



## Department of Energy

Bonneville Power Administration  
P.O. Box 3621  
Portland, Oregon 97208-3621

FREEDOM OF INFORMATION ACT PROGRAM

October 19, 2015

In reply refer to: FOIA #BPA-2015-01602-F

Rose Anderson  
McCullough Research  
6123 SE Reed College Place  
Portland, OR 97202

Dear Ms. Anderson:

This communication is a final response to your request for records, control number BPA-2015-1602-F, under the Freedom of Information Act (FOIA), (5 U.S.C. § 552). Your FOIA request was received in this office on July 9, 2015, and was formally acknowledged on July 16, 2015.

### **Request:**

“...any work papers associated with the informal study of discount theory and practice. Specifically, we would like to know the rates used by participating utilities.”

### **Response:**

We have communicated with the most knowledgeable BPA personnel and searched the electronic files of the BPA Analysis & Requirements and the BPA Budget Planning & Forecasting sections. Two records were gathered that might be responsive to your request. However, both records have been identified as containing “pre-decisional and deliberative” information. As such, BPA is releasing both records with redactions applied under the 5 U.S.C. § 552(b)(5) exemption (Exemption 5). We are releasing a total of 28 pages, with 7 pages containing redactions and 21 pages released in full.

### **Pre-Decisional and Deliberative:**

Exemption 5 protects “inter-agency or intra-agency memorandums or letters which would not be available by law to a party other than an agency in litigation with the agency” (5 U.S.C. § 552(b)(5)). In plain language, the exemption protects privileged documents. The deliberative process privilege protects the decision-making processes of government agencies. Records protected under this privilege must be (1) pre-decisional – created before the adoption of an agency policy or course of action, and (2) deliberative – making recommendations or expressing opinions on a legal or policy matter. In this case, we assert Exemption 5 to protect a theoretical discussion of future rate revisions and BPA’s interpretation of benchmarking information received from public utilities..

**No Discretionary Release:**

Records protected by Exemption 5's pre-decisional and deliberative privilege may be discretionarily released. We considered discretionary release in accord with the guidelines set forth in Attorney General Holder's March 19, 2009, FOIA Memorandum. Agencies may decline to discretionarily release material when they reasonably foresee that disclosure would harm an interest protected by the statutory exemption. The deliberative process privilege protects the decision-making processes of government agencies, and Exemption 5 encourages open, frank discussions on matters of policy and protects against public confusion and the premature disclosure of proposed policies. Disclosure of the protected draft material and internal discussions would have a chilling effect on future BPA discussions and decisions, and we decline to discretionarily release this material.

**Fees:**

There are no fees associated with this request.

**Appeal:**

You may seek administrative appeal pursuant to Department of Energy FOIA regulations at 10 C.F.R. § 1004.8. If you choose to appeal, you must do so in writing within 30 days, and include the following information:

- (1) The nature of your appeal - denial of records, partial denial of records, lack of responsive records, or denial of fee waiver;
- (2) Any legal authorities relied upon to support the appeal; and
- (3) A copy of this determination letter.

Clearly mark both your letter and envelope with the words "FOIA Appeal," and direct it to the following address:

Director, Office of Hearings and Appeals  
Department of Energy  
1000 Independence Avenue SW  
Washington DC 20585-1615

If you have any questions about this communication, please contact James King (CorSource Technology Group, Inc., assigned to BPA) at 503-230-7621.

Sincerely,



C. M. Frost  
Freedom of Information/Privacy Act Officer

# Discount Rate - Discussion

Agency Strategic Objective S10:

*\*The value of the existing federal power system is preserved for the region for the long run, while ensuring obligations to federal taxpayers are met*



# What is a Discount Rate?

- The discount rate is used to determine the present value of future cash flows of a project using the concept of the time value of money
  - All future cash flows are estimated, discounted, and then summed to give their present values
  - This discounted sum is expressed as the net of the present value of the costs and benefits
- When discounting cash flows that are risky or uncertain, a risk-adjusted discount rate should be used
  - The risk-adjusted discount rate is meant to measure the riskiness of a specific project and the uncertainty of its cash flows
  - Theoretically, it should measure project risk not company risk



# Role of Discount Rates in Capital Budgeting

- Therefore, a discount rate plays two roles in a capital budgeting evaluation
  - First, a risk-free discount rate illustrates the time value of money, such that benefits received earlier or cost incurred later are more valuable than benefits received later or costs brought forward
  - Second, a risk-adjusted discount rate is the means by which projects of different riskiness can be compared, since a project that is more certain to attain its expected benefits is more valuable than projects that are less certain to attain the same level of benefits



# Capital Budgeting - Interpreting the Results

- For capital budgeting decisions involving replacements, there are at least two alternatives to consider – replace now or replace later
  - The objective is to choose the alternative with the least cost, or if there are benefits associated with the project, the highest net present value (even if both alternatives produce negative net present values)
  - The magnitude or the sign of the present value is not as important as the relative relationship between the alternatives being evaluated



# Capital Budgeting - Interpreting the Results

(continued)

- For capital budgeting decisions involving expansions, the decision is whether to accept or reject the proposal
  - The objective is to choose proposals that, given the risks associated with the project, can recover their costs without putting significant pressure on rates
  - Acceptance or rejection of a particular proposal as a result of a positive or negative net present value may be a decision criterion, but it is not sufficient since other factors may be relevant to the decision
  - Using a discount rate that appropriately reflects the project's risk produces a clearer indication of the potential effects on future rates
    - Riskier projects need to produce higher returns in order to compensate for the fact that they may not achieve the expected benefits or may have higher costs



# Illustrative Example

- If two projects with the same capital investment costs and in the same pattern have different risks associated with the investment costs and benefits, then the use of a risk-adjusted discount rate will produce useful information about the effects on future rates
  - Product 1, which is offered as part of a regulated business, is mainly pre-sold as firm, and is produced with a high degree of certainty as a result of the investment
    - Related investments should be evaluated with a relatively low discount rate because the effect on future rates is fairly certain
  - Product 2, which is offered as part of an unregulated business, has a price that is subject to market volatility, and has a high degree of uncertainty as to whether the investment will produce more product
    - Related investments should be evaluated with a relatively high discount rate because the effect on future rates is very uncertain



# Discount Rates for a Public Entity

- There are three established views as to what discount rate to use for public entities
  - One view states that there is no analytical basis for setting a discount rate since the state is an organic entity, in other words, it is not equal to the sum of its parts, and as such the discount rate should be made as a policy decision with possible input from citizens through the ballot box
    - Analysis: This approach is not transparent and it may not necessarily be viewed as objective
  - Another view is that for projects for which the risks may be spread over the body politic the discount rate should only reflect the time value of money, not risk
    - Analysis: This approach using just the riskless rate may only work for true public goods, for which benefits and costs are not divisible or assignable, and are funded from a broad tax base
  - The third view is that all projects which recover their costs when discounted for time and risk should be accepted regardless of the nature of the project's sponsor (that is a public or private entity)
    - Analysis: Using the market rate for comparable risky projects minimizes the tendency to over-invest in (or over spend on) public projects, which would otherwise displace other investments with higher expected returns after discounting for risk



# Applicability to BPA

- The recent 9<sup>th</sup> Circuit Court decision on the DSI rates provides a view of which theory has applicability to BPA
  - “[T]he rule is that Congress intended BPA to operate as a business selling power for profit, not as a charitable institution distributing ‘benefits’”
  - Profits are simply the amount necessary to be reasonably compensated for risks taken
  - Any profits actually earned would be available to mitigate future rate increases
- An important value for BPA of applying a well-constructed discount rate is the transparency it provides to senior management about the potential business impacts, such as future rate effects



# Net Present Value - Applicability to BPA

- Being business-like does not mean that BPA must accept only projects that produce positive net present values using market-based discount rates
  - Even for businesses a positive or negative net present value is not dispositive
    - Businesses accept projects with negative net present value when non-quantifiable benefits are produced, such as with investing in amenities for employees
    - Businesses also accept projects with negative net present values when they believe the investment is equivalent to an option that may produce future benefits
      - One example is Disney, which accepted a large negative net present value for a capital investment in Mexico, with the knowledge that the project could also provide a platform for future investments in the rest of Latin America
  - Therefore, if there are identified business reasons that directly link BPA strategies to projects, even if they may produce financial losses, BPA, as would any business, is able to accept those projects



# Practical Limitations

- There are practical limitations on aligning risk with the appropriate discount rates
  - The private sector readily acknowledges that there is a significant gap between theory and practice in the application of discount rates to projects of similar risk
  - So while BPA may not produce precise results, the valuation of projects should produce a relational array that ranks projects by their ability to recover costs given the risks
- Using discount rates developed by analyzing proxy businesses is an approach that is well accepted in industry
- Many times non-quantifiable factors are as, or even more, important than the financial considerations of a capital investment decision



# Capital Investment Decisions - Other Factors

- BPA often sees project proposals that are not justified solely on financial merits. Other decision criteria may include:
  - Environmental
  - Safety
  - System Reliability
  - Efficiency
  - Legal/Regulatory
  - Political
- Any of these factors could supersede the requirement for selecting a positive, or the most positive NPV
  - For example, in a choice between two viable options with positive NPVs, BPA could select the less positive option if it offered stronger Environmental or Safety benefits
    - Often, these non-financial benefits are difficult to quantify and are not reflected in the NPV



# Negative NPV

- BPA's main criterion pertaining to project Net Present Values is to choose the **Least Cost** of the viable options - this could be either the most positive or least negative NPV
- Projects that produce no or limited benefits will by their very nature have Net Present Values that are negative
- As a result, BPA often sees project proposals in which all viable options have a negative NPV.
- In such cases, the other factors previously stated may supersede the requirement to have a positive NPV and the *Least Cost Option* is selected from the viable alternatives based on the consideration of the other factors



# Negative NPV Examples

- Some examples of negative NPV projects BPA has approved under the new process (and the reason for selecting the project):

## Transmission:

- 500 kV Spare Transformer Procurement (Reliability)
- NERC CIP-005 Compliance Project (Legal/Regulatory)
- Access Roads (Reliability & Environmental)
- Libby-Troy 115kv Line Rebuild (Reliability)



# Negative NPV Examples

## Power:

- The Dalles Station Service (Reliability)
- TPP Roof Rehabilitation (Reliability/Safety)

## IT:

- RODS Replacement (Reliability)

## Facilities:

- Headquarters Business Critical Upgrades Project (Reliability)



# Real Options Analysis

- A project with a negative NPV might be selected because of its positive impact on future investment decisions; the selection of this project creates an option
- The analysis involved with this selection is called **real options analysis** and often involves future expansion
  - Typically, the value and timing of the real option is uncertain and estimating either can be problematic
  - If future investment options are part of the project justification, the NPV of the project will suffer if those benefits cannot be reasonably described



# Real Options Analysis

- Firms use real options analysis to rationalize selecting investments that have negative net present values but may provide opportunities in the future
- Real options are at the basis of the argument that investments should be made for strategic considerations
- A disciplined approach is necessary for optimal use of real options analysis



(b) (5)

- (b) (5)
- Ibbotson's last updated its analysis in March 2008
- (b) (5)

	(b) (5)	
(b) (5)		



# Discount Rate Benchmarking Update

Agency Strategic Objective S10:

*\*The value of the existing federal power system is preserved for the region for the long run, while ensuring obligations to federal taxpayers are met*

PRE-DECISIONAL / INTERNAL USE ONLY

*This information has NOT been made publicly available by BPA and contains BPA-approved Agency Financial Information.*

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# Background

- Investing in capital projects involves risk
- Being transparent about that risk helps decision makers make better plans
- Measuring risk can be somewhat subjective, but there are resources available that can help
- Most of these resources are better at measuring risk at a macro level, that is for an entire organization or a single industry
- Measuring risk at a project level can be the most difficult
- Almost all the publicly-owned utilities we had an opportunity to contact are struggling with how best to measure this risk and achieve their missions
- Some have settled on a macro level of risk measurement that involves looking outside the organization, but acknowledged that they are not completely satisfied in their solutions



## Methodology

- In the October FMC there was interest expressed in researching what discount rates are being used at other public utilities
- We compiled a list of potential contacts from publicly owned utilities across the USA and Canada
- Using publicly available material we researched these companies and then called to see if they would discuss their discount rates and capital project evaluation techniques. We had two main objectives:
  1. To ascertain, if possible, what discount rate they use;
  2. To understand both the theory and methodology used in the creation and application of discount rates.
- Some contacts were more willing than others to share details but overall we were able to gather information from the following eight companies:
  - TVA, New York Power Authority (NYPA), WAPA, Grant County PUD, BC Hydro, BC Transmission, Manitoba Hydro, and Sacramento Municipal Utility District (SMUD)



## Summary Table of Benchmarking

\*The following results show a wide range of methodology and sophistication. The approach to identifying and accounting for project risk varies and there is no agreement among the sample as to an appropriate solution.



# Summary Table

Organization	Discounted Cash Flows Y/N	Alternative to Discounted Cash Flows	Theory	Results	Discount Rates *estimated in most cases
Bonneville Power Administration (BPA)	Y		BPA uses separate discount rates for different classes of investments (Transmission, Power, Corporate). These rates are meant to measure BPA's marginal cost of debt plus a designated risk premium depending on the class of investment. Since BPA is completely debt financed there can be no equity portion of a Weighted Average Cost of Capital calculation.	Discount Rate = Marginal Cost of Debt plus a risk premium. The cost of debt is the rate of outstanding Treasury debt. The risk premium is calculated by consulting Ibbotson data for the Weighted Average Cost of Capital of comparable companies. After backing out BPA's cost of debt, the remainder is an implicit risk premium for that industry. Since BPA has no required return on equity and the cost of Treasury debt does not reflect project risk, researched data from Ibbotson is the best way to determine the risk associated with these types of investments.	Power = 13% Transmission = 9% Corporate = 11%



# Summary Table

Organization	Discounted Cash Flows Y/N	Alternative to Discounted Cash Flows	Theory	Results	Discount Rates *estimated in most cases
Tennessee Valley Authority (TVA)	(b)(5)		(b)(5)	(b)(5)	(b)(5)
New York Power Authority (NYPA)	(b)(5)		(b)(5)	(b)(5)	(b)(5)



# Summary Table

Organization	Discounted Cash Flows Y/N	Alternative to Discounted Cash Flows	Theory	Results	Discount Rates *estimated in most cases
BC Hydro	(b)(5)			(b)(5)	(b)(5)
BC Transmission Corporation	(b)(5)		(b)(5)	(b)(5)	(b)(5)



# Summary Table

Organization	Discounted Cash Flows Y/N	Alternative to Discounted Cash Flows	Theory	Results	Discount Rates *estimated in most cases
Sacramento Municipal Utility District (SMUD)	(b)(5)		(b)(5)	(b)(5)	(b)(5)
Manitoba Hydro	(b)(5)		(b)(5)	(b)(5)	(b)(5)



# Summary Table

Organization	Discounted Cash Flows Y/N	Alternative to Discounted Cash Flows	Theory	Results	Discount Rates *estimated in most cases
Western Area Power Administration (WAPA)	■	■	(b)(5)	■	■
Grant County PUD	■	■	(b)(5)	■	■



## Observations

- While it was interesting to learn about how other publicly owned utilities make investment decisions, there is no consensus on the best approach
- (b) (5)
- (b) (5)
- Almost all utilities have to select, due to constrained resources, a limited set of projects from a pool of almost unlimited need
- Each utility has to make that selection based on decision criteria that meets its own needs



## Next Steps

- Perform further research on the theory and application of discount rates for governmental entities
- Evaluate the social benefits BPA provides in different investment scenarios
- Report back in January

