Office of the New York City Comptroller

Request for Information (RFI):

Investment and Fiduciary Analysis of Prudent Strategies for Divestment of Securities Issued by Fossil Fuel Reserve Owners

Contents

I. Executive Summary

Responses should include an Executive Summary which provides the name of the responding entity, contact information for the point of contact for communications and a brief description of the responding entity and the major features of its response

Longstanding commercial partners and currently in advanced discussions for an upcoming merger, Beyond Ratings and Grizzly Responsible Investment are pleased to respond to this Request for Information (RFI) issued by the Office of the New York City Comptroller ("Comptroller"), on behalf of the Teachers' Retirement System of the City of New York ("TRS"), New York City Employees' Retirement System ("NYCERS") and the New York City Board of Education Retirement Systems ("BERS").

A. General Information

1. Name and business address of responding party

Beyond Ratings	Grizzly RI
51 rue Sainte-Anne, Paris 75002	Headquarters: Résidence Cîteaux 1131, Avenue de Mormal, 59800 Lille Office: c/o Beyond-Ratings, 51 rue Sainte-Anne, 75002 Paris

2. Website address

Beyond Ratings	Grizzly RI
www.beyond-ratings.com	http://grizzly-ri.com

3. Name, address, email address and phone number for single point of contact for all communications

Beyond Ratings	Grizzly RI
Contact: Emilie Bartholome, Head of Business Development at Beyond Ratings 51 rue Sainte-Anne Paris 75002 **emilie.bartholome@beyond-ratings.com** +33 (0)7 60 17 73 60	

4. Brief description of occupational and professional status and background, expertise related to the issues in this RFI and any other relevant background information

Beyond Ratings

Beyond Ratings is an independent financial services provider dedicated to systematically integrating ESG and climate factors into macrofinancial analyses. As experts in country and sovereign risk, we work with commercial partners to provide coherent metrics for all asset classes.

Since our creation in 2014, Beyond Ratings offers innovative services for the financial sector, aimed at increasing the role of finance in the transition of economies towards sustainable trajectories. This expertise is today integrated by more than thirty international public and private financial institutions (investment banks, pension funds, insurance companies, asset management companies, infrastructure funds, development banks, commercial banks) across Europe and North America.

Our expertise is organized around four main poles:

- **Augmented country and sovereign risk**
  - Extension of credit rating models of banks to include an Energy-Climate pillar;
  - Quarterly rating of the solvency of 146 countries, including a pillar Energy-Climate-Natural Resources accounting for 20% of the overall score, since 2000;
  - Assessment of the climate footprint and climate vulnerability (physical and transition risks) for more than 200 countries.
- **Financial engineering services for the energy-climate transition**
  - Design and feasibility study of energy transition financing mechanisms involving public and private financial resources: investment funds, credit lines, guarantee mechanism, private equity companies.
- **Institutional support for the development of Energy-Climate roadmaps**
  - Support to the development of climate strategy of development banks;
  - Accompanying the drafting of the Finance Climate of Governments roadmap.
- **Support for the design and implementation of environmental credit lines**
  - Methodological work for conducting stress-test climate of the activity of financial institutions;
  - Tools of financial institutions for the assessment of the environmental performance of projects under due diligence;
  - Development of the workload capacity of financial institutions for the identification and financing of environmental projects;
  - Design and support for the implementation of environmental credit lines by development banks.

Beyond Ratings is labeled a *Young Innovative Enterprise* and devotes more than 25% of its annual budget to research and development. Beyond Ratings is a founding member of the Academic Chair Energy and Prosperity.

Beyond Ratings is a member of the following organizations:

- **UN Principles for Responsible Investment**
  - Signatory
  - Member of the *ESG Integration in Credit Ratings Initiative* working group
  - Member of the *Fixed Income* working group
- **Luxflag**
  - Associate member
  - Member of the *Green Bonds Label Eligibility Committee*
- **French Responsible Investment Forum**
  - Active Member

- **Finance for Tomorrow**
  - Member of the *Green Bonds* and *Innovation* working groups

Corporate Social Responsibility

- Beyond Ratings is a member of the 1% for the Planet network and, as such, transfers 1% of its turnover (standard products) to environmental NGOs.
- As a services company, Beyond Ratings favors the use of recycled (furniture) and / or eco-designed / eco-labelled products in its purchases.
- Beyond Ratings implements a restricted salary scale (min-max deviation less than 2).
- Beyond Ratings finances the health insurance of its employees.
- 15% of Beyond Ratings shareholding is held by employees.

Grizzly Responsible Investment (Grizzly RI)

Grizzly RI is an independent financial services and research provider dedicated to sustainable development, corporate social responsibility and responsible investment. The company was founded by Valéry Lucas-Leclin in 2014 and offers services within the following areas: ESG Data Modelling & Benchmarking, Carbon Modelling & Carbon Footprint, ESG-linked Financial Products and Corporate ESG and Carbon Rating.

One of the major strengths of Grizzly RI lies within the embedded experience of the active founders. With a combined experience of 60 years, Valéry Lucas-Leclin, Stéphane Voisin and Geneviève Férone-Creuzet have vast expertise in issues related to responsible investment. The three were all key contributors in launching the SRI market in France, as well as instrumental in developing ESG research in Europe and globally through their roles within ESG rating agencies, research departments at investment banks and listed corporations.

Grizzly RI is a member of the following organizations:

- Grizzly RI is member of the French SIF (Social Invest Forum), or FIR ("*Forum pour l'Investissement responsable*"). As a recognized expert, Grizzly RI is currently a member of the Board of the organization, representing the college of Experts.
- As such, Grizzly RI has been appointed as a permanent representative for the Technical Working group of Finance for Tomorrow, a collaborative, government-backed institution for Sustainable Finance.

5. Ability to provide the Investment Analysis Services, or a portion of such work, including legal fiduciary analysis services, and is likelihood of responding to an RFP that includes Investment Analysis Services.

Beyond Ratings and Grizzly RI both have prior experience of providing advice and support in the development of investment strategies centered around reducing carbon risks in investment portfolios. As such, they are able to provide the Investment Analysis services described and would be interested in responding to a potential RFP.

B. Information Requested Regarding RFP and Investment Analysis Services

1. *What specific areas, factors, risks and impacts should an RFP consider in order enable selection of a provider or providers that can best conduct comprehensive and in-depth Investment Analysis Services?*

Though the carbon issue seems simple at first sight while only financial consequences for portfolio performances might be complex, we believe that the whole story about carbon and climate change is still complex. On climate change and carbon issues alone, many factors interplay together and create a deep halo of uncertainty for companies, investors, and the whole economy that are not easy to overcome.

We would like to be able to say that data are there, both on transition risks and physical risk, and even more we'd like to say that forward-looking data are there as well as the required tools finance uses to play with: scenarios, stress-test, Carbon VaR, sensitivities, free-options, long-short strategies, clear technological roadmaps, etc. Unfortunately, we consider that despite sincere efforts by many pioneers in research, asset management, asset ownership, academics, we are still in the beginning of the journey. The low-hanging fruits only have just been reaped, and it will take time to gather both in-depth & accurate data, experiences, back-tests, feed-backs, new comprehensive models. Our own experience is that, as Mark Carney put it so rightly, we are facing a tragedy of horizons, and we must live with it, as finance is not equipped or adapted to very-long term strategic decisions in a deep-changing system.

We'd therefore recommend selecting providers that able to cover issues ranging from already well- accepted carbon footprints – with all their traps - to new issues of forward-looking indicators, trajectories, and 2DS scenarios.

We think that a deep understanding of the type, quality, and value of data is absolutely required before any attempt to model the financial impacts.

We also believe that there could be great value in a seamless intelligence of the issue ranging from macro perspectives (NDCs, countries, global economy) lastly to companies, notwithstanding macro and micro sectors. We remind the Comptroller that the Paris Agreement, upon which the main scenarios are based, focus on country contributions and macro sector evolutions, whereas most securities invested are usually company stocks. In our opinion, there is a strong need for a consistent strategy within a wholly changing economic system

Lastly, there is information disparity amongst asset classes, with much more research now available on bonds and equities, while real estates, infrastructures, non-listed securities probably deserve more work in the coming years to better analyze their risks, especially physical risks.

In terms of content and indicators, we recommend providers be able to deliver on:

- Footprinting
  - Contribution
  - Carbon intensity and related ratios
  - Sector Allocation and Stock Picking Effect
  - Trajectories and 2DS Compliance
- Exposure:
  - Current and forward-looking
  - Coal, oil, and gas, for all industrial energy-related sectors
  - Sales and/or assets
  - Unconventional and conventional
  - Green vs Brown revenues
  - Scope 3 if possible
  - Imported and exported emissions (through imported goods and services) for sovereign assets
- Carbon Value-at-Risk and Financial Impacts

  - Type of Models used
  - Underlying assumptions and parameters
  - Bottom-up versus top down approach
  - Reconciliation at sector and country levels
- Physical Models
  - Types
  - Underlying data and granularity
  - Asset-location base or country location basis
- Financial Models
  - Type of models: VaR, ALM, etc
  - Multi factor Models

Coverage:

- Securities and Asset Classes:
  - Listed Companies, by country and level of market cap
  - Countries (sovereign assets)
  - Supranationals
  - Municipals
- Proportion of public (data) and estimated data when missing
  - Sources of data
  - Models used to estimate data
  - Models and origins of models used for modeling of financial impact

2. *What other important questions should be included in an RFP that includes Investment Analysis Services?*

In addition to the elements listed above, other key questions for an RFP should include the following:

- Presentation of the company or companies responding: organizational, legal or operational aspects
- Presentation of the team that will be in charge of the work: years of experience, expertise, CVs, organization
- Key strengths of the proposal according to the providers and differentiating factors
- Data sources, internal statistical capacities and data management processes
- Detailed presentation of the proposed methodology
- Coverage rates (number or % of assets covered for relevant asset classes)
- Proposed price

3. *What information and format do you believe would be useful for soliciting and evaluating Investment Analysis Services?*

In order to solicit and evaluate Investment Analysis Services, it would be useful for service providers to have access to the following elements, in addition to the RFP:

- A document specifying the request, following the information gathered through the RFI
- A list of the documents and pieces of information to be provided by respondents
- Details on the selection criteria
- A potential list of questions if relevant or on subjects for which it could be relevant
- Details on the portfolio(s) to be analyzed: *e.g.* aggregated view and portfolio-specific views, asset classes to be covered, approximate number of assets. It could also be useful for respondents if the portfolio or an extract of the portfolio could be made available in confidentiality.

- Details on any potential benchmark analysis to be provided, an if a benchmark would be provided by the Comptroller.

Most of these documents could be provided online in Pdf or Word format although some of these elements (portfolio details, some information requests) could be provided in Excel format.

These elements would allow potential service providers to be more precise in their proposals and the presentation of their methodologies, in particular with regards to the scope of the analysis. A potential list of questions would also facilitate the comparability of proposals.

If needed, potential service providers could potentially also provide the following elements on this basis, in addition to their detailed proposals:

- Statistics on expected coverage rates taking into account the available details on the portfolio(s) and scope of analysis
- Illustrative data
- Available mockup reports of carbon/climate portfolio analysis such as those that the provider can provide to other investors (general portfolio analysis)

4. *What criteria, experience and qualifications for services providers should be considered for Investment Analysis Services?*

We think that the following criteria might help guarantee the quality of services:

- Years in finance industry
- Years in SRI/Sustainable/ESG sub-industry
- Main publications or achievements in the domain of carbon and climate change (individually and collectively)
- Main academic qualifications and skills:
    - Finance
    - Climate & carbon & ecology
    - Ecological Economics
    - Statistics and Modelling
- Number and Percentage of:
    - Statisticians and data scientists
    - Analysts:
        - senior vs junior
        - data Analyst vs country & sector analyst
        - years of experience
        - international profiles/experience

Approaches to Investment Analysis Services

Initial considerations:

For the following answers we base our thoughts and proposals on both our pragmatic views on the topic, our 20-year experience with engaged, SRI, ESG, and Sustainable investors across the globe – some of them as clients having already started to divest from fossil fuels – and on market and academic literature. For market literature, we cite:

- IIGCC: "Investor Workshop on Carbon Foot Printing", 2015
- Bloomberg NEF: "Fossil Fuel Divestment: a $5trn challenge", August 2014
- Novethic "Invest-Divest Investors Guide", December 2017
- Assets Owners Disclosure Project, "Global Climate500 Index, Rating the World's Investors on Climate RelatedFinancial Risk", 2016
- Mercer, "Investing in A Time of Climate Change", 2015
- UNPRI: "2 degrees of separation: Transition risk for oil and gas in a low carbon world", Carbon Tracker Initiative, 2017
- All the carbon Bubble reports by CTI: https://www.carbontracker.org/reports/
- All the reports by 2-degree-initiative: https://2degrees-investing.org/
- Science-based targets: http://sciencebasedtargets.org/
- Transition pathway Initiative: http://www.lse.ac.uk/GranthamInstitute/tpi/
- ACT: http://actproject.net/

For academic research, amongst many high-quality papers, we build our views on:

- "Fossil Fuel Divestment and Portfolio Performance", by Arjan Trinksa, Bert Scholtensa,b, Machiel Muldera, Lammertjan Dama, 2018, in Ecological Economics,
- "Divest from the Carbon Bubble? Reviewing the Implications and Limitations of Fossil Fuel Divestment for Institutional Investors"; by Justin Ritchie (Correspondence author), in Review of Economics & Finance, 2014
- "Fossil fuel divestment strategies: Financial and carbon related consequences", 2018, Hunt, Chelsie & Weber, Olaf (accepted), Organization & Environment.

We also strongly rely on scenarios from the International Energy Agency, the World Economic Outlook and the Organization for Economic Co-operation and Development, or on specific issues like sector trajectories by the Science-Based Target Initiative.

5. *What do you believe are best approaches to:*
   a. *Determining the scope of companies, including further defining fossil fuel reserve owners, appropriate for divestment.*

Market players have different answers to this question. The type of constraint differs depending on the type of fossil fuels, type of reserves (proven, probable, plausible) and the eventually the level of exposure. Even for coal there is still a pending and rich debate about the type of coal (thermal or metallurgical) that should be considered. Furthermore, despite many years of exploration since the first, disruptive report by Carbon Tracker on the Carbon Bubble, it is still unclear whether all reserves should be considered as immediately burnable or reserves on a certain horizon time, taking into account the pace of burning them. Some reserves might be unburned before the end of the century due to the current level of yearly production. In that perspective, one could legitimately argue that excluding any company because of its reserves without shedding light on forward-looking emissions by 2050-2060 or 2100 might cut too deep.

However, this is not the entire story. Market players also differ about the possibility for companies, despite their reserves, to adapt, change and modify their business model and exposure. In that vein, we enter a discussion that is similar to a best-in-class approach vs best-in-trend approaches. Some companies might trigger a new era of development without their fossil fuel activities being spun-off.

b. Determining the timetable and specific milestones within a five-year period appropriate for divestment.

This question is complex, and our understanding is that it might depend more on the political maturity of the question than on technical and financial considerations.

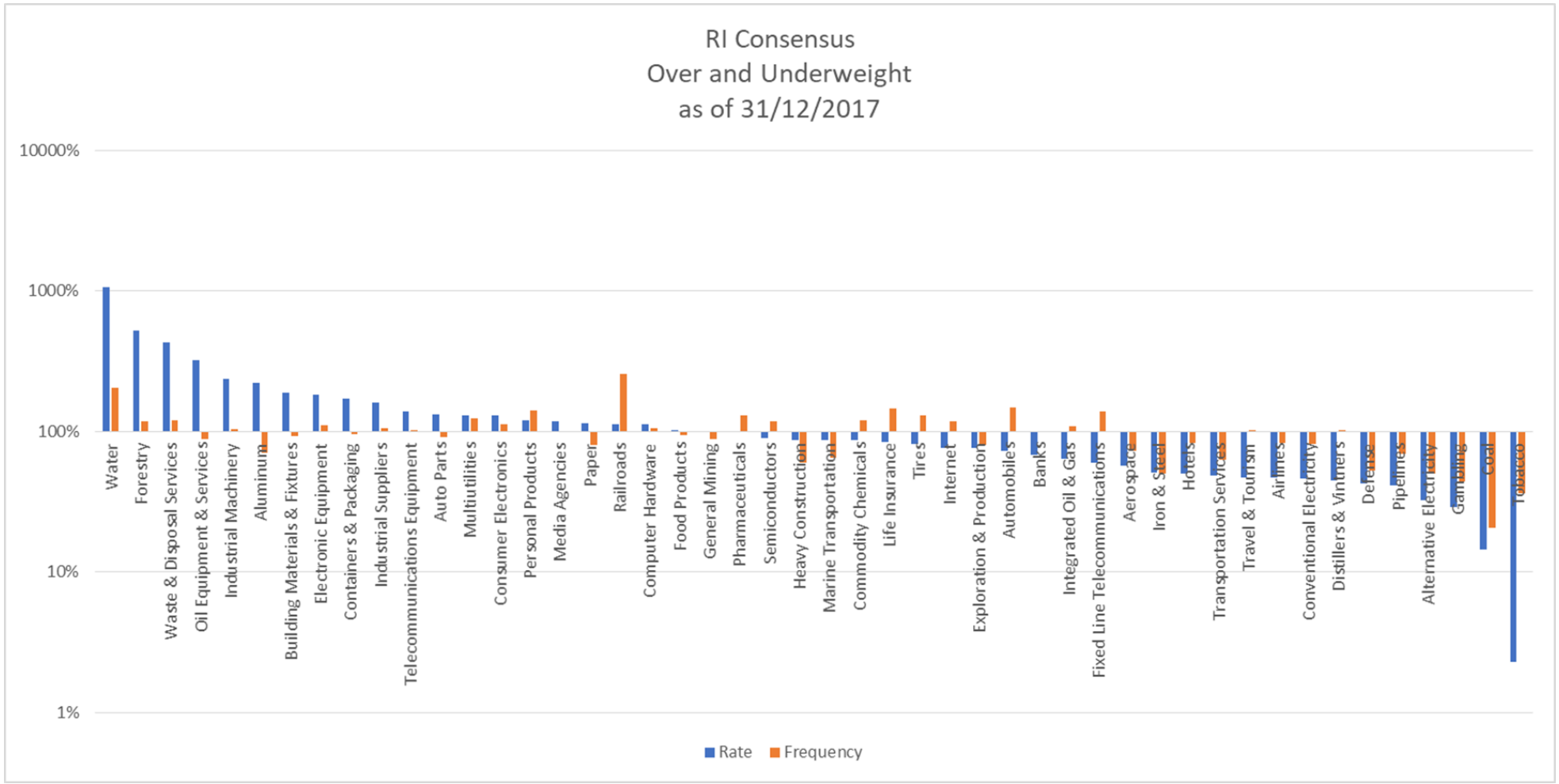
When we look back at all the moves and thresholds adopted by many asset managers having divested around the globe, what we see is a gradual and diverse movement towards divestment.

Usually, everything starts with coal (mainly thermal), with gradual thresholds of exposure (e.g. with a maximum threshold of 50% to start with, and then 25 or 20%). We also notice that divestment does not explicitly focus on the reserves issue, but more on current exposure to coal. This has consequences as we see some investors divesting not only from coal miners but also from electric utilities that rely partially on coal-fired power stations. We believe that the move away from coal was also facilitated by declining prices and limitations to export and importation, as well as the surge of shale gas and oil as a substitute.

Full divestment from fossil fuels other than oil & gas is more complex, as the proportion in benchmarks and indexes is much higher on the one hand, and the possible usages of those fuels is very diversified as well.

Taking a pragmatic view on this issue, we still have our doubts on the current possibility to fully diversify a portfolio with a strong energy and energy-related portion. The switch from fossil stocks to renewable stocks is feasible but comes at a cost in terms of diversification.

In the chart below, we introduce our proprietary tool RI Consensus which allows for analyzing and aggregating all positions taken by a panel of 500 SRI/ESG etc. funds. What we can see is that in average investors, very logically, tend to reallocate their money within the same mega-sectors but overweigh non-fossil sub-sectors while underweighting the fossil ones.


RI Consensus
Over and Underweight
as of 31/12/2017
10000%
1000%
100%
10%
1%
Water
Forestry
Waste & Disposal Services
Oil Equipment & Services
Industrial Machinery
Aluminum
Building Materials & Fixtures
Electronic Equipment
Containers & Packaging
Industrial Suppliers
Telecommunications Equipment
Auto Parts
Multiutilities
Consumer Electronics
Personal Products
Media Agencies
Paper
Railroads
Computer Hardware
Food Products
General Mining
Pharmaceuticals
Semiconductors
Heavy Construction
Marine Transportation
Commodity Chemicals
Life Insurance
Tires
Internet
Exploration & Production
Automobiles
Banks
Integrated Oil & Gas
Fixed Line Telecommunications
Aerospace
Iron & Steel
Hotels
Transportation Services
Travel & Tourism
Airlines
Conventional Electricity
Distillers & Vintners
Defense
Pipelines
Alternative Electricity
Gambling
Coal
Tobacco
Rate
Frequency

Here we see that for the Utilities sector a strong overweighting is proposed for Water (10x!), Waste & Disposal services (5x), and even Multi-Utilities. In the meantime, the Conventional Electricity sector is strongly under-allocated. Ultimately coal is the new "tobacco" sector, e.g. a typical sector to be excluded on almost purely ethical criteria as it has been the case for tobacco over the last 40 years.

Our belief is that the Comptroller as prudent investor could adapt a step-by-step approach following the same path, stabilizing its allocation in mega sectors (level 1 for taxonomies like Industry Classification Benchmark and Global Industry Classification Standard), but progressively rebalancing the sub-sectors (level 3 or 4), with a clear focus on coal first thanks to a maximum threshold of exposure -rather based on current or forward-looking production within the next 5 years (use of Capex data besides production).

But again, to come back on our initial point, confidence on the use of this new set of exclusion filters will frame the process and its timelines. We could envision 3 phases where:

- Year 1 and 2:
  - Main: testing out the robustness of stepwise divestment from coal. This would include the identification of the level of exposure to fossil fuels by segment (coal, oil, gas) across relevant assets classes (at least public equity, corporate bonds and sovereign assets).
  - Secondary: implementing specific filters on unconventional oil and gas exposure
- Year 3 and 4:
  - Main:
    - balancing fossil-fuel sectors to the benefit of renewable and energy stocks
    - examining international diversification within the energy sector
    - examining diversification options across the sovereign asset class (countries, sub-sovereign assets, supranationals) in consistency with the New York City Comptroller's investment policy (including discussing various potential options).
  - Secondary:
    - implementing specific filters on Electric and Conventional Utilities based on coal exposure
    - examining exposure levels and diversification options based on the exposure to fossil fuels exports (beyond fossil fuels reserves) in the analysis of sovereign assets
- Year 5:
  - Main: total fossil-fuel phase-out
  - Secondary: other than energy asset reallocation to keep returns and diversification to non-correlated elements. Global portfolios are then less renewables-dependent.

More complex approaches are also possible, based on:

- Carbon-weighted factor (scope 1, scope 2, reserves, green/brown revenues, and potentially scope 3)
- Similar risk-adjusted performance profile
- Best-in trend stocks with regards to reduced intensity / exposure (towards 2050 2DS scenarios)
- Carbon beta (sensitivity to different types of carbon impact on stocks, i.e. whether it is implicit carbon content or price, or via carbon Value-at-Risk)

However, we believe these more sophisticated approaches might be complex enough to be prepared for an initial phase of 2 years of back-testing under the specific constraints of the Comptroller.

c. Assessing appropriate divestment approaches based on asset classes, strategies and styles.

Please see our response to 5b above for bonds and equities.

A multi-asset approach is necessary to minimize the full covariance of the asset classes altogether. Based upon our experience, we think two approaches are feasible:

- A purely statistical approach based on the matrix of variance – covariance between all asset classes and sector classes, with the obvious limitation of missing data and historical track
- A modeled, dynamic framework or hypothetical covariance that could be progressively adjusted time going by based on preselected parameters and assumptions. In that case this would be a conceptual prototype that would be refined with accumulated data and back-tests.

The debate however would start with the following question: optimizing the divestment approach at the level of strategic allocation or rather at tactical level (within asset classes, strategies, and styles). Our belief is that, given the low visibility of this on-going concern, it may be easier and wiser to opt for a tactical level, where divestment is considered per asset class, etc.

From a higher standpoint, this section will require significant on-going work. Grizzly and Beyond Ratings are coordinating with various technical working groups in France on this topic on which much research has still to be done.

Also, usual ALM techniques could be used. Asset liability management is a common framework applied to long-term investors and one that could therefore be insightful here. In the pension fund industry, liability-driven investing (LDI) has become a popular approach. Applying a dynamic ALM framework could be viewed as an extension of LDI that has been tailored to socially-responsible oriented investors.

d. Analyzing the investment risks posed by climate change and fossil fuel reserve owners to the Systems' portfolios (including scenario analysis).

We think the various types of financial risk are well documented in papers such as "Fossil Fuel Divestment and Portfolio Performance", 2018, with a clear view on specific carbon factor after modeling for traditional Carhart-4 factors.

Modern Portfolio Theory recommends testing out the robustness of a fossil free strategy as a specific additional risk factor deserving its premia.

However, we believe this approach so far does not account for two major risks:

- Physical risks that could affect other non-fossil fuel securities -mainly real estate, insurance, banks, and potentially all sectors,
- Risk on the whole economic system, which encompasses but goes beyond traditional systemic risk as they are usually understood (market risk)

e. Analyzing potential investment impacts on the Systems' portfolios of divesting from the securities of fossil fuel reserve owners, including impacts on return, risk, diversification and cost (including tracking error).

We refer again to the available academic literature, especially the articles we referred to in our response to question 4 (Approaches to Investment Services, p.7). At this stage we acknowledge that the issue is double:

- Issue 1: treating fossil fuel securities as the new exclusion filter, and in that case, we know that diversification is decreasing in the energy sector. Portfolios are then significantly less resilient to any shock as most of assets are renewables-oriented and any global energy macro-change (fuel price volatility) can highly impact asset value.
- Issue 2: As cyclical values, fossil-fuel divestment won't allow the asset manager to benefit from the leverage effect of growth.

f. Assessing potential alternative investments available to the Systems that have risk and return characteristics equivalent to the securities that may be divested.

It is possible to conduct optimization tests to minimize or maximize a given factor under specific constraints. This would require specifying both the factor to be optimized and the risk and return characteristics to be guaranteed.

For example, it is possible to:

- Minimize the share of investments' exposure to a given issue (e.g. coal) based on a threshold and/or on a weighted average
- Minimize the number of assets exposed to a given issue
- Minimize a weighted footprint or exposure (e.g. carbon footprint)

In a divestment or exclusion approach, we would like to consider seriously the first option.

In addition, it is indeed appropriate for exclusion or divestment approaches to also include an assessment of alternative investments, based on eligible assets. This should allow to guarantee the same risk and return characteristics. For this purpose, criteria to be taken into account may differ across asset classes but can include financial returns indicators or financial ratings and analyze them based on latest data available, long-term averages and trends. It is possible to combine these criteria in optimization tests to minimize negative exposures to issues such as coal or all fossil fuels, without impact risk and returns levels.

In some cases, these tests can also be combined with diversification goals. For example, in the case of highly concentrated sovereign portfolios, tests can allow to optimize specific carbon/climate criteria in the framework of a given considered level of diversification.

6. Are there any precedents that can help guide the approach to analyzing the impacts of and determining a prudent strategy for divesting from fossil fuel reserve owners?

We refer to examples publicly disclosed in reports like the Novethic report "DIVEST-INVEST Guide: How to divest from fossil fuels and invest in the green economy", published in December 2017. We can also discuss some examples of our clients in confidentiality.

According to our knowledge, it is too early to give significant, robust examples of:

- Asset managers and asset owners suffering lasting losses from climate change (physical and transitional), or reversely
- Asset managers and asset owners benefiting from a rebalancing shift towards non-renewable stocks, except obviously for so-called thematic funds (water, renewable, energy efficiency, etc.)

7. *What are ways to address the costs of externalities in investment portfolios that can help mitigate risk?*

In some methodologies, the costs of externalities can refer to climate physical risks. The analysis of climate physical risks can provide a complementary view of a portfolio's level of risk exposure. To analyze climate physical risks, it can be relevant to combine both external and internal approaches in order to identify consensuses. An issue with climate risks is indeed the fact that these risks tend to be medium-term or long-term oriented. In addition, it remains difficult to have a very precise assessment to risks at stake for a specific region, country, activity, sector or time horizon, given the complexity of the factors at stake, and the lack of track-record. However, it is possible to assess relevant orders of magnitude and this is the goal that we would recommend when assessing climate physical risks (for example based on quintiles of risk level). Lastly, to analyze physical risks we also recommend distinguishing between strictly physical risks (*e.g.* natural disasters, sea level rise, etc.), economic risks (*e.g.* GDP losses due to climate impacts, share of vulnerable sectors in the economy, etc.) and attenuation factor (*e.g.* political mitigation factors through climate policies, etc.).

Costs of externalities can also relate to the economic costs of carbon taxes that can be implemented to integrate costs of externalities in economic and financial assessments. In this context it is possible to consider several types of tests applicable to portfolios' assets depending for example on the following criteria:

- Price of the tax
- Scope of the tax in terms of covered activities
- Specific impacts of carbon border taxes: for example, for sovereign assets it is possible to assess the impact of carbon border taxes on the trade balance or on government revenues, through a more specific analysis of exported and imported emissions (*i.e.* emissions embodied in exported and imported goods and services)
- Type of scheme: carbon tax or ETS

8. *How do you view the extent to which the market currently prices in climate change risk and, specifically, the economic and investment risks related to the carbon intensive businesses such as fossil fuel reserve owners?*

We think that, despite good efforts, the market does not currently accurately price climate change risk. Meanwhile, we are not sure that we really understand how the market will be impacted as a system and the types of evolutions it is going to face in the coming years.

In our view, we are more inclined to see a fundamental evolution of the whole economic system instead of winners and losers above or below a neutral market.

To some extent, the last two centuries have seen the rise and fall of some great technologies that were consequently at the roots of the economic system: from horsepower to steam power, to electric power and now to renewable power; or from paper as the main media channel to television, and now the Internet as the new platform for exchanging information. With regards to climate change, we see this as a mega trend that is reshaping the world. Meanwhile, global economy is going to change and adapt as much as it can,

and we do not foresee any return “back to the normal”: the world will be different and reshaped. In our views, that means that the question is not so much to live and invest in an already low-carbon economy but to make sure that investors will start the journey for the transition early enough.

Obviously, the nature and the infrastructure will be also impacted to a certain (high) degree, with consequences and impacts that might be severe if not extreme in some circumstances. It is even possible that the changes will be strong enough to permanently change the structure of the economy, coupled with other mega-trends (demographics, water, education, migration, democratic life, Artificial Intelligence, etc.).

From an investment perspective, the movement away from coal might be appropriate as it was appropriate to divest from horsepower to the benefit of new energies. In that case divestment from coal may not be a specific risk so much as a technological shift for the better, and in that perspective, it could mean investors and the world economy are going to face a real transition and not a shock.

Our experience is also that governments, for better or worse, never drop or constrain their local industries unless they leave them an acceptable alternative in order to spare employment and economic growth.

In terms of tools, this could mean that a pure risk assessment might look more like an intellectual exercise while companies and sectors will have and still have time to adapt, change, and evolve in various directions. That leaves place both for engagement and stress-testing, carrots and sticks, to the extent that investors consider the business cycles and investment cycles of companies they invest in.

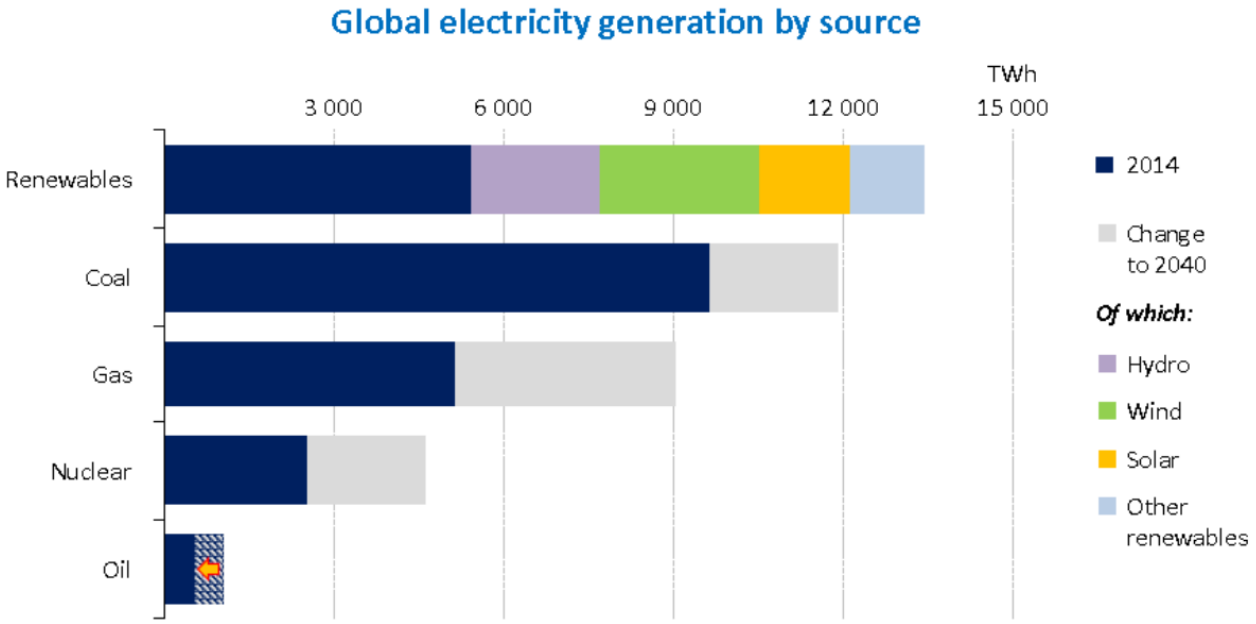
We would also like to evoke a position sometimes expressed by some advanced Asset Owners:

- If you sell your fossil fuel securities, you lose any power to stimulate companies for a better change
- Other non-committed investors will buy back securities at a discount and will continue to invest while less committed to push them in the right direction

9. *How could divestment be effective in influencing fossil fuel reserve owners to take steps toward addressing carbon risk?*

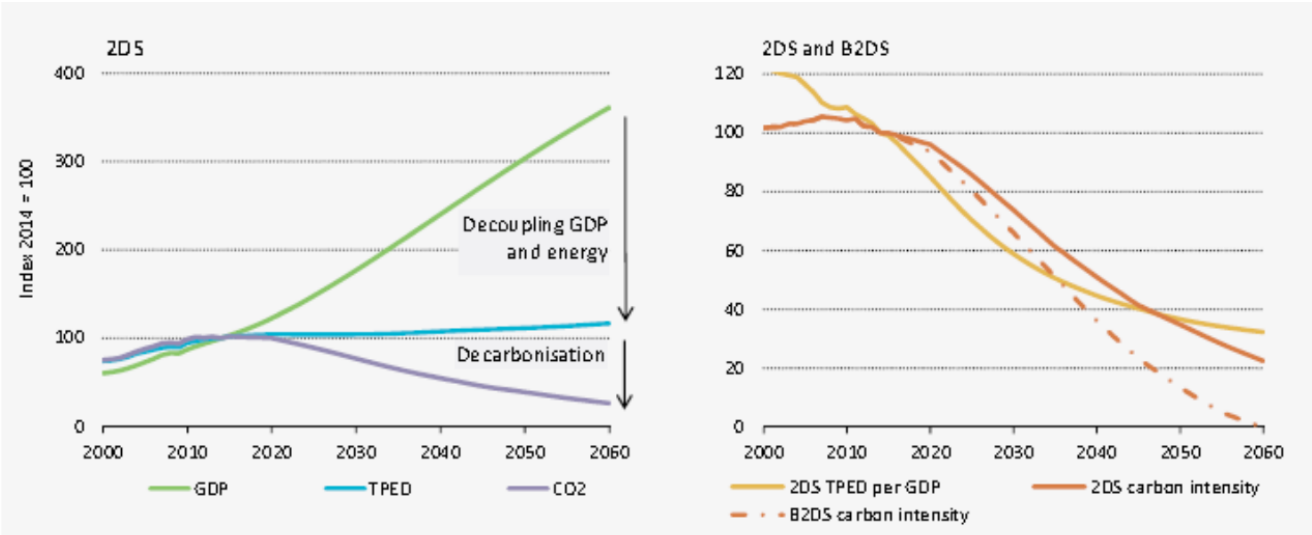
With regards to above, we think that only a step-by-step process of divestment can combine the value of engagement as well as the protection of investment return.

That said, we must reckon that coal and fossil fuels will still play a major part in energy production and consumption in almost all scenarios as reckoned by the IAE. In that vein it is unlikely that the main target for prudent investors be to stop any investment in fossil-onomics. In the meantime, energy and then carbon efficiency mainly depends on users of fossil fuels (Utilities, drivers clients of Auto sector, Airlines, etc.) as well as technological suppliers (cap goods, auto parts, etc.).



Source: OECD, IEA, World Energy Outlook 2015

Fossil fuel divestment will only be one part of the solution, while decoupling energy and production will play an absolutely critical role as well.



Note: Carbon intensities expressed as CO_2 emissions per unit of GDP.

Source: IEA (2016h), *World Energy Statistics and Balances*; IEA (2016i), *CO_2 Emissions from Fuel Combustion*; IEA (2016c), *World Energy Outlook*; IMF (2016), *World Economic Outlook*.

II Responses to Questions

a. What services can you provide that could satisfy the Investment Analysis Services sought in the above-referenced RFP? Describe briefly what other services relating to mitigating climate change or carbon risk you can you provide.

Beyond Ratings

Beyond Ratings provides carbon-related data and research based on four axes:

- Carbon emissions
- Sovereign Footprint
- Added value KPIs
- Energy-Climate Change Risk Index

All datasets are updated on at least a yearly basis. We also update our work as soon as any data suppliers deliver new updates.

- Raw carbon emissions data:

For a large scope of countries (>180 countries) with a sectorial breakdown (cf Figure 1), we provide information for CO2 and global GHG emissions. Using statistical methods and modelling, we can deliver data for up to 2016.

Category code	Description
CAT0	National Total
CATM0EL	National Total excluding LULUCF
CAT1	Total Energy
CAT1A	Fuel Combustion Activities
CAT1B1	Fugitive Emissions from Solid Fuels
CAT1B2	Fugitive Emissions from Oil and Gas
CAT2	Industrial Processes
CAT2A	Mineral Products
CAT2B	Chemical Industries
CAT2C	Metal Production
CAT2D	Other Production
CAT2G	Other
CAT3	Solvent and Other Product Use
CAT4	Agriculture
CAT5	Land Use, Land Use Change, and Forestry (LULUCF)
CAT6	Waste
CAT7	Other

- Sovereign Footprint (BR country carbon database):

Beyond Ratings' Country Carbon Database provides essential information on the carbon fundamentals of more than 170 countries and allows for the benchmarking of their GHG (greenhouse gas) performance for key performance indicators.

Available key indicators include the following (based on a full-service access):

- **[Territorial + Imports] GHG:** tCO2e/USD m ratio including the ratio's breakdown based on Domestic excl. Exports, Exports, and Imports GHG/GDP
  - Latest available data
  - Estimates and projections until 2020
- **Fossil Fuel Reserves GHG Content:** tCO2e/USD m ratio including the ratio's breakdown based on Coal/Lignite Reserves, Oil Reserves and Gas Reserves GHG/GDP
- **Fossil Fuel Exports GHG Content:** tCO2e/USD m ratio including the ratio's breakdown based on Coal/Lignite Reserves, Oil Reserves and Gas Reserves GHG/GDP
- **Public-sector specific GHG emissions (from public sector consumption):** [Territorial + Imports] GHG/GDP including the ratio's breakdown based on geographic criteria (Domestic excl. Exports, Exports, and Imports GHG/GDP) and public-sector level (Direct and Upstream GHG/GDP)

- Added Value KPIs:

Based on internal process and methodologies Beyond Ratings proposes several proprietary KPIs:

- Temperature of a NDC and its distance to a 2° scenario
- Country 2° compliant GHG budget by 2030
- GHG consumption per capita: (territorial emissions + imported emissions – exported emissions)
- Green proxy: % of low-carbon energy in primary consumption
- Brown proxy: % of fossil fuels in primary energy consumption
- GHG abatement/surplus: abatement/surplus vs. reference level.

- Energy-Climate Change Risk Index:

Two types of sub-risks have been identified for the analysis of energy and climate risk:

- Climate physical risk: assessment of physical risks linked to climate change based on objective and quantifiable criteria (e.g. physical impacts, human cost of natural catastrophes, agricultural or energy-related impacts, etc.)
- Energy-climate economic risk: assessment of economic impact and exposition of climate and energy risks (e.g. energy consumption and dependency, resilience of the electric system, energy price stability, energy supply, etc.)

The final output of this analysis consists in scores from 0 to 100 for each pillar, with 100 meaning that the country is better prepared and 0 meaning that the country is not prepared. This index covers 57 countries.

- Climate Physical Risk Index:

The purpose of this score is to determine several objective and quantifiable criteria per country that makes it possible to measure physical risks linked to climate change. The chosen indicators capture the following problems:

- Physical impacts by climate change events such as rising sea levels, water resources
- Human cost of natural catastrophes particularly natural climate related catastrophes
- The level of foreign dependency for the country's internal agricultural consumption
- Share of energy production dependent on water sources

Furthermore, certain criteria were selected to represent countries' level of commitment towards the fight against climate change and their level of preparedness (climate policies, etc.). This index covers 57 countries.

- Energy-Climate Economic Risk Index

This score aims to measure the economic impact and exposition of climate and energy risks.
For climate, the risks taken into consideration include the share of sectors most affected by climate change (agriculture and tourism) in the economy, the economic cost of natural catastrophes, and the level of vulnerability of countries to fiscal constraints linked to CO2. Furthermore, the same indicators that measure the level of commitment and preparedness in the Climate Physical Risk Index are included.

For energy, the objective is to evaluate the impact of energy stress on the economy's productive sectors. The chosen indicators capture the following issues:

- Level of energy consumption and dependency
- Resilience of the electric system and quality of the energy infrastructure
- Stability of the price of energy
- Risks related to energy supply

Furthermore, the country's financial and social capacities to intervene are taken into consideration as the proxy for the level of preparedness of each country. This index covers 57 countries.

Grizzly RI

The first product and service developed by Grizzly RI was a carbon footprint analysis of a portfolio, based on scope 1 and scope 2 emissions, with a strong focus on analyzing contributions / sector allocation and stock-picking effect.

Today, the model also encompasses:

- An analysis of trends and trajectories by 2030 based upon AIE and SDA work
- Full intensity metrics (EV, MV, etc)
- Scope 3 downstream for at least the Auto sector
- Scope 3 upstream for all sectors (pure modelled data) (to be released by June 2018)

We have also developed a CREAM II model (based upon the CREAM model published when at SocGen in 2007) that can play on various parameters, such as:

- Carbon Intensity
- Carbon allowances
- Carbon costs (market / technology)
- Learning curve and technology roadmap
- Pricing power
- Operating Margin
- Market Share

b. Describe your business including your primary business activity and all the professional services that you or your company or organization provide.

Beyond Ratings

Beyond Ratings' standard services include:

- **Data feeds**

We provide data feeds on augmented credit risk, ESG performance, and carbon/climate risk at the country level, which cover the following topics:

  - **ESG-augmented credit risk scores**
  - **ESG performance scores**
  - **Carbon & climate data**

- **Scorecards & Analysis**

Country scorecards are also available for our ESG-augmented credit risk, ESG performance services, and climate services, which cover the following topics:

  - **ESG-augmented credit risk**
  - **ESG performance**
  - **Carbon & climate**

- **Reporting**

We provide customized solutions for reporting on climate action and SDG alignment.

  - **Climate reporting**
  - **Sustainable Development Goals**

- **Index creation**

We can capitalize on our advanced macroeconomic credit risk, ESG performance, and climate metrics to assist in the design and creation of new indices.

Please find an overview of our clients below:

Grizzly RI

Grizzly RI's standard services include:

- **Data feeds**

We provide databases on carbon/climate risk, ESG, and financial integration of ESG/Carbon performances at corporate level, which cover the following topics:

  - **Carbon data (reported and estimates) for scope 1, scope 2, and potentially scope 3 upstream and downstream, as well as estimated trajectories for a 2° scenario**
  - **RI Consensus: scores derived from the inclusion of stocks within 500 ESG/ethical/sustainable portfolios**
  - **ESG operational performance scores**
  - **Geographical ESG scores**
  - **Ethical specific filters**

- **Portfolio Analytics**

We conduct analysis for portfolios (equity and credit) using all our approaches and data feeds. In particular, we calculate the following indicators for portfolios:

  - **ESG performance**
  - **Carbon & climate performance (carbon intensity for sales, MV, EV)**
  - **Sector allocation effect and stock picking selection effect**
  - **Distribution, scenarios, trajectories, etc.**

- **Consulting**

We provide customized solutions for reporting on climate action and SDG alignment.

  - **Climate reporting**
  - **Financial integration**
  - **Indexes building**
  - **Financial Impacts (CREAM II Model)**
  - **2° scenario**

- **Index creation**

We help our clients set up, customize, and boost their ESG and climate related ideas into indices and financial products, like including an ESG or a climate factor into multifactor indices based on a risk premia approach.

Please find an overview of Grizzly RI's clients below:

c. *What skills, experience, expertise or tools do you have that enable you to provide Investment Analysis Services? Please include a list of similar prior projects and/or services; a description of experience with providing similar services to public pension funds or other institutional investors; and the length of time that you and your company or organization have provided such services.*

Please find a selection of our common references below:

Mission name: *Analysis of the carbon / energy transition of the portfolio*	Provider: *BR and GRIZZLY*	Client name: *IRCANTEC (French pension fund)*
Start date: *December 2018* End date*: December 2020*	Mission length: *2 years*	
Short description of the mission *Analysis of the carbon footprint of the client's sovereign assets for the years 2018 and 2019, including analysis of exposure to carbon risk, calculation of green and brown proxy, alignment to 2°C & 1.5°C scenarios.* *Analysis of the client corporate assets (bonds and equity) in the same conditions with a focus on trajectories*		

Mission name: *Analysis of the carbon / energy transition of the portfolio*	Provider: *BR and GRIZZLY*	Client name: *ERAFP (French pension fund)*
Start date: *June 2017* End date*: December 2019*	Mission length: *3 years*	
Short description of the mission *Analysis of the carbon footprint of the client's sovereign assets for the years 2017 to 2019.* *Analysis of the client corporate assets (bonds and equity) in the same conditions with a focus on trajectories*		

Mission name: *Building up a series of 14 ESG MultiFactor risk premia Indexes*	Provider: *Grizzly*	Client name: *Société Générale Index- Lyxor*
Start date: *September 2017* End date*: on-going*	Mission length: *NA*	
Short description of the mission *Helping Société Générale, a leading investment bank in indexes solutions to supply their institutional clients with customized, multi-factor ESG indexes in risk premia perspective, using proprietary database RI Consensus*		

Mission name: *Consulting on Green taxonomies and carbon Modeling*	Provider: *Grizzly*	Client name: *FTSE Russell*
Start date: *September 2017* End date*: on-going*	Mission length: *1 Year*	
Short description of the mission *Helping FTSE Russell refresh its Green revenue taxonomy + developing internal models and procedures to generate estimates when carbon data are missing (all scopes)*		

Mission name: *Design of the "ESG and fiduciary obligations" strategic roadmap for the OECD and France*	Provider: *BR and Grizzly*	Client name: UN *Principles for Responsible Investment*
Start date: *March 2018* End date*: July 2018*	Mission length: *4 months*	
Short description of the mission *Advisory mission to: (i) develop a road map to support the alignment of OECD policies on international interpretations of fiduciary duty and (ii) develop a strategic roadmap dedicated to France's ESG factors in investment policies.*		

Mission name: *Support for the development of an internal country risk rating model*	Provider: *BR*	Client name: *BPI France (French investment bank)*
Start date: January 2017 End date*: December 2017*	Mission length: *1 year, renewal in progress*	
Short description of the mission *Supporting BPI France in the development of an internal country risk rating model for 160 countries as part of its export insurance business.*		

Mission name: *Portfolio analysis of carbon/energy transition*	Provider: *BR and Grizzly*	Client name: *COVEA Finance (French mutual insurance company)*
Start date: January 2017 End date*: March 2017*	Mission length: *3 months*	
Short description of the mission *Report on carbon footprint analysis at 31/12/16 and evolution since 31/12/15 and presentation of the results.*		

Mission name: *Complete climate, ESG and financial portfolio analysis*	Provider: *BR and Grizzly*	Client name: *Garance MNRA (French mutual insurance company)*
Start date: *September 2016* End date*: January 2017*	Mission length: *3 months*	
Short description of the mission *Services for the achievement of structural risk measurement and dynamic carbon footprint for an investment portfolio*		

Mission name: *Assessment of the alignment of portfolios with climate goals and climate scenarios*	Provider: *BR*	Client name: *Agence française de développement (AFD - French development agency)*
Start date: *January 2016* End date*: December 2016*	Mission length: *1 year*	
Short description of the mission *Development of a framework for assessing project coherence with national climate strategies and NDCs.*		

Mission name: *Integration of Energy and Climate Risks into a new specific pillar for internal country risk assessment process*	Provider: *BR*	Client name: *Agence française de développement (AFD - French development agency)*
Start date: *January 2015* End date*: December 2017*	Mission length: *3 years*	
Short description of the mission *Development of a new pillar within AFD's country risk rating model that characterizes the energy-climate resilience of its intervention geographies. The internal model thus increased & serves as a reference for all economists in the department in assessing the credit risk of countries.*		

d. Would you be willing to serve as a fiduciary to the Systems if you performed the Investment Analysis Services?

No, neither Beyond Ratings nor Grizzly possess the adequate experience, expertise and legal status necessary to serve as fiduciary to the Systems.

e. What are your sources of income other than from clients? If you are a not-for-profit organization, please identify your donors.

Beyond Ratings

Beyond Ratings is a simplified joint-stock company. In addition to revenue for services provided to clients, our company is backed by a private equity fund (Newfund). Certain academic research projects are/have been supported by public grants, Climate KIC, and the French Development Agency (Agence française de développement).

Grizzly RI

Grizzly RI is a simplified joint-stock company launched by its founding members, all well-respected figures from the ESG/SRI world where they have been analysts, heads of research, and CEO for ESG rating agencies, corporates, brokers (BofA Merrill Lynch, Société Générale, Crédit Agricole, KeplerCheuvreux, CIC Securities, Veolia, Eiffage namely).

f. What is the estimated pricing structure and cost for provision of Investment Analysis Services?

We separate the following services:

- Carbon footprint including intensity, contribution, allocation effects, trajectories, 2DS compliance
- Modeling financial impacts on transition risks for companies (bottom up approach) using VAR-type approach
- Index, benchmark and portfolio services including reshuffling, strategies, backtesting

For carbon footprint we deliver our analysis on a portfolio basis notwhistanding the size of the portfolio or the benchmark (with exceptions if needed)

For modeling financial impacts we use, develop, and customize our model CREAM II that allows different parameters. The cost associated depends on the granularity, comprehensiveness, and various time horizons used for carbon value at risk. A minimum fee is required and the final cost would depend on the additional workload that could be generated by the size of the universe and the depth of the analysis.

The third service is considered as consulting and invoiced accordingly.

A similar pricing structure would apply to the analysis of public bond issuer portfolios.