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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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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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.

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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.” 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 the strategic objectives they had formulated for investments in infrastructure.

With all of this in mind we set out 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:

“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 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.

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.

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.
PART 2 | CalPERS’ APPROACH TO INFRASTRUCTURE INVESTMENT DECISIONS

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 an inconsiderable measure, reveals or articulates the conceptual underpinning for what CalPERS deems to fall within the category. 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 support services that benefit society as a whole and are intended to serve a long and useful life.”

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. 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. 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.11

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 cabinied, 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.
waste, natural resources, communications and certain social infrastructure projects that meet the Program objectives.21

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/lock 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.”

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%).

However, this prescription constitutes only one of three so-called “Key Policy Parameters.” 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. Even then there is an overlay of additional requirements which concern hedging currency exposure. There are, in addition, separate parameters for leverage.

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. 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.

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.
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.
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.
5. Labor Risk: Risks associated with public sector outsourcing, or labor relations may affect investment opportunities in infrastructure.
6. Regulatory Risk: Changes in regulatory conditions may affect investment returns.
7. Country Risk: Political, economic, and currency risks are associated with investing in all countries.
8. Governance Risk: Risks may arise from mismanagement and partner misalignment or lack of fundamental governance and ownership rights, protections and remedies.
9. Valuation Risk: Risks are associated with failure by a general partner or partnership to employ an appropriate valuation methodology and discipline.
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.
11. Environmental and Climate Risk: Long term investment returns may be impacted by risks related to the environment and climate change.
12. Hazardous Materials: Risks are associated with the use of hazardous materials in facilities or business processes.
13. Counterparty Risk: Infrastructure investments may rely on the financial strength of off-takers, hedge providers, suppliers, service providers and constructors.

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.” 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 form 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.”

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). Signatories to the UNPRI – of which CalPERS is one – state a “beliefs” that environmental, social, and corporate governance (ESG) issues can affect the performance of investment portfolio and “recognize that applying these Principles may better align investors with broader objectives of society.” As a signatory, CalPERS commits, among other things, to “[a] cquiring [ESG] issues in investment policy statements” and “ask[ing] investment service providers...to integrate ESG factors into evolving research and analysis.” At this point there is no specific articulation of the practical implementation of this commitment although efforts certainly appear to be in progress.

5. Emerging Equity Markets Principles

Second, staff must be “guided by the CalPERS Emerging Equity Markets Principles for all investments in such countries.” This requirement reflects a case by case approach different from what was originally a categorical, exclusion type method. There is an overlap between the substantive content of these principles and considerations articulated among the risk factors discussed above. 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”;
- (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”;
- “market regulation and liquidity,” including “[l]ittle to no repatriation risk” and “[p] otential market and currency volatility [being] adequately rewarded”; [Extended Investment: currency; Risk Factors: Country Risk]
- “capital market openness” including “[f]ree market policies, openness to foreign investors, and legal protection for foreign investors’; [Risk Factors: Capital Markets Risk]
- “reasonable trading and settlement procedures” and more generally,
- ”appropriate disclosure...[o]n environmental, social, and corporate governance issues.”

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.”

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 efficient 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.” 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.” The former entails written agreements “from managers of any investment vehicle, for which the Responsible Contractor Program (“RCP”) applies...[o]n adherence to CalPERS investment policy for the RCP” and “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.” According to the RCP, a responsible contractor is one, among other things “who pays workers a fair wage and a fair benefit.” (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. 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 impacting 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.” 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.

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. More particularly it first refers to four elements which characterize the “unique, strategic role” of infrastructure “within the total portfolio.” 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.” 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.

After that it delineates what is encompassed under a “Risk/Return Framework” matrix. 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. 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.
PART 3 | A DIFFERENT APPROACH TO DECISION-MAKING

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.61 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

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

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 overstressed. 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(s) private enterprise(s) to supplant it in part or almost entirely. 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. 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 profiers 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.
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 by 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
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 communities at risk of displacement or harm to their livelihood from projects. While the latter considerations embodied in the Principles may be more or less relevant or significant depending upon the particular category under consideration.

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. 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 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

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.
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. 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).

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.

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.

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).
PART 4 | THE CalPERS DECISION-MAKING PROCESS FOR INFRASTRUCTURE INVESTMENT RECONSIDERED

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 or 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 the CalPERS. 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.”

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. 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.

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. 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.

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. There is no discussion in the Infrastructure Program as to the reasons for this particular choice of figures. (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.”)

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 underwater 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.
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.84

- **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.85

- **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.86

- **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.87

- **Republic Intelligent Transportation Services, Inc. ("Republic"):** A $36 million equity investment in December, 2007. Republic maintained, tested, repaired, replaced, and upgrated 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 2010.88

- **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.89

- **South Staffordshire Water:** An ~£400 million ($823 million) purchase on November, 2007 of a regulated water utility in the UK.90

- **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.91

- **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 natural gas storage facilities in the Southeast, 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.92

- **Binnenlandse Container Terminals NederlandsourceGas (BCTN):** a $63 million purchase in October, 2011 by Alinda from the owner and operator of two natural gas storage facilities located in northern Texas.93

- **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.94

- **BAA Ports 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 2011.95

- **InterPark:** a joint investment with Alinda Infrastructure Fund II 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 US, 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.107

- **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)108

- **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.109

  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.110

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 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

- **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)


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.116

- **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 denominated 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 NederlandsourceGas (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); agricapital (biogas and biogas 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 (fiber optic network for (data center connectivity, cellular backbone 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 agricapital, 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.

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.
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: AGRI CAPITAL 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.”

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

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, businesses, and governments.”

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 its sees “likely to provide steady returns with potentially many other enterprises.”

The premise is that “[t]he usage, cost, and subsidies might be important to the success of the agri.capital business model. As we shall see, the firm engages in provision though a stereotypical image of a large scale, centralized, high amount of capital needed for new infrastructure. “

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. In so doing it would acquire a majority interest in the company. It was stated that “[t]he company’s existing common equity investors and certain other early-stage investors [w]ould continue to participate in the ownership of the business.”

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.”

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 through 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 opposite 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:
Agricapital 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.” The biogas is then “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.” 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.” 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 is 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 biomethane, 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 –
of incentives and subsidies similar to those afforded in Germany might be relevant to its pricing power and more generally its success elsewhere.\textsuperscript{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.\textsuperscript{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 on-going 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.\textsuperscript{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, cHPm 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 cooperative suppliers 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.\textsuperscript{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.

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:

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.
disturbances. 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.” The gas also has to be refined before it can be “transported and used, or put into existing pipeline networks.”

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?”

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-suppliers/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.

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.

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.

There are related issues as to the suitable storage and disposal of digestate and leakage of fermentation substrates and the impact of reappraisal 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. 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. In July, 2007 that fund invested $604 million to acquire a minority share of ownership ostensibly in BAA Airports Ltd. It appears more accurate to say that the investment was in FGP Topco Ltd. because it is the holding company for BAA Airports Ltd. 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.” Gatwick was, in fact, sold (at a loss) in 2009 and in 2012 BAA acceded to an order to sell Stansted. 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). (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
concerns with respect to Aberdeen airport about Edinburgh or Glasgow airports; it has also raised
So for example, the Commission directed that the Competition Commission and the Department
among other agencies, the Civil Aviation Authority, authorized to supply it is subject to regulation by,
the extensive air transport services the BAA was
Exchange in 1987. However, notwithstanding
shares of which were sold on the London Stock
rights and liabilities were transferred to BAA plc,
doesn’t 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. 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.” 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.

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). 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.

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”.” For BAA airports overall, such revenue constituted 44% of overall income (though the percentage for Heathrow Airport may be much larger).
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.

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. 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.”
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 which have their origin at the level of the European Union, others from the UK government, as still others from local authorities. 176

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). 177

   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. 179

   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. 180

   The operational capacity of airports to serve 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. 181

   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. 182

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 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
PART 5 | SUMMARY AND CONCLUSION

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.

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.

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. 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 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...
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.
### APPENDIX A | RELATION OF CalPERS RISK (AND RELATED FACTORS) TO LINKED CATEGORIES

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

<table>
<thead>
<tr>
<th>Product or service, kind of infrastructure</th>
<th>Demand</th>
<th>Supply: Exogenous constraints on competition or markets</th>
<th>Supply: Endogenous constraints on competition or markets</th>
<th>Pricing</th>
<th>Form of payment for goods or services</th>
<th>Public sector role — operations</th>
<th>Public sector role — regulation</th>
<th>Public sector role — contract</th>
<th>Public sector role — finance</th>
<th>Enterprise — finance</th>
<th>Enterprise — operations</th>
<th>Non-Enterprise Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation • roads • bridges • tunnels • mass transit • parking • airports • seaports • rail energy • oil • natural gas and liquids • pipelines • storage • distribution power • transmission distribution • generation • including renewables utilities (?) • water • storage • transportation • distribution • treatment waste water • collection • transportation • treatment and processing waste (?)</td>
<td>GDP resilience (D) Growth risk (DP,E) Demand elasticity (D) User patronage risk(DP)</td>
<td>Minimal competition (D) Competition risk (D,E) Strong barriers to entry (D)</td>
<td>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)</td>
<td>Regulation risk (DP) Legal/ political regulatory regime risk (E) Political approval and public acceptance risk (KPP4)</td>
<td>Low/no risk (D) Strong credit quality off-takers or payers (D) Terminal value risk (D,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 (KPP5) 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)</td>
<td>Low operational risk (D) Commodity price risk (E) Contract risk (DP) Capital expenditure risk (D,E) Low obsolescence risk (D) Low/no development risk (D) Technology risk (E) Cash-generated investments (D) Construction risk (DP) Political stability (EMP)</td>
<td>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)</td>
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APPENDIX B | ASSESSMENT OF AGRI.CAPITAL
BASED ON CalPERS’ INFRASTRUCTURE PROGRAM
“RISK SEGMENTS”

As a form or source of energy, biogas and biomethane 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 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.” In the latter regard a company representative has alluded to “[f]eedstock hedging contracts in place with an average length of 13 years.” 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 the 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. 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. Also, the scale of individual plants appears to be very small, perhaps less than $2 million. 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 in 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.

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.


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 more expansive notions 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.” “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/enterprise/2011%20Sustainable%20Development%20Report/English/HDR_2011_EN Summary.pdf (Accessed December 14, 2012)


INFRASTRUCTURE PROGRAM, p. 12 (italics added).

INFRASTRUCTURE PROGRAM, p. 4.

INFRASTRUCTURE PROGRAM, p. 16.

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.”


“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)

“Agenda Item 7, ITEM NAME: Targeted Investment Programs

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 consistently with fiduciary duty but also that doing so “may[be] 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/3/3/36/Mainstreaming%20Responsible%20Investment.pdf (Accessed November 21, 2012). Note here notions of “responsible” 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 “demonstrates 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.endowmentcoalition.org/faq/ (Accessed November 21, 2012)


“Infrastructure PROGRAM, p. 5.

Id.

Id. (italics added).

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 Puts”/“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 PROGRAM, p. 5.

Id. at 7.

Id.

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:

<table>
<thead>
<tr>
<th>Region</th>
<th>Allocation Range</th>
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<tbody>
<tr>
<td>United States</td>
<td>40-60%</td>
</tr>
<tr>
<td>Developed OECD</td>
<td>20-50%</td>
</tr>
<tr>
<td>Less Developed</td>
<td>&lt;= 10%</td>
</tr>
</tbody>
</table>

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.

CalPERS requires managers to consider these 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/polices/inv-asset-classes/real-estate/real-assets-full-policy.pdf (Accessed March 20, 2013)


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


Id., Slide 4.

Id., Slide 5.

Id., Slide 6.

Id., Slide 8. 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) 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


Id. at 13-14.

Id. at 5.

Id. at 8.

Id. at 7.

Id. at 8.


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) The same would appear to be the case with regard to the other kinds of investments the cited CalPERS report mentions.

In a session of the CalPERS Investment Committee about the rationale for and parameters for possible infrastructure investments in California, there was reference to “[attachment 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/ep-docs/about/board-cal-agenda/agenda/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/ep-docs/about/board-cal-agenda/agenda/invest/201109/item07c-02.pdf and “Attachment 3, Equity Term Sheet.” Available at http://www.calpers.ca.gov/ep-docs/about/board-cal-agenda/agenda/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/ep-docs/about/board-cal-agenda/agenda/invest/201109/item07c-02.pdf (Accessed March 20, 2013) Referring to the investment in Neptune, one report states that “[c]lassified as an asset as Defensive, due to its operational status and an existing 20-year, fixed-price contract with the Long Island Power Authority, which provides cash flow 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 21, 2012; From: Stephen McCourt, David Ahlhalter, Melka Investment Group; Re: 2011 Infrastructure Program Annual Review,” p. 4. Available at http://www.calpers.ca.gov/ep-docs/about/board-cal-agenda/agenda/invest/201205/item07-02btc.pdf (Accessed March 20, 2013) “Infrastructure and Forestland Program Update, Real Assets,” CalPERS, August 13, 2012. Available at http://www.calpers.ca.gov/ep-docs/about/board-cal-agenda/agenda/invest/201208/item08b2-01.pdf (Accessed March 20, 2013) “Memorandum, To: Members of the Investment Committee, California Public Employees’ Retirement System; Date: April 25, 2012; From: Stephen McCourt, David Ahlhalter, Melka Investment Group; Re: 2011 Infrastructure Program Annual Review.” Available at http://www.calpers.ca.gov/ep-docs/about/board-cal-agenda/agenda/invest/201205/item07-02btc.pdf (Accessed March 20, 2013) “INFRASTRUCTURE PROGRAM, p. 7. Available at http://www.calpers.ca.gov/ep-docs/investments/policies/in-asset-classes/real-estate/real-assets-full-policy.pdf (Accessed March 28, 2013) We have not been able to locate such discussion in any CalPERS document relating to infrastructure investment. “INFRASTRUCTURE PROGRAM, p. 6. Available at http://www.calpers.ca.gov/ep-docs/investments/policies/in-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. In its infrastructure program review in May 2012, CalPERS referred to having (as of December 31, 2011) $798 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/ep-docs/about/board-cal-agenda/agenda/invest/201205/item07-01btc.pdf (Accessed March 28, 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/ep-docs/about/board-cal-agenda/agenda/invest/201205/item07-01btc.pdf (Accessed March 28, 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.

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 “[attachment 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/ep-docs/about/board-cal-agenda/agenda/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/ep-docs/about/board-cal-agenda/agenda/invest/201109/item07c-02.pdf and “Attachment 3, Equity Term Sheet.” Available at http://www.calpers.ca.gov/ep-docs/about/board-cal-agenda/agenda/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/ep-docs/about/board-cal-agenda/agenda/invest/201109/item07c-02.pdf (Accessed March 20, 2013) Referring to the investment in Neptune, one report states that “[c]lassified as an asset as Defensive, due to its operational status and an existing 20-year, fixed-price contract with the Long Island Power Authority, which provides cash flow 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 21, 2012; From: Stephen McCourt, David Ahlhalter, Melka Investment Group; Re: 2011 Infrastructure Program Annual Review,” p. 4. Available at http://www.calpers.ca.gov/ep-docs/about/board-cal-agenda/agenda/invest/201205/item07-02btc.pdf (Accessed March 20, 2013) “Infrastructure and Forestland Program Update, Real Assets,” CalPERS, August 13, 2012. Available at http://www.calpers.ca.gov/ep-docs/about/board-cal-agenda/agenda/invest/201208/item08b2-01.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/ep-docs/about/board-cal-agenda/agenda/invest/201205/item07-01btc.pdf (Accessed March 28, 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.


113 “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%2011-23-0962FINAL.pdf (Accessed March 8, 2013)

114 “CIM Portfolio Company Closes on $183M Sale, JV” by Natalie Dolce, GlobalWtrNet.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 CSIs 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.globalwtrnet.com/12_387/losangeles/associates_dispositions/CIM-Portfolio-Company-Closes-on-183M-Sale-JV-323013.html (Accessed March 8, 2013).


116 “Alinda Infrastructure Fund II, L.P. fund 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 $35 million “CIO Quarterly Performance Report, quarter Ending June 30, 2012.”


122 “Alinda Infrastructure Fund I, L.P., commitment was $100 million and the net asset value was $69 million with a three-year rate of 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 $35 million “CIO Quarterly Performance Report, quarter Ending June 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),” agricapital.
The main legislative driver for renewable energy development in Germany is the Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG). Grid operators will require (e.g. scrubbing of the biogas). “Id.

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 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.”


See “agri.capital has acquired the Pliening biomethane plant from r.e Bioenergie” September 4, 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-


Id.

“Biogas Comes of Age,” by Iyad Ommati & Peter Stepany, Waste Management World. Available at http://www.waste-

can arise with biomass. In Germany, growing crops for fuel is relatively uncompetitive 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”.


(note “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)

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.”


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://www.preqin.com/docs/newsletters/INF/2011/10/BAA_Airports/Downloads/PDF/Fitch_Presale_%20BAA_Funding_PDF.pdf](http://www.preqin.com/docs/newsletters/INF/2011/10/BAA_Airports/Downloads/PDF/Fitch_Presale_%20BAA_Funding_PDF.pdf) (Accessed March 22, 2013) For a discussion of the different drivers of BRAs retail revenue from other than car-park and car-park sources, see id. at 12.


Id.

“Economic Regulation of Heathrow and Gatwick Airports, 2008-2013, CAA decision,” Civil Aviation Authority, March 11, 2008, p. 28. Available at [http://www.caas.co.uk/docs/b/ ergdoc/103-heathrowgatwickdec10_mem.pdf](http://www.caas.co.uk/docs/b/ergdoc/103-heathrowgatwickdec10_mem.pdf) (Accessed March 23, 2013) For a detailed description of the complex formula for determining permissible airport charges, see id., starting at p. 102. Although the CAs 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


182 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, p. 14-15. Available at http://propsearch.com/detail/transaction-update-baa-funding-ltd-baa-airports-home.html (Accessed March 22, 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, p. 14-15. Available at http://propsearch.com/detail/transaction-update-baa-funding-ltd-baa-airports-home.html (Accessed March 22, 2013)


189 “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.” Id. at 12. For a discussion of other concerns and mitigating factors, see id. at 6-7.


191 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, FitchRatings, August 23, 2012, p. 3. Available at http://www.fitchratings.com/content/baa-funding-baa-sh-full-ratings-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 Rajvi Sharma, October 4, 2012, pp. 27-30. Available at http://hausercenter.org/ir/wp-content/uploads/2012/10/10IRConference-Paper_R_Sharma.pdf (Accessed March 22, 2013)

192 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/BAAL_Airports/Downloads/PDF/Financial_information/BAAL_Funding_Base_prospectus_14_June_2012.pdf (Accessed March 22, 2013) 195 “Frog Capital Backs Europe’s Leading Biogas Producer,” Company Presentation, agri.capital, “by Dr. Anton Daubner, February 1, 2010. Available at http://www.frogcapital.com/index.php/2012-presentations/cat_view/57-2012-conferences/59-2012-canadian-farm-and-feed-biogas-conference (Accessed March 22, 2013) 196 “Heathrow Air Pollution,” London Borough of Hillingdon. Available at http://www.hillingdon.gov.uk/media/pdf/3/HillingdonAirportv2.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 March 22, 2013) In this connection it also refers 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. “Company Presentation, agri.capital,” by Dr. Anton Daubner, March 2, 2010, Slide 3. Available at http://www.ludgateenvironmental.com/pdf/agri_capital2032010.pdf (Accessed March 22, 2013) 199 “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) 200 “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 agricapital it light of its business model and scale is not clear. 201 “BUSINESS MODEL,” agricapital. Available at http://www.agricapital.de/en/about/agricapital.html (Accessed March 22, 2013) The company adds that “[t]he farmers also have the opportunity to participate permanently in the success of each plant through performance-related remuneration. Several hundred farmers are currently partners with agricapital.” Id. 202 “Company Presentation, agri.capital,” by Dr. Anton Daubner, March 2, 2010, Slide 3. Available at http://www.ludgateenvironmental.com/pdf/agri_capital2032010.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. 203 See pp. 28 and 37 and note 142, supra. 204 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. Available at http://energypedia.info/index.php/Costs_of_a_Biogas_Plant#Large-scale_bios gas_plants (Accessed March 22, 2013) 205 According to one report relating to production in Germany, “the average specific investment costs are 3100 € per kWh 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.czystaenergia.pl/pdf/ farma2009_04.pdf (Accessed March 22, 2013) 206 “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; • 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 http://energypedia.info/index.php/Costs_of_a_Biogas_Plant#Large-scale_bios gas_plants (Accessed March 22, 2013) 207 “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 around 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) 208 “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-feed-biogas-conference (Accessed March 22, 2013)