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Ecological Economics and Sport Stadium Public Financing

Christopher M. McLeod

John T. Holden

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Abstract

Given the recent importance that sport organizations, academics, and the public have placed on environmental sustainability this Article introduces the study of ecological economics—founded upon Nicholas Georgescu-Roegen's application of thermodynamics to economics—to legal perspectives on public financing. The authors argue that the economic growth limits implied by thermodynamic principles should be incorporated in the public financing of sport stadiums. More specifically, municipalities can require facilities receiving public financing to produce environmental cost accounting reports and to make them publically available.

Introduction

In the Summer of 2000, John Siegfried and Andrew Zimbalist noted that, between 1990 and 1998, 49 professional sports stadiums and arenas were built in the United States.[1] Siegfried and Zimbalist argued that, despite the construction boom of the 1990s, there was virtually "no statistically significant positive correlation between sports facility construction and economic development."[2] Between 2004 and 2010, more than $1.5 billion in tax subsidies were given to sport stadium construction projects.[3] As skepticism over public stadium financing has become

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* Christopher M. McLeod is a Doctoral Fellow in the Center for Sport Health & Equitable Development at Florida State University.
** John T. Holden is a Visiting Scholar in the Sport Management Department at Florida State University.

[1] John Siegfried & Andrew Zimbalist, *The Economics of Sports Facilities and Their Communities*, 14 J. Econ. Persp. 95, 95 (2000).

[2] *Id.* at 103. For a sample of the prior research into stadium building and economic development, *see* Robert Baade & Richard Dye, *The Impact of Stadiums and Professional Sports on Metropolitan Area Development*, 21 Growth & Change 1 (1990); *see also* Robert Baade, *Professional Sports as Catalysts for Metropolitan Economic Development*, 18 J. Urb. Aff. 1 (1996); *see also* Dennis Coates & Brad Humphreys, *The Growth Effects of Sport Franchises, Stadia and Arenas*, 14 J. Pol'y Analysis & Mgmt. 601 (1999).

[3] This includes improvements and stadium construction. *See* Geoffrey Propheter, *Are Basketball Arenas Catalysts of Economic Development*?, 34 J. Urb. Aff. 441, 441 (2012).

more mainstream,[4] there has been an added emphasis placed by owners on intangible aspects of stadium construction as a means of selling the project to the public.[5] Oram noted that between 1900 and 2000, more than $20 billion has been spent on professional sports venues, with government subsidies totaling $14.7 billion.[6] Despite the seemingly endless body of literature touting stadium construction as lacking benefits for local economic growth, there has been no shortage of private accounting and consulting groups that have produced reports that can be made to appear favorable to those attempting to sell cities and states on new stadiums.[7]

Carbot noted that the "lucrative business and entertainment universe" of sport can no longer be supported by stadiums that facilitate observation of the game as essentially the sole novelty.[8] The stadium construction epidemic has been called an arms race that has gone through various architectural periods, and despite occasional calls for limitations on the ability of franchise owners to hold cities and states hostage with threats of relocation, little has been done to arrest the practice.[9] Carbot observed that the issuance of bonds is the most common means of public stadium financing, based on the assertion that stadiums

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[4] *See, e.g.*, Bonnie Kristian, *The Outrageous Rip-Off of Taxpayer-funded Stadiums*, THE WEEK (July 22, 2016), http://theweek.com/articles/629756/outrageous-ripoff-taxpayer funded-stadiums [https://perma.cc/BXD4-9GR9]; *see also* Joe Kimball, *Vikings Stadium Makes MarketWatch List of 'Worst Deals from Sports Teams*,' MINNESOTA POST (July 17, 2015), https://www.minnpost.com/political-agenda/2015/07/vikings-stadium-makes-mar ketwatch-list-worst-deals-sports-teams [https://perma.cc/V4AW-3W3Y].

[5] *See* Kristian, *supra* note 4; *see also* Douglas Hanks & David Smiley, *Beckham to Miami Mayor: Soccer Stadium Next to Marlins Park can be World-Class*, MIAMI HERALD (July 22, 2015, 12:46 PM), http://www.miamiherald.com/news/local/community/miami -dade/article28288822.html [https://perma.cc/TW7G-JL2N].

[6] Marc D. Oram, *The Stadium Financing and Franchise Relocation Act of 1999*, 2 VA. J. SPORTS & L. 184, 195 (2000).

[7] *See, e.g.*, *id.* at 197 (noting that the construction of a new proposed stadium for the San Diego Padres was projected by Deloitte & Touche to result in approximately $1.1 billion in spending in the direct vicinity of the stadium and also create 17,000 temporary jobs). *See also* Tim Elfrink, *Six Lies About the Marlins Stadium*, MIAMI NEW TIMES (May 5, 2011, 4:00 AM), http://www.miaminewtimes.com/news/six-lies-about-the-marlins-stadium-6380692 [https://perma.cc/9WGF-ZF4Z]; *see also* NEIL DEMAUSE & JOANNA CAGAN, FIELD OF SCHEMES: HOW THE GREAT STADIUM SWINDLE TURNS PUBLIC MONEY INTO PRIVATE PROFIT, 32–33 (U. Neb. Press 2008).

[8] *See* Christopher B. Carbot, *The Odd Couple: Stadium Naming Rights Mitigating the Public-Private Stadium Finance Debate*, 4 FIU L. REV. 515, 519 (2009).

[9] *See id.* at 522–23 (noting that in 1999 Congress debated a bill that would have expanded antitrust protection to the four major professional leagues in exchange for channeling a percentage of broadcast revenues to stadium construction). *See also Stadium Financing and Franchise Relocation Act of 1999,* S. 952, 106th Cong. (1999).

are more than a revenue generating venue for private entities, they serve a public purpose.[10] Carbot articulated that objections to stadium financing projects have typically been challenges related to the stadium as serving a public purpose, this opposition dates to at least the 1930s.[11]

It has been widely claimed that sports stadiums provide "no economic value to the local community," however we argue that not only do stadiums not provide the promised stimulus benefits, the environmental impact of the ever-shortening lifecycle of stadium construction is an additional economic consequence that should be considered by city councilors and voters alike.[12] Thus, in addition to imposing a financial cost, new stadium construction is likely even more detrimental to the public good when considering the energy, material use, and waste production that goes into demolishing, constructing, and operating ever more elaborate facilities with ever shortening life spans.[13]

The issue of environmental sustainability has recently become important across academic disciplines.[14] This trend is evidenced by the proliferation of environmental- and ecology-based journals—a trend that has been mirrored in the fields of law, finance, and economics.[15] Sport-related disciplines, however, have been slower on the uptake. According to Mallen, Stevens, and Adams, only 17 of the 4,639 articles published before 2009 in 21 sport-related peer-reviewed academic journals addressed

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[10] Carbot, *supra* note 8, at 526.

[11] *Id. See also* Meyer v. City of Cleveland, 171 N.E. 606, 607–08 (Ohio Ct. App. 1930); *see also* N.J. Sports & Exposition Authority v. McCrane, 292 A.2d 580 (N.J. 1971) (addressing the construction of a multisport facility at the Meadowlands); *see also* Kelly v. Marylanders for Sports Sanity, Inc., 530 A.2d 245 (Md. 1987) (addressing the construction of Camden Yards in Baltimore); *see also* Ginsberg v. City and County of Denver, 436 P.2d 685 (Colo. 1968) (addressing the sale of bonds for acquisition of a stadium for the Denver Broncos).

[12] *See* Marc Edelman, *Sports and the City: How to Curb Professional Sports Teams' Demands for Free Public Stadiums*, 6 RUTGERS J. L. & PUB. POL'Y 35, 50 (2008).

[13] For background on the environmental impact of sport stadiums, *see generally* Thomas J. Grant Jr., *Green Monsters: Examining the Environmental Impact of Sports Stadiums*, 25 VILL. ENVTL. L. J. 149 (2014).

[14] For an example of study in education, *see* Tarah S. A. Wright, *Definitions and Frameworks for Environmental Sustainability in Higher Education*, 3 INT'L J. SUSTAINABILITY IN HIGHER ED. 203 (2002); for an example of discussion in business ethics, *see* Rosa M. Dangelico & Devashish Pujari, *Mainstreaming Green Product Innovation: Why and How Companies Integrate Environmental Sustainability*, 95 J. BUS. ETHICS 471 (2010); for an example of the discussion of environmental sustainability from a field of engineering, *see* C. I. M. Martins, *New Developments in Recirculating Aquaculture Systems in Europe: A Perspective on Environmental Sustainability*, 43 AQUACULTURAL ENGINEERING 83 (2010).

[15] *See, e.g.*, ECOLOGICAL ECON.; ENVTL. RESOURCE ECON.; J. ENVTL. ECON. & MGMT.; J. ENVTL. ECON. & POL'Y; J. ENVTL. INVESTING; J. OF SUSTAINABLE FIN.

environmental sustainability.[16] This is surprising given the importance sport organizations are placing on issues of environmental sustainability. The International Olympic Committee incorporated protection of the natural environment into the Olympic Charter in 1996.[17] In North America, the National Resource Defense Council has been collaborating with major sports leagues since 2010, resulting in the National Hockey League's ("NHL") sustainability report,[18] the National Football League's ("NFL") Environmental Program,[19] the NBA's annual "Green Week,"[20] and the formation of the Green Sport Alliance in 2010.[21] This suggests key stakeholders in the sport industry are willing to incorporate environmental concerns into decision-making.

Building on the work of Georgescu-Roegen and Daly, ecological economists explore how economic systems exist within, and are subject to, ecological systems and natural laws.[22] In his seminal work, *The Entropy Law and the Economic Process*, Georgescu-Roegen demonstrated that the economy is a thermodynamic subsystem of the environment and, as a result, has certain biophysical limits that are not accounted for by

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[16] Cheryl Mallen et al., *A Content Analysis of Environmental Sustainability Research: In a Sport-Related Journal Sample*, 25 J. SPORT MGMT. 240 (2011).

[17] *Factsheet: The environment and sustainable development*, INT'L OLYMPIC COMM. (Jan. 2014), https://stillmed.olympic.org/media/Document%20Library/OlympicOrg/Factsheets-Reference-Documents/Environment/Factsheet-The-Environment-and-Sustainable-Development-January-2014.pdf [https://perma.cc/XP8K-VWT2].

[18] *2014 NHL Sustainability Report*, NAT'L HOCKEY LEAGUE (2014), http://www.nhl.com/green/report/ [https://perma.cc/PE69-J3YW].

[19] *See NFL Green*, NFL (June 16, 2011, 6:31 PM), http://www.nfl.com/news/story/09000d5d8205a0e7/printable/nfl-green [https://perma.cc/NE8Q-X8BK]; *see also* Jim Carlton, *Some NFL Teams Are Going Green*, WALL ST. J. (May 17, 2014, 4:45 PM), http://www.wsj.com/articles/SB10001424052702304677904579537882691550494 [https://perma.cc/A943-453P].

[20] *See 2015 NBA Green Week Tips Off,* GREEN SPORTS ALLIANCE (Mar. 23, 2015), http://greensportsalliance.org/2015-nba-green-week-tips-off-2/ [https://perma.cc/HN9X-472F]; *NBA's Second Shot at Green Week Aims for a SlamDunk*, GREENBIZ (Apr. 2, 2010, 5:35 PM), https://www.greenbiz.com/news/2010/04/02/nbas-second-shot-green-week-aims-slam-dunk [https://perma.cc/T8T6-QHAU].

[21] *See About—Green Sports Alliance*, GREEN SPORTS ALLIANCE (2016), http://greensportsalliance.org/about/ [https://perma.cc/MDE2-E4UR].

[22] *See* NICHOLAS GEORGESCU-ROEGEN, THE ENTROPY LAW AND THE ECONOMIC PROCESS (Harv. U. Press 1971) [hereinafter GEORGESCU-ROEGEN, THE ENTROPY LAW AND THE ECONOMIC PROCESS]; *see also* Nicholas Georgescu-Roegen, *The Entropy Law and the Economic Problem*, *in* TOWARD A STEADY-STATE ECONOMY (Herman E. Daly ed., W. H. Freeman & Co. 1973) [hereinafter Georgescu-Roegen, *The Entropy Law and the Economic Problem*]; TOWARDS A STEADY-STATE ECONOMY (Herman E. Daly ed., W. H. Freeman & Co. 1973) [hereinafter TOWARDS A STEADY-STATE ECONOMY]; HERMAN E. DALY, STEADY-STATE ECONOMICS (Island Press 2d ed. 1991) [hereinafter DALY, STEADY-STATE ECONOMICS].

neoclassical economic theory.[23] Georgescu-Roegen's observation has proliferated into a field of inquiry concerned with topics ranging from environmental valuation,[24] cost accounting methodologies,[25] and ecological-economic sustainability.[26]

Although there are other fields of study that attempt to integrate environmental issues and observations into economic thought (e.g., environmental economics),[27] ecological economics is the most relevant to stadium construction because it touts a "strong" rather than "weak" version of sustainability.[28] This means ecological economists are skeptical of technocratic or innovative solutions to ecological issues, they are skeptical of recycling programs and advances in efficiency, and are unmoved by green marketing, all of which saturate public and academic discourse on stadium construction.[29] Consequently, it is an excellent perspective to couple with the current literature on stadium financing; given the persistent finding that stadiums provide no economic benefit to the public,[30] it is important to show they also necessitate much detrimental material production. In this Article, we outline the theoretical and practical foundations of ecological economics and offer implications for sport stadium construction and financing.[31] We also develop one important step to incorporating ecological costs into stadium construction and financing: mandated and publically reported ecological accounting.

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[23] *See* GEORGESCU-ROEGEN, THE ENTROPY LAW AND THE ECONOMIC PROCESS, *supra* note 22.

[24] Robert Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 25 ECOLOGICAL ECON. 3 (1998); *see also* Giorgos Kallis et al., *To Value or Not to Value? That is Not the Question*, 94 ECOLOGICAL ECON. 97 (2013).

[25] *See* A. Valero, *Exergy Accounting: Capabilities and Drawbacks*, 31 ENERGY 164 (2006).

[26] TOWARDS A STEADY-STATE ECONOMY, *supra* note 22; *see also* Martin Fritz & Max Koch, *Potentials for Prosperity without Growth: Ecological Sustainability, Social Inclusion and the Quality of Life in 38 Countries*, 108 ECOLOGICAL ECON. 191 (2014); Frank C. Krysiak, *Entropy, Limits to Growth, and the Prospects for Weak Sustainability*, 58 ECOLOGICAL ECON. 182 (2006); Fritz Söllner, *A Reexamination of the Role of Thermodynamics for Environmental Economics*, 22 ECOLOGICAL ECON. 175 (1997).

[27] *See, e.g.*, Robert N. Stavins, *Environmental Economics*, *in* THE NEW PALGRAVE DICTIONARY OF ECONOMICS (L. Blume & S. Durlauf eds., Palgrave Macmillan 2008).

[28] *See* Krysiak, *supra* note 26.

[29] *See* Timothy B. Kellison & Yu K. Kim, *Marketing Pro-Environmental Venues in Professional Sport: Planting Seeds of Change Among Existing and Prospective Consumers*, 28 J. SPORT MGMT 34 (2014).

[30] *See id.*

[31] Similarly, Richard Posner has advocated that legal scholars expand their study beyond strict doctrinal research methodologies to incorporate methods from other social sciences. *See generally* Richard A. Posner, *Statutory Interpretation—In the Classroom and in the Courtroom*, 50 U. CHI. L. REV. 800 (1983); Richard A. Posner, *The Present Situation in Legal Scholarship*, 90 YALE L.J. 1113 (1980).

I. THERMODYNAMICS AND ECOLOGICAL ECONOMICS

Ecological economics was born out of Georgescu-Roegen's application of thermodynamic principles to economics.[32] To ensure clarity, we begin with a description of the laws of thermodynamics. We follow with an application to economics before moving onto sport and stadium applications.

Thermodynamics describes transformations of energy from work to heat or from heat to work; these being the two ways energy is transferred.[33] Work describes the transfer of energy in a uniform and directed force through an opposing object.[34] Heat differs from work in that it transfers energy through the random motion of atoms.[35] Think of the working material components of a Formula One race car engine: pistons *work* by pumping in a given direction to drive rotation. Alternatively, the *heat* in an engine is not in itself directed. It needs to be harnessed; it is always escaping into various components and outlets.

There are four laws of thermodynamics,[36] from the Zeroth Law through the Third. For our purposes, the important laws are the First and the Second.[37] The First Law of Thermodynamics demonstrates that energy cannot be created or destroyed (it is often expressed as the Conservation of Energy Law).[38] Consider any action of work upon an object: the energy that we expend does not disappear so much as it transforms into other forms of energy or dissipates into our surroundings.[39] In athletic contexts, the chemical energy that we derive from food is stored in muscles; there it is transformed into kinetic energy through our limbs, with which we kick balls. This kick transfers kinetic energy into the ball, which rises in the air—gaining gravitational potential energy—finally to fall to the earth in a parabola. No energy is lost in this sequence. However, of central importance to

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[32] Mark D. Glucina & Kozo Mayumi, *Connecting thermodynamics and economics: Well-lit roads and burned bridges*, 1185 ANN. N.Y. ACAD. SCI. 11, 11 (2010).
[33] *Id.* at 12.
[34] *Id.*
[35] *Id.*
[36] For a short digestible account of the four laws, *see* PETER ATKINS, FOUR LAWS OF THAT DRIVE THE UNIVERSE, Oxford U. Press (2007). Some of the most important individuals responsible for the laws include Ludwig Boltzmann (1844–1906), Sadi Carnot (1796–1832), Lord Kelvin (1824–1907), and Rudolph Clausius (1822–1888). The second law is expressed by the equivalence of the Kelvin and Clasius statements.
[37] The zeroth law denotes and describes temperature, the condition on which the other three laws sit. The third law states the difficulty in attaining absolute zero in temperature.
[38] ATKINS, *supra* note 36, at 23.
[39] Glucina & Mayumi, *supra* note 32, at 14.

this energy chain is that each of these conversions also releases a portion of energy as heat.[40]

The Second Law of Thermodynamics applies to this phenomenon—this lost heat energy. For practical purposes, the second law explains the heat tax that nature requires of all of our energy transformations.[41] One way to state the second law is this: work can be totally converted into heat, but the reverse is impossible. For example, ice cream melts when it falls on hot pavement because heat transfers from a hotter to a colder reservoir and work is required to do the opposite. We have devised measures to keep our ice creams cold, however, this requires work. Freezers do this work (through electrical mechanics) transferring heat from a colder (ice cream tub) to a hotter (kitchen) reservoir, but they rely on a spontaneous process occurring elsewhere, at a power plant for example.

This presents an asymmetry.[42] Work can be totally transformed into heat, however, heat cannot be totally captured to do work.[43] This is because heat acts through the random motion of atoms—it is not as useful. An amount of heat energy is always "lost" because it is too "dilute" to do work.[44] Thus, the Second Law expresses two general ideas: energy can be of differing quality, and work is irreversible. It explains why perpetual motion machines are impossible. And it explains that, because energy can only be used to do work once, it cannot be recycled.[45] This inefficiency will persist regardless of how advanced technology becomes: some energy will always be lost as heat, which is effectively unable to power another engine.[46]

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[40] *Id.*
[41] *Id.* at 13.
[42] *Id.* at 14.
[43] *Id.*
[44] *Id.*
[45] Glucina & Mayumi, *supra* note 32, at 14.
[46] The exceptions are engines that run using the pressure differences of hot and cold thermal reservoirs. A Stirling engine is one example, but the practical use of a Stirling engine is limited in the example of "waste heat." Stirling engines may be configured to utilize heat from solar or from the external combustion of nearly any material. They have been developed specifically for developing or rural communities using anything from gas to dung as the combustible. However, this is a far stretch from utilizing heat lost from the efficiency limits of another engine. *See* Bancha Kongtragool and Somchai Wongwises, *A Review of Solar-Powered Striling Engines and Low Temperature Differential Stirling Engines*, 7 RENEWABLE AND SUSTAINABLE ENERGY REV. 2 (2003), and for a practical example and description, *see* Christopher Helman, *Segway Inventor Dean Kamen Thinks His New Sterling Engine Will Get You Off the Grid for Under $10K*, FORBES (July 2, 2014), http://forbes.com/sites/christopherhelman/2014/07/02/dean-kamen-thinks-his-new-stirling-engine-could-power-the-world/#73fcb8a0589d [https://perma.cc/EA36-WFNF].

The initial implication for thinking about the economy is this: no amount of capital-inspired innovation can overcome this fundamental asymmetry. This begs the question: do orthodox economics conform to the thermodynamic laws?

First, it is important to understand what exactly an economy is. In thermodynamics, an environment (or the "universe") is always divided into the system and its surroundings.[47] From this starting point Glucina and Mayumi identify four distinct types of thermodynamic systems.[48] In an *open* system, matter, heat, and work may move across the system boundary.[49] In an isolated system, neither energy nor matter may cross the system boundary into the surroundings or from the surroundings into the system (e.g., a thermos with the lid screwed closed).[50] In a closed system, energy can move across the boundary but matter cannot (e.g., a cooking pot with a lid).[51] In an open system, matter, heat, and work may move across the boundary (e.g., a salad bowl).[52] Based on this taxonomy of systems, the economy is an open system, with the earth and its atmosphere acting as the system's surroundings.[53] The world and its atmosphere is a closed, diathermic system, meaning heat can move into an out of the system via solar radiation and dissipation into space; however, for all practical purposes, matter cannot.[54] Importantly, the economy is embedded in the world system and its material limitations. Each of these classifications is important; we will return to them shortly.

Thermodynamics also introduces two different measurements of energy through which we can understand the functioning of these systems. The first, as defined by the First Law of Conservation, is the quantity of energy in a system.[55] Although by law, the quantity of energy in the universe must remain constant, the quantity of energy in a system may change depending on whether it is open, closed, or isolated. The second important characteristic of energy is its "entropy." Entropy, as introduced by the second law, describes the quality of energy in a system: "the potential to transfer the energy across the system boundary as work," low-quality energy has "high entropy," and high-quality energy has "low

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[47] Glucina & Mayumi, *supra* note 32, at 14.
[48] *Id.*
[49] *Id.*
[50] *Id.*
[51] *Id.*
[52] *Id.*
[53] Glucina & Mayumi, *supra* note 32, at 24.
[54] *Id.* at 14, 23.
[55] *Id.* at 14.

entropy."[56] Given the second law, the entropy of the universe tends toward maximum. Thus, any transfer of energy tends toward a higher absolute entropy, or lower quality of energy.

This makes intuitive sense, considering the race car example used above. In the transfer of energy into different forms of work some useful energy is lost in the low-quality form of heat. This presents no problem for an internal combustion engine because, being an open system, it can release heat. The pit crew can also introduce new low entropy matter from outside the system in the form of petroleum. The high entropy waste material (e.g., used oil, carbon monoxide) can be extracted or released from the system. However, considering the combustion engine system exists within a larger, closed, world system, those wastes and entropy changes are never lost, they are simply accumulated in surrounding waste sinks (for example, toxins of game-going cars released into the atmosphere or, in the case of stadium refuse, in garbage dumps).

Ecological economics is consequently based on the premise that every economic activity has an associated throughput of matter and energy.[57] In the language of thermodynamics, every exchange process requires an increase in entropy and a decrease in overall usefulness.[58] As Georgescu-Roegen originally phrased it, "from the viewpoint of thermodynamics, matter-energy enters the economic process in a state of *low entropy* and comes out of it in a state of *high entropy*."[59] Such a perspective on the economy is paradigmatically opposed to the growth models of neoclassical economics.[60] In particular, thermodynamics shows that mainstream economics is based on the false assumption that the economy is an isolated system; or in other words, that no matter or energy ever enters or leaves its orbit (see Figure 1). Based on thermodynamic laws, this is preposterous. Such an economy would need to be a perpetual motion machine, which is impossible. Moreover, if the economy was an isolated system, humans would subsist in a medium consisting off their own waste products, which is also impossible.

Instead, ecological economists show that, in addition to circulating values, an economic system also provides a linear throughput of matter and energy (see Figure 2). Such a throughput has two ends: depletion of environmental sources and pollution. From an ecological perspective, matter

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[56] *Id.* at 14–15.

[57] *See generally* Tomas Kaberger & Bengt Mansson, *Entropy and Economic Processes—Physics Perspectives*, 36 ECOLOGICAL ECON. 165 (2001).

[58] *See id.* at 166.

[59] *See* Georgescu-Roegen, *The Entropy Law and the Economic Problem*, *supra* note 22, at 39.

[60] George F. McMahon & Janusz R. Mrozek, *Economics, entropy and sustainability,* 42 HYDROLOGICAL SCIENCES-JOURNAL—DES SCIENCES HYDROLOGIQUES 501, 504 (1997).

and energy progress linearly from a low entropy state toward high entropy at which point, devoid of use, it will be released from the economic cycle and deposited in waste sinks such as the atmosphere, the ocean, or a dump. In other words, economic processes are irreversible transformations that take place in a system with limited resources for transforming.[61]

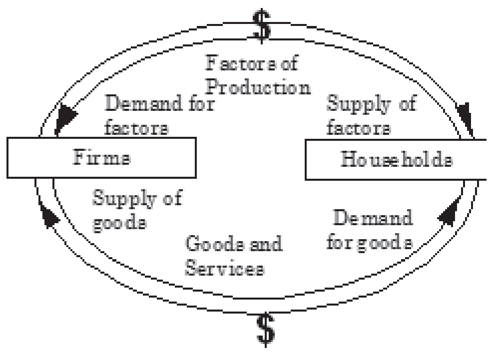

Figure 1: The circular flow of the economy according to orthodox economics (adapted from Daly and Farley, 2004, p.24)

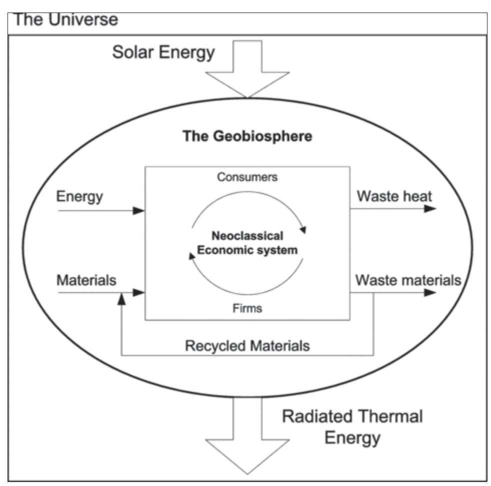

Figure 2: The ecological economic model of the economy depicting the economy as an open system with a material throughput within the closed system of earth (Glucina & Mayumi, 2010, Based on Hall et al.)

[61] *See* Krysiak, *supra* note 26.

As Daly and Georgescu-Roegen demonstrate, these insights fundamentally undermine many neoclassical growth models such as the Cobb-Douglas function and its variants (including that provided by Solow-Stiglitz).[62] Simply, capital and labor cannot be used in place of matter in the production process. Labor and capital are the means by which we transform matter, not create it.[63] Therefore, growth in production will always require a flow of natural resources that cannot be infinitely decreased by increases in capital investment. To quote Georgescu-Roegen at length:

> [A]ny material process consist in the transformation of some materials into others (the flow elements) by some agents (fund elements), and second, that natural resources are the very sap of the economic process. They are not just like any other production factor. A change in capital or labor can only diminish the amount of waste in the production of stuff out of which it is made. In some cases it may also be that the same service can be provided by a design that requires less matter or energy. But even in this direction there exists a limit, unless we believe that the ultimate fate of the economic process is an earthly Garden of Eden.[64]

Therefore, economic systems cannot exceed the carrying capacity of the ecosystem in which they operate. This is clearly demonstrated by Glucina &

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[62] *See* Herman E. Daly, *How Long Can Neoclassical Economics Ignore the Contributions of Georgescu-Roegen?*, BIOECONOMICS AND SUSTAINABILITY: ESSAYS IN HONOR OF NICHOLAS GEORGESCU-ROEGEN (Kozo Mayumi & John M. Gowdy eds., Edward Elgar 1999) [hereinafter Daly, *How Long Can Neoclassical Economics Ignore the Contributions of Georgescu-Roegen?*]; *see also* Nicholas Georgescu-Roegen, *Comments on the Papers by Daly and Stiglitz*, *in* 8 SCARCITY AND GROWTH RECONSIDERED (V. K. Smith ed., Routledge 2013) [hereinafter Georgescu-Roegen, *Comments on the Papers by Daly and Stiglitz*]; Georgescu-Roegen, *The Entropy Law and the Economic Problem, supra* note 22; GEORGESCU-ROEGEN, THE ENTROPY LAW AND THE ECONOMIC PROCESS, *supra* note 22. The Cobb-Douglas function as detailed by Solow-Stiglitz: Q=Ka Lb Rc, where Q is output rate, K is capital, L is labor, R is natural resources, and a, b, c are fixed parameters. *See* Joseph Stiglitz, *Growth with Exhaustible Natural Resources: Efficient and Optimal Growth Paths*, 41 REV. ECON. STUD. 123 (1974).

[63] *See* Daly, *How Long Can Neoclassical Economics Ignore the Contributions of Georgescu-Roegen?, supra* note 62; *see generally* GEORGESCU-ROEGEN, THE ENTROPY LAW AND THE ECONOMIC PROCESS, *supra* note 22.

[64] *See* Georgescu-Roegen, *Comments on the Papers by Daly and Stiglitz, supra* note 62, at 98.

Mayumi as a function of the following thermodynamic truths: 1) matter-energy cannot be created, i.e., our stocks are limited; 2) matter-energy cannot be destroyed, i.e., we are stuck with the wastes we create; 3) each unit of energy can only be used once; and 4) technology has limits, it can only ever approach maximum efficiency of energy conversion to work.[65]

The key debate revolves around whether economic growth is *practically* restrained. Although some authors point to the vast potential of solar stocks of energy, it is fair to conclude that, in a growing economy, the energy requirement *is* practically constrained.[66] Indeed, this is undoubtedly the case if growth is a function of the production and consumption of physical commodities or facilities.[67] Even in service industries like sports, Daly points out that an assessment of economic activity requires an inclusion of all of the indirect aspects of service activities including, not just hotdogs and beer, but their transport, the travel of the concession workers, the fabrication of the tools by which the hotdog is heated and the beer is poured, the replacement of these tools, and the chains by which each of these primary, secondary, and tertiary commodities are procured (this is perhaps the foundational logic of ecological economics).[68] Food associated services, for instance, use nearly as much energy as is used in farming and processing of food itself.[69] One further aspect to consider in assessing limits to growth is waste. Although the capacity of the earth system to assimilate waste is not predictable by thermodynamics, there is a body of literature arguing that this capacity is the primary constraint on growth.[70] Research on global warming, for instance, shows that carbon sinks, such as oceans and forests, are unable to keep up with current rates of carbon dioxide emissions.[71]

If we take the position that there are practical limits to growth, then it becomes apparent that such limits need to be dealt with. There are two general ways to incorporate the implications of entropy in the

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[65] *See* Glucina & Mayumi, *supra* note 32.
[66] *See id.*; *see also* Kaberger & Mansson, *supra* note 57.
[67] *See* Krysiak, *supra* note 26.
[68] *See* DALY, STEADY-STATE ECONOMICS, *supra* note 22.
[69] Eric Hirst, *Food-Related Energy Requirements*, 184 SCI. 134 (1974).
[70] See Martin O'Connor, *Entropy, liberty and catastrophe: The physics and metaphysics of waste disposal*, *in* ECONOMICS AND THERMODYNAMICS: NEW PERSPECTIVES ON ECONOMIC ANALYSIS (Peter Burley & John Foster eds., Kluwer Academic Publishers 1994); *see also* IS CAPITALISM SUSTAINABLE? POLITICAL ECONOMY AND THE POLITICS OF ECOLOGY (Martin O'Connor ed., The Guilford Press 1994).
[71] *See* Rob Dietz & Dan O'Neill, Enough is Enough: Building a Sustainable Economy in a World of Finite Resources (2013).

assessment of economic activity. The first is called "environmental economics" and the second is "ecological economics."[72] Environmental economists are concerned with internalizing externalities and promoting human capital growth as a means to combat natural resource depletion.[73] That is, environmental economists promote market solutions for environmental problems.[74] This is a model of weak sustainability, which Krysiak argues "is either based on a physically inconsistent model or [is] ethically unattractive, in the sense that it guarantees future generations the possibility to meet their needs only under rather optimistic assumptions on future technologies or preferences."[75]

On the other hand, ecological economists such as Daly argue for a steady-state economy, defined as:

> An economy with constant stocks of people and artifacts, maintained at some desired, sufficient levels of low rates of maintenance "throughput", that is, by the lowest feasible flows of matter and energy from the first stage of production (depletion of low-entropy materials from the environment) to the last stage of consumption (pollution of the environment with high-entropy wastes and exotic materials).[76]

While Daly's steady-state economy holds capital stocks, consumer goods, and human populations fairly constant, it also allows for changes of culture, genetic inheritance, social relationships, knowledge, ethical codes, and, sport and leisure practices. Similarly, although quantitative *growth* is restricted, qualitative *developmen*t is promoted and celebrated.[77] Sport may contribute to a steady-state economy in terms of qualitative development,

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[72] *See* Stavins, *supra* note 27; Daly, *How Long Can Neoclassical Economics Ignore the Contributions of Georgescu-Roegen?*, *supra* note 62.
[73] *See* Stavins, *supra* note 27.
[74] Consider the following particularly market-orientated vision from an environmental economics textbook: "prices ration resources to those that value them the most and, in doing so, individuals are swept along by Adam Smith's invisible hand to achieve what is best for society as a collective. Optimal private decisions based on mutually advantageous exchange lead to optimal social outcomes." *See* NICK HANLEY, JASON F. SHOGREN & BEN WHITE, ENVIRONMENTAL ECONOMICS IN THEORY AND PRACTICE, Oxford U. Press (1997). *See also* Robert L. Nadeau, *The Unfinished Journey of Ecological Economics*, 109 ECOLOGICAL ECON. 101 (2015); *see also* Magnus Söderberg, *Willingness to Pay for Nontraditional Attributes Among Participants of a Long-Distance Running Race*, 15 J. SPORTS ECON. 285 (2014).
[75] *See* Krysiak, *supra* note 26, at 190.
[76] *See* HERMAN E. DALY, STEADY-STATE ECONOMICS: WITH NEW ESSAYS, Island Press (1991).
[77] *Id.*

but only if it can be delimited from unnecessary material growth—stadium construction included.

To summarize, Georgescu-Roegen applied thermodynamic laws to economics and showed economic processes are entropic in the sense that they result in a decrease in the overall quality of energy in the universe.[78] Consequently, if the economy is an open system within a closed system of the biosphere, then economic processes take resources from low-entropy stocks and transform and expel them into high-entropy waste sinks.[79] This reality of throughput, which is a type of irreversible transformation that underlies all productivity, is the central premise of ecological economics; and with it in mind we discuss the implications for sport stadium construction.

II. STADIUM THROUGHPUTS

Welfare economists who study stadium and facility financing have been predominantly critical of the use of public money. There are, however, some caveats. We will briefly compare this work with ecological economics to demonstrate how each approach has different implications for understanding stadium construction.

If a stadium does not produce a large enough positive externality or economic impact to justify a subsidy, public financing may still be feasible if the stadium produces a public good.[80] That is, a stadium may have value for people in a way that is not directly observable in revealed market prices. Scholars start from this assumption to justify using the Contingent Valuation Method ("CVM") as a way to measure the market value of non-market or intangible goods like sport teams.[81] The method assigns value to how much an individual is willing to pay to attract or keep a sport entity. Studies consistently demonstrate that the value of public goods generated by sports teams, professional and collegiate, fall below that needed to justify public subsidies used to finance stadiums.[82]

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[78] *See* GEORGESCU-ROEGEN, THE ENTROPY LAW AND THE ECONOMIC PROCESS, *supra* note 22.
[79] *Id.*
[80] For conditions under which a stadium subsidy is justified, *see* Thomas Chema, *When Professional Sports Justify the Subsidy*, 18 J. OF URB. AFFAIRS 20 (1996).
[81] *See* Bruce K. Johnson, Peter A. Groothuis & John C. Whitehead, *The Value of Public Goods Generated by a Major League Sports Team the CVM Approach*, 2 J. SPORTS ECON. 6 (2001); *see also* Bruce K. Johnson, Michael J. Mondello & John C. Whitehead, *The Value of Public Goods Generated by a National Football League Team*, 21 J. SPORT MANG. 123 (2007); *see also* Bruce K Johnson & John C. Whitehead, *Value of Public Goods from Sports Stadiums: The CVM Approach*, 18 CONT. ECON. POL'Y 48 (2000).
[82] *See* Johnson, Groothuis & Whitehead, *supra* note 81; *see also* Johnson, Mondello & Whitehead, *supra* note 81; *see also* Johnson & Whitehead, *supra* note 81.

Although the CVM fails to justify public subsidies for spectator sport facilities, the inherent assumption is that a defensible funding project is possible.[83] If a true economic impact coupled with public valuation met or exceeded the rate of the subsidy, then a stadium could be validly publically financed. The fact that they are not is because subsidies are negotiated by local governments rather than on the market. This is an inefficiency, it means stadiums are built too big, too often, too new, in the wrong place, and, most importantly, are paid for by the wrong people; but stadium financing and construction is not, a priori, wrong. It is only wrong when compared to the revealed price of the market, or in the case of the CVM, the next best way of revealing a price for something without one.

Like Welfare economists, ecological economists do not condemn stadium construction outright. They only do so when the construction increases overall throughputs of matter and energy. The difference is ecological economists argue that markets cannot place appropriate values on intergenerational effects such as scarce resources and waste.[84] While the market may be able to maximize utility for buyers that are competing today, it disadvantages those that cannot yet act on it.[85] Market-sport will overuse resources and overproduce waste in order to satisfy the utility and price needs of current consumers, at the expense of future sport consumers. Therefore, in a similar manner to which we might argue that intergenerational effects should be calculated into the public costs of sport stadia (consider for example the inherited costs of the Miami Marlins

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[83] *See* Johnson, *supra* note 81.

[84] This shortcoming of classical economic thought has been demonstrated, and in turn ignored, for a very long time. Otto Neurath (1838–1921) for example, was particularly vocal about these limits. *See* Joan Martinez-Alier, *Ecological Economics and Ecosocialism*, *in* M. O'Connor (ed.), IS CAPITALISM SUSTAINABLE? POLITICAL ECONOMY AND THE POLITICS OF ECOLOGY, Guilford Press (1994); *see also* JOAN MARTINEZ-ALIER & KLAUS SCHLUPMANN, ECOLOGICAL ECONOMICS: ENERGY, ENVIRONMENT AND SOCIETY, Oxford U. Press (1987).

[85] Moreover, it is important to note that the Contingent Valuation Methodology is derived from environmental economics and the notion that nature can be valued and, therefore, internalized within economic decision-making. Ecological economists are skeptical of valuing nature, the environment, or the world as it more often leads to newly valued services and capital being purchased and consumed. On the topic of valuing nature *see* Giogos Kallis et al., *To value or not to value? That is not the question*, 94 ECOLOGICAL ECONOMICS 97 (2013); *see also* Joan Martinez-Alier, Giuseepe Munda, & John O'Neill, *Weak comparability of values as a foundation for ecological economics*, 26 ECOLOGICAL ECONOMICS 277 (1998). For an opposing view see the incredible effort to value the world's ecosystem, *see* Robert Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 387 NATURE 253 (1997).

stadium for future taxpayers), we should also consider the inherited costs of depleted resources and created waste produced by sporting events.[86]

Second, ecological economists demonstrate we will inevitably need to change the privileged model of unfettered economic growth in sport, particularly if growth necessitates the production and consumption of material goods such as stadia. Either our society will run headlong into ecological limits, or policymakers will act to preempt ecological limits and impose regulations on the economy. In both of these scenarios—environmentally imposed and policy-imposed economic limits—those sports organizations and events that are unsustainable, will perish. In this case, the economic impact of a team or their stadium is unintelligible without evaluating the throughput used in construction, demolition, and operations, on which economic impact is built.

Ecological economists only condemn stadium construction when it increases overall throughputs of matter and energy. We expect that this is the case in nearly every instance of stadium construction, and it is certainly the case today, when owners make stadiums obsolete well before their technology becomes outdated, their facilities become worn, or their debt has even been paid. Thus, the first implication of ecological economics is that subsidized stadiums have a public cost in addition to tax burdens and forgone opportunities: an ecological cost. However, in the same way as publically financed stadiums are, under certain strict conditions, feasible in welfare economics, it is possible that, using ecological economics, a new stadium could replace an old one and maintain or even decrease overall throughput.[87] The problem is a lack of information, or a lack of good information, about how to evaluate relative stadia throughputs.

III. ENVIRONMENTAL ACCOUNTING, ECOLOGICAL ACCOUNTING, AND CONTRACTS

We recommend municipalities include stipulations in financing contracts for stadiums and other sport facilities that require the conducting

[86] For a brief discussion on the length of time stadium financing debts can burden tax payers *see* Neil deMause, *Kingdome Debt Finally Due to be Paid Off This Year, 15 Years After the Kingdome Ceased to Exist*, FIELD OF SCHEMES (Mar. 31, 2015), http://www.fieldofschemes.com/2015/03/31/8712/kingdome-debt-finally-due-to-be-paid-off-this-year-15-years-after-kingdome-ceased-to-exist/ [https://perma.cc/4PFZ-QH82].

[87] *See* Christopher McLeod & John T. Holden, *Steady-State Stadiums: Using the Date of Ecological Maturity to Conceptualize and Govern Sport Facility Construction*, *in* ROUTLEDGE HANDBOOK ON SPORT, SUSTAINABILITY, AND THE ENVIRONMENT (Brian P. McCullogh & Timothy B. Kellison eds., 2017).

of environmental or ecological accounting and the release of these reports to the public. Environmental accounting is the identification, measurement, and analysis of material streams using accounting systems to provide total and/or estimated environmental impact for an activity or event.[88] Ecological accounting differs from environmental accounting, conceptually, in that replaces the idea of "impact" with that of "interdependence"; which is to say business activities do not just impact entities and environments, but are also dependent on, and thus practically limited by, them.[89] Managers who measure material flows often also measure money flows to estimate environmental impacts alongside associated financial effects.[90] Here we focus on the measurement of material flows, assuming municipalities and sports organizations already practice financial accounting and management.

Techniques for environmental or ecological accounting include quantitative methods of life cycle analysis, total cost assessment accounting systems,[91] ecological evaluation frameworks,[92] and ecological footprint analyses.[93] Methods developed in sport or associated industries include the carbon footprint methodology created for the London Olympics,[94] and Cloverleaf, an ecological accounting tool developed for the tourism sector.[95] In the sport context, studies have assessed efforts to reduce the carbon footprint of team travel and spectators,[96] and assessed the environmental consequences of major sporting events[97] and mega events.[98]

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[88] *See* Patrick De Beer & Francois Friend, *Environmental Accounting: A Management Tool for Enhancing Corporate Environmental and Economic Performance*, 58 ECOLOGICAL ECON. 548 (2006).
[89] Frank Birkin, *Ecological Accounting: New Tools for a Sustainable Culture*, 10 INT'L J. OF SUSTAINABLE DEV. & WORLD ECOLOGY 49 (2003).
[90] *See* De Beer & Friend, *supra* note 88.
[91] *Id.*
[92] *See* Xi Ji, *Ecological Accounting and Evaluation of Urban Economy: Taking Beijing City as the Case*, 16 NUMERICAL SIMULATION 1950 (2011).
[93] Mathis Wackernagel et al., *National Natural Capital Accounting with the Ecological Footprint Concept*, 29 ECOLOGICAL ECON. 375 (1999).
[94] *See* JOHN KARAMICHAS, THE OLYMPIC GAMES AND THE ENVIRONMENT, 174–75 (Palgrave MacMillan, 2013).
[95] *See* Birkin, *supra* note 89, at 52.
[96] *See, e.g.*, Matt Dolf & Paul Teehan, *Reducing the Carbon Footprint of Spectator and Team Travel at the University of British Colombia's Varsity Sports Events*, 18 SPORT MGMT. REV. 244 (2015).
[97] *See, e.g.*, Andrea Collins et al., *Assessing the Environmental Consequences of Major Sporting Events: The 2003/04 FA Cup Final*, 44 URB. STUD. 457 (2007).
[98] *See* Andrea Collins, Calvin Jones & Max Munday, *Assessing the Environmental Impacts of Mega Sporting Events: Two Options?*, 30 TOURISM MGMT. 828 (2009).

Publically available accounting information of this type will benefit municipalities, taxpayers, and the sport industry in three ways. First, the information can be used to inform policy. As noted above, the lack of quality information means we are unable to calculate under what circumstances a new stadium or facility would be ecologically feasible. Stipulated accounting procedures would enable stakeholders to evaluate stadium proposals on a case-by-case basis, and would also add to our stocks of information so as to make informed policy decisions in the future.

Second, ecological and environmental reporting information can internalize ecological costs within market and non-market valuations of stadia. Ex ante and ex post reports are both capable of achieving this objective. For instance, an ex ante report could be a requirement for a bidding process, as is currently practiced by the IOC.[99] Citizens and decision-makers can use this report to include environmental externalities into their public valuations and decision-making. In the same way as Johnson, Whitehead, Mason, and Walker found Alberta, Canada residents favored tax financing over lottery funding for amateur sport facilities, environmental impact information may alter residents' willingness to pay.[100] The problem with ex ante reporting is the same as economic impact analyses; they invariably underestimate the costs and overestimate the benefits.

Municipalities could also require annual, ex post evaluations of demolition, construction, and operation throughputs. The NHL has released similar reports in partnership with the Green Sport Alliance.[101] Such a report encourages firms to account for external environmental costs as internal costs. For instance, a firm whose environmental degradation is public knowledge will suffer financial costs, even though they are not legally liable, because information of their activities affects their image or relationships with stakeholders. The problem with ex post reporting is unique to ecological economics: because thermodynamic processes are irreversible, stadiums cannot be unbuilt.[102] Therefore, ex post reporting will not necessarily regulate throughputs and will do so

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[99] For history of environmental policy in the Olympics, *see* Hart Cantelon, *The making of the IOC environmental policy as the third dimension of the Olympic movement*, 35 INT'L REV. FOR THE SOC. OF SPORT (2000). For current requirements for host cities, *see* JOHN KARAMICHAS, THE OLYMPIC GAMES AND THE ENVIRONMENT (Palgrave Macmillan, 2013).
[100] *See* Bruce K. Johnson et al., *Willingness to Pay for Amateur Sport and Recreation Programs*, 25 CONTEMP. ECON. POL'Y 553 (2007).
[101] *See 2014 NHL Sustainability Report*, *supra* note 18, at 16.
[102] *See* Keith T. Maunders & Roger L. Burritt, *Accounting and Ecological Crisis*, 4 ACCT., AUDITING & ACCOUNTABILITY J. 9, 10 (1991).

only in the case that it operates as an incentive for organizations, or in the case that it provides stakeholders with information to make accurate decisions in the future.

Neither ex ante nor ex post reporting is useful unless ecological throughputs are measured accurately and in detail.[103] It is important to note that environmental reporting is often used in the context of Corporate Social Responsibility. Here, the objective is to create favorable reputations and stakeholder perceptions rather than substantial ecological change. In the worst case scenario, sport organizations may promote new stadium designs and "green" technologies as a way to speed up the obsolescence and consequent funding and construction of new facilities. However, municipalities using financing contracts have an advantage; they can require best practices be used in reporting. Here is one example showing how an ecological economics approach leads to strongly sustainable evaluations of sport business.

The environmental sustainability rhetoric was heavy and misleading in the planning and promotion of Super Bowl XLIX in Arizona.[104] A survey of the environmental efforts reveals the NFL planted trees, purchased energy credits to fund renewable energy development, recycled, composted, and donated wasted food to a non-profit food delivery agency.[105] From an ecological economics perspective, none of these measures will decrease the material throughput of the event because none of them are designed to decrease the use of resources. All that recycling does, for example, is delay some throughput from becoming waste by placing it through another economic cycle. This could theoretically decrease throughput in another sector of the economy, but the results are far from assured. Moreover, collecting, transporting, sorting, recycling, and redistributing recycled wastes makes additional throughputs. Similarly, carbon or energy offsetting has little guaranteed benefit and can easily result in increased throughputs in other locales.[106] According to ecological

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[103] *See* Stefan Schaltegger, *Information Costs, Quality of Information and Stakeholder Involvement—the Necessity of International Standards*, 4 ECO-MGMT. & AUDITING 87 (1997).

[104] Some of the rhetoric is also dangerous. Jack Groh, director of the NFL Environmental Program said "[i]t's not so much about how much of the problem do you create; it's about how much of the problem are you willing to take responsibility for." *See* Caitlin McGlade, *Arizona's Super Bowl Includes Environmental Efforts*, AZ CENTRAL (June 9, 2014), http://www.azcentral.com/story/news/local/glendale/2014/06/09/super-bowl-greening-sustainability/10217795/ [https://perma.cc/3D6A-AK9E]. It is unclear exactly what he means here, likely on purpose, but we can be sure that it is entirely erroneous from an ecological perspective.

[105] *Id.*

[106] *See* Brian Wilson, *Growth and Nature: Reflections on Sport, Carbon Neutrality, and*

economics, these efforts are weakly sustainable. In the case of "green" Super Bowls, as with stadium construction, best practices in ecological and environmental accounting are essential for distinguishing ecological best practices from green rhetoric. This is the third benefit of stipulating ecological and environmental accounting in financing contracts.

IV. PUBLIC FINANCING CONTRACTS

The skyrocketing values of franchises within the major American sports leagues has in part been attributed to owner friendly stadium leases that municipalities have gifted to keep teams from finding a more attractive offer in another city.[107] Safir noted that the monopoly status of the NFL and Major League Baseball—achieved by controlling the number of teams and restricting which geographic regions teams will play in—gives the leagues the power to dictate terms to cities.[108] In addition, Safir noted that each league has unique rules for how teams distribute revenue generated by stadium gate receipts.[109] These rules can be credited as being at least partially responsible for the seemingly shortened life span of professional sport stadiums; for instance, the NFL revenue-sharing agreement exempts revenue derived from 'club seat,' luxury sky box, and Personal Seat Licenses.[110] The structure of the NFL revenue sharing model has created an incentive for owners to construct new stadiums with more exempt seating.[111]

Ecological Modernization, *in* DAVID ANDREWS & MICHAEL SILK, SPORT & NEO-LIBERALISM: POLITICS, CONSUMPTION, AND CULTURE 90–108 (Temple U. Press 2012).

[107] Adam Safir, *If You Build It, They Will Come: The Politics of Financing Sports Stadium Construction*, 13 J. L. & POL. 937, 938 (1997).

[108] *Id.* This is also arguably the case for the National Basketball Association and the National Hockey League as well. While there have been a multitude of antitrust cases dealing with franchise relocation, *see, e.g.*, Los Angeles Memorial Coliseum Comm'n v. Nat'l Football League, 726 F.2d 1381 (9th Cir. 1984); while Major League Baseball is something of an anomaly in regards to antitrust law since 1922 and the decision in Fed. Baseball Club of Baltimore, Inc. v. Nat'l League of Pro. Baseball Clubs, 259 U.S. 200 (1922); *see also* City of San Jose v. Off. of the Comm'r of Baseball, 776 F.3d 686 (9th Cir. 2015).

[109] Safir, *supra* note 107, at 939.

[110] *Id.* (citing *Antitrust Implications of Sports Franchise Relocation: Hearings on Professional Sports Franchise Relocation—Antitrust Implications Before the H. Comm. on* the Judiciary, 104th Cong. 149–54 (1996) (written testimony of Andrew Zimbalist, Smith College Economist)).

[111] For a breakdown of the NFL owner's revenue sharing agreement, *see* Harperslaw, *NFL Revenue Sharing: How It Works*, BIG CAT COUNTRY (Oct. 13, 2009, 4:50 AM), http://www.bigcatcountry.com/2009/10/13/1082845/jones-nuke-the-chicken-blow-up-the [https://perma.cc/82S4-C794].

Safir used the saga surrounding the construction of Bank One Ballpark in Phoenix, Arizona as an illustrative example of the lengths some municipalities are willing to go to in order to attract a professional sports team.[112] The county pledged $253 million via a county sales tax to the construction of a stadium for the Diamondbacks, an expansion team yet to be granted.[113] The stadium financing contract was conditional upon the team being awarded, which took place in early 1995.[114] In exchange for the $253 million the ownership group agreed to pay the county between $1 million and $2.5 million plus a portion from luxury seating revenue and stadium naming rights.[115] The baseline numbers associated with the financing contract in Phoenix are not unique. Safir also cites construction of the Seattle Mariners' new stadium as an example of the public bearing the majority of the financial burden in stadium construction in order to keep sports teams from leaving.[116]

There are at least two potential avenues whereby ecological accounting and reporting could be included in public financing. The first is via the federal government. Authors such as Phelps have already shown how federal bodies might intervene in limiting the use of public funds.[117] Phelps argued that at present, the risk of failure is disproportionately felt by the public as most contracts disproportionately favor ownership groups.[118] Phelps proposed that in order to facilitate less reliance on public money the federal government should revise the tax code to allow for repayment of bonds through stadium revenues.[119] The federal government could additionally provide tax incentives via a sliding scale based on the ecological efficiency of a stadium.

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[112] *See* Safir, *supra* note 107, at 948–49.
[113] *Id.*
[114] *Id.*
[115] *Id.*
[116] *See id.* at 950–52. For additional examples in an academic context of challenges to the classification of professional sports stadiums being constructed for a public purpose, *see* Brent Bordson, *Public Sports Stadium Funding: Communities Being Held Hostage by Professional Sports Team Owners*, 21 HAMLINE L. REV. 505 (1997). For a popular press critique of public financing of stadia, *see* Jeffrey Dorfman, *Publicly Financed Sports Stadiums Are A Game That Tax Payers Lose*, FORBES (Jan. 31, 2015 12:18 PM), http://www.forbes.com/sites/jeffreydorfman/2015/01/31/publicly-financed-sports-stadiums-are-a-game-that-taxpayers-lose/#3bfbf89b6183 [https://perma.cc/7UUX-4FHL].
[117] *See* Zachary A. Phelps, *Stadium Construction for Professional Sports: Reversing the Inequities Through Tax Incentives*, 18 J. OF C.R. & ECON. DEV. 981 (2004).
[118] *Id.*
[119] *Id.* at 1026.

The second avenue to improve environmental accountability is at a contractual level.[120] This would require municipalities to condition stadium funding on the completion of ecological accounting that meets certain standards.[121] Various ecological provisions, such as maintaining insurance in the event of environmental contamination, are already found in many agreements between municipalities and team ownership groups for stadium construction.[122] In addition to these existing provisions incorporated into agreements between municipalities and ownership groups, it would be a natural extension to expand the accounting requirements that stadium financing incorporates to require for the inclusion of an ecological cost accounting report.[123]

While there is little indication that municipalities will cease delivering billions of dollars of subsidies to private sports franchises, if politicians want to continue to economically burden their electoral base they should, at a minimum, require ongoing assessment and analysis of the ecological impact of existing and proposed stadiums.[124] The implementation

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[120] For the purposes of this proposal it is assumed that there is a mutually beneficial interest in using a certain municipality, and that the parties are relatively unburdened in their freedom to contract. For background on some of the modern intricacies of freedom to contract, *see generally* Richard Carswell, *Freedom of Contract* (Coase-Sandor Institute for Law & Economics Working Paper No. 33, 1995) http://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1215&context=law_and_economics [https://perma.cc/99F5-SN5V].

[121] While cities would be the most likely candidate to preface funding on completion of contractual provisions related to meeting environmental benchmarks, this suggestion does not foreclose on the possibility of a league or other entity imposing an environmental (or other) provision on new stadium construction.

[122] *See, e.g.*, Memorandum from George M. Burgess, Re: Resolution Authorization Execution of Stadium Agreement among Miami-Dade County, the City of Miami and the Florida Marlins L.P., Relating to the Design, Development, and Construction of a New Baseball Stadium for the Florida Marlins at the Orange Bowl Site; and Approving the Assignment of the Inspector General as the Independent Private Sector Inspector General for the Ballpark Project (Feb. 21, 2008), http://www.miamidade.gov/govaction/legistarfiles/Matters/Y2008/080526.pdf [https://perma.cc/MZ3E-2SCY].

[123] For an example of a provision detailing the accounting requirements associated with stadium construction, *see* Financing, Development, and Operating Agreement between Sports and Exhibition Authority of Pittsburgh and Alleghany County and PSSI Stadium Corp. at 6.16 (June 20, 2000), http://www.pgh-sea.com/images/Steelers_Financing_Development_Operating_Agreement.pdf [https://perma.cc/CJC2-RTHA].

[124] For an extreme example of the economic burden that tax payers have faced financing stadiums, consider Montreal's Olympic Stadium, built for the 1976 Summer Olympics and as a home for the now departed Montreal Expos. The stadium (and Olympic village) was fully paid for in December 2006, a mere two years after the Expos left the city for a promised new stadium in Washington, D.C. *See Quebec's Big Owe Stadium Debt is Over*, CBC NEWS (Dec. 19, 2006 9:39 AM), http://www.cbc.ca/news/canada/montreal/quebec-s-big-owe-stadium-debt-is-over-1.602530 [https://perma.cc/RQS8-4FWZ].

of ecological and environmental cost accounting requirements as a condition of stadium construction financing is a minimal intrusion on the overall expense associated with stadium construction with an impact that could potentially last long after future demolition. Economic impact reports are being found more frequently, and even required by some jurisdictions; consequently, requiring environmental cost accounting would be a natural extension that would facilitate greater transparency and provide the public with a clearer understanding of the ecological cost of a new stadium.[125]

CONCLUSION

Even though economists have repeatedly criticized public financing for sport stadiums, owners of professional sport teams continue to benefit from public subsidies. Ecological economics contributes to understanding this phenomenon by identifying the ecological cost of stadium demolition, construction, and operations to the public. In this sense it adds to the criteria a new facility project must satisfy to justify public funding. Those who study interest groups, civic paternalism, and urban growth coalitions will be understandably skeptical as to how ecological economics can help admonish poor public decision-making; more evidence does not appear to show an immediate impact.[126] Nevertheless, financing contracts are a useful tool that can be used to a) internalize ecological and environmental impacts into sport business decision-making, and b) stimulate the creation and dissemination of high-quality information to inform public policy. Indeed, many of the most promising efforts to hold professional franchises accountable to their communities may be found in contractual agreements negotiated by public authorities. They will also prove invaluable for safeguarding spectator sports for the steady-state economy.

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[125] For an example of a recent Economic Impact Report, *see* Draft Environmental Impact Report—The City of San Diego (Aug. 11, 2015), https://www.sandiego.gov/sites/default/files/legacy/cip/pdf/stadiumeir/draftstadiumeir.pdf [https://perma.cc/52DR-Q3Z8].

[126] On civic paternalism, *see* Timothy B. Kellison & Michael J. Mondello, *Civic Paternalism in Political Policymaking: The Justification for No-Vote Stadium Subsidies*, 28 J. OF SPORT MGMT. 162 (2014).