

INFRASTRUCTURE:

Deciding Matters

*Second in a series of papers, the first
entitled 'Infrastructure: Defining Matters'*

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Deciding Matters

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EXECUTIVE SUMMARY

This study builds upon the understanding of infrastructure developed in our paper “Infrastructure: Defining Matters” with the aim of translating it in practical terms using a more detailed formulation of the schematic for pension fund investment decision-making which we outlined in that paper. The method for our doing so is to use as a reference an in-depth review of the decision-making process of one of the leading, if not the leading U.S. public sector pension fund on many matters, including infrastructure investment. The text proceeds as follows: First, we determine how the fund articulates what it understands infrastructure to be or entail. Second, we review what it states are its strategic objectives for infrastructure investment. Third, we canvas its stated perceptions or beliefs as to the financial characteristics of infrastructure investments. Fourth, we review in extensive detail the approaches and parameters according to which the fund seeks to achieve those strategic objectives. Fifth, we compare these with the ones embodied in a modified and refined version of the linked categories formulated in the paper. We suggest that while those approaches and parameters are useful they embody multiple and overlapping characterizations not conducive to systematic analysis. We point out that in terms of substantive content they are encompassed by but do not exhaust ones associated with the linked categories, such as Supply – Exogenous Constraints on Competition, Enterprise – Finance, Non-Enterprise Stakeholders. We discuss why we think the categories could be a more useful tool by which to describe and assess the fund’s infrastructure investments. Sixth we explore more closely certain aspects of the actual investment decisions which the fund has made. We start by detailing as best we can determine not only the vehicles through which the fund has invested but also all the particular investments made by any of the vehicles at the level of the infrastructure-related enterprise. We then consider two of the fund’s investments at the enterprise level, in one case according to the certain of the parameters which the fund has set forth but then in both cases based on the revised version of the linked categories. Finally, we summarize key observations made in the course of the foregoing analysis and offer conclusions which might be drawn from it. These which point to ways the approach we suggest might contribute to better decision-making with respect to infrastructure investments.

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Dr. Larry Beeferman is the Director of the Pensions & Capital Stewardship Project at Harvard Law School's Labor and Worklife Program. The Project addresses key legal, policy, and other practical issues relating to strengthening and extending retirement security for more households and practices, institutions, and systems of pension fund governance, management, and investment that encourage capital markets and corporate policies to work more effectively for workers and the health and well-being of the larger community.

The Project's publications have included ones concerning pension fund investment in infrastructure, the tools for and practice of taking into account social factor risks in investment decision-making, labor and private equity, worker voice and the union role in the management of pension fund assets, the Dodd-Frank financial markets reform legislation, and proposals for automatic enrolment in retirement plans. A forthcoming publication on rethinking fiduciary duty will be part of a collection of essays will be published by Cambridge University Press.

Larry W. Beeferman received a juris doctorate from Harvard Law School and a doctorate in applied physics from Harvard University. Prior to leading the Project he was a professor of law at the Massachusetts School of Law and Western New England School of Law, headed up the Asset Development Institute at Brandeis University's Heller School for Social Policy and Management, and served as Associate Counsel to the Massachusetts Special Commission Concerning State and County Buildings.



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INTRODUCTION



INTRODUCTION

Pension funds and others have had great interest in and have been active in investment in infrastructure. It has been our intent to provide resources to them in aid of their thinking about whether to invest in infrastructure and if so, how.

Our previous, first paper toward that end, “Infrastructure; Defining Matters” (“Paper”) was informed in part by what we had learned from various published reports: that despite increasing attention to infrastructure investment, what infrastructure was understood to be was “an uncertain and moving target.”¹ In our view, those who sought “a thoughtful consideration of infrastructure” were “ill-served” by what appeared to be “a confused and problematic state of affairs” with respect to matters fundamental to decision-making. Our concern was to a large degree confirmed by the results – reported on in the Paper – of our survey of some U.S. public sector pension funds about their experience with infrastructure investments. We found that responses to questions as to what fund trustees and staff thought infrastructure to be were, among other things, “colored by historical/cultural understandings of infrastructure” and “suggest[ed] a conflation of, mix-up, and/or overlap of functional understandings of infrastructure with economic readings in terms of the role of the market.” We saw that this blurring of concepts and categories spilled over into responses by the funds to questions about what they thought were the financial characteristics of infrastructure investments and, in turn, how they characterized

Facilities, structures, equipment, or similar physical assets – and the enterprises that employ them – that are vitally important, if not absolutely essential, to people having the capabilities to thrive as individuals and participate in social, economic, political, civic or communal, household or familial, and other roles in ways critical to their own well-being and that of their society, and the material and other conditions which enable them to exercise those capabilities to the fullest.

the strategic objectives they had formulated for investments in infrastructure.

With all of this in mind we set out to do two main things.

First, we sought to formulate a definition for infrastructure which not only was alert to the broader and evolving history of the term itself but also appropriately sensitive to the diverse understandings referred to above. Most importantly we did so with an eye to the intersecting communities of discourse and practice to which that definition was relevant.²

“Facilities, structures, equipment, or similar physical assets – and the enterprises that employ them – that are vitally important, if not absolutely essential, to people having the capabilities to thrive as individuals and participate in social, economic, political, civic or communal, household or familial, and other roles in ways critical to their own well-being and that of their society, and the material and other conditions which enable them to exercise those capabilities to the fullest.”³

The definition is different from many others in several ways. The emphasis is on people’s needs – important if not essential – because meeting them is the ultimate end in relation to which finance is a means. In doing so we shift the emphasis away from the popular or conventional focus on (kinds of) facilities, structures, buildings, etc. This is not because they are not unimportant but because they are just one among the (material) means by which those needs are met. Note that the definition

does not actually use the word “need” but rather “capabilities.” The latter term is associated with what might well be viewed as a better way to frame discourse about individual well-being. It is one which shifts the focus from individuals as passive recipients of particular basic material or other means to survive to one which views them as potentially active agents capable of defining their goals and changing their lives if equipped with requisite capacities, resources, tools, etc. The approach has close links to the notion of “sustainable human development” at the core of the UN Development Program which is, in turn, relevant in many ways to issues concerning infrastructure.⁴

We also focus on what we refer to as *infrastructure-related enterprises* because the task of provision to meet needs is a sustained project or undertaking by an often large group of people organized for that purpose. Again, that endeavor will of necessity entail the use of facilities, structure, buildings, etc. which may well loom large – literally and figuratively – in its operation and prospects for success. However, its achievements (defined in relevant ways) ultimately depend upon the actions of the individuals who constitute the enterprise. Also, not surprisingly and hardly inappropriately, investors tend to keep the spotlight on financial attributes and characteristics. Yet this emphasis too easily risks losing sight of the real world enterprise which gives rise to those attributes and characteristics. This problem becomes more severe insofar as investments are made through one or another vehicle rather than directly. In those

In principle, this formulation, one geared most immediately to the concerns of investors – or more aptly in this context, the strategic objectives of pension fund investors – allows one to trace or track the interplay of the various factors or considerations relating to a particular infrastructure-related enterprise which bear upon the possible achievement (or not) of those objectives.

cases, investors are at least one more step removed from the underlying enterprise.

Second, we sought to begin to develop a tool or method which linked infrastructure as defined in direct and indirect ways to the ultimate concerns of investors. Among those concerns, many are, of course, of a financial nature. However, as we discuss at greater length in the Paper they extend to other, ostensibly non-financial considerations. In some cases, that is a matter of necessity, insofar as attending to those concerns is imposed on particular kinds of investors (such as pension funds) as a matter of law, policy, or practice. In other cases it is a question of the investor's (typically institutional) understanding of the relationships within which it is embedded, its role in those relationships, and how they might bear on what the investors' responsibilities are with respect to those with whom they are in such relationships. Based on this approach we fashioned what we term a series of links/categories. These connect at one end with infrastructure-related provision as we characterize it, They then move through a series of what are largely (though not exclusively) categories identified with different kinds of people, on an individual or organized basis, whose expectations and behaviors bear upon the success of the enterprise (in an operational, financial or other sense). Such an analysis, as it shifts across those categories readily reveals or illustrates the kind of blurring and spill-over effects referred to above. In principle, this formulation, one geared most immediately to

the concerns of investors – or more aptly in this context, the strategic objectives of pension fund investors – allows one to trace or track the interplay of the various factors or considerations relating to a particular infrastructure-related enterprise which bear upon the possible achievement (or not) of those objectives.

While we thought the approach and methods we formulated in the paper had merit – perhaps even considerable merit – we recognized that they needed to be tested against the actual investment experience of pension funds. In that respect, the Paper had the benefit of insights drawn from the survey of U.S. public sector pension funds. However, we believed it would be productive to assess our work in light of an in-depth study of what at least one major fund active in infrastructure investment had in fact done. One logical candidate for that study was the California Public Employees' Retirement System (CalPERS). It was not only the largest pension fund in the United States and among the largest in the world, but it was also seen as having strong leadership and a sophisticated organization as well as being prominent nationally and internationally on many important issues. As of the time of the commencement of this work, among U.S. pension funds CalPERS had made the largest allocation to infrastructure investment, though it was and still is in the relatively early stages of filling out that allocation. Moreover, CalPERS makes readily available considerable material detailing

the process by which it makes decisions relating to infrastructure investment.

Having chosen CalPERS, we first review in the following what CalPERS understands infrastructure to be; its strategic objectives for making infrastructure investments; and how it views the financial characteristics of such investments. We then canvas the approaches and parameters which guide how CalPERS makes infrastructure decisions, and compare them with an updated version of those parameters which characterize the approach we suggested in the Paper and suggest the merits of the latter approach. Next we canvas in detail what enterprise investments CalPERS has directly or indirectly made and how aligned they are with its stated understanding of what infrastructure is and the decision-making approach and parameters. We follow with a close application of our proposed approach to two such investments to illustrate the kinds of considerations which come into play and their import for how decisions might be made. Lastly, we review the ground covered and close with suggestions as to how our method might help to strengthen decision-making.

A. What is infrastructure understood to be or entail?

As far as we can determine, nowhere in the document setting forth in detail CalPERS' approach to infrastructure – the Infrastructure Program (“Program”) – is there a definitive definition of infrastructure. Such a definition would be valuable because it, in not inconsiderable measure, reveals or articulates the conceptual underpinning for what CalPERS deems to fall within the category.⁵ Indeed none appears anywhere in the array of materials by which the fund characterizes how it goes about the task of investing. Such materials even encompass the terms included in CalPERS' “Investment & Risk Management Glossary” which “identifies, defines, and clarifies the meaning of investment terms used by CalPERS in our investment policies.” There a definition is proffered in a backhanded way: reference is made to “Essential Municipal Services,” namely “[t]hose municipal services including, but not limited to, *water, power, sewer, garbage removal, and other infrastructure essential to the wellbeing and quality of life of a municipality*, and upon which the municipality pays a high priority in service delivery.”⁶ Beyond that, the closest the fund comes to doing so is in the context of a discussion of public-private partnerships, stating that “Infrastructure assets, by definition, *support services that benefit society as a whole and are intended to serve a long and useful life.*”⁷

Notwithstanding the lack of a categorical definition CalPERS does, at a couple of points, offer ones by default in the form of a series of examples. In one case, CalPERS somewhat broadly refers to “invest[ing] in opportunities” within public and private infrastructure, including but not limited to, transportation, energy, power, utilities, water, waste, natural resources, communications and certain social infrastructure projects that meet the Program objectives.⁸ It is not evident what CalPERS means by its reference to “natural resources.” Generally speaking they are not among what is usually denominated as infrastructure-related. If it is intended to encompass oil, gas, and mining activities, the first two would seem to fall under the “energy” rubric in the foregoing list.

In another case, CalPERS gives a (non-exclusive) list of infrastructure sectors in which the fund will consider investment opportunities:

- a. Transportation (roads, bridges, tunnels, mass transit, parking, airports, seaports, rail);
- b. Energy (oil, natural gas and liquids, pipelines, storage, and distribution);
- c. Power (transmission, distribution, generation, including renewables);
- d. Water (water storage, transportation, distribution, treatment and waste water collection, transportation, treatment and processing);
- e. Communications (towers and networks);
- f. Social Infrastructure (building facilities such as health, education, justice, military);

- g. Other infrastructure investments that are aligned with CalPERS strategic objectives.”⁹

The lists are quite similar. The latter one offers examples of the kind of social infrastructure in which investments might be made. However, it does not include a reference to “utilities,” “waste,” or “natural resources” as such. This list also represents a slight shift from that given for infrastructure which, several years earlier, was included among what were termed inflation-linked assets.¹⁰ Another brief characterization of infrastructure set forth in equity and debt term sheets issued by CalPERS is, again, very similar, though not identical.¹¹

Certainly these lists are valuable as a rough guide to the fund's thinking about whether and how it might invest. However, if it is the primary guide it should provide a consistent choice of specific examples to afford clarity and coherence to decision-making.

B. Perceptions as to the Financial Characteristics of Infrastructure Investments and Asserted Strategic Objectives for Infrastructure Investments

The current strategic objectives of the Infrastructure Program – beyond those of the Real Assets program within which it is nested – are to:

- A. Preserve investment capital;
- B. Generate stable investment returns that are attractive, on a risk-adjusted basis, relative to the program benchmark (“Program Benchmark”);
- C. Provide cash distributions, as a prominent component of investment returns;

- D. Provide long-term inflation protection;
- E. Diversify CalPERS investments;
- F. Establish CalPERS reputation as a premier infrastructure investment manager and investor of choice within the investment community;
- G. Practice responsible investment to support efficient operation of assets, delivery of quality services, utilization of responsible labor and management practices and implementation of responsible environmental practices; and,
- H. Foster renewal and expansion of infrastructure assets.”¹²

The first five objectives are explicitly financial. In that regard they are expressed in relatively broad gauge and generic ways which are strongly suggestive but without a level of detail by which decision-making can readily be channeled or cabined, as the case may be.

The first, preservation of investment capital, could arguably be a mandate to focus on the extent of risk taking. However, here it might alternatively or in addition reflect a desire to avoid investments which are not likely to entail the return of invested capital. Broadly speaking that is consistent with the third objective although its emphasis would appear to be on the generation of returns from income rather than capital appreciation.

Generally speaking, the second objective emphasizes a desire for stable returns. In light of the third objective, that would largely be expected to be accomplished primarily through steady

The reference to the investment community suggests a financial intent in the sense that the fund’s actual and perceived position in and in relation to that community might be significant in terms of the investment vehicles to which it has access, the terms upon which it has access, its bargaining power with respect to those terms, etc.

income returns/cash distributions. The specific financial goal is defined with respect to a benchmark described at one point as “Consumer Price Index +4%, lagged one quarter.”¹³ This would appear to be identical to CalPERS’ investment policy financial goal for real assets; that is, “the strategic role of the [overall] Program” is “to meet a real rate-of-return of 4 percent, after fees.”¹⁴

This benchmark is lower than the previous one – the Consumer Price Index +5%, lagged one quarter – which was changed in 2011.¹⁵ Two reasons were offered for the modification. First, that it was “[c]onsistent with lower return expectations for asset classes established in the November 2010 ALM Workshop” and second, “an increased focus...on low-risk (stable, income-generating) investments, consistent with its strategic role articulated in conjunction with the ALM Workshop.”¹⁶ With respect to the second reason, the prior allocation scheme was defined in terms of four categories, three for private investments, namely Core, Value-Added, and Opportunistic ones, plus publicly listed securities. The three private investment categories as briefly described are broadly similar to what CalPERS current denominates as Defensive, Defensive Plus, and Extended Categories (discussed below). Practically speaking they seem to be fungible.¹⁷ Consonant with the noted shift, the target for Defensive Investments was 25-75% of the portfolio, an increase from that of 10-40% for Core Investments.¹⁸

In all events, a subsequently published document acknowledges that the benchmark designated “is not investable and does not represent the target investments in infrastructure.” However it does suggest that the benchmark “does provide a highly stable, inflation-linked target for the Program.”¹⁹ While the document itself quite appropriately remarks that there is/(are) no particularly satisfactory choice(s) for private infrastructure benchmark(s), nonetheless having one(s) which reflect the nature and extent of the risk associated with achieving the sought-for returns would appear essential.²⁰ In this regard, note that the two stated strategic objectives most relevant here are the fourth one, “long-term inflation protection,” and the second, “stable returns on a risk-adjusted basis.” And certainly, as discussed below, the Infrastructure Program attends to a considerable variety of factors cast in terms of risk. Thus, at minimum (a) benchmark(s) incorporating some criteria for risk would seem to be necessary as a complement to ones for return.

The fifth objective is generic in nature, but grounded in a specific presupposition that investments in infrastructure will afford the benefits of diversification, e.g., lack of correlation of returns from investments in other asset classes.

At least two of the three remaining are non-financial in nature.

With respect to the sixth, the import of the fund being and perceived as a “premier infrastructure investment manager and investor of choice within the investment community” is not entirely clear.

The reference to the investment community suggests a financial intent in the sense that the fund’s actual and perceived position in and in relation to that community might be significant in terms of the investment vehicles to which it has access, the terms upon which it has access, its bargaining power with respect to those terms, etc. With respect to the latter, though, insofar as the fund’s standing in the community affords it transactional leverage that could be employed to advance such direct or indirect non-financial objectives as the fund might have.

The seventh is somewhat curious in that it first references a phrase – “responsible investment” – which is widely but variously used to characterize a commitment to realize one or more non-financial objectives.²¹ In illustration it then specifically refers to two goals which at first blush are relevant to any enterprise though arguably of heightened importance for infrastructure-related ones, namely the “efficient operation of assets” and the “delivery of quality services.” Thus, here the practice of responsible investment is limited to the two specific (though quite important) objectives – “[t]he utilization of responsible labor and management practices and implementation of responsible environmental practices” – though the phrase has been used to encompass a broader range of objectives. Indeed, as we shall see in the discussion below the provisions by which the fund implements the broader mandates/objectives simply describe a different and more expansive

commitment to what might be termed to be responsible investment.

The eighth and final objective, to “[f]oster renewal and expansion of infrastructure assets,” is both generic and on its face implicit insofar as the Infrastructure Program is, of course, focused on investments which have that precise outcome. Insofar as there is a specific meaning or import it is, perhaps, that the consideration of investments might or would give special attention to achieving that kind of outcome for its own sake, that is, financial outcomes aside. Such an objective might well be most cogent insofar as investments are made in infrastructure-related enterprises in California. And, in fact, we shall briefly discuss later the September 2011 decision by the CalPERS Investment Committee to “direct[] staff...to target investment of up to \$800 million in California infrastructure over a three year period.”²²

C. The Approaches and Parameters According to Which the Strategic Objectives Are to be Achieved

1. Kinds of Infrastructure

After setting forth CalPERS’ strategic objectives, the Program details what it terms the fund’s “Investment Approaches and Parameters.” The first parameters described are those for the kinds of infrastructure in which investments might be made. These investments, as noted, are stated broadly, namely “public and private infrastructure, including but not limited to, transportation, energy, power, utilities, water,

waste, natural resources, communications and certain social infrastructure projects that meet the Program objectives.”²³

2. Risk Segments

The second major group of parameters – “Risk Segments” (listed under “Risk Classifications”) – are said to address “effective risk management.”²⁴ At first blush it is not clear as to the outcomes or consequences with respect to which the listed risks have import. In all events, the three categories set forth for the purpose of effective risk management are introduced in the following way: “Defensive, Defensive Plus or Extended will be based on an investment-level analysis across pertinent risk/return factors.”²⁵ Judgments as to the categories in which investments are deemed to fall are to be “based on an *investment-level analysis* across pertinent risk/return factors.”²⁶ The delineation is as follows:

Defensive investments: These are deemed to be “characterized substantially” by twelve elements:

1. Essential assets and services
2. GDP resilience; demand inelasticity; pricing certainty
3. Minimal competition; strong barriers to entry
4. Stable revenues and returns; rate-regulated or long-term contracted
5. Low operating risk; allowed cost recovery
6. Long-term inflation protection
7. Strong credit quality off-takers or payers
8. Cash-generative investments
9. Long-lived tangible assets

10. Low obsolescence risk

11. Low/no development risk

12. Low/no currency risk.

Defensive Plus Investments: These investments are termed to “carry greater return potential and greater risk than Defensive investments.” That is, they “possess significant defensive qualities, although they generally feature greater degrees of risk associated with some of the following elements: competition; user patronage; regulation; contracts; construction; pricing; capital expenditure, terminal value; and growth.”

Extended Investments: These are said to “carry greater return potential and greater risk than Defensive Plus investments. Such investments are “risk-extended” in that they generally feature significant risks associated with some of the following elements: competition; merchant business; growth; construction; development; technology; operating costs; pricing, capital expenditure; terminal value; commodity prices; legal/political/regulatory regime; and currency.”²⁷

This formulation is useful, emphasizing certain considerations that do, without doubt, bear upon enterprise-level performance. However, it is not clear whether the specific delineation of elements is as useful or productive as it might be.

For example, the criteria for Defensive Investments are in some measure overlapping and in some respects in tension. For instance, that the infrastructure is associated with the provision of essential assets and services strongly suggests

substantial and sustained demand under a wide variety of circumstances. Demand elasticity is an aspect of element 2. Among those circumstances would be macroeconomic changes as manifested in significant increases or decreases in GDP, also accounted for in element 2. The remaining aspect of element 2, pricing certainty, is closely linked to aspects of element 4, namely rate-regulated or long-term contracted. Moreover the combination of pricing certainty and demand elasticity of element 2 is closely tied to there being stable revenues, another feature of element 4.

The fact that revenues are stable does not necessarily imply that returns are. Whether they are depends on other considerations, for example, insofar as rates being regulated – a different part of element 4 – entails assured cost recovery – a facet of element 5. That there is low operating risk – another aspect of element 5 – suggests a certain measure of predictability for and perhaps a corresponding stability of operational costs. Low operating risks may also be thought of in terms of a low risk of significant interruptions to operations and hence, to supply.

Long-term inflation-protection accounted for in element 6 has at least two aspects. On the revenue side it includes an ability to raise prices to, at minimum, take account of inflation. On the costs side it includes an enterprise’s ability to either avoid or protect itself from inflationary pressures on goods and services significant to its operation. In combination these factors have a bearing on

element 4 insofar as the concern is with real revenues and returns.

It is not clear in what sense or ways element 8 – investments being cash-generative – is relevant to a classification in terms of risk. As noted, strategic objective C is to “[p]rovide cash distributions, as a prominent component of investment returns” so the greater the risk that they will not be provided the greater the concern. But that is not an independent factor; rather, it is rather an outcome of other features already noted, for example, the stability of demand, pricing certainty linked to rate regulation and/or a monopoly position/lack of competition, the absence of serious operational risks, etc.

Elements 7 (relating to credit quality) and 12 (pertaining to currency risk) are appropriately focused on finance-related aspects of the enterprise, namely its ability to gain sufficient finance on acceptable terms in a timely fashion, and the dependence of financial outcomes on foreign currencies.

It is not evident how enterprise assets being “tangible” and “long-lived” – element 9 – is a risk factor as such. Perhaps the notion is that insofar as the assets are tangible they are a source of relatively ascertainable and stable value (in connection with an ongoing operation or liquidation?), an important attribute if they are long-lived. In some measure this element is linked to what is more readily characterized as a risk, namely obsolescence risk – element 10 – that is, the emergence of a dramatically different and highly competitive mode of provision which might sharply devalue

By contrast, development risk – element 11 – would appear appropriately concerned with where provision fits in the range from greenfield to brownfield projects, especially as it relates to the assumptions which inform, at an early stage, a project’s anticipated start-up costs, and assumptions as to its ongoing cost, revenue, and other operational considerations.

existing tangible assets. In any event, there may also be implicit the notion that the asset being long-lived might imply that major capital expenditures – other than in connection with repairs or modest modifications or updates of facilities – will not be required.

By contrast, development risk – element 11 – would appear appropriately concerned with where provision fits in the range from greenfield to brownfield projects, especially as it relates to the assumptions which inform, at an early stage, a project’s anticipated start-up costs, and assumptions as to its ongoing cost, revenue, and other operational considerations.

Defensive Plus Investments: These are described as “carry[ing] greater return potential and greater risk than Defensive investments.” That is, while they “possess significant defensive qualities,...they generally feature greater degrees of risk associated with some of the following elements: competition; user patronage; regulation; contracts; construction; pricing; capital expenditure, terminal value; and growth.” For the most part, these features align with the elements of Defensive Investments:

Competition: element 3 (minimal competition; strong barriers to entry).

User patronage: element 2 (GDP; demand inelasticity).

Regulation: element 4 (rate regulated), though regulatory issues extend beyond rates to permissions to operate and to operate in particular ways.

Contracts: element 5 (long-term contracted) though contracting issues, if primarily meant to refer to contracts for provision, extend beyond pricing to the terms of provision.

Construction: there is no specific element which on its face relates to this term, but it may refer primarily to greenfield projects and construction risk – as matters of timeliness, quality, and cost – although it might be relevant to established projects with respect to which significant improvements, updates, or repairs are required.

Pricing: element 2 (pricing certainty) though related elements 4 (rate-regulated) and element 5 (allowed cost recovery) are implicated.

Capital expenditure: there is no specific element which appears linked to this phrase but it has some links to element 9 (long-lived tangible assets), element 10 (low obsolescence risk); and element 11 (low/ no development risk).

Terminal value: there is no specific element which seems connected to this word. It presumably concerns the value of the investment upon exit which can be affected by a whole host of factors. If there is a concession arrangement, there would be no terminal value.

Growth: this is quite generic. At first blush it involves the demand and supply side aspects of elements 1, 2, and 3.

Extended Investments: These investments are deemed to provide “greater return potential and greater risk than Defensive Plus investments, that

is, they are ‘risk-extended’ in that they generally feature significant risks associated with some of the following elements: competition; merchant business; growth; construction; development; technology; operating costs; pricing, capital expenditure; terminal value; commodity prices; legal/political/regulatory regime; and currency.”²⁸

The list includes many of the factors by which Defensive Plus investments are characterized with the following additions:

Merchant business: presumably this refers to market-based provision; if so, it would be the flip side of element 4 (rate-regulated).

Development: this corresponds to element 11 (low/no development risk).

Technology: this arguably is linked to aspects of element 10 (low obsolescence risk).

Operating costs: this relates to aspects of element 5 (low operating risk; allowed cost recovery).

Commodity prices: presumably these are source (to the enterprise) commodities and if so it concerns aspects of operating costs, matters covered in some measure by element 5 (low operating risk; allowed cost recovery).

Legal/political/regulatory regime: while the regulatory regime appears to relate to an aspect of element 4 (rate-regulated) as noted, regulatory risks extend beyond matters of pricing. The reference to legal/political would seem to have particular relevance to developing countries where, at the extreme, there might be issues of concern in respect of the rule of law, stability, etc.

though the matter of legal uncertainty and political pressure/machinations might extend under some circumstances to developed countries.

Currency: Clearly this concerns non-domestic investment though it might also pose concerns on the matter of source supply pricing where supplies come from abroad.

In all events, the tripartite Risk Segment categorization is the basis for a specific prescription for diversification in those terms. That is the investments must be made within the following allocation ranges: Defensive (25 to 75%); Defensive Plus (25 to 65%), and Extended (0 to 10%).²⁹

However, this prescription constitutes only one of three so-called “Key Policy Parameters.”³⁰ Another is a geographic distribution requirement which implicitly takes account of the legal/political/regulatory and currency risks which are among those which distinguish Extended Investments.³¹ Even then there is an overlay of additional requirements which concern hedging currency exposure.³² There are, in addition, separate parameters for leverage.³³

Although the three Risk Segments are, as noted, geared to an “investment-level” analysis, they require individualized assessments of particular enterprises which are the possible object of direct investment by the fund or prospective investments within the portfolio created by an intermediary investment vehicle which the fund has chosen.

...the Infrastructure Program has a set of geographic requirements for diversification which limits the percentages of the overall allocation to the United States, what it terms “Developed OECD ex US,” and to “Less Developed” countries.

3. Specific Risks

This point seems to be taken up in the Program where it states that “[t]here are specific risks associated with investments” which staff must consider in their due diligence assessments.³⁴ These are reproduced below. At first blush, they seem most relevant at the enterprise level, with only indirect application outside of the sphere of direct investments.³⁵

In any case there is some though not a complete overlap between the risks listed here and the elements which underpin the Program’s Risk Segment formulation discussed above. In the text below the differences are in italics.

1. Financial Risk: Infrastructure investments may employ substantial leverage (borrowing), which may result in significant financial risk. [*Leverage is not explicitly mentioned in the tri-partite formulation though there is some link to element 7 (strong credit quality off-takers or payers).*]
2. Liquidity Risk: Infrastructure investments may lack liquidity and may have time horizons greater than 10 years. Secondary markets for such investments can be very limited. [*Liquidity issues of this sort do not seem to be addressed.*]
3. Capital Markets Risk: Capital markets experience volatility and changes in these markets may have a significant impact on the cost of financing infrastructure investments and overall transaction execution. [*Capital markets risk is not explicitly mentioned though seems to be a*

substantial link to element 7 (strong credit quality off-takers or payers).]

4. Political and Public Risk: Infrastructure investments may be subject to risks associated with political approval and public acceptance of projects. [*This seems in many respects closely related to the legal/political/regulatory regime concerns highlighted for Extended Investments at the project/investment approval stage.*]
5. Labor Risk: Risks associated with public sector outsourcing, or labor relations may affect investment opportunities in infrastructure. [*There is no reference to these risks in the Risk Segment formulation.*]
6. Regulatory Risk: Changes in regulatory conditions may affect investment returns. [For the most part this category seems *related to the legal/political/regulatory regime concerns highlighted for Extended Investments at the post-project/investment approval stage.*]
7. Country Risk: Political, economic, and currency risks are associated with investing in all countries. [*This is closely related to element 12 (low currency risk) and more generally concerns about the legal/political/regulatory regime posed for enterprise investments.*]
8. Governance Risk: Risks may arise from mismanagement and partner misalignment or lack fundamental governance and ownership rights, protections and remedies. [*This is largely an investment vehicle risk not raised in the materials considered so far, though it might arise in the*

context of enterprise-level investment through or in conjunction with other parties.]

9. Valuation Risk: Risks are associated with failure by a general partner or partnership to employ an appropriate valuation methodology and discipline. [*This is largely an investment vehicle risk not raised in the materials considered so far, though it might arise in the context of enterprise-level investment involving other parties.*]
10. Market Risk: The infrastructure market continues to develop globally and market opportunities can change depending on many variables such as market supply and demand. [*Since the focus here is on the infrastructure market, it seems closely related to number 2 above, Liquidity Risk.*]
11. Environmental and Climate Risk: Long term investment returns may be impacted by risks and opportunities related to the environment and climate change. [*There is no reference to these risks in the tri-partite formulation except what might be implicit in element 5 (low operating risk).*]
12. Hazardous Materials: Risks are associated with the use of hazardous materials in facilities or business processes. [*There is no reference to these risks in the tri-partite formulation except what might be implicit in element 5 (low operating risk).*]
13. Counterparty Risk: Infrastructure investments may rely on the financial strength of off-takers, hedge providers, suppliers, service providers

and constructors.” [*There is clearly a link here to element 7 (strong credit quality off-takers or payers).*]³⁶

As noted before, the Infrastructure Program has a set of geographic requirements for diversification which limits the percentages of the overall allocation to the United States, what it terms “Developed OECD ex US,” and to “Less Developed” countries. The characteristics defining the second category of countries which presumably distinguish them from the third are “established rules of law and regulation, established and highly liquid domestic capital markets and highly convertible currency on global foreign markets.”³⁷ So clearly there is another form of overlap of the criteria. Of course, the diversification criteria operate at a generic/aggregate level whereas the others referred to here apply ostensibly at the level of an investment in a particular infrastructure-related enterprise.

Among what are denominated as risks to be avoided or minimized in the list above are ones apposite with the affirmative goals set forth in strategic objective G quoted above, most particularly the “[p]ractice [of] responsible investment to support ...utilization of responsible labor and management practices and implementation of responsible environmental practices.”³⁸

While in the aggregate the foregoing lists are fairly extensive, the Program also includes among “Investment Approaches and Parameters” three other kinds of requirements under the rubric of “Other Guidelines.”

4. United Nations Principles for Responsible Investments

First there is statement that the staff should be “guided by the United Nations Principles for Responsible investments” (across all kinds of assets, including infrastructure).³⁹ Signatories to the UNPRI – of which CalPERS is one – state a “belief[] [that] environmental, social, and corporate governance (ESG) issues can affect the performance of investment portfolio” and “recogni[ze] that applying these Principles may better align investors with broader objectives of society.” As a signatory, CalPERS commits, among other things, to “[a] dress[ing] ESG issues in investment policy statements” and “ask[ing] investment service providers...to integrate ESG factors into evolving research and analysis.”⁴⁰ At this point there is no specific articulation of the practical implementation of this commitment although efforts certainly appear to be in progress.⁴¹

5. Emerging Equity Markets Principles

Second, staff must be “guided by the CalPERS Emerging Equity Markets Principles for all investments in such countries.”⁴² This requirement reflects a case by case approach different from what was originally a categorical, exclusion type method.⁴³ There is an overlap between the substantive content of these principles and considerations articulated among the risk factors discussed above.⁴⁴ The emerging markets-related principles refer to a concern about :

- political stability embodied in “a strong and impartial legal system” and “respect and

enforcement of property and shareowner rights”; [*Extended Investment: legal/political/regulatory regime; Risk Factors: Country Risk, Political and Public Risk*]

- (financial) transparency, “including elements of a free press”;
- “productive labor practices,” namely labor practices that are not “harmful” and do not involve the “use of child labor” and, more generally reflect “compliance or moving toward compliance, with the International Labor Organization (ILO) Declaration on the Fundamental Principles and Rights at Work”; [*Risk Factors: Country Risk*]
- “[c]orporate [s]ocial [r]esponsibility and [l]ong-term [s]ustainability,” “[i]ncluding environmental sustainability” “[i]n compliance, or moving toward compliance, with the Global Sullivan Principles of Corporate Social Responsibility”;
- “[m]arket [r]egulation and [l]iquidity,” including “[l]ittle to no repatriation risk” and “[p]otential market and currency volatility [being] adequately rewarded”; [*Extended Investment: currency; Risk Factors: Country Risk*]
- “[c]apital [m]arket [o]penness” including “[f]ree market policies, openness to foreign investors, and legal protection for foreign investors”; [*Risk Factors: Capital Markets Risk*]
- “[r]easonable trading and settlement proficiency and reasonable transaction costs”; and more generally,

- “[a]ppropriate [d]isclosure...[o]n environmental, social, and corporate governance issues.”⁴⁵ [*Risk Factors: Labor Risk, Environmental and Climate Risk, Hazardous Materials, Governance Risk*]

Some of the overlaps with other criteria set forth in the Investment Program are noted in italics above.

Although the Investment Program allows investments in emerging market infrastructure none have been made by CalPERS to date. Hence, there presumably has been no occasion to apply the Emerging Market Principles in that context. However, a recent CalPERS report briefly describes the approach taken in their use with respect to equity markets. It essentially involves hiring a third party to analyze whether there has been “infringement of international standards” based on an analysis of its data base which (apparently) includes “[o]fficial filings, media reports, NGO research and other sources.”⁴⁶

Third, there is a somewhat more diffuse prescription concerning “Renewable Energy and Sustainability.” That is, “CalPERS encourages the prudent use of sustainable development methods and operational practices when reasonable and economically feasible.” This encouragement entails “[c]onsideration” being “given to the use of renewable energy technologies, recycled and renewable building materials, air and water conservation technologies and practices, and efficient waste, recycle and disposal technology and practices” as well

as “the environmental sustainability of investments including, but not limited to, energy efficiency, fuel economy, alternative energy generation and distribution impacts.”⁴⁷ Although this formulation is cast in proactive, positive terms it overlaps considerations within the scope of the risk-based categories detailed above, for example, those specifically concerned with “Environment and Climate Risk” and the general commitments to disclosure on ESG pursuant to the Emerging Market Principles and the ESG-sensitive investment practices required of UNPRI signatories.

6. Responsible Contractor Policy and Preference and Domestic Public Sector Jobs

It should also be observed that the Program also includes a “Responsible Contractor Policy and Preference” and one in relation to “Domestic Public Sector Jobs.”⁴⁸ The former entails written agreements “from managers of any investment vehicle, for which the Responsible Contractor Program (“RCP”) applies...[to] adhere to CalPERS investment policy for the RCP” and to “give a strong preference to all domestic infrastructure investment vehicles that have adopted an internal policy regarding responsible contracting consistent with the CalPERS RCP subject to CalPERS fiduciary duty.”⁴⁹ According to the RCP, a responsible contractor is one, among other things “who pays workers a fair wage and a fair benefit.”⁵⁰ (In a provision of the RCP particularly applicable to the U.S. context, CalPERS also states that it “supports a position of neutrality in the event there is a

...the diverse, overlapping, and in certain respects conflicting parameters can make for a less than consistent, more difficult, and less productive basis for decision-making than might otherwise be available.

legitimate attempt by a labor organization to organize workers employed in the construction, maintenance, operation, and services at a System owned property.”⁵¹) Clearly these considerations relate to (at least in a domestic sense) what is referred to as “operational risk,” more specifically what is termed “Labor Risk” and more generally is referenced in connection with the need to disclose and take account of the social factors aspects of ESG.

The section on domestic public sector jobs is grounded in concern about any investment by the fund “directly impact[ing] California public sector jobs.” It requires that any investment vehicle through which CalPERS might invest in-state “make every good faith effort to ensure that such transactions have no more than a *de minimis* adverse impact on existing employees.”⁵² Depending upon how one reads the terms, both of the foregoing policies implicate at least, legal, political, regulatory risk, and development risk as well as labor risk-related issues in the domestic context.⁵³

7. Other Formulations

Curiously, CalPERS has proffered a description of what is labeled as the “Infrastructure Strategic Plan.” It brings together elements associated with most of the formulations detailed above but in a way which does not obviously clarify the roles and importance of each and their relationships with one another.⁵⁴ More particularly it first refers to four elements which characterize the “unique, strategic role” of infrastructure “within the total portfolio.”⁵⁵

These are only financial outcome related elements; they do not include the other strategic objectives set forth in the Investment Program and described above. Moreover, the Program refers to five financial outcome related objectives, not four. While the two sets appear to overlap considerably it is not obvious they cover precisely the same area.

8. Other parameters

Next, it refers to an investment screening process to identify “high-quality, sustainable opportunities, with a high probability of successful completion” with a dual focus: “Asset Risk/Return” and “Partnering & Alignment.”⁵⁶ They appear to correspond to what we have termed enterprise and investment vehicle level considerations, respectively. The list of the former does not appear to match any of the ones described above, but rather appears to include aspects of each of them.

It then turns to the Risk Segment terminology but here, too, refers to it generally under the rubric of “Asset-Level Risk/Return” and specifically in terms of “idiosyncratic return and risk factors” and proceeds to list all the Defensive segment factors.⁵⁷

After that it delineates what is encompassed under a “Risk/Return Framework” matrix.⁵⁸ The titles for the three columns are those for the three Risk Segments. The rows include eight factors which match in many ways with those set forth under the Risk Segment formulation, although there is no ready individual association for every one of them and there are some that do not seem to fit at all.

Last, and quite interestingly, it presents several groupings of the rows (though it would appear in an overlapping manner) under a common label.⁵⁹ That is, “Price Risk,” “Demand/Volume Risk,” and “Inflation” seem to fall under what is termed “Revenue”; “Inflation, Operating Costs, and Capital Expenditure” under “Costs,” “Capital Expenditure,” “Asset Value,” and “Efficient Debt Levels/Debt Quality” under “Balance Sheet”; and “Engineering and Construction,” “Valuation,” “Partners/Alignment/Governance,” and “Currency/FX, Regulatory, Legal, Political,” under “Other & Non-Financial.” In certain respects this last category is curious because the first and fourth elements seem to refer to the enterprise-level in specific and generic ways while the second and third seem to correspond to the investment vehicle level. That notwithstanding, the approach affords the benefit of a simple and coherent organization of factors to which the linked categorization we proposed in the Paper and build upon here bears some resemblance.

The parameters, categories, classifications, discussed above are expressions of both the thoroughness and care which CalPERS has given to the decisions it makes with respect to infrastructure as well as its sensitivity to a range of considerations – financial and otherwise – which bear upon those decisions. Nonetheless, the diverse, overlapping, and in certain respects conflicting parameters can make for a less than consistent, more difficult, and less productive basis for decision-making than might otherwise be available.

The preceding section suggests the need for a different approach to decision-making about infrastructure investments. That method should be two-fold. First, it should be informed by a clearer or more coherent understanding of that which is thought to be infrastructure. Second, it should be systemically and as comprehensively as practicable take account of the diverse aspects of the corresponding infrastructure-related enterprise which on one hand are the ultimate basis for provision and on the other hand are the ultimate source of financial (and perhaps other) outcomes that are the concern of investors in those enterprises.

A. Categories and Links

In the Introduction we briefly reviewed what we believe is such an approach, one first described in the Paper. Refining the approach has been and remains a work in progress. We detail at some length in this document a revised version of what was characterized in the Paper, which reflects several considerations. First, for the reasons discussed, the primary emphasis is analysis at the enterprise level. Second, again for the reasons offered, the starting point is the infrastructure product or service provided by the enterprise. Third, we then move in successive stages (or columns as the case may be) to the role of different parties, as individuals or as groups, organizations, etc. We do so because concerns and actions of theirs not only come into play in the effort to provide the product or service but also bear on outcomes in

relation to the enterprise, to the pension fund as an investor in light of its strategic objectives, and for other parties as well. The categories/links are as follows:

Product or service: What is the infrastructure-related good or service provided by the enterprise? (Actually, as we shall see, infrastructure-related enterprises may, in fact, provide a variety of goods and services, some though not necessarily all of which might be thought to be infrastructure-related. In effect, in the sense of our terminology, the companies operate multiple – though often interconnected – enterprises, some of which are infrastructure-related.) In that regard, the Paper suggests a hierarchy of needs for which there must be provision. Some of those needs – for example, that for sufficient potable water – are of such overarching importance that provision may be framed in terms of “rights” so that their provision is situated at the high end of the hierarchy.⁶⁰ Note that in contrast with the need for water which is universal and in many respects identical in character across societies, in other cases – for example, ones pertaining to transportation and communications – though needs may be extremely important, they have a character specific to the particular societies in which people live.⁶¹ But even with respect to water, the particular means for provision might range widely with the societal context.

Facilities, structures, etc.: With an eye to that aspect of conventional rough judgments as to what is infrastructure we focus here on the physical

Note that in contrast with the need for water which is universal and in many respects identical in character across societies, in other cases – for example, ones pertaining to transportation and communications – though needs may be extremely important, they have a character specific to the particular societies in which people live.⁶²

means for provision – especially, though not only, its scale in a physical terms but also in the sense of the resources required to bring them into being – we include a characterization of such facilities, structures, etc. as are central to those means.

Demand: Here we are concerned with those to whom infrastructure related goods or services are provided and look to considerations which bear upon the extent of their demand for it. In the first instance, of course, how important or essential the infrastructure-related need is a critical factor. Yet other considerations may come into play. To take an extreme example, water is absolutely essential but beyond a certain quantity it is not. Compare water required for individual consumption as contrasted with personal hygiene, cooking, cleaning, agricultural use, etc. Moreover, even here, demand might be sensitive to the quality of supply or the timing of it, for example, when people get up from or go to bed, dine, etc. And strictly speaking, the issue is demand in relation to a particular source of supply (discussed at greater length below), for example, the ability to obtain water through an elaborate and large piping system as contrasted with getting it from water vendors. Demand may be quite sensitive to social context, that is, social norms and expectations, e.g., standards of cleanliness or to level of technological development, the availability of or relative efficiency of irrigation systems for farming.

Supply – Endogenous constraints on competition or markets: This and the next link/column

pertain to the universe of those enterprises which do or might provide the good or service by the same or differing means or provide a competitive equivalent. This one concerns in what ways, if at all, the nature of the good or service or the nature of the available means for its provision as such give rise to restrictions, constraints, or limits on the extent to which the enterprise might offer to provide the good or service. In some cases, they might arise from the nature of the physical environment: insofar as it is otherwise seen as desirable for there to be a road for motor vehicles to enable people to travel from one city to another or to situate an above-ground electricity grid to bring electric power from its source to those who need it to light and heat their dwellings, it would be senseless as a physical matter to construct other than a single road or grid to meet it. Or, in an often related way, the scale of resources – material, financial, and otherwise – required may make it untenable for a second enterprise to be a provider because of first mover advantages or because under the relevant economic and financial calculus the demand cannot sustain two enterprises at the requisite scale. Clearly the force of such considerations is sensitive to the state of the relevant technology for provision. For example, the electronic/electro-mechanical means that were the basis for land-line telephone communications are quite different from those for mobile phone communications with significant implications for who might be in a position to be a supplier.⁶²

For example, even if there is a road concession, because of the government's critical role in meeting transportation needs across the board it may (or must) retain and exercise its power to build other competing roads or use it despite seeming contractual commitments to the contrary.

Supply – Exogenous constraints on competition or markets: This link/column pertains to restrictions, constraints, limits, etc. which arise from action on the part of players outside the enterprise, most frequently government players. They are driven by a variety of factors, though they are most likely associated with the great importance of provision of the particular good or service in question and a corresponding perceived need to control who supplies it and under what circumstances. That can take the form of government insistence on a single provider – which might be the government itself – or just a few providers. In some cases the limitations are applicable to particular geographic areas within a given governmental jurisdiction.

With regard to both this and the previous supply-related link/category it should be noted they might apply differently even though on its face the same “infrastructure” (as popularly characterized) might be involved, especially insofar as it is what some term network infrastructure. So for example, while individuals' need might be for electric power to light and heat homes, as a matter of government policy the electric power grid might be operated on a monopoly basis while the supply of power to and through the grid could be provided by a single enterprise or alternatively by many, diverse enterprises.⁶³

Pricing: While quite obviously, the price at which the good or service is or might be sold currently or at a future time will in some not inconsiderable

measure be an artifact of the preceding factors or considerations, this link/column is intended to highlight how in view of those considerations, actions by the enterprises and other players have or might affect those prices. Clearly, insofar as government regulation is in the equation and how it does or might address matters of pricing, the formulas settled upon for pricing the good or service, the circumstances and timing of possible changes in those prices etc., are additional considerations of great importance. Note that we will shortly speak to regulation of the means for provision which might well have a significant impact on its cost. Formulas for pricing which address cost recovery in certain ways operate at the intersection of these considerations.

Of course, pricing may be the result of actions taken in relation to non-government actors. So, for example, the enterprise may, in view of the factors noted above, be able to enter into a long-term contract which by its terms might ensure some measure of guaranteed demand for the good of service and ostensible certainty for the prices or the formula for the prices to be paid over relatively extended periods of time.

Form of Payment for Products or Services: This is less a matter of the level of the payment for the good or service and more one of the manner in which it is paid. This factor may bear on concerns about whether and the extent to which direct users make payments as well as how timely and stable payments (from any source) are. So, for example,

payments may be made directly from users (in the form of tolls) or wholly from the government on behalf of the user (in the form of availability or shadow payments). There may be situations in which the payments for users are less than the price of the good or the service with the difference being covered by a government subsidy.

Public sector (operations): There might be a slight overlap with or redundancy in what is covered by this category and what is touched upon in other ones. However, this and the next three links/categories explicitly focus on the role of government as a player, a not infrequently important one. Obviously, at the extreme the government might be a monopoly provider performing every task relevant to the supply of the good or service. But a public role of this kind may be circumscribed in certain ways, sometimes significant ones. Of course, depending upon historical practice in a country or jurisdiction provision may have been solely by the public sector. But where it is the opposite, new or emerging roles for private enterprises vary widely. At the extreme private enterprise might entirely supplant the public sector or the former have a wide ranging concession for operation over an extended period of years. Alternatively, private enterprise may play a greater or lesser role in the planning and design or construction of the facilities, structures, etc. required for provision and in many or just one or a few aspects of operations once they commence (for the repair, upgrading, etc. of the facilities).

In this context, the delineation of the respective roles – typically by contract (discussed below) – is quite important in terms not only of the respective parties being clear about what are their responsibilities (and especially who bears what risks) but also recognizing challenges that might arise when the boundaries are not well-defined or might be thought to have been overstepped. This conflict may be an issue even in the extreme cases of private enterprise taking on a far ranging role because there will remain what might be thought to be higher level, non-delegable responsibilities for the public sector which can create uncertainty or tensions. For example, even if there is a road concession, because of the government's critical role in meeting transportation needs across the board it may (or must) retain and exercise its power to build other competing roads or use it despite seeming contractual commitments to the contrary.

Public sector (regulation): Here the focus is primarily on the regulatory aspects of the government role. (As such it presupposes some private function in provision.) Regulation may range from whether, in the first instance, a particular private enterprise is allowed to engage in supplying a good or service, and if so, for how long, and on what terms: the kind of good and service, the standards for provision as to geographic, demographic, or other reach, quantity, quality, pricing, possibly rates of return on a measure of invested capital or other relevant financial characteristics, operational

aspects of provision, etc., as well as matters of health and safety within and without the enterprise, impact on the environment, etc. There are also other, related issues, such as the frequency of reviews of regulatory decisions, the extent to which the regulatory regime might change, etc. Clearly, apart from the substantive financial and operational issues that arise in this context there are often closely related substantive and perhaps reputational legal and political ones as well.

Public sector (contract): Although the public sector historically may have had a significant or perhaps even monopolistic role in provision it may choose to allow (a) private enterprise(s) to supplant it in part or almost entirely.⁶⁴ Nonetheless, many aspects of provision which could otherwise have been dealt with by regulation might be addressed by contract. So, for example, a concession agreement is likely to run hundreds if not thousands of pages. It may specify not only the roles and responsibilities of the private enterprise and public sector parties to it in extraordinary detail but also include terms for taking account of innumerable foreseeable contingencies, procedural mechanisms for resolving disputes, consequences for one or another party's unjustified failure to comply with the terms of the contract, etc. (Moreover, there might still remain aspects of the enterprise's operation which could be subject to regulation, e.g., issues of health and safety, pollution, hazardous waste disposal, etc.)

Public sector (finance): Here we are concerned with the ways, if any, government plays a role directly or indirectly in providing financial resources to the enterprise to enable or sustain its operation. We largely do not attend here to resources afforded by price-related mechanisms in which the government is involved, ones which are canvassed in an illustrative way under "Form of payment for goods and services." Rather we refer to cases in which government might give a direct grant in money or kind (for example, donation of land), provide loan guarantees, or lend money at or below market rates and/or take a position as a subordinate lender, or effectively subsidize loans, etc. For example, in the latter case so-called private activity bonds in the U.S. are essentially treated the same as state and local bonds the interest income from which is tax-free.⁶⁵ Certainly any of these might have a significant bearing on the short- or long-term financial viability of the enterprise. At the same time it might well pose issues depending upon the conditions which must be met for the private provider to qualify for receipt of such resources, the duration and renewability of particular proffers of resources, and the legal and/or political context in which they are offered and might be accepted.

Enterprise (Operations – Staff and Key Suppliers): For this link/category overall, the subject is that of the full range of factors or considerations which might bear on the enterprise operating in such a way as to meet goals or

requirements – it has set, agreed to, or been set for it – for the provision of the good or service in terms of quantity, quality, and time (or other relevant measure). This subcategory is concerned with the number, roles, skills, capacities, commitments, individual and collective effectiveness, etc. of any and all who work at or for the enterprise as they might bear upon its effective and efficient operation. It might also be thought to include suppliers or contractors upon whom the enterprise is greatly reliant, for example, by virtue of the products or services being critical to the ongoing operation of the enterprise and/or perhaps the mode of provision of those products or services being highly integrated with that operation.

Enterprise (Operations – Other): This encompasses anything from the sufficiency of, among other things, the processes, machinery, tools, materials, and technology needed for such provision in principle and in practice, as well as the cost of acquiring or using them. Of course, these factors are necessarily linked with the enterprise having the requisite staff (or suppliers organized in a way to make effective use of those factors). The reference to "in practice" is meant to capture both the monetary and non-monetary dimensions of operational issues.

Enterprise (Finance): This link/category is concerned with the ability of the enterprise to have access to sufficient financial resources on appropriate terms as its dependence upon financial commitments from others and their financial

condition and reliability. With respect to the former it would include the ability to raise money for capital expenditures, operating expenses, or acquisitions, whether by way of equity or debt, the forms they take, the terms on which they are available (if at all), the need, the possibility, and prospective terms for enhancement, renewal, extension of the terms under which finance is currently being or has in the past been offered. It also encompasses the dependence of the enterprise on the financial condition, stability, reliability, etc. of others. This might range from the (continued) ability of others to provide promised infusions of equity or loans, fulfill commitments to pay for insured losses, serve as a swap counterparty, or make similar commitments, honor financial guarantees, or to meet contracted payment obligations for goods or services supplied.

Non-Enterprise Stakeholders: As noted, this link/category is meant to reach diverse kinds of "stakeholders." We are largely concerned here with those who, individually or as a group, by virtue of their transactional or other relationship with the enterprise are affected by it or in a position to affect it in substantial ways which bear on the enterprise's prospects for success in an operational and financial sense. They include those whose lives or livelihoods are or might be intertwined with the operation of the enterprise, by virtue of physical displacement, the effects of air or water pollution or hazardous discharges, other kinds of damage to the physical environment, interference with their economic activities, etc.

It is often expected to supply a large population and serve in that role for extended periods of time. Arguably by reason of that it is believed that extensive material, financial, and other resources are required to construct or establish it.

The former, of course, include direct employees of the enterprise and, depending upon the circumstances, employees of certain contractors with the enterprise, but as noted, we thought it more useful to place them in the separate "Enterprise (Operations – Staff and Key Suppliers)" category.

Ideally it would be helpful to relate the categorization described above to one or more of the several overlapping groups of factors which CalPERS takes into account in making infrastructure investment decisions. In some measure that is possible. The result is reflected in Table 1. More particularly, we have placed as best we could the various factors set forth in the Investment Program in the relevant categories in our formulation. In doing so we assume that CalPERS factors are to be applied at the enterprise level.

As can be seen from the table, our framework is comprehensive enough to encompass all those Program factors which were color-coded according to the groups from which they came. Some of the overlaps of the factors are evident from the presence in a column of factors of different colors. (As noted in the review of the Program factors above, there may be other commonalities depending how some of the factors are understood or interpreted.) However, it can be seen that there are no factors in some of the columns. This outcome would suggest that there has been no, little, or perhaps only implicit attention to the elements which are associated with the subject matter of those columns. If so, the table and its categorizations

may for that reason alone provide a useful tool for decision-making.

B. The Understanding Which Informs the Categories and Links

However, it – or some variation thereof reflecting, among other things, the strategic objectives of or the legal or policy constraints on the fund – may, for one or another reason be yet more helpful insofar as it might aid in more systematic and consistent analysis of potential investments at the enterprise level. In all events, whatever the particular approach we suggest it should be pursued in light of the understanding which informed how these particular categories were crafted.

First, briefly stated, the categories are alert to the three rough, "rule of thumb" ways in which infrastructure tends to be thought of conventionally.

The lead category is the nature of a particular would-be infrastructure-related good or service and its importance to those in need of it. That importance is typically associated with broad-based and sustained demand for a good or service so the question of the nature and extent of demand comes into play. (There is more than a hint in that of a sustained demand for the product and at least a suggestion of pricing strength on the part of the enterprise providing the good or service.) The fourth and sixth categories of demand and pricing more broadly capture these considerations.

The next category is derived from the typical association of infrastructure with a physically large

structure, facility, etc. being central to whether and how provision is achieved. It is often expected to supply a large population and serve in that role for extended periods of time. Arguably by reason of that it is believed that extensive material, financial, and other resources are required to construct or establish it. In turn, it is often identified with the opportunity to make large financial investments in tangible things which will retain their value – and perhaps be a continuing source of financial return – over a correspondingly long period. At the same time, though, the more extensive the facility, the larger may be its physical and other footprint and the more extended its reach geographically or otherwise, the greater the number of people affected and the potentially larger the impact on them.

The following category is the modality for provision. Infrastructure is frequently associated with monopolistic or quasi-monopolistic forms of supply. However, in fact, how a good or service is provided may range from a pure public monopoly to pure private competition. While the range of possible modalities may be strongly influenced by the technological and material basis for provision, it is informed by contention and judgments – among them political and economic judgments – about how pressing the need is to be met and the confidence required in the enterprise(s) ability to meet it and on what terms. These considerations are captured in the two categories somewhat esoterically labeled with references to endogenous

and exogenous constraints on competition and markets. In essence the aim here is to differentiate the impetus toward or away complete government supply – or for that matter total private, market based provision, driven or spurred by the material, technological, and related means for doing so.

Second, the categorization upon which Appendix A is based also offers a different and helpful way of thinking about a range of relevant issues. We believe so because most, though not all, categories focus explicitly or implicitly on one or another type of *person*, sometimes as an individual and sometimes through his or her role in a collective endeavor. In accordance with our definition of infrastructure it first focuses on the important or essential needs of people which are the *raison d'être* for the infrastructure-related enterprise itself. At the transactional level of the enterprise, translates the nature and scale of the important or essential individual needs to be met into aggregate terms under the rubric of as demand (by users or buyers, as the case may be) It then turns to other individuals whose behavior typically has had a direct bearing on whether and how the enterprise operates and whether and how it succeeds; supply (other suppliers competitors, individual or collective), public role (governmental actors), and enterprise role (including those who constitute – those who work for or at in a variety of capacities – but also arguably encompassing those who provide input in the form of materials or services as well as finance). Finally, it also recognizes the

...if the presence of a factor is identified with a higher risk of not achieving a desired outcome, its absence would, correspondingly, be thought to bear positively on achieving that outcome, that is, have association with “rewards.”

importance of other people who are stakeholders. That is, it focuses on those located within the immediate physical or other reach of the enterprise's impacts as well as others further removed but whose lives or livelihoods might be affected by it. In some cases the “stakes” for certain stakeholders may be as important as the needs of those for whom the enterprise exists to meet. For example, an enterprise organized to provide electric power may release effluents that can seriously harm the water supply for those who live in its vicinity.

Third, the table eschews any specific descriptive reference to “risks” – or rewards for that matter – or rather, the considerations associated with risks. But, of course, if the presence of a factor is identified with a higher risk of not achieving a desired outcome, its absence would, correspondingly, be thought to bear positively on achieving that outcome, that is, have association with “rewards.” So by reason of this fungible terminology alone it is better to focus on all relevant considerations which have a potentially non-trivial connection to the outcomes desired. Another reason, though, is that at least in certain contexts, especially those which pertain to the role of stakeholders, there is an inclination to frame the factors and considerations associated with them in terms of risk. Doing so tends to induce a “take” on them as being external to the enterprise, as possible inhibitors or obstacles to its effective operation, perhaps even its success. But that is in many respects both unrealistic and unfair. It is

unrealistic particularly insofar as it diminishes or denigrates the necessary and perhaps important role that certain stakeholders have in an affirmative sense in constituting the enterprise. It is not only unfair for the same reasons as for such stakeholders but also for others whose lives and livelihoods are in a different way entwined with the operation of the enterprise. This is especially so when there is an imposed or assumed commitment on the part of the enterprise (and investors in it) to do no harm to others or perhaps even to enhance their well-being in the course of pursuing the enterprise's immediate objectives.

Fourth, the categorizations reflected in the table not only readily enable systematic evaluation of investments according to a comprehensive set of factors but also more easily allow investors to compare different potential investments according to the same terms or criteria. Precisely how this approach might be employed in practice could vary. The description and analysis might be qualitative, serving just as a means to ground and frame the decision-making process in light of other materials. They might be very roughly quantitative insofar as points might be assigned to categories and/or factors. These might be weighted and aggregated in a way to allow a broad gauge comparison of choices or to rank a particular potential enterprise-level investment against some established standard of desirability or acceptability. Alternatively, the categorization might provide core elements of a detailed quantitative assessment

of a potential investment which produces estimates of outcomes for variables directly relevant to those among the funds' strategic objectives that are financial in nature.

A Tool for Assessing the Financial (and Perhaps Other) Import of Environmental, Governance and Social Factors at the Infrastructure-Related Enterprise Level

The International Finance Corporation, in conjunction with others, has formulated a “Financial Valuation Tool for Sustainability Investments” applicable to infrastructure and other projects which it has a role in financing, especially projects in developing or emerging markets countries. In essence it focuses on company decisions which link “sustainable” business operations to “sustainability” understood in terms of environmental, social, and governance (ESG) matters which have import for the well-being of stakeholders in relation to the relevant enterprise. In this formulation, the focus is a dual one. On one hand it is on so-called “[d]irect value (creation),” for example, “savings, increased productivity,” etc. from local workforce training (especially in an emerging markets country context). On the other it is on what is termed “[i]ndirect value (protection),” for example, averting “delay, disruption, added costs of expropriation, post-project litigation,” etc. by timely and meaningful engagement on communities at risk of displacement or harm to their livelihood from projects. While the latter is cast in terms of “risk” both aspects share the common purpose of estimating the “net present

value” to the company of “sustainability investments.” In this respect, consonant with the comments above, the ostensibly negative “risk” related considerations are no different from the ostensibly positive value creation factors.*

It is important to recognize that this particular tool was developed to make “the business case” for taking account of ESG matters of concern to or consequence for stakeholders affected by the projects in question. As such it eschews normative issues, that is, enterprises taking action because they have chosen or are required to do “what is right.” What can and should drive such decisions (and in turn, investors’ decisions with respect to how those enterprises act) is, of course, extremely important. In that respect, what can be said of this particular and similar tools is that they offer a valuable means for exploring when and how doing what is right and what yields a sufficient reward as a business/investment decision may overlap or coincide. However, it is important to recognize that in its nature the tool frames the issues as seen from the perspective of the enterprise, that is, in terms of benefits or detriments for the enterprise of certain of its behaviors or actions in relation to stakeholders. By contrast, by definition, a normative approach focuses on the consequences of those behaviors and actions from the perspective of those stakeholders.

* See “User Guide, Financial Valuation Tool for Sustainability Investments, Daft” International Finance Corporation, et al., January 2012, p. 7. <http://www.fvtool.com/page.php?node=aWQ9MTQ=> (registration required). (Accessed June 10, 2013) Collaborators included Rio Tinto Alcan, Deloitte and the Multilateral Investment Guarantee Agency (MIGA).

For example, where it is a matter of the good or service provided, the supply of sufficient potable water is a paramount concern in any society. In a developed country there might well be little worry in terms of the adequacy of supply.

An analysis of quite that sort for other objectives may well not be possible or at least easy, although there are tools available by which to incorporate factors related to some of such objectives into one.

We will consider one such tool in a subsequent paper, but in the accompanying textbox we briefly characterize it and its import for this essay. Note that the tool described has had particular application to what are termed developing or emerging market countries.

However, as described above, the definition for infrastructure proffered in the Paper was crafted to be applicable or relevant regardless of the country in which the enterprise was located. In principle, the categories we describe here which build upon those set forth in the Paper were formulated with the same intent in mind. The CalPERS’ approach is in a broad sense consistent with that approach. That is, the Emerging Market Principles referred to above are in addition to or distinguishable from other standards or criteria which its Infrastructure Program deems necessary to bring to bear when investments are to be made in emerging market countries. However, recall that CalPERS now applies them on a case by case basis, ostensibly at the enterprise level of investment.⁶⁶ Thus, the considerations embodied in the Principles may be more or less relevant or significant depending upon the particular category under consideration. Even then, in a number of instances the issue is in its nature no different as it pertains to developed or emerging market countries though it may have a

starker, more dramatic, or exaggerated character for them. We offer a few illustrations in that regard.

For example, where it is a matter of the good or service provided, the supply of sufficient potable water is a paramount concern in any society. In a developed country there might well be little worry in terms of the adequacy of supply. Certain issues of higher pricing might be the source of some distress, but given the relative affluence of the vast majority of people, increased prices likely would not pose a severe tradeoff between life-threatening lack of access to water and satisfaction of other needs. By contrast, in other countries, where many more people could be at the margin of survival economically speaking (and perhaps otherwise) the threat might be much more present and severe. In some measure heavy subsidies for water services to poor populations in those countries is indicative of that, as might also be tolerance for ostensible extensive unlawful access to water.⁶⁷

Again, the issue of possible monopoly supply is hardly unique to developed countries. However, it might have more of an “edge” in developing ones where the monopoly provider is a foreign one and where the memory and/or appreciation of the benefits of what was once a new or greatly expanded supply offered by that provider has dimmed.⁶⁸

In addition, insofar as there is regulation by government of the terms of provision there would, on its face, be similar concerns with respect to developed and developing countries. However

...while the lives and livelihoods of stakeholders not directly involved in the operation of the enterprise may be affected by the enterprise regardless of where it is located, the impacts may be more problematic to navigate in the developing country context.

insofar as the agencies in the latter could be of more recent vintage or perhaps even established in tandem with commencement of provision by a private enterprise, decision-making might be slower and the outcomes perhaps more uncertain.⁶⁹ Indeed, the regulatory regime might have been crafted for what had been a regime of purely public supply, one not easily or well adapted to a private role; or there may simply be multiple agencies with which to engage (although that matter is hardly unique to developing countries).⁷⁰

Also, in many respects there are a range of operational issues which would be posed in largely the same way regardless of the country in which the infrastructure-related enterprise operates. However, to the extent that foreign investment entails a dominant role for foreigners starting at the top down, knowledge about local labor and procurement practices, cultural norms and values which bear on transactions and personal interactions, the availability of sources of materials and equipment, and the identity and suitability of needed partners may be at a premium.⁷¹

Further there are a host of issues which are directly or indirectly linked to the finance of enterprises which, from the perspective of a foreign investor might be unfamiliar, strange, novel, or seemingly challenging to navigate. These issues range from laws pertaining to foreign direct investment, the nature and application of tax rules and incentives, the ostensible availability and strength of host government guarantees, strictures

pertaining to the import of materials (or perhaps even services), and the reciprocal link among any of the foregoing to concerns about the availability and rates of currency exchange.⁷²

Finally, while the lives and livelihoods of stakeholders not directly involved in the operation of the enterprise may be affected by the enterprise regardless of where it is located, the impacts may be more problematic to navigate in the developing country context. As noted already, some of that challenge might be due to adverse outcomes being identified with “foreigners” or it being more difficult to address those consequences because of unfamiliarity with local norms and values, culture, practices, etc. and corresponding local expectations. Some of it might derive from the fact, also noted previously, that the harms might be felt more acutely where those affected live “closer to the margin.” Also development is not infrequently associated with dramatic changes in the natural environment which can have profound consequences for communities of people who for long periods – hundreds of years if not longer – have rooted their ways of life in the natural environment. Where that is the case, in the absence of a strong commitment to anticipate such impacts and engage those affected communities in a fair and meaningful way, highly visible and highly contentious debates and actions may well follow.

All of the foregoing being said, the links/categories discussed in detail above are meant to be resources for pension funds as potential

investors who are alert to a range of important considerations: ones more associated with conventional approaches geared to financial results as well as others which tend to be identified with normative considerations (but may also bear on financial ones as well). Clearly, the approach is not a substitute for the appropriate thorough-going analysis and due diligence required of external asset managers or internal staff with respect to any particular enterprise-level investment. (Of course, additional work is required at the level of the investment vehicle, the asset class or grouping and overall investment portfolio, as the case may be).

A. Investments at an Enterprise Level and How They Appear to Relate to Fund Policies and Parameters

From a practical perspective the critical choices for a pension fund are those it makes for enterprise-level investments either directly by means of some investment vehicle. In the following section we first look at the results of CalPERS' choices overall in both those respects. That is we briefly describe every infrastructure investment it has made directly or indirectly at the enterprise level. This review allows for broad-gauge characterization of how those choices line up with the parameters which define CalPERS' Infrastructure Program. Second, although we are not in position to assess how the outcomes might have been different if an approach along the lines of what have outlined here had been taken, we describe in detail how that method plays out with respect to two of those enterprises.

Below we present a summary of such investments as CalPERS has made as of this writing. All but two of them have been through investment vehicles. For that reason we have gathered as much information as we could about what enterprise level investments have been made so far by those means. We provide below a list of all of CalPERS investments and then, under the investment vehicles what we have been able to learn about the enterprise level investments made up until now by those vehicles' managers.

In some cases we have not been able to ascertain important information about the investments,

including the amount of money invested. As can be seen from the description, a large proportion of the sums invested (or committed to investment) have been allocated to unlisted infrastructure funds, though CalPERS has acquired fractional direct interests in two infrastructure-related enterprises. We take note of, though do not canvas, the numerous publicly traded securities of infrastructure-related corporations and, it would appear, large number private equity limited partnership interests CalPERS has acquired with respect to enterprises, which might in part or whole be deemed to be infrastructure-related ones. Indeed, just in the context of investment in California, a recent CalPERS report on its infrastructure portfolio stated that it had: "\$94 million invested.... through its portfolio of commingled fund investments," that "Private Equity has more than \$2000 million," and "Fixed Income has invested \$100 million in credit enhancement for General Obligations of California."⁷³ It would appear that these investments need to be assessed in term of the goals and methods set forth in the Infrastructure Program. However, that does not, in fact, appear to have been done.⁷⁴

We group the investments – at the investment vehicle level – according to how CalPERS has classified them based on the three "Risk Segments" specified in its Infrastructure Program. That is, in fact, the only way CalPERS appears to use the classification system. Note that the accompanying text in the Program does not detail how exactly

CalPERS (or its delegate), employing the criteria of that classification scheme, determines which of the three labels is deemed to be the appropriate one to apply to any direct investment let alone an investment vehicle.⁷⁵ Only in one of the later, regular reports charting implementation of the Program, is there a brief and broad gauge statement as to why a particular investment was assigned to a Risk Segment.⁷⁶

Moreover, in those reports and in the most recent annual review there is some though not a complete reference to the Program's strategic objectives. Not surprisingly, in those reports such figures as are provided for investment returns in relation to the benchmarks which pertain to objective (B) and implicitly objective (C). Also, the description of investments based on the risk classifications, and regional and concentration requirements is apposite with (E). As such, though, the figures do not show the degree to which investment capital has been preserved and, correspondingly the role of cash distributions in investment returns as referenced in objectives (A) and (C). There is also no mention of objectives (F), (G), and (H), except implicitly there is a reference to what would seem to be objective (H) insofar as there is mention of meetings convened to advance CalPERS' plan to target up to \$800 million for investments in California infrastructure over three years.⁷⁷ Except for the absence of any remarks on the would-be in-state effort, broadly speaking the same characterization

applies to CalPERS' infrastructure consultant's annual review of the progress of the Program.⁷⁸

The reader will recall that CalPERS sets permissible ranges within which the allocation of infrastructure investments in the aggregate must fall. These are 25-75% for Defensive investments; 25-65% for Defensive Plus investments; and 0-10% for Extended Investments.⁷⁹ There is no discussion in the Infrastructure Program as to the reasons for this particular choice of figures.⁸⁰ (In all events, though, the Infrastructure Program provides that "the requirement to meet the Infrastructure Key Policy Parameters pertaining to Risk Segments and Geographic Segments as outlined below will be applicable for the Program only when the [aggregate net asset value of all the infrastructure investments] exceeds \$3.0 billion."⁸¹)

DEFENSIVE

1. Neptune Regional Transmission (Direct Investment): purchase for ~\$200 million in February, 2012 of 75.0% of Class C (passive investor) shares) in this company which owns and operates a 65 mile undersea and underground high voltage direct current (HVDC) transmission line that extends under water and underground from New Jersey to Long Island, New York and under a long-term agreement with the Long Island Power Authority, provides power electricity to consumers.⁸²

DEFENSIVE PLUS

2. Alinda Infrastructure Fund I, L.P.

Commitment: \$100 million in May, 2007

Fund size at close: \$3 billion

Investments:

- **American Roads LLC (“American Roads”):** A \$200 million equity investment in October, 2006. American Roads has a portfolio of toll concessions in the United States, namely the Detroit-Windsor Tunnel and four bridges in Alabama.⁸³
- **SourceGas:** A \$437 million equity investment in March, 2007 with GE Financial Services and with each being 50% owners. The company operates distribution, gathering, and transmission pipelines, as well as storage facilities. It also sells and repairs in-home heating and cooling appliances.⁸⁴
- **Reliance Home Comfort L.P. (“Reliance”):** A \$356 million equity investment (representing 34% of the fund) in June, 2007. Reliance is an enterprise which derives recurring monthly revenues from owning and servicing water heaters and related assets for residential and commercial customers in Ontario, Canada.⁸⁵
- **Reliance Security Services (“RSS”):** A \$174 million equity investment on the same date as the acquisition of Reliance. RSS is a security monitoring business in Canada.⁸⁶
- **Republic Intelligent Transportation Services, Inc. (“Republic”):** A \$36 million equity investment in December, 2007. Republic maintained,

*tested, repaired, replaced, and upgraded street lights, traffic signals and other intelligent transportation systems in approximately 200 cities in six US states. The fund sold its entire interest in Republic in September 2010.*⁸⁷

- **BAA Airports Ltd. (“BAA”):** A \$604 million equity investment in July, 2007 for a minority interest. BAA was the world’s largest airport operator which owned and operated eight airports, seven of which were wholly-owned and in the United Kingdom, three of which regulators required BAA to sell.⁸⁸
- **South Staffordshire Water:** an ~£400 million (\$823 million) purchase on November, 2007 of a regulated water utility in the UK.⁸⁹
- **NorTex Gas Storage:** a \$505 million purchase in April, 2010 from the owner and operator of two natural gas storage facilities located in northern Texas.⁹⁰
- **InterPark: what would seem to be** a joint investment with Alinda Infrastructure Fund II of \$800 million) in June, 2011 in a leading owner-operator of central business district parking facilities in the United States, which manages approximately 37,000 parking spaces located in 13 states along with an owned and managed major off-airport parking business through its PreFlight brand.⁹¹
- **BAA Airports Ltd. (“BAA”):** a joint purchase with Alinda Infrastructure Fund II in October, 2011 of a 5.88% stake in FGP Topco Ltd., parent company of BAA, for a price of GBP

280 million (~EUR 325 million)(~ \$400 million) in October 2011.⁹²

Note that according to the latest report (dated June 30, 2012) we have been able to locate, 87.5% of the capital of the fund had been called.⁹³

3. Alinda Infrastructure Fund II

Commitment: \$300 million in December, 2009

Fund size at close: \$4,097 million

Investments:

- **Binnenlandse Container Terminals NederlandourceGas (BCTN):** a \$63 million transaction in December, 2010.⁹⁴ BCTN, a leading Dutch inland barge terminal owner and operator owns and operates four intermodal terminals in Nijmegen, Den Bosch, Wanssum and Hengelo, and handles approximately 20% of container volumes barged in the Netherlands. BCTN serves markets and industrial areas located along the Rhine and Maas Rivers and the Dutch canals.
- **agri.capital Group S.A. (“agri.capital”):** funds managed by Alinda Capital agree in March, 2011 to invest over €300 million (~\$400 million) in agri.capital, a leading biogas and biomethane company in Europe over the next three years to fund the anticipated growth of the business. Alinda acquires a majority interest in agri.capital with the company’s existing common equity investors and certain other early-stage investors will continue to participate in the ownership of the business.⁹⁵

- **Houston Fuel Oil Terminal Company:** purchase in October, 2011 by Alinda Capital Partners (in part on behalf of Alinda Infrastructure Fund II, L.P.) of 100% ownership of Houston Fuel Oil Terminal Company for \$1.325 billion, a company which owns and operates a 13.8 million barrel oil storage and blending residual fuel facility located on the Houston Ship Channel, with pipeline links to major refineries. The Company stores, blends, and transports residual and crude oil via pipeline, barge, rail, truck and ship for major oil companies, refiners, carbon black manufacturers, international trading firms and bunker suppliers.⁹⁶
- **DukeNet:** Alinda Capital Partners buys 50 percent of DukeNet Communications for \$137 million, December, 2010 (which appears attributable to Alinda Infrastructure Fund II, L.P.). DukeNet, one of the largest wholesale fiber-based carriers in the Southeast operates a fiber optic network of more than 5,300 miles in four states, providing offers a wide variety of services including data center connectivity, cellular backhaul bandwidth and Ethernet services.⁹⁷
- **Santa Paula Water:** acquisition for \$63 million in July, 2008 of this wastewater treatment facility public/private partnership located in Santa Paula, California.⁹⁸
- **InterPark:** a joint investment with Alinda Infrastructure Fund I of \$800 million (?) in June, 2011 in a leading owner-operator

of central business district parking facilities in the United States, which manages approximately 37,000 parking spaces located in 13 states along with an owned and managed major off-airport parking business through its PreFlight brand.⁹⁹

- **BAA Airports Ltd. (“BAA”):** a joint purchase with Alinda Infrastructure Fund I in October, 2011 of a 5.88% stake in FGP Topco Ltd., parent company of BAA, for a price of £280 million (~€325 million)(~\$400 million)¹⁰⁰
- **Regency Intrastate Gas Systems:** a \$535 million investment in March, 2009 in this Federal Energy Regulatory regulated gas pipeline system in Louisiana which provides an essential infrastructure link to get gas from East Texas and the Haynesville Shale gas field in Northern Louisiana to truck lines that serve the New York and Chicago markets.¹⁰¹

Note that according to the latest report (dated June 30, 2012) we have been able to locate, 57.0% of the capital of the fund had been called.¹⁰²

4. Carlyle Infrastructure Partners

Commitment: \$100 million

Fund Size at Close: \$1,150 million

Investments:

- **Synagro Technologies:** investment of \$722 million (\$455 million in cash and the assumption of \$310 million in debt) in April, 2007 in this company which recycles biosolids and other organic residuals for municipal and industrial customers in the United States and is the

only national company focused exclusively on the estimated \$8 billion organic residuals industry, which includes water and wastewater residuals.¹⁰³ *In 2013 Synagro “sought bankruptcy protection with a plan to sell most of its assets to private-equity firm EQT Infrastructure II LP [for]....about \$455 million.”*¹⁰⁴

- **ITS Technologies & Logistics, LLC:** acquisition in May, 2008 for an undisclosed amount of a majority interest in this intermodal services company which generates more than 90% of its revenue from lift-on/lift-off of containers from trains and trucks, the maintenance and repair of transport and lift equipment, and checkpoint administration. Other services include drayage, rail switching, auto unloading, near-dock port operations, and chassis pool services.¹⁰⁵
- **Project Service:** Joint venture with Doctor’s Associates in November, 2009 committing to invest \$230 million in improvements and upgrades in connection with acquisition of 35 year concession to operate and maintain 23 highway service areas across the state of Connecticut along a (currently) toll-free highway.¹⁰⁶
- **Qube:** commitment in February, 2011 for a potential \$116.5 million investment – unconditional subscription for shares for \$46.3 million and the right to purchase additional shares for \$70.3 million – for up to a 15 percent interest in this publicly traded Australian port-side logistics company.¹⁰⁷

- **Illinois Central School Bus LLC:** purchase in June 2010 for an undisclosed amount of Pontiac, Michigan based provider of school bus transportation services.¹⁰⁸
- **Park Water Company:** purchase in December 2010 for \$102 million of a family-owned business that distributes water to approximately 225,000 people in California’s Los Angeles County, Apple Valley and Missoula, Montana.¹⁰⁹
- **(Certain assets of?) Cogentrix:** September 2012 commitment – deal was scheduled to close by the end of 2012 – to purchase for an undisclosed amount of North American power assets from Cogentrix, which has significant ownership interests in coal-fired power plants in Florida and Virginia and solar power facilities in California as well as development pipeline of other projects. (Cogentrix has other assets in Turkey and the Dominican Republic.) Note that CalPERS has a small general partner stake with respect to these enterprises through its financial stake in the Carlyle Group, which generates at least carry, fees and distributions.¹¹⁰ We do not know whether the Group co-invests with limited partnerships in its infrastructure funds; if so, CalPERS would indirectly have a small, additional interest in the enterprises.

5. Global Infrastructure Partners Fund II (GIP II)

Commitment: \$250 million plus up to \$25 million fees in July, 2012

Size of Fund at Close: \$8.0 billion

Investments:

- **Edinburgh Airport:** bought for £807m (~ \$1.3 billion) in June 2012.¹¹¹

6. Gatwick Airport (Direct Investment): committed \$155 million in 2010 for the purchase of a 12.7% equity interest in this regulated airport in the United Kingdom (and provisions for bridge costs and future administrative expenses).¹¹²

Note that CalPERS previously had an indirect interest in Gatwick as a 2007 investor in BAA through the Alinda Infrastructure Fund I. That interest was disposed of in 2009 when the BAA sold Gatwick to Global Infrastructure Partners.¹¹³ (Recall that CalPERS recently invested in one of this asset manager’s funds, Global Infrastructure Partners Fund II. As of 2011, Global Infrastructure Partners held a 41.95% stake in Gatwick.¹¹⁴)

EXTENDED

CIM Infrastructure (V)

Commitment: \$200 million in 2007.

Size of Fund at Close: \$205 million?

Investments:

- **SkyPower Limited:** Loan for an undisclosed sum to SkyPower Corp. in late 2009 and purchase in November, 2009 for an undisclosed sum of solar assets from SkyPower Corp and the creation of a new entity named

SkyPower Limited. Assets include a 50 percent stake in the 9.1 megawatt First Light energy park – the first operational utility-scale solar energy project in Canada – as well as a pipeline of 50 additional projects representing the potential for more than 500 megawatts of solar power generation nameplate capacity.¹¹⁵

- **Canadian Solar Inc./CSI Skypower:** *SkyPower Limited in July 2012 sells to Canadian Solar Inc. (CSI) controlling interests in 16 utility-scale solar projects* for \$181 million and a five-year warrant for 9.9% of CSI's outstanding shares at an exercise price of \$5 and establishes a 50:50 joint venture agreement with CSI, called CSI SkyPower to operate in Africa, the Middle East and South America through the pursuit of power purchase agreements and the development and construction of solar power plants. CSI is a publicly traded (NASDAQ) vertically integrated provider of ingots, wafers, solar cells, solar modules, solar power systems and specialized solar products with operations in North America, Europe, Australia and Asia.¹¹⁶
- **Antelope Valley Water Storage Project:** purchase in October 2007 for unreported sum of agricultural land in Southern California with a program to develop the Antelope Valley Water Bank, a proposed 500,000 acre feet underground storage capacity which customers will have the ability to put and take 100,000 AF of water annually until 2035.

Note that at least for three of the infrastructure funds, substantial portions of the listed commitments had not been called as of early 2012.¹¹⁷

B. The Alignment of the Enterprise-Level investments with What CalPERS Understands infrastructure to Be

In sum, at the enterprise level a fair number of the investments fall *within what CalPERS denominates as infrastructure (insofar as it is associated with particular kinds of physical facilities) and might conventionally be understood to do so*. They include: **American Roads LLC** (roads and bridges); **BAA Airports Ltd.** (airports); **Gatwick Airport** (airports); **Edinburgh Airport** (airports); **South Staffordshire Water** (water distribution); **Park Water Company** (water distribution); **Antelope Valley Water Storage Project** (water storage); **Santa Paula Water** (wastewater treatment facility); **Binnenlandse Container Terminals Nederland** (inland barge terminals); **Qube** (port-side logistics); **SourceGas LLC** (natural gas pipelines); **NorTex Gas Storage** (natural gas storage); **Houston Fuel Oil Terminal Company** (storage and blending residual fuel facility and transport by pipeline); **Regency Intrastate Gas Systems** (gas pipeline); **agri.capital** (biogas and biomethane producer); (assets of) **Cogentrix** (coal-fired power plants and solar power facilities); **SkyPower Limited** (solar power facilities); **Neptune Regional Transmission** (high voltage direct current (HVDC) transmission line); and **DukeNet**

There are yet other instances in which the enterprise in question engages not only in activities which in conventional and our terms are seen as infrastructure-related but also others which are at best ancillary or otherwise loosely connected to those core activities.

(fiber optic network for (data center connectivity, cellular backhaul bandwidth and Ethernet services). **Synagro Technologies** (recycling of biosolids and other organic residuals) in many respects falls within this group especially insofar as it treats and disposes of municipal and industrial wastewater but, per the next two paragraphs it engages in diverse other activities, some linked to the ones just noted and others further removed.

At the other extreme there are some investments which at first blush do not appear to fall within the ambit of what CalPERS – or for that matter, many others – would term infrastructure-related ones. They include **Reliance Home Comfort L.P.** (ownership and service of water heaters and related assets), **Reliance Security Services** (security monitoring business in Canada)(by the Alinda Infrastructure Fund I, L.P.), and **Illinois Central School Bus LLC** (school bus transportation services)(by Carlyle Infrastructure Partners).

There are still others which are one or more steps removed from what CalPERS or others might plausibly view as infrastructure: they include **InterPark** (central business district parking and off-airport parking business), **Project Service** (operation and maintenance of highway service areas), and **ITS Technologies & Logistics, LLC** (lift-on/lift-off of containers from trains and trucks, the maintenance and repair of transport and lift equipment, and checkpoint administration).

There are yet other instances in which the enterprise in question engages not only in

activities which in conventional and our terms are seen as infrastructure-related but also others which are at best ancillary or otherwise loosely connected to those core activities. So, for example the core activity of the **BAA** group of airports along with **Gatwick** and **Edinburgh** airports is the operation of facilities for the transport by airplane of arriving and departing passengers. However, the enterprise also affords facilities – and derives significant revenues from – the leasing of commercial space for the sale of a variety of goods and services, many of which might be completely unrelated to air travel. Two other examples are **SourceGas**, the central activity of which is to store and distribute gas but which also sells and repairs heating and cooling appliances, and **agri.capital**, a principal activity of which is the production and supply of biogas and biomethane but which also (as a byproduct) makes and sells fertilizer. Somewhat similar, though only illustrative, is **SkyPower Limited's** (very small) interest in **Canadian Solar Inc.** as a producer of ingots, wafers, solar cells, solar modules, solar power systems and specialized solar products.

A substantial portion of demand for agri.capital's fuel is local in nature, with customers nearby to small scale production facilities. In that respect its targets include public utilities and energy providers (with municipal energy providers apparently being important).

C. The Enterprise Investments Seen Differently: Through the Lens of the Categories and Approach Proposed Here

CASE 1: AGRICAPITAL GROUP S.A.

The first enterprise level investment we consider in detail is that for agri.capital, which, according to the company, "is the leading biogas and biomethane company in Europe."¹¹⁸

In late 2009 CalPERS made a \$300 million commitment to Alinda Infrastructure Fund II, which closed as a \$4 billion vehicle.¹¹⁹

According to a consultant's report to another pension fund – the State Universities Retirement System of Illinois – that fund's goal was "to capitalize on attractive investment opportunities in infrastructure in North America and Europe." Its target was to be "investments that provide essential services to communities, governments and businesses."¹²⁰

The report goes on to describe the "Manager's investment thesis" as being "based on" "identifying infrastructure assets and companies which are essential to communities, businesses, and governments," ones it sees "likely to provide steady cash-flow returns growing at rates higher than inflation." The premise is that "[t]he usage, cost, and revenues of such assets are expected to remain reasonably stable regardless of economic or market cycles and are less susceptible to changes in macro-economic factors such as interest rates, inflation, and economic growth rates." Further, the report describes the fund's target market as being "the

United States, Canada, and Europe where fundamental demographic and macro-economic factors are highly favorable to long-term institutional investments in the infrastructure sector." The environment is deemed favorable because of "traditional sources such as taxes and governmental debt constrained from providing large amounts of capital needed for new infrastructure and the maintenance and upkeep of existing infrastructure."¹²¹

In March, 2011 it was announced that Alinda Capital on behalf of the Alinda Infrastructure Fund II, L.P. would invest over €300 million – roughly \$400 million – in agri.capital over the following three years.¹²² In so doing it would acquire a majority interest in the company. It was stated that "[the company's existing common equity investors and certain other early-stage investors [w]ould continue to participate in the ownership of the business."¹²³ According to the company, agri.capital "develops, plans and operates biogas plants for the production of environmentally friendly energy. With its plant portfolio, agri.capital ranks among the largest decentralised biogas-based energy providers in Europe. Along with the generation of electricity and heat from biogas, the company's core business areas also include the production of biomethane (also known as bio-natural gas) to feed into the natural gas grid."¹²⁴

The case of agri.capital is an interesting one for several reasons. First, the provision of energy can be broadly associated with infrastructure assets and enterprises, which in the words of the

consultant, it might be thought of as "essential to communities, businesses, and governments." However while agri.capital is certainly a source of particular forms of energy, its relation to the provision of energy and the physical context within which it operates seem removed from the stereotypical image of a large scale, centralized, perhaps market dominant energy provider. As we shall see, the firm engages in provision though highly decentralized, small operations in competition with potentially many other enterprises.

Second the firm is strongly attentive to the seeming benefits of both the energy it produces and how it produces it in terms of renewable energy, climate change, etc. This offers the occasion to consider it to be an enterprise which might operate in a way not only commensurate with a pension fund's strategic financial objectives but also could be apposite with other, non-financial strategic objectives as well. However, at the same time, as we shall discuss, there might be issues about how certain stakeholder interests might be affected which cut the other way.

Third, although the "thesis" sketched by the Alinda Manager suggests that investment by way of that vehicle might be one source of the "large amounts of [needed] capital" which are not available because "traditional sources such as taxes and government debt [are] constrained," the picture does not fit that of agri.capital. Indeed, in some measure it is the opposite at least insofar as government action and subsidies might be important to the success of the agri.capital business model.

Below we present a comprehensive and systematic narrative for agri.capital as an enterprise in light of the meaning and reach of the links/categories which we have suggested as a tool for analysis which might serve better than the multiple and overlapping formulations contained in the CalPERS infrastructure program. In Appendix B we offer a contrasting view of the enterprise primarily through the lens of the CalPERS Program's three-part Risk Segment scheme.)

1. Product or service:

Agri.capital produces biogas by fermenting "agricultural waste such as liquid manure or dung" as well as "different energy crops" such as "maize... [and] many types of grain, grasses, sugar beet or hedge trimmings and cuttings"¹²⁵ The biogas is then "is used on site for the production of electricity and heat" through cogeneration. "The resulting electricity is directly fed into the electricity grid." The heat produced "can be used in the area surrounding the biogas plant," for example, "residential houses, stables, greenhouses or municipal facilities, as well as process heating for industrial plants."¹²⁶ It also extracts biomethane – which "has the same properties as fossil fuel natural gas." Biomethane is burned in cogeneration facilities to produce electricity and heat and "{feed} into the local natural gas grid" and potentially can be used as a "fuel for vehicles."¹²⁷ It appears that agri.capital may have a modest line of business in providing advisory and technical services for operations in the supply chain for facilities which produce

biogas and biomethane. While such activity would not entail direct provision of the sort described, it represents an adjunct line of business indirectly, but fairly closed tied to such provision.¹²⁸

It appears that a minor figurative and literal byproduct of agri.capital's operations toward that end is the production of materials which can serve as fertilizers, an activity which would not be seen as infrastructure-related.¹²⁹

2. Facilities, structures, etc.

While agri.capital is, as noted, a source of certain forms of energy, the material means through by which it engages in provision seem quite removed from the stereotypical image of large scale, centralized facilities, structures, etc. Rather, insofar as we are concerned with its primary business of producing fuels, the firm manufactures them though a multiplicity of facilities which are very small in size physically, require modest capital to construct (on the order of a few million Euros), have individual operations tied to the particular localities in which they are situated and where the biogas fuel is used, and are not linked with one another.¹³⁰ As noted in the next section, one aspect of its business does involve the supply of biomethane to a national scale grid by agri.capital which makes the fuel available to a wide range of geographically dispersed users but agri.capital has no role with respect to the grid – owned and operated by others – except as a user.

3. Demand

A substantial portion of demand for agri.capital's fuel is local in nature, with customers nearby to small scale production facilities. In that respect its targets include public utilities and energy providers (with municipal energy providers apparently being important). It also makes efforts to market directly to block heating station operators.¹³¹ Biogas marketed target groups include stables, warehouses, residential houses, greenhouses, industrial buildings, and municipal facilities (e.g., schools, public swimming-pools, hospitals).¹³² Geographically speaking local users across Germany appear to be the core market though there are efforts to expand the reach of the enterprise's operations to other western European countries. There are diverse reports about the reach of agri.capital's operations outside of Germany.¹³³ However, as described, agri.capital supplies biomethane more broadly: to a country-scale natural gas distribution network; hence nominally accessing demand widely through that network. In all events, under The German Renewable Energy Act (EEG) renewable sources such as agri.capital have the right to feed them to public grids at a guaranteed minimum price.¹³⁴ At this time, it appears that the cost of refining biogas to use as fuel for vehicles makes it too expensive as compared to gasoline, so demand of that sort is limited if not nonexistent.¹³⁵ It would seem that such non-infrastructure related fertilizer business as agri.capital, by virtue of transportation costs,

be confined to local demand in the area where it is produced as a by-product.

4. Supply – Endogenous constraints on competition or markets

There would appear to be little inherent in the nature of provision by agri.capital which would point to other than market-based/competitive provision. That is, in principle, there are potentially innumerable others who would be potential suppliers of biogas and biomethane. That being said, the materials available suggest that because of its experience with building biogas plants, agri.capital might be at an advantage and correspondingly be in something of a first-mover position with respect to supply in particular localities. Indeed, it seems that in some measure by virtue of that agri.capital has been able to “lock in” relatively long term contracts of supply to municipal and perhaps other users in particular localities. In that sense it would have a monopoly on a portion of those local markets. By contrast, agri.capital as a supplier of biomethane to the natural gas grid would be little different from any other supplier. As noted there is nothing about the scale of provision which might tend to limit who would be in a position to supply what agri.capital provides.

5. Supply – Exogenous constraints on competition or markets

There would appear to be little or nothing by virtue of direct regulatory or related public action which limits entry of competitors to agri.capital. With regard to the production of biogas and bio-

methane, agri.capital would appear to be no differently situated than other producers with regard to health, safety, siting, operational, or other regulations which would bear upon their ability to be a supplier. The same would appear to be true insofar as there are financial incentives or subsidies which might support or spur supply in those terms.

6. Pricing

At first blush, agri.capital would appear to have no special pricing power with regard to supply of biogas or biomethane. Information is not available to characterize how the availability of each from other competitive suppliers bears on pricing. Clearly, insofar as agri.capital has and will be successful in gaining long-term contracts for supply it then presumably has the benefit of locked-in pricing for a number of years. However, it would seem that agri.capital's pricing power is influenced – perhaps significantly so – by its reliance on higher tariffs allowed by the EEG for the use of biomethane in the cogeneration of heat and electricity and for supply of biomethane to the national gas network.¹³⁶ Of course, in this regard, it is similarly situated to others who produce in comparable ways. Note, though, that the EEG scheme has recently been revised in a way which would be adverse to a supplier like agri.capital and is subject to further change. This poses questions for the future of agri.capital's pricing (and profits) regime.¹³⁷ Moreover, agri.capital has stated its intent to expand its business to other western European countries so the existence – or not –

it is not clear the extent to which there are or would be a limited number of producers for supply because of geographic constraints, other markets in which they can sell their products, and the importance and pricing of transporting those products to the biogas plants.

of incentives and subsidies similar to those afforded in Germany might be relevant to its pricing power and more generally its success elsewhere.¹³⁸

All the foregoing being said it is not clear how potentially large sources of gas produced from newly discovered sources in shale might dramatically alter the supply and pricing calculus.¹³⁹

7. Form of payment for goods and services

As already discussed, users pay the ostensible “full” price of the biogas and methane supplied to them. What they do pay out of pocket depends upon how the subsidies and incentives discussed above are given effect.

8. Public sector role (operations)

There is no public sector operational role in the provision of biogas and biomethane in the manner done by agri.capital (or for that matter in any other way).

9. Public sector role (regulation)

There is regulation as it might bear on agri.capital’s license to operate and operate on an ongoing basis as they relate to health, safety, siting, environmental, and other issues both within the enterprise and inclusive of how its operation affects the surrounding community.

10. Public sector role (contract)

It would appear that provision of biogas and biomethane has never or for many years not been a matter of public supply so no issues of public authorities contracting with agri.capital or others to afford such supply in their stead arise. As noted, among agri.capital’s customers have been municipal

ones, but in this regard they would seem to be no differently situated from other private customers.

11. Public sector role (finance)

The public sector appears to play both a direct and indirect role in the finance of agri.capital as an enterprise. It seems to have been a source of direct project funding, regional subsidies, and low-interest tax credits.¹⁴⁰ Per the discussion above, government has indirectly, under the EEG, mandated the feed-in tariffs for electricity produced by biogas and a higher tariff for the use of biomethane in combined heat and power plants, and reduced the cost of access of biomethane supplied to the national gas EEG. Also, as noted, there appear to be bonuses for the use of dedicated energy crops, CHP technologies, manure and formaldehyde in the production of biogas. All of the foregoing refers to what is available in Germany.

12. Enterprise (operations – staff and key suppliers)

Clearly biogas product is dependent upon a reliable source of raw materials. It appears that agri.capital relies on local farmers and agricultural cooperatives to supply crops and manure on suitable terms. Ideally it would seek sufficiently long contracts for provision of such materials. For example, note has been taken of the company’s reliance on r.e Bionergie GmbH for long-term supply of raw materials. Also, it appears that agri.capital relies on stable relationships with farmer-operators/partners on suitable terms over long periods of time.¹⁴¹ In any event, it is not clear

the extent to which there are or would be a limited number of producers for supply because of geographic constraints, other markets in which they can sell their products, and the importance and pricing of transporting those products to the biogas plants. Other considerations, the importance of which is not possible to assess, concern the quality of and uniformity of supply of raw materials being sufficient for utilization in plants and related one of the cost of preparing them for use at the plant.

The company also has a need for adequate and stable water supplies for its plant operations; how serious a challenge, if any, that may prove to be is not clear. On the product side agri.capital needs to be able to dispose, through sale or otherwise, of fermentation residues as fertilizer; how large that looms is uncertain.

As a general matter, as suggested under **Public role (regulation)**, agri.capital requires a range of regulatory approvals relating to the siting and operation of plants.

As a general matter it has been suggested there is significant complexity of plants to manage, with safety measures being particularly important.¹⁴²

Some worry has been expressed about significant safety issues with plant systems as well as the risks from fire, lightning and explosions.

13. Enterprise (operations – other)

Although the general operational and maintenance issues (and costs) are likely to vary with the raw material, one description (which appears to relate to the use of dung) appears broadly applicable:

acquisition (purchase, collection and transportation) of the substrate; water supply for cleaning the stable and mixing the substrate; feeding and operating of the plant; supervision, maintenance and repair of the plant; storage and disposal of the slurry; gas distribution and utilization; and administration.” For large plants with high water consumption, there are additional issues, “construction costs for water piping or fees for public water supply,” “[t]he question of water rights” and the need “to cover the demand for water during dry periods.”¹⁴³

There are, in fact, a wide range of raw materials which can be used to produce biogas. Among those used by agri.capital are energy crops, decaying garbage, and poultry manure. A challenge for a producer is to have a suitable process for transforming each particular raw material. For example, agri.capital, in connection with the use of poultry manure in place of energy crops refers to the “special developed process [which it].used for this...which ensures...stable plan operation.”¹⁴⁴

Another task which likely varies with the source material concerns impurities in the raw biogas. For example, [t]race amounts of hydrogen, nitrogen, carbon monoxide, saturated and halogenated carbohydrates, sulphur gases and siloxanes are occasionally present in the biogas. Usually the mixed gas is saturated with water vapour and may contain dust particles.” These can “harm the gas distributing system or the gas utilities or cause unwanted exhaust products. High quality is thus required in order to avoid performance

disturbances.¹⁴⁵ Moreover, it has been suggested that raw biogas “contains too much [carbon dioxide] to burn efficiently” although there are “many methods for refining the biogas to suit different purposes” the “cost of refining can offset the low-cost of producing the raw gas.”¹⁴⁶ The gas also has to be refined before it can be “transported and used, or put into existing pipeline networks.”¹⁴⁷

The use of food waste poses similar and other issues. It is ‘contaminated with non-organic material such as plastics.’ Biogas operators rely on waste collectors to remove pollutants but “[t]he ease of cleaning can vary a lot and it’s notoriously hard... and it is notoriously hard to implement rigorous standards for household food waste [as compared to a food processing factory].” Also, waste often comes from many sources and even when the different feedstocks have been cleaned. The mix [and its quality] make[] life difficult for the plant operator?”¹⁴⁸

14. Enterprise (finance)

As described, agri.capital appears to be significantly reliant on subsidies for prices, cost of access to distribution network, and to finance plants. The need remarked on above for stable relationships with farmer-operators/partners on suitable terms over long periods of time implicates not only issues of a guaranteed supply but also those of relatively stable or assured costs in connection with it. Those cost factors need to be consistent with agri.capital’s ability to meet long-term supply commitments. More particularly, the terms of partnerships with farmers (and others) in running

plants, e.g., level of salary and performance-related share would seem to be critical. Clearly agri.capital must have the ability to lease or purchase land on which to situate plant operations at an acceptable price. Presumably the land must be located sufficiently close to farm suppliers, a requirement which raises financial as well as operational issues. Also, although agri.capital has enjoyed bio-methane feed-in rights and tariffs with respect to public grids, it, like other “renewable energy producer[s],...must pay the costs incurred by connecting the plant to the grid connection point.” The significance of this depends, of course, on how large and variable such costs are and the degree of control agri.capital has over them.¹⁴⁹

15. Non-Enterprise Stakeholders

In certain, potentially major respects and broadly speaking, the enterprise’s operations might be viewed quite positively by stakeholders concerned with renewable sources of energy which reduce the carbon dioxide burden on the atmosphere. Discourse around biogas production seems to be of that character and the general policies enacted to support and subsidize biogas (and biomethane) production from which agri.capital benefits are testimony to that.

However, there are stakeholders for whom biogas (and biomethane) plant actions might be seen as problematic though precisely how relevant some of the issues are as to agri.capital’s functions in particular and with what import for them is not clear.

For example, as a general matter, consumer advocates express concern about the upward

pressures of significantly expanded operations might put on market prices for food and fodder crops. However, this issue may not be a problem for plants in Germany. Also, there appears to have been a move (on agri.capital’s part and perhaps others) to a more diversified source of material for its plants.¹⁵⁰

For communities surrounding biogas plants there are at least nominally a wide range of potential concerns. There might be upward pressures on land prices from increased usage of farmland. There are fears or worries about the release of offensive smells from plants (with a possible need to locate plants far from populated areas and corresponding increased costs of transportation to them.); plant’s creating noise pollution; the timing and/or volume of traffic from delivery of source materials being disruptive; the risk of hazard from gases and liquids which might leak, e.g., ammonia, and hydrogen sulfide, escaping from plants.¹⁵¹

There are related issues as to the suitable storage and disposal of digestate and leakage of fermentation substrates and the impact of reapplication of plant fermentation residues on fields.

Other concerns do not seem to apply immediately to agri.capital’s operations though they might have import for their operations and the operations of others in the aggregate. For example, some have suggested that there is a potential for large acreages with monocultures endangering biodiversity; effects on soil and water by intensive industrial agriculture.

2. CASE 2: BAA AIRPORTS LTD. (HOLDING COMPANY: FGP TOPCO LTD)

The second enterprise level investment we consider is that for BAA Airports Ltd. At first blush it more closely resembles the enterprises in which the Alinda Infrastructure Fund I, L.P. was ostensibly committed to investing.¹⁵² However, in this case, as discussed below, it was many years ago that taxpayers were relieved of any financial responsibility for the airports in question.

In May, 2007, CalPERS made a \$100 million commitment to the Alinda Infrastructure Fund I which raised a total of \$3 billion.¹⁵³ In July, 2007 that fund invested \$604 million to acquire a minority share of ownership ostensibly in BAA Airports Ltd.¹⁵⁴ It appears more accurate to say that the investment was in FGP Topco Ltd. because it is the holding company for BAA Airports Ltd.¹⁵⁵ At the time it owned and operated eight airports, seven of which were in the United Kingdom – Heathrow, Gatwick, Stansted, Glasgow, Edinburgh, Aberdeen, and Southampton – though regulators required BAA “to divest three airports by 2011, comprised of both Gatwick and Stansted as well as either Edinburgh or Glasgow.”¹⁵⁶ Gatwick was, in fact, sold (at a loss) in 2009 and in 2012 BAA acceded to an order to sell Stansted.¹⁵⁷ In October, 2011 Alinda Infrastructure Funds I and II jointly purchased a 5.88% stake in FGP Topco Ltd. for a price of GBP 280 million (EUR 325 million)(~\$400 million).¹⁵⁸ (We have been unable to learn whether each Fund invested the same or different amounts.)

The air transport enabling and related activities of the kind with which the BAA is concerned involve many airlines, numerous travel routes, a large number of passengers, the transport of substantial amounts of commercial freight, and correspondingly large physical facilities extending over a fairly large area which, in their nature, are likely to have a great impact on the surrounding geographic regions.

This case is interesting because it concerns what is readily viewed in popular or conventional terms as “infrastructure.” And, at first blush, it seems to offer the prospect of financial rewards (and risks) apposite with the strategic financial objectives not only of CalPERS but also of many other pension funds. However, at the same time, if one canvases the considerations embodied in the various categories of the chart one finds a richer and more complicated picture as to the ways in which this particular enterprise – really a group of closely related enterprises – might realize fund objectives. The narrative below generally focuses on one of the airports within the company’s portfolio, Heathrow, to highlight or illustrate considerations raised by the various categories.

1. Products or services

Clearly BAA’s core activities are concerned with enabling the transport of people by air. As such the activities are geared to making possible the arrival and departure of passengers and their movements between, before, and after flights, the handling of passenger baggage and commercial freight, the arrival and departure of planes, and the repair and maintenance of aircraft. BAA engages in the distinct, though functionally closely related activity of enabling ground transport of people to and from the airport for the purpose of accessing air transportation. BAA further engages in other activities which are a typical concomitant of air travel but only a few of which have are important or essential in character as the BAA’s direct

transport-related activity. Namely, it not only provides amenities to meet basic sanitary and food needs, but also caters to the desire to purchase a wide-range of goods or services, e.g., clothing, house wares, personal grooming products, books, etc., not immediately connected with air travel.

2. Facilities, structures, etc.

With respect to its core activities BAA maintains runways, facilities for the entry, transit, and departure of passages, to meet basic needs for sanitation and food, for the receipt and transfer of personal baggage and commercial freight, and for the storage and repair of aircraft. For its activities closely related to the foregoing it maintains facilities for the parking of motor vehicles and operates railway tracks and stock and related facilities to transport people to or from urban centers to its airport facilities. For its activities which are further removed from those already described, it operates terminal facilities which include space related to the provision and for the sale of non-essential amenities to passengers and others who work at the airport.

3. Demand

Demand for the services associated with the BAA’s core and other activities depends upon a host of general and specific factors. Some pertain to which airlines have sought and acquired landing rights at the airport; the number and type of aircraft they operate and the kind of passengers they carry – for example, leisure business travelers, short- or long-haul or more or less affluent travelers, etc.

– and the travel routes they offer which allow or require a stop at a BAA airport. If the airport location is a hub for the airline or otherwise offers many travel destinations, it is a transit point that will clearly be conducive to more flights into and out of the airport. For example, Heathrow is a hub airport and transfer traffic makes up one third of its overall traffic.¹⁵⁹

Airlines may offer premium services which might result in fewer seats and/or passengers. While the reduction might not affect the overall traffic of aircraft, it could have other effects which are discussed below.¹⁶⁰

Some issues relate to the potential population of passengers. These matters may involve geographic considerations, that is, the size of the potential travelling population in the catchment area and the relative ease with which they are able to travel between their homes or businesses and the airport. Others might pertain to the demographics of would-be passengers, for example, how wealthy they are, how their affluence affects their need or desire to fly by discount airlines or afford more costly ones, how pricing might affect them directly or indirectly as a result of the pass-through of costs from airplane fuel to landing rights charges.¹⁶¹ In some measure there are macro-factor overlays, for example the sensitivity or not of potential travelers to the general condition of the economy. Other, time- or event-sensitive factors include the impact of terrorist threats or incidents, extreme weather events (such as severe cold and snow), other

extreme natural events (such as the Icelandic volcano), on the willingness or ability to travel.

Arguably insofar as these factors affect the extent of air travel by way of BAA airports they are broadly speaking likely similarly to affect the level of use of the related ground transport facilities and the demand for the various amenities provided in connection with that travel. As noted, the precise extent of demand will also be influenced by passenger demographics, e.g., retail spending by passengers will depend upon the socio-economic statuses represented in the mix. Demand is also sensitive to a host of considerations.¹⁶²

As discussed below, non-aeronautical revenues at BAA airports in 2011 were a significant portion of overall revenues so the extent of demand for those amenities is quite important to BAA’s overall financial performance.¹⁶³

4. Supply – Endogenous constraints on competition or markets

The air transport enabling and related activities of the kind with which the BAA is concerned involve many airlines, numerous travel routes, a large number of passengers, the transport of substantial amounts of commercial freight, and correspondingly large physical facilities extending over a fairly large area which, in their nature, are likely to have a great impact on the surrounding geographic regions. As such, just about of necessity, there will be only a single enterprise engaged in those activities in a particular large geographic area. However, this does not mean that there will

“Heathrow competes for transfer traffic with the other European airports such as Paris Charles de Gaulle, Amsterdam Schiphol, Frankfurt and Madrid Barajas” and will face increasing competition from “hub airports in the Middle East, such as the current and planned future airports in Dubai.”

necessarily have to be one supplier to meet demand. Whether there are others depends upon whether another single enterprise centered in another geographic area is sufficiently close to enable air transport in some or perhaps many of the same ways and otherwise in a position to supply it. Another consideration is the cost and ease of transport for potential passengers to the airports from where their homes and businesses are located.

5. Supply – Exogenous constraints on competition or markets

Perhaps not surprisingly, given the endogenous constraints on domestic supply of air transport, it was provided by a government controlled entity – as of 1965, the British Airports Authority – for many years so that precisely whether and how it was supplied was a matter of government policy. That entity was dissolved in 1986 and all its property, rights and liabilities were transferred to BAA plc, shares of which were sold on the London Stock Exchange in 1987. However, notwithstanding the extensive air transport services the BAA was authorized to supply it is subject to regulation by, among other agencies, the Civil Aviation Authority, the Competition Commission and the Department of Transport. The Competition Commission is particularly relevant here because it determines who is allowed to own and operate which airports. So for example, the Commission directed that the BAA sell Gatwick and Stansted airports and one of Edinburgh or Glasgow airports; it has also raised concerns with respect to Aberdeen airport about

adequate competition.¹⁶⁴ There has also been contentious debate about whether Heathrow airport should be allowed to expand and/or whether permission should be given to build one or more new airports which can take up such traffic. Of course, regulatory (and perhaps other) actions in other countries as to the number and location of airports could have significant impact in terms of competition from other hubs, e.g., elsewhere in Europe, as well as the extent to which the BAA can serve as the place of origin and destination of and as a transfer point for flights.

For example, at the international level, “Heathrow competes for transfer traffic with the other European airports such as Paris Charles de Gaulle, Amsterdam Schiphol, Frankfurt and Madrid Barajas” and will face increasing competition from “hub airports in the Middle East, such as the current and planned future airports in Dubai.”¹⁶⁵ At the domestic level it faces more limited competition from Gatwick Airport, Luton Airport, Southend Airport, and London City Airport as well as from other forms of transportation, e.g., Eurostar’s high-speed rail.¹⁶⁶

6. Pricing

Aeronautical income is derived from passenger fees, based on the number of departing passenger boarding and aircraft, which to some degree might depend on route and destination and landing charges, paid on the basis of an airplane’s take-off weight, and parking charges. The UK Civil Aviation Authority (CAA) has the power to set the

maximum amounts that airport operators are permitted to levy for airport charges on a per passenger basis. Currently the calculation is done on what is termed a “single till” basis in that it incorporates what the BAA derives from its commercial activities and unregulated charges (on airlines and other service suppliers at the airport).¹⁶⁷ Thus, efforts by BAA to raise revenues from increasing prices on retail sales are limited because the total is constrained by the noted overall revenue limit. Note that tariffs are usually fixed for a period of five years which has both positive and negative import for revenues and profitability.¹⁶⁸

7. Form of payment for goods and services

As noted, BAA derives revenue from fees charged to airlines for use of the airports’ facilities for flight and passenger activities.

BAA also has non-aeronautical revenue mainly from retail operator concession fees, car parking and advertising income, and property rental income from the provision of operational facilities and utilities including “airport premises such as “aircraft hangars, cargo storage facilities, maintenance facilities and offices” and “facilities such as baggage handling and passenger check-in”).¹⁶⁹ For BAA airports overall, such revenue constituted 44% of overall income (though the percentage for Heathrow Airport may be much larger).¹⁷⁰

In addition it would appear that the BAA is paid cash fares from its Heathrow Express rail service operations.

8. Public sector role (operations)

It appears that the only public operations role involves border control and immigration control over entries and departures of travelers from and to abroad although, not surprisingly, through regulation, direction, and monitoring by government looms relatively large with respect to security operations.¹⁷¹

9. Public sector role (regulation)

As also discussed above, BAA is subject to regulatory decisions which, among other things, allow for the acquisition or compel the divestment of airports; as to whether additional runways might be constructed at existing airports; (at minimum) the cash stream derived from aeronautical revenues (though perhaps indirectly as well, by virtue of the “single till” rules, those gained from non-aeronautical revenues); indirectly cost recovery for capital expenditures (and as a result, arguably whether certain capital expenditures must, can, or might be made); and quality of service, safety, and other considerations.¹⁷² Moreover, there are related issues as to the timing of the regulatory effects, e.g., the rules for taking into accounts cost being established on a forward-looking basis for a period of 5-years, as well as to whether and how the regulatory regime might change, for example, whether there is a shift from the current single to double-till rules. Note that as one rating agency’s commentary described it, “there is still significant uncertainty about the regulatory environment and the government’s aviation policy.”¹⁷³

Clearly labor relations, workplace conditions and practices, etc., among both direct employees and those employed by key providers to the enterprise are critical to operations.

There are, in addition to health and safety requirements, extensive environmental policies and regulations which, among other things encompass energy use, noise, air quality, soil and water pollution, some of these have their origin at the level of the European Union, others from the UK government, as still others from local authorities.¹⁷⁴

10. Public sector role (contract)

It would not appear that the public sector has any contractual role with the BAA which is in any way special or distinctive as compared to any other party.

11. Public sector role (finance)

It would not appear that the public sector has any role in the finance of the BAA airports. For example, it is not clear whether changes at or expansion of Heathrow or other airports would entail the acquisition of land or the construction of access roads with respect to which the UK government might play a financial role. (Certainly, though, the extent of any direct or indirect subsidy for expansion would be a central issue in any debate over it being permitted.)

12. Enterprise (operations – staff and key suppliers)

As a general matter the enterprise requires on an ongoing basis personnel with the knowledge and expertise who can give sustained and effective attention at the governance and management level to airport users, regulators, and media, and others. There has been some suggestion that during at least

in its first few years BAA had serious challenges in this regard.¹⁷⁵

Clearly labor relations, workplace conditions and practices, etc., among both direct employees and those employed by key providers to the enterprise are critical to operations. Commensurate with the complex organizational structure associated with the BAA there are correspondingly complicated relationships in this regard. For example, BAA has created a subsidiary, BAA Airports, which provides services to Heathrow (and at the time Stansted) including IT, health and safety, security, research, airport planning and marketing, finance, human resources, property management, regulatory services, corporate and public affairs and legal support” and “contract[s] certain of the cash management and accounting services“ to another subsidiary.¹⁷⁶ However, as BAA describes it with respect to Heathrow (and at the time, Stansted) airports, “a large number of services required for the[ir] operation...are arranged on a separate basis with external suppliers, including security screening, baggage and ground handling, terminal cleaning and passenger transportation services.”¹⁷⁷ Further, “[c]argo and mail carriers are responsible for handling merchandise and packages” at the airports. (Cargo sheds and related facilities are leased to them or made available to them on billed, as used basis.) In addition, BAA pays for the provision of policing services by local police and the UK Home Office’s Border Force is responsible for the control of persons and goods.”¹⁷⁸

Labor unrest and strikes related to airport operations may be indicative of problematic relationships with both direct and other workers which can result in disrupted operations, loss of passenger traffic on a short-term, or perhaps even long-term basis. Issues of this sort have arisen for BAA with respect to both employees of its providers (baggage handlers), of the airlines it serves (pilots and cabin personnel), and public employees (border and immigration agency staff).¹⁷⁹ In an early report it was noted there was concern about flight delays some of which were related to the adequacy and quality of security operations though it was also observed that the “ground handling, catering and air traffic control” also contributed was well.¹⁸⁰ Note that Heathrow Airport is required to give airlines rebates if defined service targets related to passengers’ experience, e.g., security, queuing times, cleanliness, etc., are not met putting up to 7 percent of total airport charges at risk.¹⁸¹

The operational capacity of airports to service increasing numbers of passengers is important to prospects for revenue growth and potentially profitability in the future. In this respect the apparent fact that Heathrow “is operating very close to runway capacity...and does not have any additional take-off or landing slots available” is a two-edged sword. On one hand it is “indicative of pent-up demand from airlines for its services”; on the other, there has been significant opposition to any expansion at Heathrow to increase that capacity.¹⁸² Should opponents prevail, capacity might be raised only if Heathrow

were permitted to have more night flights or use the same runways for landings and takeoffs, though these possibilities, too, are subject to regulatory approval.¹⁸³ Airlines could also be encouraged to act on their own to expand their use of slot capacity.¹⁸⁴

13. Enterprise (operations – other)

As described in the preceding section the functioning of the airport involves an extensive range of often highly inter-related services or activities which must operate in tandem smoothly and efficiently as a general matter. Some of the more difficult issues which are faced by Heathrow appear to operate at the intersection of the challenge of limited airport capacity described above with operations described in such general terms. Those issues are in certain ways captured in a recent description by Heathrow Airport Limited (as part of FGP Topco Limited) of its priorities which it refers to as focusing on “passenger experience, hub capacity and resilience, and a competitive cost of operation.” The interrelated issues range from the need for greater baggage capacity and efficient transfer of baggage, passengers’ ability to make connections (as a matter of the arrival of departure of airplanes and movement between terminals and the availability of kiosks at which departing passengers can check; the ease with which people have access to the airport by virtue of better air connections or through better situated car parks; the ability to move planes off runways upon arrival and getting them on runways for departure; and the speed and effectiveness of clearing runways

during winter snow storms. Some of these challenges relate to solving these problems in light of changes in the in the size and needs of new aircraft. The extent to which timely and effective responses can be found will depend upon devising innovative and effective strategies with regard to these and other issues what will be required and what implementing them will cost (in terms of both capital and operating expense) would appear to depend greatly on the resolution of the larger issue of the ways, if any, by which Heathrow's operations might be allowed to expand in space or time.¹⁸⁵

14. Enterprise (finance)

The reliance on debt finance generally and more particularly, the extent of leverage, the terms of finance – for example, fixed or variable interest – the timing and amounts of the refinance of debt, the bearing of the need for liquidity in light of cash flows and the need for capital investments on the need for short or long-term finance, are all relevant considerations.

Financial rating reports in the recent past have suggested a number of issues for the BAA in this connection.¹⁸⁶ According to a fall 2011 report, it included having a “capital structure [which] can be considered aggressive,” a “negative cash flow due to a lumpy capital plan for the foreseeable future, and a consequent need to access the debt markets for additional financing,” and “a significant and recurrent financing risk.”¹⁸⁷ More particularly, BAA has been described as needing to raise capital

to finance expansion of runways (if permitted to do so), add terminals, or upgrade runways and terminals.¹⁸⁸ A later report in 2012 offered a less problematic outlook, for example, with respect to refinance risk and the level of index-linked debt.¹⁸⁹

15. Non-Enterprise Stakeholders

There are a host of environmental, health and safety, and related considerations which affect a range of stakeholders.¹⁹⁰ For example, the community immediately surrounding an airport has concerns about its scale and operation. More particularly, in the case of Heathrow, there has been an evident desire and proclaimed need to expand it with addition of a third runway. However, it has run into opponents concerned about air and noise pollution from current and certainly expanded operations and the threat of demolition of homes as well. (Heathrow is “hemmed in by housing on three sides and London’s ring road on the west.”¹⁹¹)

Other stakeholders from the general population express concern about the impact of carbon dioxide emissions on climate change and of nitrogen dioxide emissions, as well as the risks to bird wildlife from extended airport operations.¹⁹²

Here we have sought to build upon the understanding of infrastructure and the means for translating it in practical terms to pension fund investment decision-making which we described in our first paper. One of the best methods for doing so was, we thought, to consider it within the context of an in-depth review of the decision-making process of one of the leading, if not the leading U.S. public sector pension funds on many matters, including infrastructure investment: CalPERS. In proceeding along those lines we were not disappointed. Insofar as we have been able to determine, CalPERS has, among such funds, the most detailed, comprehensive, and nuanced process for choosing whether and how to invest in infrastructure. The conclusion is that much more impressive given the relatively modest amount of time during which CalPERS has actively and seriously attended to such investments.

For these reasons, the issues raised here have not been ones as to the thoughtfulness and diligence of CalPERS trustees and staff. Rather, they concern whether the particular methods and tools which have been applied to the task have been as productive as they might be. Indeed, for the most part it is not even a question of which particular criteria or considerations have been taken into account. Instead it is substantially one of how the decision-making process is framed and structured and the understanding of infrastructure which informs it. In this essay we have been bold enough to suggest that an approach grounded

in what we detail in the Paper, though better articulated and refined, would be useful to enhancing that process and if so, can serve as a model not only for other pension funds but also for others who have an important stake or interest in investment in infrastructure.

This assertion is grounded in a number of observations we have made in the course of this study in closely examining the CalPERS process.

First, CalPERS describes or defines infrastructure in several somewhat different, though all in conventional, physical facility terms. The advantage of that, of course, is to allow a ready connection with conventional discourse using such words. Whatever the approach, consistency in these respects is certainly a virtue. More importantly, though, insofar as the arguments presented in the Paper and here about a different understanding of infrastructure have merit, CalPERS' reliance on one or another conventional definition is not productive.

Second, CalPERS sets forth eight strategic objectives for its infrastructure program five of which concern financial-related outcomes familiar to discussion about the ostensible financial benefits of infrastructure investment. One of the five is what might be thought to be the generic one of diversification.¹⁹³ There does not appear to be any narrative among CalPERS' materials which details in any length how, given the would-be nature of infrastructure, investments in it are linked in a causal way to the particular desired results in general and the sole stated numerical outcomes, namely a

The challenge, though, is the multiplicity of these factors which are grouped in different ways and, as noted, overlap in certain respects. For example, there is the tri-partite classification of investments – arguably at the enterprise level – as Defensive, Defensive Plus, and Extended ones implicating a variety of considerations.

benchmark return of the CPI plus 4%. There is no benchmark risk-related measure as such proffered. Such a narrative is helpful in and of itself but it is particularly valuable insofar as it is ultimately connected to CalPERS' own assessment of potential direct investments or how it identifies and evaluates the external asset managers it chooses and appraises what they actually do. There also does not appear to be any narrative which relates the broad gauge tri-partite (“Risk Segment”) allocation for the infrastructure portfolio among what CalPERS currently terms Defensive, Defensive Plus, and Extended investments to the several sought-for general results and the one specific financial outcome. It is true that these groupings are characterized in terms of various kinds of risks, ones which in some measure relate to and overlap other infrastructure program guidelines framed in terms of risk. (We will return to this point shortly.) In these respects it might be thought to supply in a non-numerical and back-handed way objectives concerning risk to complement the one numerical return objective.

The three on-their-face non-financial strategic objectives are suggestive. But because there is no accompanying explication of them it is not easy to determine more precisely what achieving those objectives entails and what their relationship is to the specifically financial ones. That observation is not intended to suggest that the three are not legitimate or important goals. To be sure, in the U.S. context, would-be non-financial objectives

are not uncontroversial in light of contested views as to the demands of and the latitude offered by fiduciary duty for pension fund trustees. Nonetheless, it would seem that greater clarity in terms of the meaning and reach of those objectives and their relation to others would be in CalPERS' interest and be valuable for other funds in determining how best to proceed in that regard.

Third, a great strength of CalPERS' formulation of its infrastructure program is that it attends to a wide range of factors which bear upon the decisions it needs to make. The challenge, though, is the multiplicity of these factors which are grouped in different ways and, as noted, overlap in certain respects. For example, there is the tri-partite classification of investments – arguably at the enterprise level – as Defensive, Defensive Plus, and Extended ones implicating a variety of considerations. There is also another group of factors termed “specific risks” – again, arguably relevant at the enterprise level – some which seem related to the foregoing. In addition, there are several other formulations, both general and fairly specific – according to which investment decisions are supposed to conform. These include the UN Principles for Responsible Investment, CalPERS' Emerging Market Principles, a broad prescription for “Renewable Energy and Sustainability,” and more detailed ones relating to responsible contracting and domestic public sector jobs. Again, all of these ostensibly pertain to enterprise level decisions. There are other quite necessary

In all events we see the approach detailed here as a work in progress, that is, as a contribution to an ongoing dialogue on how pension funds can better understand infrastructure in light of what they might or should want to achieve through investment in infrastructure-related enterprises and how funds might improve their decision-making in that regard.

requirements which are geared to the investment vehicle level which has not been our focus here. Clearly though, insofar as enterprise level decisions are delegated to others through such vehicles, that requires the latter to act in the spirit of and in a manner consistent with the enterprise level standard or requirements.

Fourth, in light of the foregoing, we have sought to refine and then in some measure test the linked multi-category framework formulated in the Paper and informed by the definition proposed there for infrastructure. In APPENDIX A we show as best we can judge the relation between the multiple factors set forth in the CalPERS infrastructure Program and the categories which we think might be more productive to employ in analysis at the enterprise level.

Fifth, because the merits of any framework must be tested in its application we first present, based on all the publicly available information we could locate, not only all of CalPERS' infrastructure investments to date – both direct investments at the enterprise level and by way of investment vehicles – but also all of the enterprise level investments made by means or through each of those vehicles. This approach is in itself enlightening because it both highlights the immense variety of enterprise level investments which have been made and poses questions (which we do not attempt here to answer) as to whether and how this array of investments overall and in relation to one another is apposite with CalPERS' overarching

goals and its more specific standards and criteria for achieving them.

Sixth, as a first step toward evaluating the efficacy of using the linked categories we have looked in great detail at two enterprise level investments in CalPERS' portfolio, those in agri.capital and BAA Inc. What we do in that regard is limited both as a matter of resources and in some measure, of ambition. We were able to analyze only what is publicly available information about those enterprises and in any event, they are not simply described, especially the BAA. The latter has operated several related but still different major enterprises – different airports – so we tended to focus on one, Heathrow Airport. Moreover, for reasons of the foregoing alone, we were not in a position to and certainly did not aspire to offer a full and definitive characterization of those enterprises in the given terms. That is the role of and task for professionals with the relevant responsibilities within and without CalPERS, as the case may be. Moreover, whether the tasks are carried out in-house or through an investment vehicle, they necessarily entail specific judgments about or estimates – in light of the kinds of key factors or considerations discussed – as to the possible financial performance of the enterprise which can be related to those among the pension fund's strategic objectives framed in financial terms. Gauging the role those factors or considerations will also offer insights relevant to assessing achievement of other kinds of objectives. In all events, our efforts have been aimed at suggesting what

might be included in a thorough-going analysis of a prospective enterprise level investment from a financial and non-financial perspective based on the linked categories we described in the Paper and have elaborated on here.

As suggested in the paragraphs above with respect to such an analysis we believe it is different from conventional approaches in its being informed by a different notion about what infrastructure might be understood to be. That is because it focuses on a range of aspects of the enterprise which are infrastructure-related, it emphasizes relevant people/actors in that connection and avoids reliance on characterization framed in terms of risk.

Seventh, we have observed that there are distinct challenges when considering infrastructure investments in developing or emerging market countries as contrasted with developed ones. Nonetheless, this does not seem to imply that the linked categories approach to analyzing them cannot be employed. Rather, it suggests that the linked categories analysis needs to be applied with an awareness of and sensitivity to those challenges. In a number of respects, though not all, the difference reflects the heightened relative importance of infrastructure-related goods or services in societies in which people are more likely to live at the margin and which represent a more uncertain or unstable political, legal, economic, and social environment. This can have a considerable bearing on their ability to have access to such goods and services

In all events we see the approach detailed here as a work in progress, that is, as a contribution to an ongoing dialogue on how pension funds can better understand infrastructure in light of what they might or should want to achieve through investment in infrastructure-related enterprises and how funds might improve their decision-making in that regard.



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EAST TO A

APPENDIX A

APPENDIX A | RELATION OF CaIPERS RISK (AND RELATED FACTORS) TO LINKED CATEGORIES

Risk Segments: Defensive (D), Defensive Plus (DP), Extended (E), Specific Risks (KPP), Emerging Market Principles (EMP)

Product or service, kind of infrastructure	Facilities, structures, etc.	Demand	Supply: Exogenous constraints on competition or markets	Supply: Endogenous constraints on competition or markets	Pricing	Form of payment for goods or services	Public sector role – operations	Public sector role – regulation	Public sector role – contract	Public sector role – finance	Enterprise – finance	Enterprise – operations	Non-Enterprise Stakeholders
transportation <ul style="list-style-type: none"> roads bridges tunnels mass transit parking airports seaports rail energy <ul style="list-style-type: none"> oil natural gas and liquids pipelines storage distribution power <ul style="list-style-type: none"> transmission distribution generation including renewables utilities (?) water <ul style="list-style-type: none"> storage transportation distribution treatment waste water <ul style="list-style-type: none"> collection transportation treatment and processing waste (?)		GDP resilience (D) Growth risk (DP,E) Demand elasticity (D) User patronage risk(DP)		Minimal competition (D) Competition risk (D,E) Strong barriers to entry (D)	Allowed cost recovery (D) Rate-regulated or long-term contracted (D) Pricing certainty, risk (D,DP) Long-term inflation protection (D) Merchant business risk (E)			Regulation risk (DP) Legal/ political regulatory regime risk (E) Political approval and public acceptance risk (KPP4)			Low/no risk (D) Strong credit quality off-takers or payers (D) Terminal value risk (DP,E) Currency risk (E) Counterparty risk (KPP13) Risk from changes in infrastructure market (KPP10) Financing and market transaction risk and from market volatility and change (KPP3) Lack of secondary market for sale (KPP2) Substantial leverage risk (KPP1) Financial stability (EMP) Market regulation and liquidity (EMP) Capital market openness (EMP) Trading, settlement, transaction costs (EMP)	Low operational risk (D) Commodity price risk (E) Contract risk (DP) Capital expenditure risk (DP,E) Low obsolescence risk (D) Low/no development risk (D) Technology risk (E) Cash-generated investments (D) Construction risk (DP) Political stability (EMP)	Environmental and climate risk (KPP11) Hazardous materials risk (KPP12) Labor outsourcing and labor relations risk (KPP5) Corporate social responsible, including environmental (EMP) ESG disclosure (EMP)

APPENDIX B



APPENDIX B | ASSESSMENT OF AGRI.CAPITAL
BASED ON CalPERS' INFRASTRUCTURE PROGRAM
"RISK SEGMENTS"

As a form or source of energy, biogas and bio-methane are among those "products" essential to a range of important activities. **(1. Essential assets and services)** At first blush though there are potentially significant suppliers of the same, similar, or other sources of energy, most particularly natural gas. The natural gas industry has experienced dramatic increases in supply and, at least recently, a drop in prices in the United States. It is not clear whether and how that affects agri.capital as a provider primarily in Germany. With regard to its own energy market, agri.capital has potential competitors though it appears that the company has a strong and perhaps strengthening position as a supplier insofar as it is an attractive or favored one because of the would-be environmentally friendly way in which it produces energy. **(3. Minimal competition; strong barriers to entry).** Arguably the demand for energy across the board would be responsive to the condition of the economy and hence, GDP as a measure of its strength. However, the precise impact would depend upon the geographic reach of agri.capital's customer base and how locked in those customers are or could be to agri.capital's particular energy "product." **(2. GDP resilience; demand inelasticity; pricing certainty).** The company asserts that its "business model benefits from very strong and highly predictable cash flows."¹⁹⁴ In this connection it has been contended that "[b]iogas offers stable revenue streams based on tariffs, currently fixed in Germany for 20 years from the start of each plant's

operation. The German government has set a goal for biogas of 18% of total energy consumption by 2020, as part of the country's strategy of reducing reliance on imported oil and gas."¹⁹⁵ However, it is not clear how firm the government pricing commitments are. For example, in late 2011, there was a reduction in biogas feed tariffs.¹⁹⁶ So with respect the provision side of the equation it is not clear how much, if any, inflation protection there is. **(4. Stable revenues and returns; rate-regulated or long-term contracted; 6. Long-term inflation protection)** On the operational side, the company emphasizes that its "business model is based on close partnership with local agricultural businesses. The company's biogas plants are operated by expert local farmers, who supply them with raw materials. This partnership is ensured through long-term agreements."¹⁹⁷ In the latter regard a company representative has alluded to "[f]eedstock hedging contracts in place with an average length of 13 years."¹⁹⁸ This suggests that the duration of source price protection may vary widely. Clearly, there is great reliance for supply from farmers in the locales in which the biogas plants are located. It is not evident how the vagaries of weather, crop markets, and other factors bear upon the reliability and pricing of supply over extended periods of time. Depending upon what is understood to be operating risks they might include dependence upon a reliable source of raw materials of uniform quality, long term contracts for provision, and stable relationships with contracting parties along

with their preparation for use in the plant. As noted in the main text, it has been suggested that the plants may be complex to manage, with safety measures possibly looming large.¹⁹⁹ There would appear to be no arrangements by which cost recovery is assured. **(5. Low operating risk; allowed cost recovery.** Here the success of the model so far and for the most part in the long term appears closely tied to business in Germany so, in the first instance, for a U.S. investor, there is currency risk tied to the euro. **(12. Low/no currency risk).** According to one report biogas plants have working lives of moderate length, rather shorter than what might be attributed to, say roads and bridges, water plants, etc.²⁰⁰ Also, the scale of individual plants appears to be very small, perhaps less than \$2 million.²⁰¹ At first blush, it would seem that the production of biogas is a relatively new, dynamic, and changing field so that new, more efficient, and less expensive facilities might relatively easily come on line though agri.capital appears to believe that it has and will continue to have cutting edge technology on play. **(10. Low obsolescence risk)** Among the operating issues are ones that appear to relate to the supply of fresh water and disposal of waste water. The former poses particular issues for larger enterprises in terms of their having a sufficient and stable supply of input materials.²⁰² **(11. Low/no development risk).** At the enterprise level it appears that because "capital costs are usually too high for financing with equity capital," financing entails "a large percentage of

debt capital." **(7. Strong credit quality off-takers or payers)**²⁰³ As noted, the enterprise operates to generate substantial cash flow. But the cash flow (and in turn, profits) will in substantial measure be tied to the level stability/growth of the principal sources of revenue, tipping fees (for receipt of the organic materials used in the process, tariffs/fees for the biogas and by-products (such as fertilizer) sold.²⁰⁴ **(8. Cash-generative investments).**

ENDNOTES

- ¹ Infrastructure: Defining Matters,” by Larry W. Beeferman and Allan Wain, Pensions and Capital Stewardship Project, Labor and Worklife Program, Harvard Law School, December, 2012 (hereafter “Paper”), p. 1. Available at <http://www.law.harvard.edu/programs/lwp/pensions/publications/INFRASTRUCTURE%20DEFINING%20MATTERS%20FINAL.pdf> (Accessed January 3, 2013)
- ² In the course of briefly describing the origin of and changes in what infrastructure was understood to be we take note of a discussion which both posits a relatively abstract and far-ranging characterization of the term infrastructure while it recognizes that particular meanings arise from and are associated with different communities of practice. See PAPER, note 9.
- ³ Paper, p. 14.
- ⁴ Here “human development” is defined as “the expansion of people’s freedoms and capabilities to lead lives that they value and have reason to value. It is about expanding choices. Freedoms and capabilities are a more expansive notion than basic needs. Many ends are necessary for a ‘good life,’ ends that can be intrinsically as well as instrumentally valuable — we may value biodiversity, for example, or natural beauty, independently of its contribution to our living standards.” In turn, “[s]ustainable human development is the expansion of the substantive freedoms of people today while making reasonable efforts to avoid seriously compromising those of future generations.” “Summary, Human Development Report 2011, Sustainability and Equity: A Better Future for All,” United Nations Development Program, 2011, p. 2. Available at http://www.undp.org/content/dam/undp/library/corporate/HDR/2011%20Global%20HDR/English/HDR_2011_EN_Summary.pdf (Accessed December 14, 2012)
- ⁵ “INFRASTRUCTURE PROGRAM,” Attachment B to “STATEMENT OF INVESTMENT POLICY FOR REAL ASSETS,” CALIFORNIA PUBLIC EMPLOYEES’ RETIREMENT SYSTEM, August 15, 2011 (hereafter “INFRASTRUCTURE PROGRAM”). Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-asset-classes/real-estate/real-assets-full-policy.pdf> (Accessed January 3, 2013)
- ⁶ “Investment & Risk Management Glossary,” CalPERS (emphasis added). Available at <http://www.calpers.ca.gov/index.jsp?bc=/investments/policies/glossary/browse-full.xml&theletter=M&theClass=9> (Accessed March 25, 2013)
- ⁷ “INFRASTRUCTURE PROGRAM,” p. 12 (italics added).
- ⁸ “INFRASTRUCTURE PROGRAM,” p. 4.
- ⁹ “INFRASTRUCTURE PROGRAM,” p. 16.
- ¹⁰ See “INFRASTRUCTURE PROGRAM,” pp. 13-14. In this formulation all but parking were included in two separate categories, “Transportation Assets” and Ports.” Parking was not among the specific infrastructure inflation-linked assets mentioned. The components of Energy and Power were combined under “Energy Resources” and in some measure a category of “Utilities.” “Energy Resources” also contained nuclear energy which these do not. The prior category of “Social Infrastructure” did not include “military.”
- ¹¹ See “Attachment 2, Debt Term Sheet.” and Attachment 3, Equity Term Sheet” “TO: MEMBERS OF THE INVESTMENT COMMITTEE, I. SUBJECT: Infrastructure Investment in California, II. PROGRAM: Infrastructure, III. RECOMMENDATION: Information,” CalPERS, November 15, 2010. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/ agendas/invest/201109/item07c-02.pdf> and <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/ agendas/invest/201109/item07c-03.pdf> (Accessed March 19, 2013) They refer, respectively, to the following “Asset Types”: “Roads, bridges, tunnels, rail, airports, ports, natural-gas fire power generation, renewable power generation, electric transmission, energy midstream (pipelines, oil & gas storage, LNG), electric and gas utilities, water pipelines, water and waste water utilities, desalination facilities, essential communications systems and social infrastructure.” Although these term sheets were prepared in conjunction with approval of a new infrastructure strategic plan in 2011 they were cited in a recent presentation in 2012. “Infrastructure Strategic Plan, Summary,” by Randall Mullen, CalPERS, September 2011. Available at <http://www.calpers.ca.gov/eip-docs/about/press/news/invest-corp/infrastructure-outreach.pdf> (Accessed December 7, 2012)
- ¹² “INFRASTRUCTURE PROGRAM,” p. 1. It is interesting to note that in its summer 2012 review of infrastructure investments in what it refers to as a condensed version of the Infrastructure Program policy, CalPERS refers to only three of the strategic objectives, all of which are financial in nature: “Steady returns (low downside risks); “Cash flow”; “Inflation protection”; and “Long-term performance exceeding CPI + 400 BPS” which approximate Program objectives B, C, D,
- and B, respectively. “Infrastructure and Forestland Program Update, Real Assets,” CalPERS, August 13, 2012, p. 4. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/ agendas/invest/201208/item08b3-01.pdf> (Accessed March 19, 2013)
- ¹³ “REAL POLICIES PROGRAM BENCHMARKS, February 10, 2012.” Attachment F, “CALIFORNIA PUBLIC EMPLOYEES’ RETIREMENT SYSTEM STATEMENT OF INVESTMENT POLICY FOR BENCHMARKS,” March 1, 2012. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-risk-mang/benchmark-modification.pdf> (Accessed March 19, 2013)
- ¹⁴ “CALIFORNIA PUBLIC EMPLOYEES’ RETIREMENT SYSTEM STATEMENT OF INVESTMENT POLICY FOR REAL ASSETS,” August 15, 2011, p.1. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-asset-classes/real-estate/real-assets-full-policy.pdf>
- ¹⁵ “TO: MEMBERS OF THE INVESTMENT COMMITTEE. I. SUBJECT: Fund Policy Benchmarks. II. PROGRAM: Total Fund, III. RECOMMENDATION: That the Investment Committee approve the revised benchmarks listed on Table 1 and described in this memo,” CalPERS, April 11, 2011, p. 2. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/ agendas/invest/201104/item03-00.pdf> (Accessed March 26, 2013)
- ¹⁶ “TO: MEMBERS OF THE INVESTMENT COMMITTEE, I. SUBJECT: Fund Policy Benchmarks. II. PROGRAM: Total Fund, III. RECOMMENDATION: That the Investment Committee approve the revised benchmarks listed on Table 1 and described in this memo,” CalPERS, April 11, 2011, p. 2. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/ agendas/invest/201104/item03-00.pdf> (Accessed March 26, 2013)
- ¹⁷ The former categories are described in “Infrastructure Program, July 1, 2011,” Attachment B, “CALIFORNIA PUBLIC EMPLOYEES’ RETIREMENT SYSTEM STATEMENT OF INVESTMENT POLICY FOR REAL ASSETS,” July 1, 2011, p.4. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/ agendas/policy/201106/item05-01.pdf> (Accessed March 19, 2013) The text which shows additions and deletions to the prior policy straightforwardly replaces the older terminology with the new one. See also “Infrastructure Delegation – Illustration
- Matrix,” Attachment 1, “TO: MEMBERS OF THE INVESTMENT COMMITTEE, SUBJECT: Adoption of an amended Delegation Resolution for Real Assets to incorporate revisions related to the Infrastructure Program and an amended Delegation Resolution for Global Fixed Income, II. PROGRAM: Infrastructure, III. RECOMMENDATION: Recommend to the Investment Committee Adoption of the amended Delegation Resolution for Real Assets and the amended Delegation Resolution for Global Fixed Income, IV. ANALYSIS,” CalPERS, August 15, 2011 (showing a parallel structure for the old and new categories). Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/ agendas/invest/201108/item04a-01.pdf> (Accessed March 19, 2013)
- ¹⁸ INFRASTRUCTURE PROGRAM, pp. 7-8.
- ¹⁹ “TO: MEMBERS OF THE INVESTMENT COMMITTEE, I. SUBJECT: Fund Policy Benchmarks. II. PROGRAM: Total Fund, III. RECOMMENDATION: That the Investment Committee approve the revised benchmarks listed on Table 1 and described in this memo,” CalPERS, April 11, 2011, p. 2. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/ agendas/invest/201104/item03-00.pdf> (Accessed March 26, 2013)
- ²⁰ “It has been difficult to identify a clearly superior benchmark for this nascent investment strategy since a standard, representative benchmark for private infrastructure is not presently available.” “TO: MEMBERS OF THE INVESTMENT COMMITTEE I. SUBJECT: Fund Policy Benchmarks. II. PROGRAM: Total Fund, III. RECOMMENDATION: That the Investment Committee approve the revised benchmarks listed on Table 1 and described in this memo,” CalPERS, April 11, 2011, p. 2. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/ agendas/invest/201104/item03-00.pdf> (Accessed March 26, 2013) For a more general discussion of this point see “Benchmarks for Unlisted Infrastructure: Part I,” by Jagdeep Singh Bachher, Ryan J. Orr, and Daniel Settel, CFA Institute, 2012. Available at <http://www.cfapubs.org/doi/pdf/10.2469/ipmn.v2012.n1.2> and “Benchmarks for Unlisted Infrastructure: Part II,” by Jagdeep Singh Bachher, Ryan J. Orr, and Daniel Settel, CFA Institute, 2012. Available at <http://www.cfapubs.org/doi/pdf/10.2469/irpn.v2012.n1.4> (Accessed March 19, 2013)

²¹ For example, the statement of the Principles for Responsible Investment to which institutional investors are signatories does not directly define what responsible investment is. Rather it asserts that “environmental, social, and corporate governance (ESG) issues can affect the performance of investment portfolios” and that investing with that in mind not only can be done consistent with fiduciary duty but also that doing so “m[ight] better align investors with broader objectives of society.” Principles for Responsible Investment. Available at <http://www.unpri.org/principles/> (Accessed November 21, 2012)

By contrast, a World Economic Forum document which several years ago canvassed the field of responsible investment offered a different and in certain ways more capacious view, suggesting that it “is most commonly understood to mean investing in a manner that takes into account the impact of investments on wider society and the natural environment, both today and in the future.” “Mainstreaming Responsible Investment,” Prepared by AccountAbility for the World Economic Forum, January 2005, p. 7. Available at <http://www.accountability.org/images/content/3/1/316/Mainstreaming%20Responsible%20Investment.pdf> (Accessed November 21, 2012) Note here notions of “responsibility” are either identified, associated, or perhaps conflict with ones of “sustainability.”

Further, what is termed a “responsible endowment” “is defined more in normative or value terms closely linked to the nature of the institution which is investing. More particularly, it is one which “[i]ntegrates the community’s values, institutional policies, and beliefs that emanate from the school’s mission statement into its investing” and “[d]emonstrates intergenerational equity and responsibility to stable, sustainable returns, not generated through gambling on destructive, risky, or socially or environmentally unsustainable investments — by fully fulfilling its fiduciary duty.” “Frequently Asked Questions,” Responsible Endowments Coalition. Available at <http://www.endowmentethics.org/faq/> (Accessed November 21, 2012)

²² “Agenda Item 7, ITEM NAME: Targeted Investment Programs Update; PROGRAM: Targeted Investment Programs; ITEM TYPE: Program Review – Information,” Investment Committee, CalPERS, June 11, 2012, p. 2. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201206/item07-00.pdf> (Accessed March 19, 2013)

²³ INFRASTRUCTURE PROGRAM, p. 5.

²⁴ Id.

²⁵ Id.

²⁶ Id. (italics added).

²⁷ INFRASTRUCTURE PROGRAM, pp. 5-6. Note that in its most recent overview on its infrastructure (and other “real assets”) investments, CalPERS offers a simplified version of its tri-partite characterization of how it “invests across the infrastructure risk-return spectrum seeking appropriate return for risks” namely:

- (1) “Defensive/”/“Low Risk”: “Essential Services”; “GDP Resilient”; “Minimal Competition”; and “Contracted// Regulated Cash Flow”;
- (2) “Defensive Pus”/“Medium Risk”: “Revenue Risk”; “Growth Risk”; “Operational risks”; “Mitigated Construction risk”; and
- (3) “Extended”/“Higher Risk”: “Market Risk”; “Growth Risk”; “Operational Risk”; “Moderate Construction Risk”; “Infrastructure & Forestland Program Update, Real Assets,” CalPERS, August 13, 2012. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201208/item08b3-01.pdf> (Accessed March 19, 2013)

²⁸ INFRASTRUCTURE PROGRAM, p. 5.

²⁹ Id. at 7.

³⁰ Id.

³¹ “Geographic Segments: CalPERS shall pursue a global Infrastructure investment strategy, with emphasis in the United States. The following geographic diversification ranges will apply across the portfolio:

Region	Allocation Range
United States	40-80%
Developed OECD ex US	20-50%
Less Developed	0-10%

Developed OECD includes OECD nations which have established rules of law and regulation, stable political regimes, established and highly liquid domestic capital markets and highly convertible currency on global foreign exchanges.” Id.

³² “Staff will undertake hedging of non-USD currency exposure where and to the extent it is deemed necessarily prudent and feasible, and subject to Delegated Authority for Hedge Transactions.” Id.

³³ See id. at 17.

³⁴ Id. at 11.

³⁵ That is, judgments must be made with respect to how investment vehicle intermediaries assert how they will go about choosing investments to make in enterprises, the prospects for their doing so, as well as the role those intermediaries play with respect to those enterprises on an ongoing basis.

³⁶ Id. at 11.

³⁷ Id.

³⁸ Id. at 1.

³⁹ Id. at 8.

⁴⁰ “The Principles for Responsible Investment,” UNPRI. Available at <http://www.unpri.org/principles/> (Accessed March 20, 2013)

⁴¹ “Towards Sustainable Investment: Taking Responsibility,” CalPERS. Available at <http://www.calpers.ca.gov/eip-docs/about/press/news/invest-corp/esg-report-2012.pdf> (Accessed March 20, 2013) and “Responsible Investment’s next decade: Developing CalPERS total Fund process for ESG Integration,” Discussion document prepared by Mercer for CalPERS ESG Board Workshop, August 15, 2011. Available at <http://www.calpers.ca.gov/eip-docs/investments/video-center/view-video/mercer-report-next-decade.pdf> (Accessed December 14, 2012)

⁴² INFRASTRUCTURE PROGRAM, p. 8. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-asset-classes/real-estate/real-assets-full-policy.pdf> (Accessed March 20, 2013) Note that here, the Principles offer a gloss on what “guidelines” actually require staff or outside investment managers to do: “CalPERS’ internal and external portfolio managers will need to exercise their best judgment after taking all relevant factors, principles, and trends into account. CalPERS requires managers to consider these principles among the decision factors employed in the investment process but does not necessarily require managers to invest in accordance with each individual principle.” “Emerging Markets Principles” CalPERS, November 13, 2007. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-asset-classes/equity/ext-equity/emerging-ecy-market-principles.pdf> (Accessed March 20, 2013)

⁴³ “It was CalPERS’ belief that market risk in emerging markets was closely related to a country’s ‘housekeeping’ (macro-policies, political economy, local financial markets, corporate

governance, etc.) and ‘plumbing’ (legal and regulatory framework, settlement proficiency, taxes, etc.) As a result, in 2002 CalPERS decided to pursue an alpha-generation strategy guided by a newly instated Permissible Emerging Market Policy. The Permissible Emerging Market Policy mandated screening out the equities of entire countries that did not meet a minimal threshold of permissibility based on factors such as political stability, transparency and labour practices.” The virtue of CalPERS’ Emerging Equity Markets Principles,” by Gabriel A. Huppé and Tessa Hebb, *Journal of Sustainable Finance & Investment*, Volume 1, No. 1, 2011, 62-76, 66. Available at <http://www.tandfonline.com/doi/pdf/10.3763/jsfi.2010.0007> (Accessed March 20, 2013)

⁴⁴ “Emerging Markets Principles” CalPERS, November 13, 2007. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-asset-classes/equity/ext-equity/emerging-ecy-market-principles.pdf> (Accessed March 20, 2013) However, “[u]nfortunately for CalPERS, although country-level screening may have reduced risk in its portfolio, it had effectively screened out the most promising and lucrative equity markets in the world, among others, Russia and China, and by late 2006, CalPERS’ emerging market portfolio had been subject to 2.6% in annual opportunity cost of foregone return.” Id. CalPERS in late 2006, started to change course, “requir[ing] that external managers who wished to invest in a company in a non-permissible market address country and market factors where the company’s home country scored below threshold, and explain why the company would meet threshold standards.” This new strategy was formalized in the form of the Emerging Equity Markets Principles. Id. at 66-67.

⁴⁵ “Emerging Markets Principles” CalPERS, November 13, 2007, pp. 3-5. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-asset-classes/equity/ext-equity/emerging-ecy-market-principles.pdf> (Accessed March 20, 2013)

⁴⁶ “Towards Sustainable Investment, Taking Responsibility,” CalPERS. p. 29. Available at <http://www.calpers.ca.gov/eip-docs/about/press/news/invest-corp/esg-report-2012.pdf> (Accessed March 20, 2013) Note that CalPERS adopted the Global Sullivan Principles of Corporate Responsibility in 1999. See “GLOBAL PRINCIPLES OF ACCOUNTABLE CORPORATE GOVERNANCE,” CalPERS, November 4, 2011, p. 17. Available at <http://www.calpers-governance.org/>

[docs-sof/principles/2011-11-14-global-principles-of-accountable-corp-gov.pdf](#) (Accessed March 20, 2013)
Signatories commit themselves to:

- Express our support for universal human rights and, particularly, those of our employees, the communities within which we operate, and parties with whom we do business.
- Promote equal opportunity for our employees at all levels of the company with respect to issues such as color, race, gender, age, ethnicity or religious beliefs, and operate without unacceptable worker treatment such as the exploitation of children, physical punishment, female abuse, involuntary servitude, or other forms of abuse.
- Respect our employees' voluntary freedom of association.
- Compensate our employees to enable them to meet at least their basic needs and provide the opportunity to improve their skill and capability in order to raise their social and economic opportunities.
- Provide a safe and healthy workplace; protect human health and the environment; and promote sustainable development.
- Promote fair competition including respect for intellectual and other property rights, and not offer, pay or accept bribes.
- Work with governments and communities in which we do business to improve the quality of life in those communities – their educational, cultural, economic and social well-being – and seek to provide training and opportunities for workers from disadvantaged backgrounds.
- Promote the application of these principles by those with whom we do business.” Id. at 59. As can be seen from the foregoing, these principles strongly emphasize workplace related issues.

⁴⁷ INFRASTRUCTURE PROGRAM, p. 8 (Emphasis added).

⁴⁸ Id. at 12-13.

⁴⁹ Id.

⁵⁰ “STATEMENT OF INVESTMENT POLICY FOR RESPONSIBLE CONTRACTOR PROGRAM,” CalPERS, April 19, 2004, p. 2. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/other/contractor/responsible-contract-prg.pdf> (Accessed March 20, 2013)

⁵¹ Id. at 8.

⁵² INFRASTRUCTURE PROGRAM, p. 13.

⁵³ At first blush, “domestic” would appear to refer to in-state investments rather than within the United States investments.

⁵⁴ “Infrastructure Strategic Plan, Summary,” by Randall Mullen, CalPERS, September 2011. Available at <http://www.calpers.ca.gov/eip-docs/about/press/news/invest-corp/infrastructure-outreach.pdf> (Accessed December 7, 2012)

⁵⁵ Id., Slide 3. Here reference is made to “Steady Returns and Cash Yields,” “Defensive Growth,” “Inflation Protection,” and “Diversification Benefits” and to the Program Benchmark (of the U.S. CPI + 400 bps).

⁵⁶ Id., Slide 4.

⁵⁷ Id., Slide 5.

⁵⁸ Id., Slide 6.

⁵⁹ Id., Slide 65. More specifically, the details for each of the rows are set forth as follows:

Price Risk: ranging from (D) regulated revenues or earnings or “long-term, quality contracts”; to (DP) “less certain price regulation” or “additional contract risk”; to (E) “higher degree of price competition”

Demand/Volume Risk: ranging from demand which is (D) highly predictable demand or very low volume/user risk or high inelasticity; to (DP) moderate-to-highly; to (E) low.

Inflation: ranging from long-term inflation protection which is (D) high; (DP) moderate-to-high; (E) lower (as a result of price and demand risks)

Operating costs: operating costs which are (D) predictable by virtue of regulatory pass-through or long term contracts; to (DP) often predictable for such reasons; to (E) much less so

Capital expenditure: expenditures which are (D) predictable in timing and amount and possibly recoverable under a base rate formula; to (DP) similarly characterized; to (E) not so characterized because of competition or need to grow

Asset value: a value which is (D) predictable or stable because of rate-base or long-term contracted cash flows; (DP) somewhat less predictable with some reliance on terminal value; (E) even less predictable because of uncertain cash flows and greater reliance on growth

Efficient Debt Level/Quality: (D) 45-90% Investment grade; (DP) BB or better; (E) 0-40%/BB or better

Engineering & Construction: (D) proven engineering/technology and low construction risk; (DP) Proven engineering/

technology and low construction risk; (E) less proven engineering/technology and moderate construction risk

The first, second and third elements are labeled as ones of “revenue”; the third, fourth, and fifth, of “costs”; and the fifth, sixth, and seventh as “balance sheet.” The eighth is included in a somewhat generic “Other & Non-Financial” group along “Valuation,” “Partners/Alignment/Governance,” and “currency/FX. Regulatory, Legal, Political.”

⁶⁰ See, for example the resolution passed by the United Nations General Assembly which recognizes a human right to clean drinking water and sanitation, which it characterizes as being essential to the realization of all human rights. “The human right to water and sanitation,” United Nations General Assembly, Resolution 64/292, July 28, 2010. Available at http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/64/292 (Accessed November 27, 2012) The document states that the water supply should be sufficient and continuous for personal and domestic purposes, be safe, be acceptable in color, odor, and taste, and be physically accessible and affordable.

⁶¹ See, for example, “Water Ripples: Expanding Risks for U.S. Water Providers,” by Sharlene Leurig, Ceres, December, 2012 (noting that in the U.S. “[i]nvestors have started to question whether *all* water is essential,” suggesting that “nearly a third of the water used by American households goes to outdoor irrigation, otherwise known as watering lawns” and that “[a]cross the U.S., water use per household has declined an average 13 percent since 1975 – by far more in some places.”), pp. 4 and 11. Available at <http://www.ceres.org/resources/reports/water-ripples-expanding-risks-for-u.s.-water-providers/view> (Accessed December 14, 2012)

⁶² Even in the former context, monopoly control might (sensibly) be limited to the underground cables and wires with the provision of communication services by means of them done on a competitive basis.

⁶³ Similar issues are raised in contests over access by other communications providers to the unique, extant, and extensive interconnected network of wires and cables controlled by one provider, often a long-term historical one.

⁶⁴ For a broad gauge historical perspective on the shifting character of public enterprises, including those typically associated with infrastructure, in Western Europe, Japan and the United States, see “Public Enterprise in the Modern

Western World: An Historical Analysis,” by Robert Millward, *Annals of Public and Cooperative Economics*, Vol. 82, No. 4, 2011, pp. 375-398.

⁶⁵ For a definition of private activity bonds, see “Private Activity Bond,” Municipal Securities Rulemaking Board. Available at https://www.msrb.org/msrb1/glossary/view_def.asp?param=QUALIFIED501C3BONDS (Accessed January 2, 2013).

⁶⁶ See p. 13 and note 43, *supra*.

⁶⁷ “Private Risk in Public Infrastructure – A Review of the Literature,” 1st General Counsels’ Roundtable, Stanford University Collaboratory for Research on Global Projects January 21-22, 2005, p. 3. Available at <http://crgp.stanford.edu/events/presentations/gcr/litreview.pdf>. (Accessed March 20, 2013) To some degree the argument is applicable to sources of electric power.

⁶⁸ Id. at 3-4.

⁶⁹ Id. at 5.

⁷⁰ Id. at 8.

⁷¹ Id. at 7.

⁷² Id. at 8.

⁷³ “CalPERS Infrastructure Investment Outreach Review,” CalPERS, October 15, 2012, p. 5. Available at <http://www.calpers.ca.gov/eip-docs/about/press/news/invest-corp/infrastructure-outreach.pdf> (Accessed December 7, 2012)

⁷⁴ The Infrastructure Program specifically provides that “Public Equity Securities shall not exceed 19% of CalPERS Infrastructure Program Allocation.” “INFRASTRUCTURE PROGRAM August 15, 2011, p. 7. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-asset-classes/real-estate/real-assets-full-policy.pdf> (Accessed March 20, 2013) However reports on infrastructure investments make no mention of any public equity securities having been acquired even though, as suggested in the main text, there are public equity securities in CalPERS’ portfolio which would seem to fit under such definition of infrastructure as CalPERS offers. In this regard, see for example, “Infrastructure and Forestland Program Update, Real Assets,” CalPERS, August 13, 2012. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201208/item08b3-01.pdf> (Accessed March 20, 2013) The same would appear to be the case with regard to the other kinds of investments the cited CalPERS report mentions.

For example, CalEast Global Logistics, LLC (“CalEast”) is described as “a joint venture between The California Public Employees’ Retirement System (“CalPERS”) and GI Partners.” In particular, “[t]hroughout the United States and Canada, CalEast owns and operates industrial, logistics and *infrastructure-oriented* real estate, including warehouses, light assembly, distribution centers, *intermodal centers, air cargo facilities, and truck terminals*. CalEast entities include CenterPoint Properties Trust, joint ventures with Aeroterm and North American Truck Terminals, and other wholly owned and joint venture assets. In total, CalEast owns and operates over 47 million square feet of industrial real estate and logistics infrastructure and over 9,000 acres of land.” CalEast Global Logistics, LLC. (bold and italics added) Available at <http://www.caleast.com/> (Accessed March 20, 2013) In turn, the CenterPoint Properties Trust is described as “a Chicago-based company focused on investment in industrial property and *related rail, road and port infrastructure*. CenterPoint, initially publicly traded in 1993 (NYSE:CENT), was privatized in 2006 by CalEast Global Logistics, LLC, a joint venture between the California Public Employees’ Retirement System (CalPERS) and GI Partners.” “Leadership,” CenterPoint Properties (bold italics added). Available at <http://www.centerpoint-prop.com/about/leadership.aspx> (Accessed December 17, 2012) According to a somewhat different description, “CenterPoint was acquired in 2006 by CalEast Global Logistics, LLC, a wholly owned subsidiary of the California Public Employees’ Retirement System (CalPERS), the largest United States pension fund.” “Partnership to strengthen and expand VA Ports,” Rubin Communications Group, March 12, 2009. Available at <http://www.rubincommunications.com/press-releases/2009/3/12/partnership-to-strengthen-and-expand-va-ports> (Accessed December 17, 2012). As of December 31, 2010, CalEast was listed as part of the CalPERS real estate portfolio and valued at \$1.98 billion. “Supplemental Reporting Document, February 2011 Investment Committee Meeting (December 2010 Reporting Period), CalPERS, p. IV-1. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201102/supplement-feb11/december-report/part-c-2.pdf> (Accessed March 26, 2013) It is not clear whether and how much of the assets of CalEast CalPERS might or should include in its infrastructure portfolio in light of how it has described what it means by infrastructure.

⁷⁵ In a session of the CalPERS Investment Committee about the rationale for and parameters for possible infrastructure investments in California, there was reference to “[a]ttachments 2 and 3 to this Item” being “consistent with the approved [infrastructure investment] strategy and policy, and the institutional market.” “TO: MEMBERS OF THE INVESTMENT COMMITTEE, I. SUBJECT: Infrastructure Investment in California, II. PROGRAM: Infrastructure, III. RECOMMENDATION: Information,” CalPERS, November 15, 2010, p. 1. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201109/item07c-00.pdf> (Accessed March 20, 2013) Attachments 2 and 3 are labeled “Debt Term Sheet” and “Equity Term Sheet,” respectively. Both refer to Defensive and Defensive Plus assets as “Target Investments” and with identical wording refer to “Eligible Investments” and “Greenfield Assets.” “Attachment 2, Debt Term Sheet.” Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201109/item07c-02.pdf> and “Attachment 3, Equity Term Sheet.” Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201109/item07c-03.pdf> The former are termed “[s]table, long-lived, cash generating assets with high levels of execution certainty” and some specific illustrations of such assets are offered. Defensive Plus assets as “Target Investments” and with identical wording refer to “Eligible Investments” and “Greenfield Assets.” “Attachment 2, Debt Term Sheet.” Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201109/item07c-02.pdf> (Accessed March 20, 2013)

⁷⁶ Referring to the investment in Neptune, one report states that “[s]taff classified the asset as Defensive, due to its operational status and an existing 20-year, fixed-price capacity contract with the Long Island Power Authority, which provides cash yield through a monthly payment mechanism. This investment is consistent with the key Policy parameters, including a focus on U.S. based, cash yielding investments.” “Memorandum, To: Members of the Investment Committee, California Public Employees’ Retirement System; Date: April 25, 2012; From: Stephen McCourt, David Altshuler, Meketa Investment Group; Re: 2011 Infrastructure Program Annual Review,” p. 4. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201205/item07-02btc.pdf> (Accessed March 20, 2013)

⁷⁷ “Infrastructure and Forestland Program Update, Real Assets,” CalPERS, August 13, 2012. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201208/item08b3-01.pdf> (Accessed March 20, 2013)

⁷⁸ “Memorandum, To: Members of the Investment Committee, California Public Employees’ Retirement System; Date: April 25, 2012; From: Stephen McCourt, David Altshuler, Meketa Investment Group; Re: 2011 Infrastructure Program Annual Review.” Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201205/item07-02btc.pdf> (Accessed March 20, 2013)

⁷⁹ INFRASTRUCTURE PROGRAM, p. 7. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-asset-classes/real-estate/real-assets-full-policy.pdf> (Accessed March 20, 2013)

⁸⁰ We have not been able to locate such discussion in any CalPERS document relating to infrastructure investment.

⁸¹ INFRASTRUCTURE PROGRAM, p. 6. Available at <http://www.calpers.ca.gov/eip-docs/investments/policies/inv-asset-classes/real-estate/real-assets-full-policy.pdf> (Accessed March 20, 2013) However, “[r]egardless of portfolio size, investment allocations within the Risk Segments and Geographic Segments are not to exceed, on a dollar basis, the upper ends of the Risk Segments and Geographic Segments ranges multiplied by the Program Allocation Target.” Id.

⁸² In its infrastructure program review in May 2012, CalPERS referred to having (as of December 31, 2011) \$790 million in Net Asset Value (NAV) of its investments of which 0% were labeled as Defensive. “Infrastructure & Forestland Program Update, Real Assets,” CalPERS, May 14, 2012, pp. 7 and 8. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201205/item07-01btc.pdf> (Accessed March 20, 2013) In its August 2012 review it refers to having (as of March 31, 2012) \$1,048 million, in NAV of which 19% was Defensive. “Infrastructure & Forestland Program Update, Real Assets,” CalPERS, August 13, 2012, pp 7 and 8. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agendas/invest/201208/item08b3-01.pdf> (Accessed March 20, 2013) That would suggest that about \$199 million of the NAV was associated with Defensive Investments and that the acquisition of Neptune in February 2012 was for approximately that sum.

⁸³ “Infrastructure Manager Search Report, State Universities Retirement System,” EnnisKnupp, October 2009, p. 5. Available http://www.surs.com/pdfs/minutes/x_inv/ex10_25_a.pdf (Accessed March 7, 2013)

⁸⁴ According to a mid-2012 pension fund consultant report, the investment in SourceGas was made in March 2007 and was currently valued at \$454 million. “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter, p. 33. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012)

⁸⁵ According to a mid-2012 pension fund consultant report, the total investment in Reliance Home Comfort was then valued at \$718 million. Id.

⁸⁶ According to a mid-2012 pension fund consultant report, the total investment in Reliance Security Services was then valued at \$238 million. Id.

⁸⁷ “Alinda Secures First Full Realization,” Mergers & Acquisitions, September 23, 2010. Available at <http://www.themiddlemarket.com/news/-211229-1.html> (Accessed March 7, 2013)

⁸⁸ Note that although we refer to the investment being made in BAA, as explained in the detailed narrative about BAA, the investment might better or more properly be seen to have been in FGO Topco Ltd., the holding company for BAA. See pp. 38-43.

⁸⁹ “South Staffordshire Water sold to US fund,” by Rebecca Bream, Financial Times, October 30, 2007. Available at <http://www.ft.com/intl/cms/s/0/e17d9856-867a-11dc-b00e-0000779fd2ac.html#axzz2MslwLFKb> (Accessed March 7, 2013)

⁹⁰ “2010 Infrastructure Dealflow, posted by Elliot Bradbrook on Preqin, May 4, 2010. Available at <http://www.preqin.com/blog/101/2439/2010-infrastructure-dealflow> (Accessed March 7, 2013)

⁹¹ See “Nationwide Corporate/M&A (Highly Regarded) (Band 3),” Bracewell & Giuliani (referring to “Alinda Capital Partners, one of the largest infrastructure firms in the world, on its \$800 million acquisition of InterPark Holdings”) Available at <http://m.bracewellgiuliani.com/rankings-by-practice/corporatema> (Accessed March 7, 2013) and “Alinda Capital Partners Acquires InterPark,” TFI News, July 1, 2011 (stating that Alinda Capital Partners has announced that investment funds managed by Alinda have acquired

100% ownership of Interpark Holdings from GE Capital Real Estate.” TFI-News. Available at <http://www.tfi-news.com/news/item/?n=13045> (Accessed March 26, 2013) However, a report in 2012 by a pension fund which had invested in both Alinda Infrastructure Funds I and II, lists among the latter’s holdings one in Interpark and states that the (apparently) original investment was \$300 million. “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter, pp. 33-34. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed March 7, 2013)

⁹² See note 101, *infra*.

⁹³ “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter, p. 33. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012) We cannot determine from the report the date with which this figure is associated.

⁹⁴ See “Infrastructure Manager Search Report, State Universities Retirement System,” EnnisKnupp, October 2009, p. 4. http://www.surs.com/pdfs/minutes/x_inv/ex10_25_a.pdf (Accessed March 7, 2013). However, according to one pension fund consultant’s report the fair market value of the investment as of September 30, 2011 was \$81 million. “1st Quarter Report, Cincinnati Retirement System,” MarquetteAssociates, March 31, 2012, p. 79. Available at <http://www.cincinnati-oh.gov/retirement/cache/file/424DCF7D-C130-44A7-BE2537DC4B769587.pdf> (Accessed March 20, 2013) In a later report for a different pension fund it refers to the total investment being \$77 million and having been made in March 2009. “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter, p. 34. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012)

⁹⁵ In a pension fund consultant’s report in mid-2012 it is reported that the Alinda Infrastructure Fund II had made an initial investment in “Agri.capital Group Options” in April, 2011 with a total investment of \$44 million. “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter, p. 34. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012)

In an earlier report to a different pension fund the consultant refers (as of September 30, 2011) to an investment of \$370 million having been invested in “Agri.capital Group S.A.” “1st Quarter Report, Cincinnati Retirement System,” MarquetteAssociates, March 31, 2012, p. 79. Available at <http://www.cincinnati-oh.gov/retirement/cache/file/424DCF7D-C130-44A7-BE2537DC4B769587.pdf> (Accessed March 20, 2013)

⁹⁶ In a pension fund consultant’s report in mid-2012 it is reported that the Alinda Infrastructure Fund II had made a total investment in Houston Fuel of \$779 million. “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter, p. 34. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012). In an end of the first quarter, 2012 report by the same consultant for report to a different pension fund, there is no investment in Houston Fuel listed. However, it did list an investment in Regency Gas Pipeline System for an investment of \$559 million. “1st Quarter Report, Cincinnati Retirement System,” MarquetteAssociates, March 31, 2012, p. 79. Available at <http://www.cincinnati-oh.gov/retirement/cache/file/424DCF7D-C130-44A7-BE2537DC4B769587.pdf> (Accessed March 20, 2013) There is no reference to Regency in the other report. With regard to the Houston Fuel transaction see “Through Buffalo Gulf Coast Terminals LLC (BGCT), a wholly owned subsidiary, Alinda Infrastructure Fund II L.P. and Alinda Infrastructure Parallel Fund II L.P. (collectively Alinda Fund II) are purchasing Houston Fuel Oil Terminal Co. from ArcLight Energy Partners Fund IV L.P.” “Buffalo Gulf Coast Terminals LLC’s New \$275 Million Debt Is Assigned Preliminary ‘BB+’ Rating” Available at http://www.bondsonline.com/print/Todays_Market/Credit_Rating_News_.php?DA=view&RID=19892 (Accessed December 14, 2012).

⁹⁷ See “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter (referring to an initial investment by Alinda Infrastructure Fund II I on December 2010 with the total investment being \$141 million), p. 34. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012) We have not been able to determine whether all or only a part of this investment was for Alinda Infrastructure Fund II, L.P.

⁹⁸ According to a pension fund consultant’s report in mid-2012, the Alinda Infrastructure Fund II, L.P.’s total investment in Santa Paula was \$27 million. “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment, 2nd Quarter, p. 34. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012) The difference between the figure in the main text which was reported elsewhere and this one may be because of the leverage used to acquire the interest in Santa Paula.

⁹⁹ According to a pension fund consultant’s report in mid-2012, the Alinda Infrastructure Fund II, L.P.’s total investment in InterPark Holdings, Inc. was \$313 million. “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter, p. 79. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012). The difference between this figure in the main text which was reported elsewhere and this one may be because of the leverage used to acquire InterPark or Alinda Capital partners acquiring a partial interest on behalf of another of its funds. See “Chambers and Partners USA, Nationwide Corporate/M&A (Highly Regarded) (Band 3), According to Chambers USA 2012,” Bracewell & Giuliani LLP (referring to a law firm “assisting Alinda Capital Partners, one of the largest infrastructure firms in the world, on its \$800 million acquisition of InterPark Holdings”). Available at <http://m.bracewellgiuliani.com/rankings-by-practice/corporatema> (Accessed March 18, 2013)

¹⁰⁰ See “Infrastructure Spotlight,” Preqin, November 2011, p. 10. Available at http://www.preqin.com/docs/newsletters/INF/Preqin_Infrastructure_Spotlight_November_2011.pdf (Accessed December 14, 2012) However, according to a pension fund consultant’s report in mid-2012, the Alinda Infrastructure Fund I, L.P.’s total investment in BAA was \$736 million while that of the Alinda Infrastructure fund II, LP was zero. “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter, pp 78 and 79. Available at http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012)

¹⁰¹ “Infrastructure Manager Search Report, State Universities Retirement System,” EnnisKnupp, October 2009 (referring to an investment in Regency Intrastate Gas Systems,

a \$535 million investment in March 2009, in this FERC-regulated gas pipeline system in Louisiana which provides an essential infrastructure link to get gas from East Texas and the Haynesville Shale gas field in Northern Louisiana to truck lines that serve the New York and Chicago markets). Available at http://www.surs.com/pdfs/minutes/x_inv/ex10_25_a.pdf. (Accessed November 29, 2012). This investment appears to be confirmed in another consultant’s report to a different fund. However, despite extensive research on our part we have not been able to confirm that assertion. See note 100 above.

¹⁰² “Marquette Associates’ Investment Manager Status Report,” Prepared for the Illinois State Board of Investment 2nd Quarter, p. 34. http://www2.illinois.gov/isbi/Documents/RFP_Gen_Inv_Consultant-2Q2012.pdf (Accessed December 14, 2012). We cannot determine from the report the date with which this figure is associated.

¹⁰³ See “Global Infrastructure Buyouts,” The Carlyle Group (listing holdings of Carlyle Infrastructure Partners) <http://www.carlyle.com/our-business/real-assets/global-infrastructure-buyout> (Accessed March 7, 2013) and (stating that) Houston-based Synagro Technologies Inc., a recycler of wastewater treatment byproducts, will be acquired by Carlyle Group for \$772 million”). Available at <http://pipeline.thedeal.com/tdd/ViewArticle.d?id=1168932158479#ixzz2MsUv1FMA> (Accessed March 7, 2013)

¹⁰⁴ “Synagro Files for Bankruptcy With Plan for Sale to EQT,” by Dawn McCarty, Bloomberg, Apr 24, 2013. Available at <http://www.bloomberg.com/news/print/2013-04-24/synagro-files-for-bankruptcy-with-plan-for-sale-to-eqt.html> (Accessed May 22, 2013).

¹⁰⁵ “In 2008, CIP acquired a majority interest in ITS Technologies & Logistics.” “Global Private Equity, The Road Ahead” The Carlyle Group. p.30. Available at http://www.carlyle.com/sites/default/files/2008%20Annual%20Report%20-%20English_0.pdf (Accessed March 7, 2013)

¹⁰⁶ See “Real Assets, Global Infrastructure Buyout,” The Carlyle Group (referring to a commitment of roughly \$230 million in November 2009 through Carlyle Infrastructure Partner, L.P. in Project Service LLC, to “a joint venture among The Carlyle Group, SUBWAY Restaurants and Subcon, Inc.” which entered into “a 35-year public-private partnership with the State of Connecticut to redevelop, operate and maintain

- Connecticut's 23 highway service areas across the state.” Available at <http://www.carlyle.com/our-business/real-assets/global-infrastructure-buyout> (Accessed March 7, 2013) See also “How Carlyle Creates Value, Case Study,” Global Alternative Asset Management,” The Carlyle Group. Available at <http://www.carlyle.com/sites/default/files/Carlyle-CaseStudy-ProjectService.pdf> (Accessed March 7, 2013)
- ¹⁰⁷ See “QUBE REACHES AGREEMENT WITH CARLYLE INFRASTRUCTURE PARTNERS,” Bloomberg, February 24, 2011 (stating that “CIP will unconditionally subscribe for 36,280,204 units at an issue price of \$1.275 per unit (ex-distribution) raising approximately \$46.3 million” and “subscribe for an additional 55,108,272 units at the same price which will raise approximately an additional \$70.3 million for Qube... The unconditional and conditional placements will raise approximately \$116.5 million.”). Available at <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aCbqyBPObkCg> (Accessed March 7, 2011)
- ¹⁰⁸ See “Global Infrastructure Buyouts,” The Carlyle Group (listing holdings of Carlyle Infrastructure Partners). Available at <http://www.carlyle.com/our-business/real-assets/global-infrastructure-buyout> (Accessed March 8, 2013)
- ¹⁰⁹ See “American Water in Brief,” Volume 12, Issue 12, December 2011. Available at <http://www.globalwaterintel.com/archive/12/12/brief/america-water-brief.html> (Accessed March 8, 2013)
- ¹¹⁰ “In 2001, CalPERS, which had been a long-time investor in Carlyle funds, decided to buy a 5.5 percent stake in the firm for \$175 million. CalPERS had been one of two outside investors that owned pieces of the private Carlyle, the other being Mubadala, a sovereign wealth fund in Abu Dhabi, which owns a 7.7 percent Carlyle stake.” “Since 2001, the CalPERS stake in Carlyle has been reduced to 4.2 percent... CalPERS owns 12.7 million shares in Carlyle, according to the firm’s offering prospectus.” “BUYOUTS-CalPERS investment in Carlyle nearly triples in value,” May 3, 2012. Available at <http://www.reuters.com/article/2012/05/03/buyouts-calpers-carlyle-idUSL1E8G3NHK20120503> (Accessed March 20, 2013)
- ¹¹¹ “Edinburgh Airports sold to Global Infrastructure Partners for £807m,” BBC News, April 23, 2012. Available at <http://www.bbc.co.uk/news/uk-scotland-scotland-business-17814024> (Accessed March 8, 2013)
- ¹¹² “CalPERS Acquires a Stake in London Gatwick Airport,” Press Release, CalPERS, June 18, 2010. Available at <http://www.calpers.ca.gov/index.jsp?bc=/about/press/pr-archive/pr-2010/june/gatwick-airport.xml> (Accessed March 8, 2013)
- ¹¹³ “Gatwick to get upgrade after £1.5bn sale,” by Richard Wray and Graeme Wearden, *The Guardian*, October 21, 2009. Available at <http://www.guardian.co.uk/business/2009/oct/21/baa-sells-gatwick> (Accessed November 29, 2012)
- ¹¹⁴ “Gatwick Airport Limited, Report and Financial Statements for the year ended 31 March 2011,” p. 2. Available at http://www.gatwickairport.com/Documents/business_and_community/Investor%20relations/Annual%20report_march2011.pdf (Accessed November 29, 2012)
- ¹¹⁵ “CIM GROUP CLOSES PURCHASE OF SKYPOWER CORP. SOLAR ASSETS,” SkyPower Corp (stating that “CIM Group announced that on Friday it closed on its purchase of SkyPower Corp’s assets, excluding SkyPower Corp’s wind portfolio. The new entity, named SkyPower Limited, includes a 50 percent stake in the 9.1 megawatt First Light energy park—the first operational utility-scale solar energy project in Canada—as well as a pipeline of 50 additional projects representing the potential for more than 500 megawatts of solar power generation nameplate capacity” and that “CIM executed this transaction through its Infrastructure Fund”), November 23, 2009. Available at <http://www.skypowercorp.com/Press%20Releases/SkyPower%20Press%20Release%2011-23-09%20FINAL.pdf> (Accessed March 8, 2013)
- ¹¹⁶ “CIM Portfolio Company Closes on \$185M Sale, JV,” by Natalie Dolce, *GlobeST.com*, July 5, 2012 (stating that “CIM Group, a Los Angeles-based real estate and infrastructure investment firm, recently revealed that its portfolio company, SkyPower Limited, an owner and developer of solar energy projects, has concluded a sale of controlling interests in 16 utility-scale solar projects. In addition, it executed an international joint venture agreement with Canadian Solar Inc.,” that “[t]he deal was for \$185 million and included the acquisition of a five-year warrant for 9.9% of CSI’s outstanding shares” and that “[i]n addition to the Canadian projects sold, the new joint venture will develop solar projects in select international markets.”) Available at http://www.globest.com/news/12_387/losangeles/acquisitions_dispositions/CIM-Portfolio-Company-Closes-on-185M-Sale-JV-323013.html (Accessed March 8, 2013)
- ¹¹⁷ Alinda Infrastructure Fund I, L.P.’s commitment was \$100 million. As of March 31, 2012 the report Net Asset Value of the investments in that fund were \$94 million with a reported three-year rate of return of 6.3%, suggesting the called commitments were approximately \$75 million. The second Alinda fund the commitment was \$300 million. The net asset value was \$186 million with a one-year return of 2.6% suggesting called commitments of about \$180 million. For the Carlyle Infrastructure Partners Fund, the commitment was \$100 million and the net asset value was \$69 million with a reported three-year rate of return of 5.9%, suggesting called commitments in the range of \$55 million “CIO Quarterly Performance Report, quarter Ending June 30, 2012,” CalPERS, p. 34. Available at <http://www.calpers.ca.gov/eip-docs/about/board-cal-agenda/agens/invest/201208/item07a-02.pdf> (Accessed March 22, 2013)
- ¹¹⁸ “Alinda Capital Partners to Invest in agri.capital Group S.A.,” agri.capital, March 21, 2011. Available at <http://www.agri-capital.de/en/news/alinda-capital-partners-investiert-in-agricapital.html> (Accessed November 30, 2012)
- ¹¹⁹ “Alinda closes second infrastructure fund,” *Private Equity Wire*, March 2, 2010. Available at <http://www.privateequitywire.co.uk/2010/02/01/32842/alinda-closes-second-infrastructure-fund> (Accessed November 30, 2012)
- ¹²⁰ “Alinda Infrastructure Fund II, L.P., Investment Profile” in “Infrastructure Manager Search Report,” EnnisKnupp, October 2009, p 1. Available at http://www.surs.com/pdfs/minutes/x_inv/ex10_25_a.pdf (Accessed March 22, 2013) It adds that “Alinda believes in negotiated transactions instead of public auctions that reside in the small to middle market (enterprise values between \$100 million and \$2 billion). In management’s opinion, this strategy allows for preferred transaction multiples that produce higher exit returns.” Id.
- ¹²¹ “Alinda Infrastructure Fund II, L.P., Investment Profile” in “Infrastructure Manager Search Report,” EnnisKnupp, October 2009, p 2. Available at http://www.surs.com/pdfs/minutes/x_inv/ex10_25_a.pdf (Accessed March 22, 2013). For additional information about the thesis see id.
- ¹²² See “Renewable Energy and Cleantech Infrastructure,” posted by Elliot Bradbrook, Preqin, March 29, 2011 (referring to “Alinda Infrastructure Fund II [having] acquired a majority stake in agri.capital). Available at <http://www.preqin.com/blog/101/3604/cleantech-infrastructure> (Accessed March 20, 2013)
- ¹²³ “Alinda Capital Partners to Invest in agri.capital Group S.A.,” agri.capital, March 21, 2011. Available at <http://www.agri-capital.de/en/news/alinda-capital-partners-investiert-in-agricapital.html> (Accessed March 22, 2013)
- ¹²⁴ “About agri.capital,” agri.capital. Available at <http://www.agri-capital.de/en/about-agricapital.html> (Accessed March 20, 2013)
- ¹²⁵ “BIOGAS (GENERATION OF POWER AND HEAT),” agri.capital. Available at <http://www.agri-capital.de/en/products-performance/biogas.html> (Accessed November 30, 2012). More particularly, “[i]n a biogas plant the organic matter is fermented in so-called fermenters. In this natural process the biomass is decomposed by bacteria which results in the formation of biogas. A process following the same principle takes place in a cow’s stomach. After subsequent cleaning and drying, the biogas becomes a suitable energy source. Generally, the biogas is converted on-site into electricity and heat using a combustion engine (combined heat and power unit).” “FAQ’S,” agri.capital. Available at <http://www.agri-capital.de/en/products-performance/biogas/haeufig-gestellte-fragen.html> (Accessed November 30, 2012)
- ¹²⁶ “BIOGAS (GENERATION OF POWER AND HEAT),” agri.capital. Available at <http://www.agri-capital.de/en/products-performance/biogas.html> (Accessed November 30, 2012)
- ¹²⁷ “BIOMETHANE,” agri.capital. Available at <http://www.agri-capital.de/en/products-performance/biomethane.html> (Accessed November 30, 2012) More particularly, “[b]iomethane is produced in a special processing plant, mostly in the immediate vicinity of the biogas plant. In the processing plant, the carbon dioxide and hydrogen sulphide are removed from the biogas. The biogas is dried and purified of other substances. To adapt the heating value to local conditions, the prepared biomethane is enriched with liquid gas. It is then condensed and raised to the operating pressure of the local natural gas grid.” “PRODUCTION PROCESS,” agri.capital. Available at <http://www.agri-capital.de/en/products-performance/biomethane/production.html> (Accessed November 30, 2012)
- ¹²⁸ See “BIOMETHANE SUPPLY,” agri.capital. Available at <http://www.agri-capital.de/en/products-performance/biomethane/supply.html> (Accessed November 30, 2012)
- ¹²⁹ “The incidental fermentation residues from the biogas plant is reapplied as high-quality fertiliser on fields.” “BIOGAS (GENERATION OF POWER AND HEAT),” agri.capital.

- Available at <http://www.agri-capital.de/en/products-performance/biogas.html> (Accessed November 30, 2012)
- ¹³⁰ According to one report on biogas production in Germany, “the average specific investment costs are 3100 € per kWel installed electric power.” Average investment costs were about 1.3 million € (corresponding to .4 mW) with maximum costs of 5 million €. “Biogas plants in Germany – experiences in implementation and processing,” Bernd Linke, ATB, October 9, 2009. Available at http://www.czystaenergia.pl/pdf/farma2009_04.pdf (Accessed March 22, 2013)
- ¹³¹ “agri.capital expands its biomethane capacity,” agri.capital, February 4, 2011. Available at <http://www.agri-capital.de/en/news/ausbau-der-biomethan-kapazitaeten.html> (Accessed November 30, 2012)
- ¹³² “Clean Technology Q1 2010;” “The Lighthouse,” Pharus Advisors, LLC, p. 19. Available at <http://www.pharus.com/templates/pharus/pdf/cleantech-first-quarter-of-2010.pdf> (Accessed November 30, 2012)
- ¹³³ See, for example, “PLANT PORTFOLIO,” agri.capital (which lists only plants in Germany). Available at <http://www.agri-capital.de/en/about-agricapital/portfolio.html> (Accessed November 30, 2012) and one report which refers to agri.capital as a company which “develops, owns and operates biogas to power and biomethane to pipeline operations in Germany and Austria.” “agri.capital Raises €60 Million in Funding,” Bloomberg, May 18, 2009. Available at <http://www.bloomberg.com/apps/news?pid=conewsstory&tkr=LEF:LN&sid=aHzHNACt99.g> (Accessed November 30, 2012)
- ¹³⁴ “The German Renewable Energy Act of 2012,” Mayer-Brown, December 8, 2011. Available at <http://www.mayerbrown.com/publications/the-german-renewable-energy-act-of-2012-12-08-2011/> (Accessed December 12, 2012)
- ¹³⁵ See “A Guide to Biogas,” by Charles M Bowen, edited by Lamar Stonecypher, updated September 9, 2011. Available at <http://www.brighthub.com/environment/renewable-energy/articles/124371.aspx> (Accessed August 13, 2012)
- ¹³⁶ “The main legislative driver for renewable energy development in Germany is the Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, or EEG), promoting the development of renewable energy sources with an electricity feed-in tariff scheme. The latest version of the EEG was issued in 2009. It includes a feed-in tariff scheme for biogas. Grid operators must pay a government-specified feed-in tariff for 20 years to biogas plant operators supplying electricity to the grid. This feed-in tariff includes a basic tariff which ranged from 0.1167 to 0.0779 €/kWh in 2009 depending on the size of the biogas plant. It also includes several bonuses for several issues, such as for dedicated energy crops, CHP, technologies, manure and formaldehyde. Furthermore, there is an annual digression of 1% of the tariff for newly installed plants. The introduction of the EEG was the main driver for attracting investment and for creating financing opportunities, since it ensures revenues for 20 years. This framework makes biogas projects in Germany calculable.” “Examples for financing of biogas projects in Germany,” by Henning Hah, Dominik Rutz, Erik Ferer, and Franz Kircmayer, BiogasIN, p.8. Available at http://www.biogasin.org/files/pdf/Biogas_financing_in_Germany.pdf (Accessed December 3, 2012)
- More recently it was reported that “[t]he new EEG Feed in Tariff guidelines for 2012 were published in Germany. Biogas in Germany was given a big boost from the decision to switch from rapeseed oil to biogas for Cogeneration Plants.” “EEG Guidelines Favor Biogas in Germany.” Available at <http://www.solar-facts-and-advice.com/biogas-in-Germany.html> (Accessed December 3, 2012)
- ¹³⁷ “The majority of the [] tariffs are subject to a so-called ‘degression.’ That is, the tariff to be paid for the next 20 years depends on the year in which the plant starts operating. The later this start-up occurs, the lower the feed-in tariff will be for the entire 20 years...Degression will have a massive impact on the profitability of any energy production investment.” “The German Renewable Energy Act of 2012,” Mayer-Brown, December 8, 2011. Available at <http://www.mayerbrown.com/publications/the-german-renewable-energy-act-of-2012-12-08-2011/> (Accessed December 12, 2012)
- ¹³⁸ See “Biogas comes of age” by Iya Omari and Peter Stepany (“One country that has established a favourable regime, albeit with shorter guaranteed tariffs than Germany, is Italy where agri.capital has already established operations.”) Available at <http://www.waste-management-world.com/index/display/article-display/printArticle/articles/waste-management-world/volume-11/Issue-4/Features/Biogas-comes-of-age.html> (Accessed December 3, 2012) and “agri.capital enters the UK biogas market.” Available at <http://www.agri-capital.de/en/news/agricapital-enters-the-uk-biogas-market.html> (Accessed December 3, 2012)
- ¹³⁹ See, for example, “German shale gas reserves up to 22 trillion cbm – study,” Reuters, June 25, 2012. Available at <http://www.reuters.com/article/2012/06/25/germany-shale-estimate-idUSL6E8HP4FP20120625> (Accessed October 31, 2012). There are, however, countervailing environmental concerns. For example, see “Germany Urged to Ban Shale Gas Fracking Near Water Reservoirs,” Bloomberg, September 6, 2012. Available at <http://www.bloomberg.com/news/2012-09-06/germany-urged-to-ban-shale-gas-fracking-near-water-reservoirs.html> (Accessed October 31, 2012)
- ¹⁴⁰ See “Examples for financing of biogas projects in Germany,” by Henning Hahn, Dominik Rutz, Erik Ferber, and Franz Kircmayer November 2010, IEE Project ‘BiogasIN’, pp. 5-6. Available at http://www.biogasin.org/files/pdf/Biogas_financing_in_Germany.pdf (Accessed January 3, 2013)
- ¹⁴¹ See “agri.capital has acquired the Pliening biomethane plant from r.e Bioenergie” September 8, 2012 (referring to agri.capital taking over a biomethane plant from r.e Bioenergie GmbH, a subsidiary of BayWa r.e GmbH and noting that “r.e Bioenergie, as agri.capital’s partner, will guarantee the long-term supply of raw materials for the plant and continue the existing co-operation with local farmers who supply the input materials needed, such as maize silage, whole crop silage, green rye and grass silage.”). Available at <http://www.agri-capital.de/en/news/agricapital-kauft-biomethananlage-pliening.html> (Accessed December 3, 2012) and “Biogas (Generation of Power and heat), (The raw materials are supplied by farmers and agricultural cooperatives in the area surrounding our biogas plants.” agri.capital. Available at <http://www.agri-capital.de/en/products-performance/biogas.html> (Accessed December 12, 2012)
- ¹⁴² “In practice, stakeholders tend to underestimate the complexity of existing plants and the extent of the safety measures required. Ensuring safety firstly requires consideration of the gas, electrical and pressure systems. Secondly, issues related to fire, lightning and explosion protection are also significant, as are organisational questions including escape routes and emergency plans. “In this context, operators have a high level of responsibility, including conducting the necessary inspections, ensuring sufficient explosion protection and expert training of employees. Operators in breach of these duties risk operating illegally, which may result in a shutdown and in restriction or even loss of insurance cover.” “Robust Analysis Cuts Biogas Risks,” by Johannes Steiglechner, Matthias Herold and Dr. Rolf M Zöllner, April 18, 2012. Available at <http://www.renewableenergyworld.com/rea/news/article/2012/04/robust-analysis-cuts-biogas-risks> (Accessed December 3, 2012) and “Robust Analysis Cuts Biogas Risks,” by Johannes Steiglechner, Matthias Herold and Dr. Rolf M Zöllner, April 18, 2012. Available at <http://www.renewableenergyworld.com/rea/news/article/2012/04/robust-analysis-cuts-biogas-risks> (Accessed December 12, 2012)
- ¹⁴³ “Costs of a Biogas Plant,” Energypedia. Available at https://energypedia.info/index.php/Costs_of_a_Biogas_Plant#Large-scale_biogas_plants (Accessed June 10, 2013)
- ¹⁴⁴ “agri.capital expands its biomethane capacity,” agri.capital, February 2, 2011. Available at <http://www.agri-capital.de/en/news/ausbau-der-biomethan-kapazitaeten.html> (Accessed June 10, 2013)
- ¹⁴⁵ “Analysis of contaminants in biogas,” SP Technical Research Institute of Sweden. Available at http://www.sp.se/en/index/services/biogas_contamination/sidor/default.aspx (Accessed June 10, 2013)
- ¹⁴⁶ A Guide to Biogas, “written by Charles M Bowen and edited by Lamar Stonecypher, September 9, 2011, BRIGHTHUB. Available at Available at <http://www.brighthub.com/environment/renewable-energy/articles/124371> (Accessed June 10, 2013)
- ¹⁴⁷ Id.
- ¹⁴⁸ “Biogas Comes of Age,” by Iyad Omari & Peter Stepany, Waste Management World. Available at <http://www.waste-management-world.com/articles/print/volume-11/issue-4/Features/biogas-comes-of-age.html> (Accessed June 10, 2013) More particularly the operator “needs to ensure a balance between different types of input entering the digester (fat, vegetables, meat, etc.). Bacteria take time to adjust to changes in feedstock composition, so frequent variations are unwelcome. Furthermore, the quality of outputs varies by feedstock; only with detailed knowledge of the inputs is it possible to forecast the outputs and the treatment they will require (e.g. scrubbing of the biogas).” Id.
- ¹⁴⁹ “The German Renewable Energy Act of 2012,” Mayer-Brown, December 8, 2011. Available <http://www.mayerbrown.com/publications/the-german-renewable-energy-act-of-2012-12-08-2011/> (Accessed December 12, 2012)
- ¹⁵⁰ See “Biogas comes of age” by Iya Omari and Peter Stepany (noting that “using food waste avoids the political issues that

can arise with biomass. In Germany, growing crops for fuel is relatively uncontroversial as the country has surplus agricultural land” whereas “[i]n other countries, including the USA, growing crops for fuel has become a subject of heated debate”). Available at http://www.waste-management-world.com/index/display/article-display/_printArticle/articles/waste-management-world/volume-11/Issue-4/Features/Biogas-comes-of-age.html (Accessed December 3, 2012) and “agri.capital accepts alternative energy source challenges,” August 28, 2012. <http://www.agri-capital.de/en/news/baubeginn-der-biogasanlage-in-kannawurf.html> (noting “the company’s strategy is diversification in its use of raw materials,” namely “continuously reducing the amount of maize silage used” and “increasingly using alternative raw materials, such as millet, grass silage, whole-crop silage and even animal waste products.”) (Accessed December 3, 2012)

¹⁵¹ For example, “[t]he biogas produced in the fermenter includes aggressive substances such as ammonium and hydrogen sulphide which are in contact with the tank walls, pipes and valves. Given this, the materials used for these components need to be highly corrosion resistant over long periods. Leaking gases and liquids pose serious hazards, containing substances which may cause asphyxiation, fires or explosions. Furthermore, leakage of fermentation substrates into water may cause severe environmental pollution.” Robust Analysis Cuts Biogas Risks,” by Johannes Steiglechner, Matthias Herold and Dr. Rolf M Zöllner, April 18, 2012. Available at <http://www.renewableenergyworld.com/real-news/article/2012/04/robust-analysis-cuts-biogas-risks> (Accessed December 3, 2012)

¹⁵² As described in the main text, a second CalPERS enterprise level investment was made in the BAA by way of its investment in the Alinda Infrastructure Fund II, L.P. See p.29, supra.

¹⁵³ “CalPERS signs to infrastructure with long-term view,” by Jon Peterson, IPE Real Estate, November 20, 2009. Available at http://www.ipe.com/real-estate/calpers-signs-to-infrastructure-with-long-term-view_33401.php#.UUyb3vIZ_jM (Accessed March 22, 2013) See also “Alinda closes \$3bn infrastructure fund,” Altassets, June 15, 2007. Available at <http://www.altassets.net/private-equity-news/alinda-closes-3bn-infrastructure-fund.html> (Accessed March 22, 2013)

¹⁵⁴ “Alinda Infrastructure Fund II, L.P. Investment Profile” in “Infrastructure Manager Search Report,” EnnisKnupp, October 2009, p 6. Available at http://www.surs.com/pdfs/minutes/x_inv/ex10_25_a.pdf (Accessed March 22, 2013)

¹⁵⁵ See “BAA Airports Market Investigation – Issues Statement,” Competition Commission, UK, August 9, 2007 (stating that “in 2006 “BAA was acquired by Airport Development and Investment Ltd (ADI), a wholly owned subsidiary of GFP Topco Ltd,” in which Grupo Ferrovial, S.A. (Ferrovial) and two other shareholders held all of the ordinary shares.”), p. 3. Available at http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/press_rel/2007/aug/pdf/47-07 (Accessed December 4, 2012) and “Who We Are,” BAA, (stating that “BAA is owned by FGP TopCo Limited, a consortium led by Spanish infrastructure specialist Ferrovial, and also including Caisse de depot et placement du Quebec, GIC Special Investments and Alinda Capital Partners.”) Available at <http://www.baa.com/about-baa/who-we-are> (Accessed December 4, 2012)

¹⁵⁶ “Alinda Infrastructure Fund II, L.P. Investment Profile” in “Infrastructure Manager Search Report,” EnnisKnupp, October 2009, p. 6. Available at http://www.surs.com/pdfs/minutes/x_inv/ex10_25_a.pdf (Accessed March 22, 2013)

¹⁵⁷ See “Gatwick to get upgrade after £1.5bn sale,” by Richard Wray and Graeme Wearden, *The Guardian*, October 21, 2009. Available at <http://www.guardian.co.uk/business/2009/oct/21/baa-sells-gatwick> and “Ryanair expresses interest in Stansted as BAA puts it up for sale,” by Dan Milmo, *The Guardian*, August 20, 2012. Available at <http://www.guardian.co.uk/business/2012/aug/20/ryanair-stansted-airport-interest?INTCMP=SRCH> (Accessed March 22, 2013)

¹⁵⁸ “Infrastructure Spotlight,” Preqin, November 2011, p. 10. Available at http://www.preqin.com/docs/newsletters/INF/Preqin_Infrastructure_Spotlight_November_2011.pdf (Accessed March 22, 2013) Note that in August 2012, Qatar Holding agreed to purchase 10.6 percent of FGP Topco Ltd. for 478 million pounds (\$748.9 million), in effect at a price lower than that at which the two Alinda Funds had acquired their interests in 2011. “Qatar buys fifth of UK airport operator BAA,” by Adam Schreck, *The San Bernardino Sun*, August 17, 2012. Available at http://www.sbsun.com/ci_21336463/qatar-buys-fifth-uk-airport-operator-baa#ixzz24T6nEVPv (Accessed March 22, 2013)

¹⁵⁹ See in this regard “BAA (SH) plc and BAA Funding Limited, Full Rating Report,” Global Infrastructure and Project Finance, Airports/UK, Fitch Ratings (noting that “[t]raffic at hub airports tend to be more stable than at competing origin and designation (O&D) airports, because during periods of declining traffic airlines will consolidate services through their existing hubs.”), August 23, 2012, p.2. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/baa-funding-baa-sh-full-rating-report-20120823.pdf (Accessed March 22, 2013) Note that “BAA Funding is a special-purpose vehicle whose sole purpose is to raise capital market debt on behalf of BAA (SP), the ultimate owner and operator of Heathrow and Stansted.” Id. at 8.

¹⁶⁰ In this connection see “Transaction Update: BAA Funding Ltd., Up To £50 Billion Multicurrency Program For The Issuance Of Asset-Backed Notes,” Global Credit Portal, RatingsDirect, Standard & Poor’s (noting that “airlines have been adding more seats for premium services, meaning that large aircrafts are not carrying as many passengers as anticipated”), September 16, 2011, p. 6. Available at <http://propdsearch.com/detail/baa-update.html> (Accessed March 22, 2013)

¹⁶¹ It was noted in 2008 in connection with a discussion of Heathrow, Gatwick, and Stansted airports, that passenger tariffs were “low compared with many European peer equivalents as they are subsidised by the non-aeronautical profit stream.” It suggested that “airport charges and costs total around 5-10% of an airline’s own costs” so that “the tariff per pax is less onerous for long-haul price tickets, but for LCC operators with low price tickets at Stansted, and for easyJet at Gatwick, rising airport tariffs are a sensitive issue.” “BAA Funding Limited Airports, UK Presale Report,” Global Infrastructure & Project Finance, FitchRatings, July 15, 2008, p. 4. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/baa-funding-baa-sh-full-rating-report-20120823.pdf (Accessed March 22, 2013)

¹⁶² For a general discussion of such considerations, see “Multicurrency programme for the issuance of Bonds,” Prospectus, BAA FUNDING LIMITED, (June 14, 2012, (Heathrow is implementing a £5.6 billion investment programme over the six years to 31 March 2014.”), p. 13. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/Financial_information/BAA_Funding-Base-prospectus_14_June_2012.pdf (Accessed December 4, 2012).

¹⁶³ “Infrastructure: an emerging asset class for institutional investors,” by Rajiv Sharma, October 4, 2012, p.31, Figure 10. <http://hausercenter.org/iri/wp-content/uploads/2012/10/IRI-Conference-Paper-R.Sharma.pdf> (Arguably, the key issue is one of profits, rather than revenues, attributable to aeronautical and non-aeronautical activities.) According to one ratings report non-aeronautical revenue is not “as vulnerable to change” as some might suggest. More particularly, it stated that “terminals’ consumer behavior does not mirror UK national consumer spending trends; also, this Commercial Revenue is a mixture of minimum rentals, concession fees, some turnover-derived flows and some directly operated activities,” although it did note the possibility that terminal outlets and operators might seek lower rentals if lower passenger volume affected their profits. “BAA Funding Limited Airports, UK Presale Report,” Global Infrastructure & Project Finance, FitchRatings, July 15, 2008, p. 4. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/Fitch_Presale_%20BAA_Funding.PDF (Accessed March 22, 2013) For a discussion of the different drivers of BAA’s retail revenue from other than car-park and car-park sources, see id. at 12.

¹⁶⁴ “BAA Ordered to Sell Three Airports,” Competition Commission, New Release, March 19, 2009. Available at http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/press_rel/2009/mar/pdf/11-09 (Accessed March 22, 2013)

¹⁶⁵ “Multicurrency programme for the issuance of Bonds,” Prospectus, BAA FUNDING LIMITED, June 14, 2012, p. 39. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/Financial_information/BAA_Funding-Base-prospectus_14_June_2012.pdf (Accessed March 22, 2013)

¹⁶⁶ Id.

¹⁶⁷ “Economic Regulation of Heathrow and Gatwick Airports, 2008-2013, CAA decision,” Civil Aviation Authority, March 11, 2008, p. 28, Available at http://www.caa.co.uk/docs/5/ergdocs/heathrowgatwickdecision_mar08.pdf (Accessed March 23, 2013) For a detailed description of the complex formula for determining permissible airport charges, see id., starting at p. 202. Although the CAA’s maximum allowable yields apply to passenger flights only and hence, not to dedicated cargo flights, “airports must charge non-passenger flights at the same rates as passenger flights.” “Multicurrency

- programme for the issuance of Bonds,” “Multicurrency programme for the issuance of Bonds,” Prospectus, BAA FUNDING LIMITED, June 14, 2012, p. 27. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/Financial_information/BAA_Funding-Base_prospectus_14_June_2012.pdf (Accessed March 22, 2013)
- ¹⁶⁸ See “Transaction Update: BAA Funding Ltd., Up To £50 Billion Multicurrency Program For The Issuance Of Asset-Backed Notes,” Global Credit Portal, RatingsDirect, Standard & Poor’s (noting the regime is one “which protects profitability against long-term declines in either passenger volumes or retail revenues, while short-term volatility could still occur if passenger number fall below expectations or if retail spend declines”), September 16, 2011, p. 6. Available at <http://propdfsearch.com/detail/baa-update.html>
- ¹⁶⁹ “Multicurrency programme for the issuance of Bonds,” Prospectus, BAA FUNDING LIMITED, (June 14, 2012, (“Heathrow is implementing a £5.6 billion investment programme over the six years to 31 March 2014.”), pp. 13 and 28. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/Financial_information/BAA_Funding-Base_prospectus_14_June_2012.pdf (Accessed March 22, 2013)
- ¹⁷⁰ Id. at 4.
- ¹⁷¹ Id. at 18.
- ¹⁷² For example, “the CAA reduces certain permitted airport charges at Heathrow if prescribed milestones are not met on certain capital investment projects” and “[u]nder service quality rebate schemes applying at both Heathrow and Stansted, failure to meet specified targets relating to, among other things, airport cleanliness, security queuing times and stand and jetty availability can result in rebates to airline customers of up to 7 per cent of airport charges.” Id. at 16 (Heathrow is implementing a £5.6 billion investment programme over the six years to 31 March 2014.”)
- ¹⁷³ “BAA (SH) plc and BAA Funding Limited, Full Rating Report,” Global Infrastructure and Project Finance, Airports/UK, Fitch Ratings, August 23, 2012, p. 2. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/baa-funding-baa-sh-full-rating-report-20120823.pdf (Accessed March 22, 2013)
- ¹⁷⁴ “Multicurrency programme for the issuance of Bonds,” Prospectus, BAA FUNDING LIMITED, June 14, 2012, pp. 17 and 39. http://www.baa.com/static/BAA_Airports/Downloads/PDF/Financial_information/BAA_Funding-Base_prospectus_14_June_2012.pdf
- ¹⁷⁵ See “Infrastructure: an emerging asset class for institutional investors,” by Rajiv Sharma, October 4, 2012, pp. 25-27. Available <http://hausercenter.org/iri/wp-content/uploads/2012/10/IRI-Conference-Paper-R.Sharma.pdf> (Accessed March 22, 2013)
- ¹⁷⁶ “Multicurrency programme for the issuance of Bonds,” Prospectus, BAA FUNDING LIMITED, June 14, 2012. Available at p. 40. http://www.baa.com/static/BAA_Airports/Downloads/PDF/Financial_information/BAA_Funding-Base_prospectus_14_June_2012.pdf (Accessed March 22, 2013)
- ¹⁷⁷ Id. at 39.
- ¹⁷⁸ Id. at 38
- ¹⁷⁹ For a brief characterization of some of these issues, see “More strikes threaten flying Britons,” *The Economist*, Aug 13, 2010. Available at http://www.economist.com/blogs/gulliver/2010/08/strike_threat_baa?zid=309&ah=80dcf288b8561b012f603b9fd9577f0e and “BAA Heathrow Express Workers Planning 24-Hour Strikes (Update1),” Bloomberg. Available at <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=avo9SLsqV5L4&refer=uk> (Accessed March 22, 2013) For some recent events, see “Airport strike suspended,” *Daily Mail*. Available at <http://www.dailymail.co.uk/news/article-148849/Airport-strike-suspended.html> (Accessed March 22, 2013) Note that “[t]he Border Force is responsible, on behalf of the Home Office, for passport control checks at all UK airports.” Heathrow Airport. Available at <http://www.heathrowairport.com/about-us/facts-and-figures/our-performance/border-force> (Accessed March 22, 2013)
- ¹⁸⁰ “Presale: BAA Funding Ltd.,” RatingDirect, Standard & Poor’s, July 15, 2008, p. 27. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/BAA_Funding_%20Presale_2008.pdf (Accessed March 27, 2013)
- ¹⁸¹ “Multicurrency programme for the issuance of Bonds,” Prospectus, BAA FUNDING LIMITED, June 14, 2012, p. 48. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/Financial_information/BAA_Funding-Base_prospectus_14_June_2012.pdf (Accessed March 22, 2013)
- ¹⁸² See for example, “Airports commission chief pledges to narrow down options by next year,” by Gwyn Topham, *The Guardian*, November 2, 2012. Available at <http://www.guardian.co.uk/politics/2012/nov/02/airports-commission-options-next-year> (Accessed March 22, 2013)
- ¹⁸³ “BAA (SH) plc and BAA Funding Limited, Full Rating Report,” Global Infrastructure and Project Finance, Airports/UK, FitchRatings, August 23, 2012, p.3. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/baa-funding-baa-sh-full-rating-report-20120823.pdf and “U.K. Airport Study to Weigh Moving Heathrow Over M25 Highway,” by Tom Metcalf, *Washington Post*, November 2, 2012. Available at <http://washpost.bloomberg.com/Story?docId=1376-MCUUQU6TTDS301-552TOFC9KRS4CFM685ETUPVSP7> (Accessed March 22, 2013)
- ¹⁸⁴ Id. at 3 (noting that the BAA could “encourag[e] airlines to use larger aircraft and operate at higher load factors”)
- ¹⁸⁵ “Full business plan – Public version,” Heathrow Airport Limited, January 2013, pp. 13, 17, 20, 27. 28. 29, 30, and 35. Available at http://www.heathrowairport.com/static/HeathrowAboutUs/Downloads/PDF/Q6_Heathrow_Full_Business_Plan.pdf (Accessed June 10, 2013)
- ¹⁸⁶ Note that the BAA and its holding companies and its subsidiaries have an elaborate structure both with regard to operations and finance, the complexities and niceties of which we cannot and do not canvas here. Clearly, though, a firm grasp of those relationships and their import for finance of the BAA is required. For pictorial representations of certain aspects of the foregoing, see “Transaction Update: BAA Funding Ltd., Up To £50 Billion Multicurrency Program For The Issuance Of Asset-Backed Notes,” Global Credit Portal, RatingsDirect, Standard & Poor’s, September 16, 2011, pp. 14-15. Available at <http://propdfsearch.com/detail/transaction-update-baa-funding-ltd-baa-airports-home.html> (Accessed March 20, 2013) See also “BAA Funding Limited Airports, UK Presale Report,” Global Infrastructure & Project Finance, FitchRatings, July 15, 2008, p.25. Available at http://www.heathrowairport.com/static/HeathrowAboutUs/Downloads/PDF/Fitch_Presale_%20BAA_Funding.PDF (Accessed March 22, 2013)
- ¹⁸⁷ “Transaction Update: BAA Funding Ltd., Up To £50 Billion Multicurrency Program For The Issuance Of Asset-Backed Notes,” Global Credit Portal, RatingsDirect, Standard & Poor’s, September 16, 2011, p. 6. Available at <http://propdfsearch.com/detail/baa-update.html> (Accessed March 22, 2013) For example, the report states that the “BAA will spend about £1.0 billion–£1.2 billion in capex each year over the next two-and-a-half years, with capex moderating to £735 million in the extension year as agreed with airlines and the CAA.” Id. at 12. For a discussion of other concerns and mitigating factors, see id. at 6-7.
- ¹⁸⁸ “Transaction Update: BAA Funding Ltd., Up To £50 Billion Multicurrency Program For The Issuance Of Asset-Backed Notes,” Global Credit Portal, RatingsDirect, Standard & Poor’s stating that “BAA will spend about £1.0 billion–£1.2 billion in capex each year over the next two-and-a-half years, with capex moderating to £735 million in the extension year as agreed with airlines and the CAA.”), September 16, 2011, p.12. Available at <http://propdfsearch.com/detail/baa-update.html> (Accessed March 22, 2013) See also, with respect to Heathrow “Multicurrency programme for the issuance of Bonds,” Prospectus, BAA FUNDING LIMITED, June 14, 2012, p. 3. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/Financial_information/BAA_Funding-Base_prospectus_14_June_2012.pdf (Accessed March 22, 2013)
- ¹⁸⁹ For example, with respect to refinancing risk it was stated that “[c]omfort...comes from the ability of BAA Funding and BAA (SH) to regularly access capital markets over the past two years, even at times of scarce liquidity. Combined with liquidity support, high quality of regulated asset base and high investor recognition, this provides comfort about BAA’s ability to manage refinancing risk.” “BAA (SH) plc and BAA Funding Limited, Full Rating Report,” Global Infrastructure and Project Finance, Airports/UK, Fitch Ratings, August 23, 2012, p.1 and pp. 7-8. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/baa-funding-baa-sh-full-rating-report-20120823.pdf (Accessed March 22, 2013) For an extensive discussion of the implications of the financial means by which the BAA was acquired by Ferrovial, see “Infrastructure: an emerging asset class for institutional investors,” by Rajiv Sharma, October 4, 2012, pp.27-30. Available at <http://hausercenter.org/iri/wp-content/uploads/2012/10/IRI-Conference-Paper-R.Sharma.pdf> (Accessed March 22, 2013)
- ¹⁹⁰ Among the considerations are “aircraft movements; air quality (including emissions standards); noise; soil and water pollution arising from airport operations; discharges and surface water drainage; land and groundwater contamination; flooding; asbestos in premises and exposure to asbestos;

waste handling, management and disposal; climate change; and energy use and efficiency.” “Multicurrency programme for the issuance of Bonds,” Prospectus, BAA FUNDING LIMITED, June 14, 2012, p. 17. Available at http://www.baa.com/static/BAA_Airports/Downloads/PDF/Financial_information/BAA_Funding-Base_prospectus_14_June_2012.pdf (Accessed March 22, 2013)

¹⁹¹ “U.K. Airport Study to Weigh Moving Heathrow Over M25 Highway,” by Tom Metcalf, Washington Post, November 2, 2012. Available at <http://washpost.bloomberg.com/Story?docId=1376-MCUUQU6TTDS301-552TOFC9KRS4CFM685ETUPVSP7> (Accessed March 22, 2013)

¹⁹² See, for example, “Heathrow Air Pollution,” London Borough of Hillingdon. Available at <http://www.hillingdon.gov.uk/media/pdf/h/3/HeathrowAirportv2.pdf> (Accessed December 12, 2012). See also “Heathrow expansion: the alternatives to a third runway,” by Keith Moore, BBC News, September 17, 2012 (citing opponents’ claims, among others, that “Heathrow would become the biggest emitter of carbon dioxide (CO₂) in the country and [that] the noise pollution would become even worse for the 725,000 already living under the flight path,” that “there would be a loss of homes,” that there was a “[s]erious risk of bird strike to aircraft using the airport” and that “would be a threat to rare wildlife.”) Available at <http://www.bbc.co.uk/news/uk-19570653> (Accessed December 12, 2012).

¹⁹³ There is a nigh-unto universal reference or appeal to diversification, the ostensible benefits of which seem obvious to many. However, the very fact of its universality in certain respects leaves it devoid of content. Clearly the task is to determine the practical meaning or import of would-be diversification in any particular context.

¹⁹⁴ “Company Presentation, agri.capital,” by Dr. Anton Daubner, March 2, 2010, Slide 3. Available at http://www.ludgateenvironmental.com/pdf/agri_capital02032010.pdf (Accessed March 22, 2013)

¹⁹⁵ “Frog Capital Backs Europe’s Leading Biogas Producer,” February 1, 2010. Available at <http://www.frogcapital.com/news/64/frog-capital-backs-europe-s-leading-biogas-producer>. (Accessed March 22, 2013) More particularly, “[t]he main legislative driver for renewable energy development in Germany is the “Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, or EEG), promoting the development of

renewable energy sources with an electricity feed-in tariff scheme. The latest version of the EEG was issued in 2009. It includes a feed-in tariff scheme for biogas. Grid operators must pay a government-specified feed-in tariff for 20 years to biogas plant operators supplying electricity to the grid. This feed-in tariff includes a basic tariff which ranged from 0.1167 to 0.0779 €/kWh in 2009 depending on the size of the biogas plant. It also includes several bonuses for several issues, such as for dedicated energy crops, CHP, technologies, manure and formaldehyde. Furthermore, there is an annual digression of 1% of the tariff for newly installed plants. The introduction of the EEG was the main driver for attracting investment and for creating financing opportunities, since it ensures revenues for 20 years. This framework makes biogas projects in Germany calculable.” “Examples for financing of biogas projects in Germany, Austria, The Netherlands, Denmark and Italy,” by Henning Hahn, Dominik Rutz, Erik Ferber, and Franz Kirchmayer, IEE Project ‘BiogasIN’ November 2010, p. 8. Available at http://www.biogasin.org/files/pdf/Financing_of_biogas_projects_in_top_5_EU_countries.pdf (Accessed March 22, 2013)

¹⁹⁶ “New Tariffs for German Biogas Sector,” Global Bioenergy Industry News, November 17, 2011. Available at <http://www.thebioenergysite.com/news/9979/new-tariffs-for-german-biogas-sector>. (Accessed March 22, 2013) Note, too, that the new tariffs favor small producers. What impact that would have on agri.capital it light of its business model and scale is not clear.

¹⁹⁷ “BUSINESS MODEL,” agri.capital. Available at <http://www.agri-capital.de/en/about-agricapital.html> (Accessed March 22, 2013) The company adds that “[f]armers also have the opportunity to participate permanently in the success of each plant through performance-related remuneration. Several hundred farmers are currently partners with agri.capital.” Id.

¹⁹⁸ “Company Presentation, agri.capital,” by Dr. Anton Daubner, March 2, 2010, Slide 3. Available at http://www.ludgateenvironmental.com/pdf/agri_capital02032010.pdf (Accessed March 22, 2013) In this connection it also refers to “[c]ontracted capacity from major biogas EPC providers to build new facilities through 2010/2011.” Id.

¹⁹⁹ See pp. 28 and 37 and note 142, supra.

²⁰⁰ “In calculating the depreciation, the economic life-span of plants can be taken as 15 years, provided maintenance and

repair are carried out regularly. Certain parts of the plant have to be replaced after 8 – 10 years, e.g. a steel gas holder.” “Costs of a Biogas Plant,” Energypedia, https://energypedia.info/index.php/Costs_of_a_Biogas_Plant#Large-scale_biogas_plants

²⁰¹ According to one report relating to production in Germany, “the average specific investment costs are 3100 € per kWh installed electric power.” Average investment costs were about 1.3 million € (corresponding to .4 mW.) with maximum costs of 5 million €. “Biogas plants in Germany – experiences in implementation and processing,” Bernd Linke, October 9, 2009. Available at http://www.czysaenergia.pl/pdf/farma2009_04.pdf (Accessed March 22, 2013)

²⁰² “The operation and maintenance costs consist of wage and material cost for:

- acquisition (purchase, collection and transportation) of the substrate;
- water supply for cleaning the stable and mixing the substrate;
- feeding and operating of the plant;
- supervision, maintenance and repair of the plant;
- storage and disposal of the slurry;
- gas distribution and utilization;
- administration.

Large-scale biogas plants

Large-scale biogas plants have a high water consumption. Investigations are necessary, if the water quantity required causes additional costs in the long run. These could be construction costs for water piping or fees for public water supply. The question of water rights has to be clarified. Steps to be taken to cover the demand for water during dry periods require thorough planning.” “Costs of a Biogas Plant,” Energypedia. Available at https://energypedia.info/index.php/Costs_of_a_Biogas_Plant#Large-scale_biogas_plants (Accessed March 22, 2013)

²⁰³ “In Germany, typical investors in biogas plants are single farmers, several farmers jointly investing in one biogas plant, municipalities, energy utilities, waste companies and industry. The size of the biogas project and the feedstock type influences the capital costs which usually ranges from 2 500 to 6 000 €/kW. The average electrical size of biogas plants in Germany is about 400 – 500 kW. Thus, capital costs are usually too high for financing with equity capital only,

and thus, financing concepts usually include a large percentage of debt capital.” “Examples for financing of biogas projects in Germany, Austria, The Netherlands, Denmark and Italy,” by Henning Hahn, Dominik Rutz, Erik Ferber, and Franz Kirchmayer, IEE Project ‘BiogasIN’, November 2010, P. 3. Available at http://www.biogasin.org/files/pdf/Financing_of_biogas_projects_in_top_5_EU_countries.pdf (Accessed March 22, 2013)

²⁰⁴ “BioGas Implementation Strategies for Maximum Profitability, European Lessons learned.” BDI- Bioenergy, March 2012, Slide 18. Available at http://www.gtmconference.ca/site/index.php/2012-presentations/cat_view/57-2012-conferences/59-2012-canadian-farm-and-food-biogas-conference (Accessed March 22, 2013)

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