

# Infrastructure fund discount rates

Prepared for Energy Networks Association

20 March 2019

Final

## 1 Introduction

The Energy Networks Association (ENA) has commissioned Oxera Consulting LLP (Oxera) to review the range of infrastructure funds' discount rates used by Ofgem in the RIIO-2 sector-specific methodology decision as a cross-check to determine the upper bound of the cost of equity range derived from the capital asset pricing model (CAPM).

In paragraphs 3.139–3.144 of the finance annex<sup>1</sup>, Ofgem quoted five out of the six listed London-based infrastructure funds' discount rates of 7.2%-7.9% nominal, 4-4.7% (real, RPI) to justify the 4% (real, RPI) upper bound of the cost of equity range for RIIO-2. Ofgem excluded the discount rate of the sixth London-based infrastructure fund (3i infrastructure), based on the following explanation:

3i Infrastructure uses a 10.2% nominal rate (7.7% real RPI) but provides limited information regarding the basis for this. We observe that the 3i Infrastructure portfolio is more concentrated than the others and appears to have companies that are more like the operating companies typical in Private Equity Leveraged Buy-Out transactions (LBOs) so includes assets with higher risk than regulated networks, which may contribute to the higher discount rate<sup>2</sup>

The justification for using the funds' discount rates (of the five infrastructure funds) as a cross-check to determine the upper bound of the RIIO-2 cost of equity range was based on:<sup>3</sup>

- the relative risks of the investments in the funds;
- prevailing net asset value (NAV) premia of the funds;
- a reduction in the funds' discount rates in recent years.

<sup>1</sup> Ofgem (2018), 'RIIO-2 Sector Specific Methodology Annex: Finance', 18 December, paras 3.139–3.144

<sup>2</sup> Ofgem (2018), 'RIIO-2 Sector Specific Methodology Annex: Finance', 18 December, para 3.140.

<sup>3</sup> Ofgem (2018), 'RIIO-2 Sector Specific Methodology Annex: Finance', 18 December, para 3.144.

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A comprehensive review of the infrastructure funds' risk and return characteristics suggests that the funds' discount rates are **not an appropriate cross-check to determine the upper bound or the lower bound** of the CAPM cost of equity range. This is because:

- the funds' asset composition makes them less risky than energy networks. Moreover, where funds' portfolio investments face greater revenue or volume risks than energy networks, these are generally hedged by long-term or availability-based contracts<sup>4</sup> and/or government subsidies e.g. renewable obligation certificates (ROCs);<sup>5</sup>
- the funds' net asset value premia have decreased since 2017. As of 2018, the average net asset value premium was 1.8%, which does not suggest a divergence between the discount rate used by the funds and the rate used by the investors in the funds.<sup>6</sup>

The rest of the note is structured as follows:

- section 2 examines the funds' asset composition and compares the relative risk profile of these assets with the UK energy networks;
- section 3 examines the trend in the average net asset value premium over time;
- annex 1 describes the characteristics of the funds' portfolios in more detail.

## 2 Asset composition of infrastructure funds

In para 3.140 of the finance annex, when referring to the six listed infrastructure funds, Ofgem notes the following:<sup>7</sup>

The mix of assets in these funds includes those with higher expected risks than energy networks, for example overseas investments or those including greater volume or revenue risk.

First, we note that Ofgem's statement is incorrect in that overseas investments do not necessarily imply greater expected risk than UK based investments. On the contrary, the funds may benefit from geographic diversification which could lower their overall portfolio risk.

Second, we examine the asset composition of the funds' portfolios to assess whether the latter part of statement holds true i.e. are the funds' investments riskier than energy networks? If so, are the volume and revenue risks hedged by contractual agreements and/or government subsidies?

We discuss this in turn for each infrastructure fund below.

### 2.1.1 BBGI SICAV (BBGI)

BBGI infrastructure fund consists entirely of long term availability-based public private partnership (PPP) contracts. The portfolio consists of investments in the transport, health, justice and education sectors.<sup>8</sup>

<sup>4</sup> Availability-based contracts are considered less risky than demand-based contracts as the payments received by the projects do not depend on the use of the asset. Thus, the availability-based contracts are largely insulated from revenue or volume risks.

<sup>5</sup> See Section 2

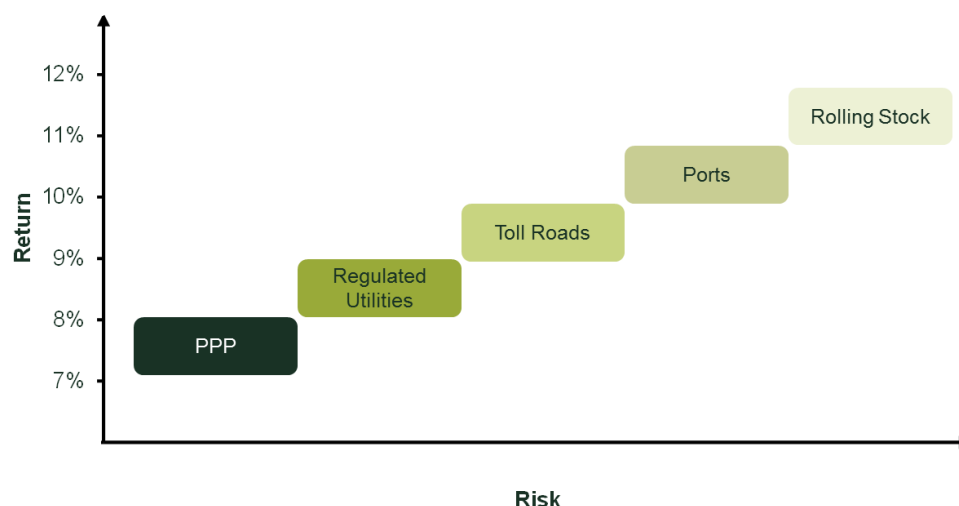
<sup>6</sup> See Section 3

<sup>7</sup> Ofgem (2018), 'RIIO-2 Sector Specific Methodology Annex: Finance', 18 December, paras 3.140.

<sup>8</sup> BBGI (2018) 'Interim Results Presentation 2018', 31 August, p.12

We note that PPP projects are less risky than energy networks and other regulated utilities due to the government support they receive. This view is also shared by a third party report which lists the respective risk and return characteristics of the infrastructure asset classes, where PPP sits at the lower end of the risk spectrum, below regulated utilities (see Figure 1.1 below from BBGI and PwC).<sup>9</sup>

**Figure 2.1 Risk return characteristics of infrastructure asset classes**



Source: PwC and BBGI's analysis presented in BBGI interim presentation, June 2018.

Therefore, the BBGI discount rate of 7.2% is applicable for a lower risk portfolio than regulated utilities, implying that equity investment in regulated energy networks would have a higher cost of equity than 7.2%.

### 2.1.2 HICL infrastructure (HICL)

HICL's portfolio consists 70% of investments in PPP contracts, 22% in demand based assets and 8% in regulated utilities. The portfolio consists of investments in the transport, health, education, accommodation, utilities, and law and order sectors.<sup>10</sup>

Despite investing in some demand based assets, HICL mitigates this risk by ensuring 'track record of user demand prior to asset purchase'.<sup>11</sup> HICL's overall portfolio risk is likely to be lower than energy networks, primarily due to a large proportion of the portfolio investments in PPP contracts.

### 2.1.3 John Laing infrastructure fund (JILF)

As of June 2018, JLIF's portfolio<sup>12</sup> consists 91.5% of availability-based investments and 8.5% of demand-based investments. Availability-based investments are considered less risky than demand based investments and regulated assets.<sup>13</sup>

<sup>9</sup> PwC and BBGI's analysis presented in BBGI interim presentation 2018. See BBGI(2018) 'Interim Results Presentation', 31 August, p. 26

<sup>10</sup> HICL (2018) 'Interim Report for the six months ended 30 September 2018', 20 November, p. 26

<sup>11</sup> HICL 2018 Capital Market Seminar

<sup>12</sup> JLIF invests in the transport, health, education, social housing, justice, and government buildings and street lighting asset classes.

<sup>13</sup> John Laing Infrastructure Fund (2018) 'Interim results 2018', September, p. 34

Moreover, JLIF predominantly invests in projects which are either owned by the government or have some form of government support. This provides shareholders with a low risk source of income and a predictable revenue stream in the form of dividends.<sup>14</sup>

Given that the majority of the funds' investments are in availability-based contracts, JLIF's portfolio is likely to face lower expected risk than energy networks.

#### **2.1.4 GCP infrastructure (GCP)**

GCP's portfolio consists of investments in private finance initiative (PFI)<sup>15</sup> /PPP (20%), social housing (14%) and renewables (66%).<sup>16</sup> Investment in renewables (in electricity, heat and transport sectors) comprises of the following asset classes: solar, onshore and offshore wind, anaerobic digestion, biomass, and charging infrastructure for electric vehicles.

As discussed before, PPP investments are considered less risky compared to energy networks. While investments in renewables are likely to face demand side risks, we note that these investments are supported by some form of government subsidies (e.g. Contract for Difference and CRC energy efficiency scheme for electricity, renewable heat incentive scheme for heat, and renewable transport fuel obligation for transport)<sup>17</sup> which reduces their revenue risk exposure.

Therefore, on balance, we would expect GCP's portfolio to have lower risk than energy networks.

#### **2.1.5 International Public Partnerships (INPP)**

INPP invests in utilities (44% comprising of energy transmission, gas distribution and waste water as of 2018), transport, education, health, courts and military housing sectors.<sup>18</sup>

PPP contracts comprise 46% of INPP's portfolio, followed by regulated investments (39%), senior debt (9%) and operating businesses (6%).<sup>19</sup> Additionally, INPP notes that its focus is on low risk assets, with revenues sourced principally from, or regulated by, public sector entities, and its investments are ring-fenced from each other.<sup>20</sup>

Given that PPP contracts and senior debt comprise more than 50% of the INPP portfolio, and are considered lower risk investments than regulated assets, INPP's overall portfolio risk is likely to be lower than energy networks.

#### **2.1.6 3i infrastructure**

3i infrastructure (the fund with the highest discount rate, 10.2% nominal) consists of investments in the transport (35%), utilities (24%), communications (24%), energy/natural resources and social infrastructure sectors.<sup>21</sup> We note

<sup>14</sup> John Laing Infrastructure Fund (2018) 'Annual Report 2017', March, p. 24

<sup>15</sup> The private finance initiative (PFI) is a way of creating PPP's where private firms are contracted to complete and manage public projects.

<sup>16</sup> GCP Infrastructure Investment Limited (2018), 'Analyst presentation', December, pp 14-15

<sup>17</sup> GCP Infrastructure Investment Limited (2018), 'Analyst presentation', December, page 6.

<sup>18</sup> International public partnerships (2018), '2018 interim results presentation', September, page 19.

<sup>19</sup> International public partnerships (2018) '2018 interim results presentation', September, page 33

<sup>20</sup> International public partnerships (2018) '2018 interim results presentation', September, page 1

<sup>21</sup> 3i (2018), 'Results for the half year to 30 September 2018', 8 November, page 24

that 3i's investments may sit above regulated utilities on the risk spectrum due to the demand-side (volume/revenue) risks they face.<sup>22</sup>

However, we note that the volume and revenue risks on the investments are, to a certain extent, hedged by long-term contracts or government subsidies. For example, 3i has invested in Attero and ESVAGT, which have long-term and medium-term contracts with customers providing revenue visibility. Moreover, 3i's investment in Infinis (solar sector) is supported by renewable obligation certificates (ROCs)—Infinis's revenues are underpinned by the inflation-linked ROCs until 2027.<sup>23</sup>

Nevertheless, given that it is possible that, net of hedging, the risk of 3i's investments is, on average, higher than that of regulated utilities, we agree with Ofgem's exclusion of 3i from the sample of infrastructure funds.

### 3 Net asset value premiums

In para 3.144 of the finance annex<sup>24</sup>, Ofgem concludes that the relative risks of the constituent investments in the infrastructure funds combined with the funds' shares trading at a premium to the NAV<sup>25</sup> support the use of the funds' discount rate as a cross-check to inform the upper bound of the cost of equity range for RIIO-2.

Ofgem presents NAV premia ranging from 3.5% (HICL) to 15.5% (BBGI).<sup>26</sup> The premiums are calculated using the closing price of 27th November 2018 and the NAV taken from the last published results or the 'Financial Times of 26th November 2018'.<sup>27</sup>

A more consistent way of estimating the NAV premiums is to use the closing price on the date of the publication of the results (i.e. using the share price and the NAV as of the same date). This approach is generally used by closed-end mutual funds and exchange traded funds (ETFs) which calculate a NAV and a premium to the NAV at the end of each trading day. Using this approach to estimate NAV premia for infrastructure funds, the results are significantly lower compared to Ofgem's estimates (see Table 1.1 below).

<sup>22</sup> See 3i (2018) 'Annual report and accounts 2018', 10 May, page 6

<sup>23</sup> 3i infrastructure website, 'Portfolio', <https://www.3i-infrastructure.com/portfolio/>, accessed on 6 March 2018.

<sup>24</sup> Ofgem (2018), 'RIIO-2 Sector Specific Methodology Annex: Finance', 18 December, para 3.144.

<sup>25</sup> A positive premium to the NAV implies that investors are willing to pay more than the value of the assets owned by the fund. This suggests that the implied discount rate used by the market to value the funds' equity investments is lower than the discount rate used by the fund itself. As such, the funds' discount rate is likely to be an upper bound of the discount rate at which the funds' assets should be discounted.

<sup>26</sup> Ofgem (2018), 'RIIO-2 Sector Specific Methodology Annex: Finance', 18 December, Table 15

<sup>27</sup> Ofgem (2018), 'RIIO-2 Sector Specific Methodology Annex: Finance', 18 December, footnote 40

**Table 3.1 Infrastructure funds' premium to NAV as of 2018**

Fund name	Premium to NAV (Ofgem)	Premium to NAV (Oxera)
BBGI SICAV <sup>1</sup>	15.5%	2.3%
John Laing Infrastructure <sup>2</sup>	9.7%	-9.1%
HICL Infrastructure	3.5%	-1.4%
GCP Infrastructure	12.1%	11.1%
International Public Partnerships	8.7%	-2.8%
3i Infrastructure	12.3%	8.5%
Weighted Average	10.3%	1.8%

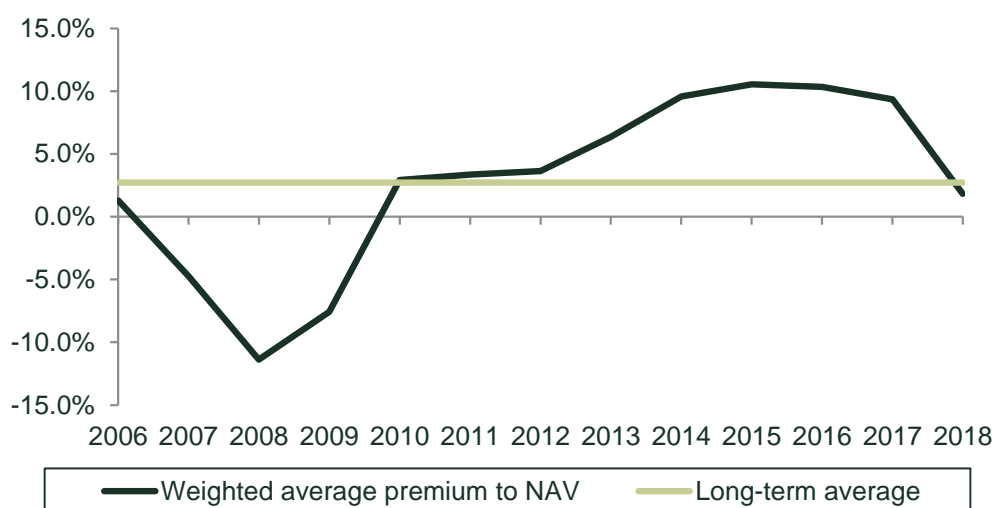
Note: <sup>1</sup>BBGI's 2018 annual report notes that the funds were trading at a discount to NAV for the 9 month period to 30 June 2018.

<sup>2</sup>JLIF was acquired in September 2018 at a price of £1.425 per share. Using the acquisition share price, the premium to NAV is positive at 9.6%. However, if JLIF's NAV grew between June and September 2018, the premium of 9.6% would be an overestimation. Further, it is possible that the acquisition price includes a control premium, which makes the comparison less meaningful.

Source: Oxera analysis based on data from annual reports of infrastructure funds and Thomson Reuters.

Given the sensitivity of the NAV premia to the underlying methodology, we estimate the premia over time to observe the trend in NAV premia, instead of relying on an estimate at a point in time (see Figure 3.1 below).

We note that the average NAV premium, while positive, has decreased since 2017. This does not suggest a marked current divergence between the discount rate used by the funds and the rate used by the investors in the funds.

**Figure 3.1 Weighted average premium to NAV for infrastructure funds**

Note: Premiums to the NAV are estimated using the closing share price on the same day that the NAV was calculated by the fund, or using the next available share price. 'Long-term average' is the average premium to the NAV estimated over 2006-18. NAVs are taken from the company's annual or interim reports and share price data is taken from Thomson Reuters.

We note that not all the funds have data available from 2006, as most of them were listed after 2006. Precisely, the earliest available data for the funds are as follows: BBGI, 2011; HICL, 2006; JLIF, 2010; GCP, 2011; INPP, 2006; and 3i, 2007.

Source: Oxera analysis based on data from annual reports of infrastructure funds and Thomson Reuters.

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The decline in the NAV premiums along with the funds' lower risk constituent investments relative to energy networks (as discussed in section 2) suggest that the funds' discount rates are **not** an appropriate cross-check to determine the upper bound of the CAPM cost of equity range for RIIO-2. Furthermore, the discount rates cannot even be used to determine the lower bound of the cost of equity range. This is because infrastructure funds are generally comprised of investments in lower risk assets, compared to energy networks.

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## A1 Infrastructure funds' portfolios characteristics

### A1.1 BBGI SICAV

BBGI's portfolio consists of '100% availability-based PPP projects with no exposure to demand or regulatory risk'.<sup>28</sup> Additionally, BBGI's portfolio consists of assets focused on operations rather than construction.<sup>29</sup>

**Table 3.2 Portfolio breakdown by sector for BBGI SICAV**

Sector	% of total portfolio value	Largest investments (>5%)
Transport	44.0%	Golden Ears Bridge M80 Motorway
Health	25.0%	McGill University Health Centre
Justice	16.0%	Northern Territory Secure Facilities Victoria Prisons
Education	13.0%	
Other	2.0%	

Source: BBGI (2018), 'Interim Report 2018', 30 August, p.5

### A1.2 JLIF

JLIF's portfolio consists of 91.5% availability-based (less risky) and 8.5% demand-based (more risky) projects.<sup>30</sup> Only two of John Laing Infrastructure's projects, namely City-Greenwich-Lewisham DLR and Connecticut Service Stations P3, have demand-based payment mechanisms, i.e. they are projects for which more than 25% of revenues are dependent on the level of use.<sup>31</sup> These are described in the table below.

<sup>28</sup> BBGI (2018), 'Annual Report 2017', 28 March, p. 8

<sup>29</sup> BBGI (2018), 'Annual Report 2017', 28 March, p. 8

<sup>30</sup> JLIF (2018), 'Annual Report 2017', 23 March, p. 3

<sup>31</sup> JLIF (2018), 'Annual Report 2017', 23 March, p. 33



**Table 3.3 Portfolio breakdown by sector for JLIF**

<b>Sector</b>	<b>% of total portfolio value</b>	<b>Investments with demand risk</b>	<b>Risk Assessment</b>
<b>Transport – Rail related</b>	29.3%	City-Greenwich-Lewisham DLR	Availability-based contract + variable usage fee paid on a share of ticket revenue; 25-year concession period
<b>Health</b>	26.5%		
<b>Transport – Road related</b>	15.7%	Connecticut Service Stations P3	Inflation-linked annual guaranteed minimum payments + percentage share of gross sales; 35-year concession period
<b>Education</b>	8.4%		
<b>Regeneration &amp; Social Housing</b>	8.0%		
<b>Justice &amp; Emergency Services</b>	4.7%		
<b>Government Buildings</b>	4.3%		
<b>Street Lighting</b>	3.1%		

Source: [jlif.com/portfolio/asset-breakdown/](http://jlif.com/portfolio/asset-breakdown/), [laing.com/project\\_portfolio/49/127/city-greenwich-lewisham-rail-link-plc-cgl-rail.html](http://laing.com/project_portfolio/49/127/city-greenwich-lewisham-rail-link-plc-cgl-rail.html), <http://jlif.com/portfolio/investment-portfolio/>

### **A1.3 HICL**

HICL's portfolio consists of 70% availability-based PPP projects, 22% demand-based assets, and 8% regulated assets.<sup>32</sup> HICL notes that revenue risk is the biggest risk factor for its demand-based assets, and that it mitigates this risk by ensuring 'track record of user demand prior to asset purchase'.<sup>33</sup> The main demand-based assets and regulated assets are described in the table below.

<sup>32</sup> HICL (2018) 'Interim Report for the six months ended 30 September 2018', 20 November, p. 26

<sup>33</sup> HICL (2018), '2018 Capital Markets Seminar', p. 15

**Table 3.4 Portfolio breakdown by sector for HICL**

<b>Sector</b>	<b>% of total portfolio value</b>	<b>Largest regulated and demand-based assets</b>	<b>Contract Description</b>
<b>Transport</b>	30.0%	High Speed 1	Demand-based contract; 30-year concession period
		A63 Motorway	Demand-based contract; 99-year concession period
		Northwest Parkway	Demand-based contract; 99-year concession period
		M1-A1 Link Road	Demand-based contract; 30-year concession period
<b>Education</b>	16.0%	Helicopter Training facility, UK	Demand-based contract; 40-year concession period
<b>Accommodation</b>	10.0%	Sheffield University Student Accommodation	Demand-based contract; 40-year concession period
<b>Electricity, Gas &amp; Water</b>	8.0%	Affinity Water	Regulated asset
<b>Fire, Law &amp; Order</b>	7.0%		
<b>Health</b>	29%		

Source: [hicl.com/portfolio/sectors/](https://hicl.com/portfolio/sectors/), HICL (2018) 'Interim Report for the six months ended 30 September 2018', 20 November, pp. 14, 26

#### **A1.4 GCP Infrastructure**

GCP Infrastructure's portfolio consists of 40% ROC/FiT/RHI projects, 18% PPA/Gate fees projects, 17% availability-based projects, 13% rental income, 11% construction projects, and 1% lease payments.<sup>34</sup>

**Table 3.5 Portfolio breakdown by sector for GCP Infrastructure**

<b>Sector</b>	<b>% of total portfolio value</b>	<b>Largest Investments (&gt;5%)</b>	<b>Asset type of largest investments</b>
<b>Solar</b>	22.0%	Gravis Solar 1 Limited	ROCs / FiT
<b>PFI</b>	20.0%	Cardale PFI Investments Limited	PPP
		GCP Bridge Holdings Limited	ROCs / FiT / RHI
<b>Onshore Wind</b>	20.0%	GreenCo Alpha Holdings	ROCs
<b>Supported Living</b>	14.0%		
<b>Anaerobic Digestion</b>	11.0%		
<b>Biomass</b>	9.0%		
<b>Other</b>	4.0%		

Source: [graviscapital.com/funds/gcp-infra/portfolio](https://graviscapital.com/funds/gcp-infra/portfolio), GCP (2018), 'Annual Report 2018', 13 December, p. 25

<sup>34</sup> GCP (2018), 'Annual Report 2018', 13 December, p. 25

### A1.5 International Public Partnerships (INPP)

INPP's portfolio consists of 19% UK PPP, 27% overseas PPP, 39% regulated investments, 9% senior debt, and 6% operating businesses.<sup>35</sup> Additionally, INPP notes that its focus is on low risk assets, with revenues sourced principally from, or regulated by, public sector entities, and its investments are ring-fenced from each other.<sup>36</sup>

**Table 3.6 Portfolio breakdown by sector for INPP**

Sector	% of total portfolio value	Largest Investments (>5%)	Risk Assessment
Transport	21.0%	Diabolo Rail Link	Availability-based contract + passenger-based income; 35-year concession period
Education	20.0%		
Energy Transmission	19.0%	Lincs Offshore Transmission	Regulated asset
		Ormonde Offshore Transmission	Regulated asset
Gas Distribution	14.0%	Cadent	Regulated asset
Waste Water	11.0%	Thames Tideway Tunnel	Regulated asset
Other	5.0%		
Health	4.0%		
Courts	3.0%		
Military Housing	3.0%		

Source: <https://www.internationalpublicpartnerships.com/our-portfolio/sectors/>, INPP (2018), '2018 Interim Results Presentation', September, p. 24

### A1.6 3i Infrastructure

3i states that 'The Company invests in businesses where the downside risk protection inherent in infrastructure investments is complemented by an acceptable level of demand risk or by appropriate growth opportunities.'<sup>37</sup> Its investment focus is on Greenfield projects and on Economic infrastructure projects, such as Infinis (electricity generation) and WIG (telecom tower assets).

<sup>35</sup> INPP (2018), '2018 Interim Results Presentation', September, p. 19

<sup>36</sup> INPP (2018), '2018 Interim Results Presentation', September, p. 1

<sup>37</sup> 3i Infrastructure (2018), 'Annual Report 2018', 10 May, p. 10

**Table 3.7 Portfolio breakdown by sector for 3i Infrastructure**

<b>Sector</b>	<b>% of total portfolio value</b>	<b>Investments under Assets</b>	<b>Risk Assessment</b>
<b>Transportation / Logistics</b>	35.0%	XLT	
<b>Utilities</b>	24.0%	Infinis Attero Valorem	‘The Company made six investments and commitments during [the year ending 31 March 2018], in Attero, Alkane Energy through Infinis, and follow-ons in Oystercatcher, WIG, Infinis and ESVAGT. In line with the Company’s investment focus, described in the Infrastructure market section, these new investments have characteristics which may increase volatility in returns from time to time, for example from exposure to market power prices or demand risk.’
<b>Communication</b>	24.0%	WIG	
<b>Natural Resources / Energy</b>	9.0%	ESVAGT	
<b>Social Infrastructure</b>	8.0%		

Source: [3i-infrastructure.com/portfolio/economic-infrastructure-businesses/](https://3i-infrastructure.com/portfolio/economic-infrastructure-businesses/), 3i Infrastructure, (2018) ‘Presentation of Results for the half year to 30 September 2018’, 8 November, p.24; 3i Infrastructure, (2018) ‘Annual Report 2018’, 10 May, p.48