ENERGY REVOLUTION Services

Professional Experience Summary

MICHAEL PULLINGER, M.SC., P.ENG.

Specialties

Planning and Development | Identification of opportunities, planning studies, feasibility studies, audits, concept design, due diligence

Computational Modelling | Computational fluid dynamics, hydraulic transient analysis, energy modelling, thermal modelling

Project Engineering | Detailed design, specifications, procurement, construction oversight, quality assurance, commissioning and testing, project management

Industry Sector Experience

Renewable Energy | hydropower, remote communities, run-of-river, pumped-storage, wind, solar, biogas

Energy Efficiency | buildings, industrial facilities, heating, ventilation, cooling, energy recovery

Community Experience

BCSEA| Board of Directors | *2012-16* | President (*2012 – 2014*) | Vice President (*2015 – 2016*)

BCIT | Guest Lecturer | *2012-15* | Environmental Engineering – Run of River Hydroelectric Power, Mechanical and Electrical Systems

APEGBC | Div. of Energy Efficiency & Renewable Energy | *2012-13* | Government and Policy Chairperson

Michael Pullinger is a mechanical and electrical engineer who specialises in sustainable energy, providing services as an independent consultant. He has a decade of experience with renewable energy and energy efficiency as an engineer, project manager and researcher in the power generation, renewable energy, building and mining industries.

Michael has worked on hydropower, biogas, solar, wind, green building, thermal, and pump station projects. He draws on his multi-disciplinary background to quickly develop innovative solutions while adapting to changing needs. Michael is a past Director and President of the BC Sustainable Energy Association and has worked on projects in Australia, Brazil, Canada, China, Costa Rica, Guatemala, Mexico and the USA.

Employment History

Energy Revolution Services | 2016 – Current | Senior Engineer and Director
- Director and Lead Engineer at independent consulting engineering firm.
- Clients include renewable energy and energy efficiency developers, owners, operators.

Knight Piésold, Vancouver | 2011 – 2016 | Senior Engineer (Project Engineer to 2014)
- Led screening and identification studies, concept design, site investigations, due diligence and feasibility of hydropower, renewable and power generation projects.
- Led design, procurement, installation and commissioning of power generation equipment and ancillary systems including turbines, generators, HVAC, pumps.
- Led numerical modelling projects including computational fluid dynamics (CFD), energy modelling and hydraulic transient analysis studies.

FWD Systems Design, North Vancouver | 2010 – 2011 | Mechanical Engineer
- Led energy efficiency assessments and design mechanical systems.

Northwest Dental, Burnie, Aus. | 2009 – 2010 | Project Manager, Cattley St. Building
- Project and construction manager for fast-track design and construction project.

Connell Wagner, Perth, Aus. | 2007 – 2008 | Mechanical Engineer
- Energy modelling and energy efficient mechanical systems design

Select Project Experience

Planning and Development

AB and SK Renewable | Screening study to identify wind, solar, hydro project sites

MB Power Development Plan | Independent expert consultant for Public Utilities Board, review of cost and development plans for wind, solar and natural gas facilities

Sikh Temple, BC | Energy audit of 2,500 m^2 facility | Identified 20% energy cost savings

Vancouver Apartment, BC | Energy audit of 41 suite rental apartment 15% energy saving

Sunshine Coast Hydro Facility, 15 MW, BC | Lead engineer for prefeasibility study

Yukon Pumped Storage, 15-25 MW, YK | Site identification, concept, cost and financial

Office Tower Solar Thermal, 85 kW, BC | Conceptual design and feasibility study

Prince Rupert Pumped Storage, 500 MW, BC | Prefeasibility, site visit, cost estimates

Yukon Diesel Plants, 25 MW, YK | Mechanical and electric condition assessments

Computational Modelling

City Square, Australia | Lead energy modeller for ~10 MW heating and cooling system at

+1 604 800 7794 | info@energyrevolution.ca

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MICHAEL PULLINGER, M.SC., P.ENG.

Professional Registrations

APEGBC | Professional Engineer

Engineers Australia | National Engineering Register

ASHRAE | Member

Education

University of New England, Aus. (Online) | Graduate Diploma in Economics | Currently In Progress

University of Southern Queensland, Aus. (Online) | Master of Engineering Practice | Electrical Power | *2015*

Murdoch University, Aus. (Online) | Master of Science | Renewable Energy | *2011*

University of Tasmania, Aus. | Bachelor of Engineering | Mechanical Engineering | *2006*

University of Tasmania, Aus. | Bachelor of Science | Geography and Environmental Studies | *2006* | First Class Honours

University of Tasmania, Aus. | Dean's Roll of Excellence for High Academic Results in Final Year of Study | *2006*

Languages

English | Native Speaker

Spanish | Business Level Proficiency

Portuguese | Conversational

48 storey office tower facility including chillers, cooling towers, boilers, lighting, envelope

Albany Entertainment Centre, Aus. | Wind flow modelling around building using CFD

Aspen Office, Perth, Aus. | Energy modelling, detailed HVAC design of 9,000 m^2 building

Nunavut Hydro, 15 MW, NU | Development of new thermal model for pipe freezing

Upper Lillooet Hydro, 77 MW, BC | Optimisation of intake design using CFD analysis

Tretheway Hydro, 21 MW, BC | Headpond sedimentation analysis using CFD simulations

Kibali Projects, DRC | Led transient analysis of 20 MW Nzoro and 10 MW Azambi plants

Project Engineering

Capilano Energy Recovery Facility, 1.8 MW, BC | Lead commissioning engineer for 1.8 MW Francis turbine and generator, 2x 12.5 m^3/s PRVs | Manufacturing quality assurance and factory acceptance testing | Turbine and generator installation contract

Campo Morado Mine, Mexico | Design review and commissioning of pump stations

Box Canyon Hydro, 16 MW, BC | Mechanical ancillary design including HVAC, valves, gates | Turbine and generator quality assurance | Transient analysis of multiple penstock

Lonsdale Apartments, BC | Condition audit, boiler and heating system retrofit design

El Vado Hydro, 8 MW, NM, USA | Commissioning procedures for Kaplan refurbishment

Cache Creek Landfill Gas, 4.8 MW, BC | Generating equipment specifications

John Hart Facility, 140 MW, BC | Tender design of HVAC, compressed air, water systems

Lower Mamquam Hydro, 50 MW, BC | Tunnel ventilation design and performance tests

East Toba Hydro, 145 MW, BC | Analysis, design, construction of 5.7 MPa service water

Publications and Publically Available Technical Reports

Energy Revolution Services. (2016). *Assessment of Renewable Energy Potential in Alberta – A Pilot Study*. Lead Author. URL: http://www.energyrevolution.ca/alberta-renewable-energy.html

Knight Piésold Ltd. (2014). *Independent Expert Consultant Report for Manitoba Public Utilities Board.* Lead Author of Chapter 5 and Chapter 6 (Wind, Gas and Solar costs). URL: http://www.pub.gov.mb.ca/nfat/knight_piesold_report_redacted_jan_27_2014.pdf

Pullinger, M.G., V. Martin and M. Robertson (2013). *Preliminary Optimization of a Run of River Intake and Headpond Design Using Computational Fluid Dynamics (CFD) Techniques.* HydroVision International – Denver, Colorado.

Knight Piésold Ltd. (2012). *Evaluation of Pumped Storage Hydroelectric Potential in the North Coast of British Columbia. Appendix to BC Hydro's Integrated Resource Plan*. Lead Author of Report. URL: https://www.bchydro.com/content/dam/hydro/medialib/internet/documents/planning_regulatory/iep_ltap/2012q2/draft_2012_irp_appendix11.pdf

Pullinger, M.G. (2011). *Evaluating hydraulic transient analysis techniques in pumped storage hydropower systems.* Master of Science Dissertation. Murdoch University.

Pullinger, M.G. and Johnson, C.J. (2010). *Maintaining or restoring connectivity of modified landscapes: evaluating the least-cost path model.* Landscape Ecology **25**.

Pullinger, M.G. and Sargison, J.E. (2007). *Using CFD to improve the Design of a Circulating Water Channel*. 16th Australian Fluid Mechanics Conference, 2-7 December, 2007.