Protecting Profits with Weather Coverage
New Solutions for Hydroelectric Companies & Water Districts

In an increasingly volatile economy and changing climate, hydroelectric companies and water districts need new ways to stabilize revenues and protect their budgets. This white paper examines weather coverage as a solution - highlighting sample coverage options as well as case studies.

WeatherBill, Inc.
420 Bryant Street
San Francisco, CA 94107
888-924-7475
www.weatherbill.com
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INTRODUCTION

Hydroelectric companies and water districts are confronting new economic and climate challenges. These challenges require new financial solutions to stabilize revenue, support expansion and protect budgets during droughts and unseasonably warm winters. Weather coverage is a new weather risk management tool that can be used alongside traditional risk management and insurance products to protect revenue, control costs, and free up cash reserves for more efficient debt and investment management.

From drought to premature snowpack melt, water district managers are confronted with many of the same budget management and revenue stabilization weather risks that hydroelectric professionals face. Weather coverage can reduce the financial impact of warm temperatures and insufficient rain or snow. Although utilities recognize the risk of property damage or loss requires insurance, many aren’t aware they can purchase protection for their greatest asset, water.

This report is written for risk managers and insurance providers in the hydroelectric and water district fields. The objective is to explain how weather coverage works and to provide examples of new ways to protect revenues and cash reserves and to control expenses from dry and warm weather.
(A VERY QUICK) OVERVIEW OF GLOBAL HYDROPOWER

One sixth of the world’s power is generated from hydroelectricity (Chart 1), according to the International Hydropower Association, and Canada is the world’s largest producer. Hydropower is the most important source of electricity in Canada, representing over 60% of the power produced, according to the Canadian Hydropower Association.

Hydropower accounted for 6% of total U.S. electricity generation and 71% of renewable energy sources in 2007, according to the Energy Information Administration (EIA). The EIA reports that more than one half of the total U.S. hydroelectric capacity for electricity generation is concentrated in three States (Washington, California and Oregon) with approximately 27% in Washington. With the White House preparing to invest heavily in renewable alternative energy sources and the public demanding to remove U.S. dependency on foreign oil, the hydroelectric industry is poised for strong growth, both in terms of output and regional expansion.
(A VERY SHORT) HISTORY OF WEATHER COVERAGE

Weather coverage traces its roots to electric companies trying to make their profits more predictable, even when the weather wasn't. The first weather coverage was created in Milwaukee for the winter of 1997-1998. Large financial risk takers, in exchange for a premium, would pay for “bad” weather – either mild winters when consumers weren't turning up their heat or cool summers when they weren’t using their air conditioning. When weather stations indicated mild temperatures, the energy companies were paid by the financial risk takers and met their profit expectations. If the “bad” weather didn't happen, the financial risk takers kept the premium, and the energy companies had the peace of mind they would meet their profit expectations.

These temperature contracts have traded on the Chicago Mercantile Exchange (CME) since 1999, but offer very limited customization and are available only in major metropolitan areas like Atlanta, New York and Philadelphia. Precipitation coverage was eventually added, but even in 2004 it was described as being “in its infancy” by The Journal of Alternative Investments.¹ These standardized CME contracts couldn’t help businesses in remote areas or small businesses protect against the weather events that are important to them.

Fortunately, the weather market continues to expand and accommodate all weather-sensitive businesses. The market experienced robust growth in 2007-2008, with the number of contracts traded increasing 35%, according to the Weather Risk Management Association (WRMA). Today there are more financial companies willing to take on weather risk and better data available for modeling all kinds of weather. Weather coverage is accessible to weather-sensitive businesses large and small, in urban and rural locations, for all kinds of weather. Municipalities, outdoor concerts, professional sports teams, ski resorts, golf tournaments, car washes, agricultural producers and more rely on weather coverage to protect profits. Even the complex weather coverage needs of hydro companies and water districts can now be met.

WEATHER COVERAGE & INSURANCE

Weather coverage is an important addition to traditional risk management tools, designed to cover unprotected weather risk and fill gaps left by traditional insurance. Similar to insurance, weather coverage pays for an anticipated loss and can be purchased from insurance agents and brokers. However, it is not insurance. There are two main ways weather coverage differs from insurance:

Payout is Based on Weather, Not Loss.
While insurance pays out based on demonstrated loss and human assessment of damages, weather coverage pays based on a measurable weather event, such as an inch of rain, which eliminates claims and waiting for payment. Weather coverage can be created for rain, drought, heat, cold, or snow. Weather measurements are taken at secure weather stations near a business’s desired coverage location (or locations). These stations are typically operated by the government and the results are audited by an independent third party. If the bad weather stipulated in the coverage contract happens, the business gets paid – it’s that simple.

It is important to note that since weather coverage payouts are based on weather measurements, the amount of payout may be more or less than actual losses. Typically, the weather station providing the settlement data is not located directly on the business property. This may result in weather measurements that are different than the weather experienced on site.

No Underwriting & Deductibles are Optional.
Since weather coverage pays out based on weather measurements, it requires no underwriting. This expedites the quote process, allowing fully customized quotes to be completed and purchased in minutes. Coverage can be customized based on type of weather, location, amount of coverage, and time period. Weather-sensitive businesses of any size and income level can participate.
HYDRO & WATER DISTRICT WEATHER COVERAGE ADVANCEMENTS

While the complex weather coverage needs of hydro companies and water districts have historically been challenging to the weather market, data, technology and analytical advancements are improving the effectiveness and affordability of coverage. For example, there are now thousands of coverage locations providing a wealth of data, even in rural areas. Many of these locations can provide a number of different measurements, including stream flow, snowfall, water content of snow, temperature and rainfall. Additionally, technology advancements have made accumulating and correlating multiple data points and massive amounts of data feasible. What was once too time-consuming to be feasible, can now be automated to create combined data sets for optimal correlations.

Weather coverage options have also advanced to better meet the needs of the hydro industry. Costless collars (a put and call combination), for example, have made coverage more affordable and less risky, by eliminating large upfront premiums and downside risk. Since protection against lower hydro production is more important than the benefits of increased production, collars provide an affordable solution with minimal budget impact. Producers can protect against low rainfall without paying a premium, while financial risk takers benefit from seasons with heavy rain. Hydro companies and water districts also benefit from predictable revenue streams and costs from year to year.

Education and awareness have also been critical to the market’s advancement. Hydro and water districts can only benefit from weather coverage if they are aware of the various coverage options and their effectiveness. The goal of the following examples and case studies to follow is to highlight the variety of coverage options available to the industry.
HYDRO & WATER DISTRICT WEATHER COVERAGE SOLUTIONS

Weather coverage is an important financial strategy for stabilizing revenue when rain or snow are unseasonably low, controlling costs when faced with drought or extreme rainfall, and managing cash reserves to optimize debt and investment management.

Revenue Stabilization Solutions

Lack of precipitation means a shortage of power supply, which leads to revenue loss. Unseasonably cool weather in summer can also reduce electricity demand and income. Weather coverage can be customized to protect a month, a season or multiple years from revenue loss due to extended drought, warm winter or cool summer temperatures or water rationing, and can be priced to fit any budget.

CASE STUDY: Multi-Year Drought Protection

**Problem**: The Australian company Southern Hydroelectric Power (SHP) experienced several years of rainfall significantly below historical average. In 2003, the company needed to stabilize cash flow and revenue by protecting the businesses from continued drought.

**Solution**: SHP purchased three-year weather coverage to protect 1/3 of its 600MW of generating assets. To control costs, SHP created a precipitation collar that would pay SHP if rainfall continued to be lower than average (the specified threshold). If rainfall was above the specified threshold, SHP would pay the financial risk taker. Limiting the range of negative or positive outcomes resulted in affordable coverage, even during drought. Darryl Flukes, the General Manager of Energy Trading at SHP, stated that the coverage “further protects us from production variability inherent in hydro generation”. SHP was also able to use a nearby weather station (not in a major city) to eliminate basis risk.

EXAMPLE: Mandatory Water Rationing Coverage

**Problem**: A California water district needs to protect revenue disrupted by mandatory water rationing when water levels are low. Pumping expenses can also increase when water levels are low enough to trigger rationing.

**Solution**: The district purchased stream flow coverage (an indicator of likely rationing) that pays when water flows are extremely low and likely to trigger rationing. Payouts supplement revenue loss if rationing is mandated and compensate for the additional pumping.
Cost Control Solutions
Reduced power output not only leads to revenue loss, but often increases generation expenses or requires purchasing power at unfavorable prices from other generators to make up the supply shortage. Additionally, although unseasonably warm weather in summer can increase demand, sharp demand spikes can also drive up costs. Weather coverage helps keep the bottom line intact when insufficient rain or unseasonable temperatures drive up generation costs, increase the need to purchase electricity or jeopardize fixed cost recovery.

CASE STUDY: Coverage for Increased Electricity Purchases

**Problem:** Sacramento Municipal Utility District (SMUD) generates half of its power and buys the rest. The combination of below average precipitation that reduces power output with increased purchasing and purchase prices prevents self-insuring in years when both occur simultaneously.

**Solution:** In 2000, SMUD created a five-year contract that would pay up to $20 million when the watershed of the upper American River resulted in less water flow through the utility’s hydro plants. The lower the flow, the higher the payout to help offset power purchase costs. A $50 million cap and a collar, that paid the risk taker when precipitation was abundant, kept costs within budget.

CASE STUDY: Fixed Cost Protection

**Problem:** Malana Power Company (MCP) in Mumbai had significant fixed costs in the form or interest and loan repayments, in addition to day-to-day operating expenses. Generation needs to be at least 90% of capacity to breakeven.

**Solution:** In 2003, MPC created the first reinsurance-based weather coverage that would pay if precipitation caused power generation to fall below 90%. The coverage has been so successful that many bankers in India now require proof of weather coverage for hydropower project loans and provide better interest rates.
Cash Reserve Management Solutions

The unpredictable nature of precipitation leads to unpredictable cash flows that may not always allow for optimal reserves or even cover fixed and necessary discretionary costs. Weather coverage can smooth cash flow variability to ensure adequate reserves for debt and investment management, capital improvements and growth and prevent unnecessary reserves for cash flow variability.

EXAMPLE: Capital Improvement Protection

**Problem:** A Washington hydro company needs to upgrade several outdated facilities to increase power generation and efficiency to current competitive levels. A few back-to-back dry years has stressed budgets and limited increases in cash reserves. Continued drought would require reserve funds to cover operating costs.

**Solution:** The Company creates two year rain coverage that pays for below average precipitation. Payout amounts are designed to cover any revenue shortfalls or cost increases beyond what’s budgeted, to ensure reserve funds will not be necessary to cover operating expenses. Facility upgrades can proceed without risk of cash shortfalls or unnecessary lending expense.

EXAMPLE: Growth Cash Reserve Coverage

**Problem:** A Canadian hydro company is planning to acquire several smaller facilities, followed by aggressive expansion of the acquired generators. The growth plan requires that available investment cash remain constant for the next five years or additional reserve funding is available to cover revenue shortfalls.

**Solution:** The Company purchases a five-year stream flow contract to reinsure the current reserve fund. Payout is designed to protect revenue at 80% if annual precipitation drops below the average of the last five years – the company can self-insure the remaining 20% to minimize cost.
ADDITIONAL WATER MANAGEMENT SOLUTIONS

Storm Coverage
Unseasonable and heavy rain is relatively frequent, not just in the United States’ hurricane-prone Southeast, but all across the country. Heavy rain can lead to flooded roads and overwhelmed storm water systems. The concentration of rain, rather than seasonal levels, damage property and sewage systems and drive up costs. Significant rainfall overwhelms storm water systems, leading to flooding, pollution, and costly fines and cleanup efforts.

EXAMPLE: Storm Water Management Protection

**Problem**: Early Spring floods in 2008 in Cedar Rapids, Iowa damaged municipal sewage systems and flooding costs overwhelmed local city budgets. Clean up and repair costs were estimated at $1 billion. Although federal funding covered much of the cost, the city budget was not sufficient.

**Solution**: The Cedar Rapids water district can purchase weather coverage that pays when heavy amounts of rain fall during a short time. For example, if 5” of rain fell in Cedar Rapids during one weekend in April (the monthly average is 3 inches). Payout is designed to cover the gap between disaster relief and actual costs.

Drought Coverage
For every city that’s hit with heavy rains, there’s one that thirsts for water. Drought has hit large areas of the country and has become a persistent, major drain on municipality budgets. Inadequate rain increases the difficulty of maintaining water quality, since pollutants like chemicals and bacteria become concentrated in smaller volumes of water. Drought also necessitates unplanned and expensive water purchasing efforts.

EXAMPLE: Drought Cost Control Coverage

**Problem**: A prolonged drought in 2007 forced Greensboro, NC, to spend more than 5 times their budget to purchase water from nearby cities. Greensboro spent $20,000/day, up from the usual $3,000 to $4,000. Drought costs were compounded by the large area that was impacted, making water more expensive to purchase.

**Solution**: Greensboro can purchase weather coverage that pays when rainfall is significantly less than the spring seasonal average of 14 inches, esp. during years following drought years. Payout can be designed to cover both increased water purchasing and likely higher prices due to impact to surrounding areas.
CONCLUSION

We’ve demonstrated how weather coverage works to protect revenues and to control expenses in the hydroelectric and water district fields. Increasingly uncertain economic and climate conditions will require new financial solutions to stabilize revenue and cash flows during droughts and unseasonably warm winters. Weather coverage is a financial solution that can be used alongside traditional risk management and insurance products to support continued profitability and expansion. Weather coverage can also free up cash reserves for more efficient use in debt and investment management.

Weather coverage can reduce the financial impact of warm temperatures and insufficient rain or snow to protect the bottom line of hydroelectric providers and water districts. Unpredictable revenues and expenses can be a thing of the past. Although weather will remain unpredictable, hydroelectric and water district profit doesn’t have to be.
ABOUT WEATHERBILL

WeatherBill is the first service to provide affordable and easy-to-use weather coverage, to protect revenue and control costs, for the millions of businesses impacted by the weather. We distribute our weather coverage through insurance agents and brokers, industry specialists, such as agribusiness vendors servicing growers, and direct to businesses of all types and sizes.

WeatherBill’s unique platform makes weather coverage accessible, affordable, and transparent. Users can customize, price, and buy coverage online or by phone in a matter of minutes at www.weatherbill.com. By streamlining customization and pricing, WeatherBill can cost-effectively provide coverage from $1.00 to millions of dollars. WeatherBill also provides historic payout charts so buyers can find the best value for the best price.

WeatherBill coverage can be created for snow and rain, drought, heat or cold. Coverage is easily customized based on four elements outlined in a weather contract:

- Location – Over 6,000 weather stations in seven countries (more locations available by phone)
- Coverage Period – Hourly, day, weekend, season, year, etc.
- Type of Weather that Triggers Payment – Rain, drought, heat, cold, snow
- Payout Amount - $1 to $100 million or more

Unlike insurance, WeatherBill payout is based on weather measurements, not human assessment of loss. Once the defined weather happens, customers automatically receive a check for the payout amount in a few business days. There’s no proof of loss, claims process, or waiting for payment. Deductibles are optional.

Coverage can be created online or over the phone in a matter of minutes and implemented as few as four days before the desired coverage period. WeatherBill’s financial risk partner, Nephila Capital Ltd., is one of the world's largest and most respected weather risk and catastrophe reinsurance fund managers, with over $2 billion in capital. In order to make sure that any payment due to our clients is available, in full, at any time, Nephila fully collateralizes each contract WeatherBill sells with cash held in trust at the Bank of New York.