by End Use. <<http://www.eia.doe.gov/emeu/recs/recs2001/enduse2001/enduse2001.html>>

3 Cohen et al, 2004.

4 Gary Klein, "California's Water-Energy Relationship," California Energy Commission, November 2005. <<http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF>>

5 California Air Resources Board. AB 32 Scoping Plan Document: Climate Change Scoping Plan: A Framework for Change, December 2008. <<http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm>>

6 Shelley de Alth and Kim Rueben. Understanding Infrastructure Financing for California. Public Policy Institute of California, June 2005.7 Ballotpedia. 2010.

8 The California Air Resources Board, AB-32 Scoping Plan Document. 2008.

9 Black and Veatch. *2006 California Water Rate Structure*. May 2006.

10 United States Government Accountability Office. *Water Infrastructure: Information on Financing, Capital Planning, and Privatization*. Report to Congressional Requesters, August 2002. <<http://www.gao.gov/new.items/d02764.pdf>>

11 United States Government Accountability Office. *Water Infrastructure*. 2002. Pg. 4.

12 Steinberg Water Conservation Act. *California State Senate 2009*. 2009. SBX 7-7. <[http://info.sen.ca.gov/pub/09-10/bill/sen/sb\\_0001-0050/sbx7\\_7\\_bill\\_20091110\\_chaptered.pdf](http://info.sen.ca.gov/pub/09-10/bill/sen/sb_0001-0050/sbx7_7_bill_20091110_chaptered.pdf)>





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