

What is the Project all about?

The Project diverts a portion of the creek's water through a turbine, generating about 33 GWh annually – enough to energize 3,000 homes. All diverted water is returned to the creek – clean and unchanged. All energy generated is sold to BC Hydro under the Standing Offer Program.

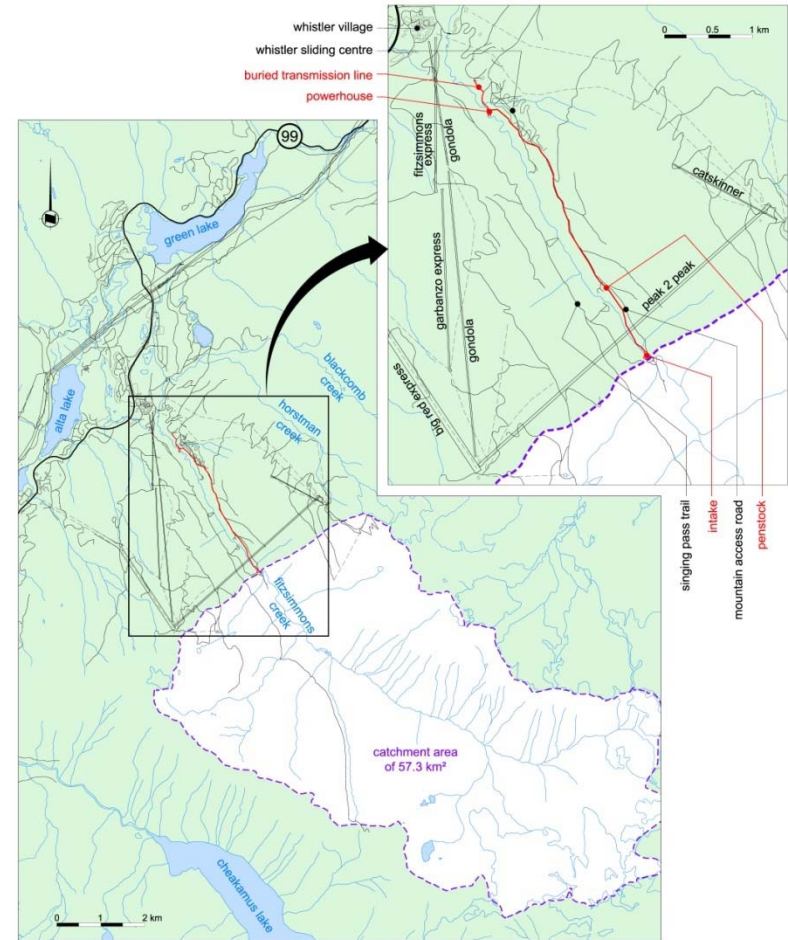
| Parameter | Description |
|----------------------------|---|
| Name of Owner | Fitzsimmons Creek Hydro Limited Partnership |
| Project Type | Run-of-River, "Green Power" |
| Rated Capacity of Plant | 7.9 MW |
| Estimated Energy Yield | 33 GWh per year |
| Project Location | Fitzsimmons Creek |
| Start of Construction | July 2008 |
| Commercial Operation Date | January 26, 2010 |
| Mean Annual Flow in Creek | 2.4 m ³ /s |
| Maximum Design Flow | 4.0 m ³ /s |
| Gross Head | 246 m |
| Watershed Area (to intake) | 57.3 km ² |
| Penstock | 3.4 km of penstock (1.4 km of 1.2 m diameter steel and 2 km of 1.4 m diameter HDPE) |
| Turbine | One, six-jet, vertical Pelton turbine |
| Switchyard (indoor) | 25 kV |
| Transmission Line | 430 m buried 25 kV transmission line |
| Point of Interconnection | BC Hydro feeder 25F64 RBW |
| Access | Glacier Lane and Mountain Access Road |

Net Environmental Benefits

- Hydroelectric energy generation offsets potential greenhouse gas production from carbon based power plants (i.e., coal and natural gas).
- The Project is emissions free.

Unique Features of the Project

- Blackcomb Skiing Enterprises LP is a strategic partner of the Project.
- The tailrace discharges water into Blackcomb's snowmaking pond before returning to Fitzsimmons Creek.
- The penstock is located adjacent to the Whistler Sliding Centre, a 2010 Olympic venue.
- The new Peak to Peak Gondola travels over the Project area, with views of the intake and penstock right-of-way.
- Zip Trek offers a zip line adventure that passes over the Project's powerhouse.



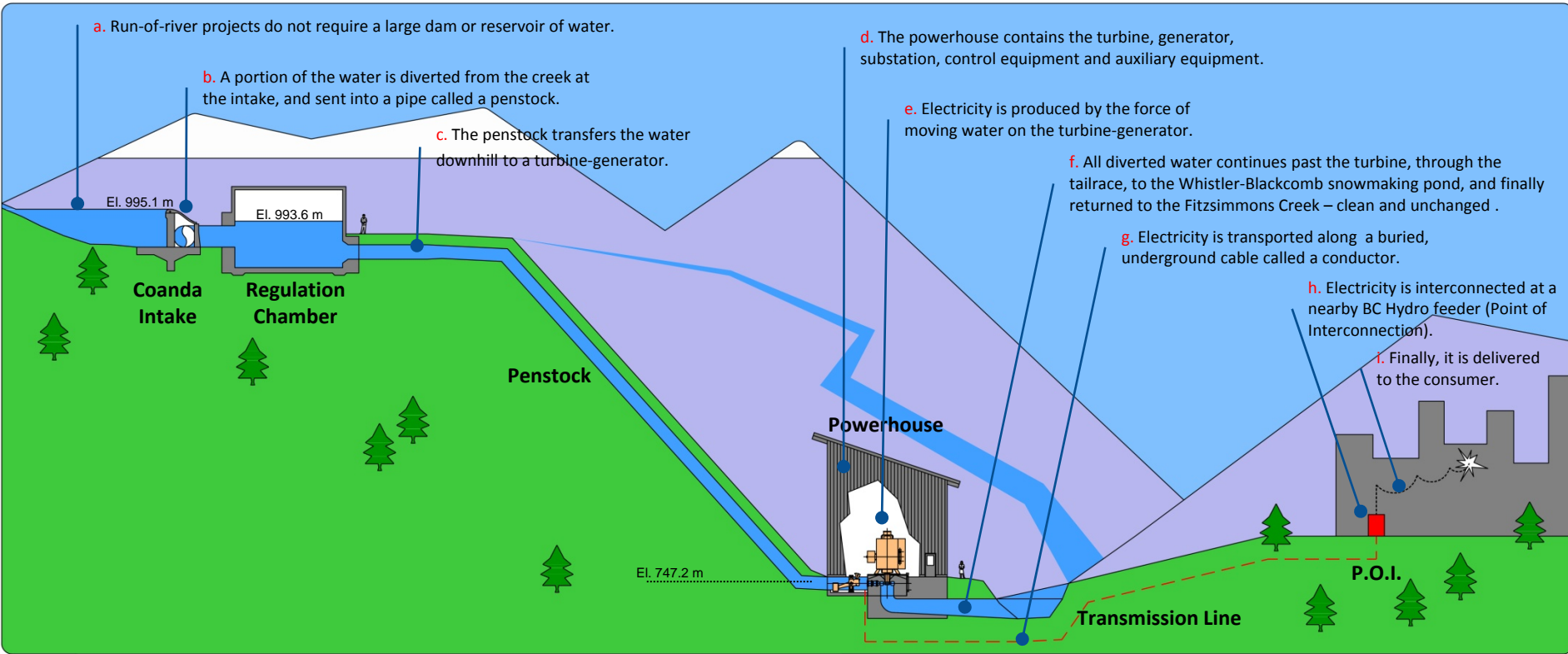
The Bottom Line

| Description | Cost (2009 \$CDN) |
|--------------------------------|-------------------|
| Total Capital Cost | \$33,162,000 |
| Total Construction Cost | \$22,797,000 |
| Annual Estimated Gross Revenue | \$ 2,800,000 |



Hydroelectric Power - Why is it renewable?

The rise (evaporation) and fall (precipitation) of water is part of a continuous natural cycle called the Water Cycle. Hydroelectric plants capture the energy of moving water to generate electricity. More than 90% of British Columbia's electricity is produced by hydroelectric means.



1. Powerhouse construction started in October 2008. Site excavation.

2. Rebar for turbine-generator floor.

3. Building footings and concrete slab.

4. Turbine-generator housing.

5. Construct steel building frame.

6. Install siding, roof, and windows.



How does water produce electricity?

The Pelton wheel is an impulse machine invented by Lester Allan Pelton in the 1870s and uses the principle of Newton's second law to extract energy from a jet of fluid. Pelton turbines are suited to high head (i.e., the difference between the water level at the intake and the turbine elevation) and low flow applications. The Project has a gross head of 246.4 m and maximum design flow of 4 m³/s.

a. Gravitational potential energy from the water is converted into kinetic energy as it flows down the penstock.

b. The turbine inlet safety valve can shut off flow to the turbine.

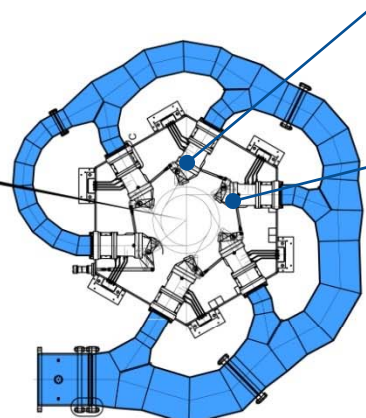
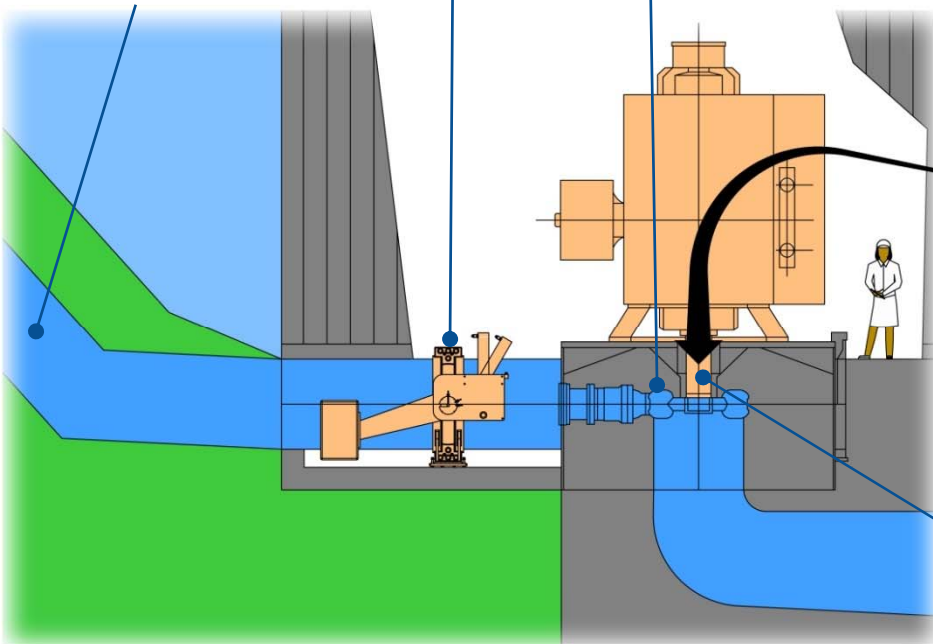
c. A Pelton turbine at the end of the penstock is turned by the moving water. The turbine consists of a runner with a number of buckets.

d. Six water jets impinge water on the buckets. Flow from the jets and, hence, power output is adjusted by a needle valve that increases or decreases the nozzle opening.

e. During rapid power reductions (e.g., complete loss of connected-load), the wheel tends to accelerate. Deflectors are used for diverting the flow harmlessly to the tailrace.

f. The shaft from the turbine goes up into the generator, which, in turn, transforms the kinetic energy into electrical energy.

In 1831, Michael Faraday discovered that moving a magnet past a conductor causes electricity to flow. Electromagnets in large generators are created by circulating direct current through loops of wire wound around stacks of magnetic steel laminations. The electromagnets are mounted on the perimeter of a rotor, which is attached to the turbine shaft. When the rotor turns, it causes the electromagnets to move past conductors mounted in the stator, which causes electricity to flow.



Plan View of Turbine Manifold

7. Install Overhead Crane.

8. Turbine inlet manifold.

9. Concrete around manifold.

10. Install generator.

11. Turbine (runner and buckets).

12. Install substation and auxiliary equipment.



September 22, 2009



October 1, 2009



October 23, 2009



November 3, 2009



December 1, 2009



November 17, 2009

How does the water get to the Powerhouse?

A 3.4 km long pipe called a Penstock conveys the diverted creek flow from the Intake to the Powerhouse.

The Penstock consists of:

Low Pressure Conduit – up to 10 m of pressure head.

- 2 km of 1.4 m diameter HDPE at a 0.5% gradient.
- Pipe lengths were fused together and buried.
- No thrust blocks.

High Pressure Penstock – up to 246 m of pressure head.

- 1.4 km of 1.2 m diameter steel at a 5 to 62% gradient.
- Pipe lengths were lined, coated, welded and buried.
- Thrust blocks at all horizontal and vertical changes in direction.

The Penstock is always full!

- Flow to the Powerhouse is controlled by six needle valves at the end of the penstock, which automatically increase or decrease the six nozzle openings to the turbine based on an operating water level in the Regulation Chamber at the Intake.

Penstock Route During Construction, Viewed from Peak-to-Peak Gondola.



1. Penstock construction started in April 2009. Clear right of way.

2. Excavate trench.

3. Steel pipe is lined, coated, placed and welded.

4. Fuse HDPE pipe lengths and place in trench.

5. Grout on the steepest section down to the powerhouse.

6. Backfill trench and seed.



What am I looking at? The Coanda Intake Screen and Spillway

A portion of the water is diverted from the creek at the Intake, and conveyed into a pipe called a Penstock. The Intake consists of a Coanda screen, a conveyance pipe, a regulation chamber, and a spillway.

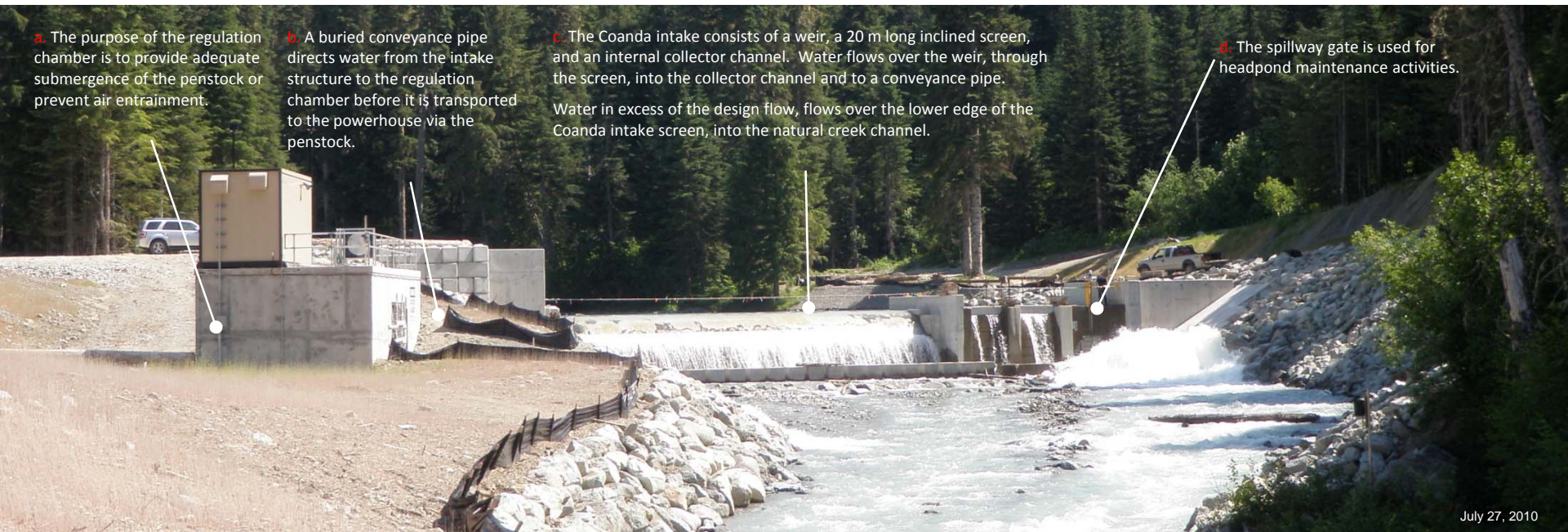
The mean annual flow in Fitzsimmons Creek is 2.4 m³/s. The intake structure is designed to divert a maximum flow of 4 m³/s and maintains a minimum instream flow release in accordance with the Conditional Water Licence issued by Ministry of Environment and the Fisheries Act Authorization. Run-of-river projects do not require a large dam or reservoir of impounded water.

a. The purpose of the regulation chamber is to provide adequate submergence of the penstock or prevent air entrainment.

b. A buried conveyance pipe directs water from the intake structure to the regulation chamber before it is transported to the powerhouse via the penstock.

c. The Coanda intake consists of a weir, a 20 m long inclined screen, and an internal collector channel. Water flows over the weir, through the screen, into the collector channel and to a conveyance pipe. Water in excess of the design flow, flows over the lower edge of the Coanda intake screen, into the natural creek channel.

d. The spillway gate is used for headpond maintenance activities.



July 27, 2010

1. Intake construction started in October 2008. Excavate foundation.

2. Pour spillway concrete.

3. Construct Coanda screen.

4. Construct regulation chamber.

5. Completed Coanda screen and spillway.

6. Grade and seed landscape. Intake construction completed September 2009.



September 4, 2008



October 8, 2008



August 10, 2009



August 25, 2009



October 5, 2009



October 5, 2009