End-to-End GHG Emissions from Online Services

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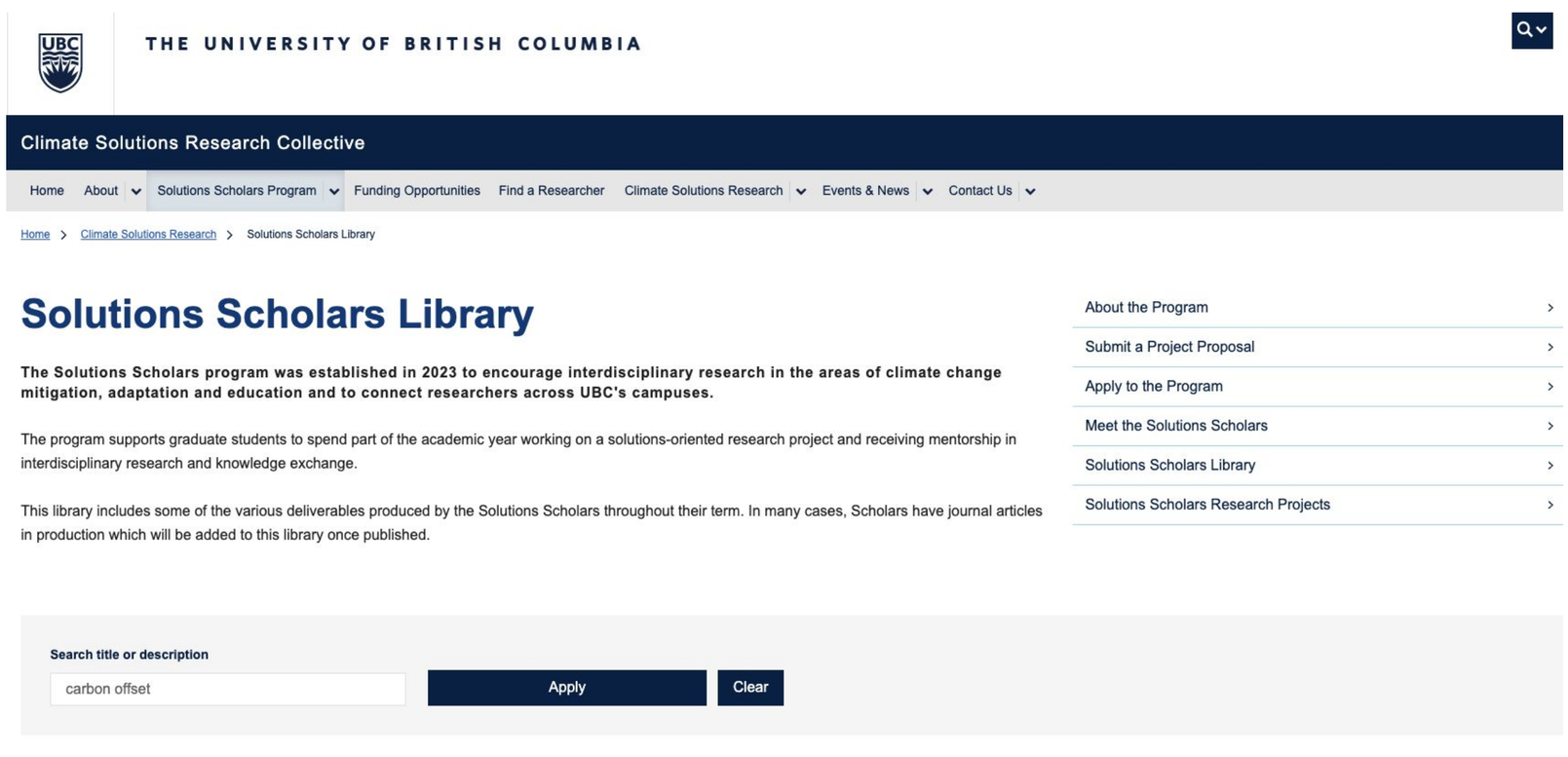
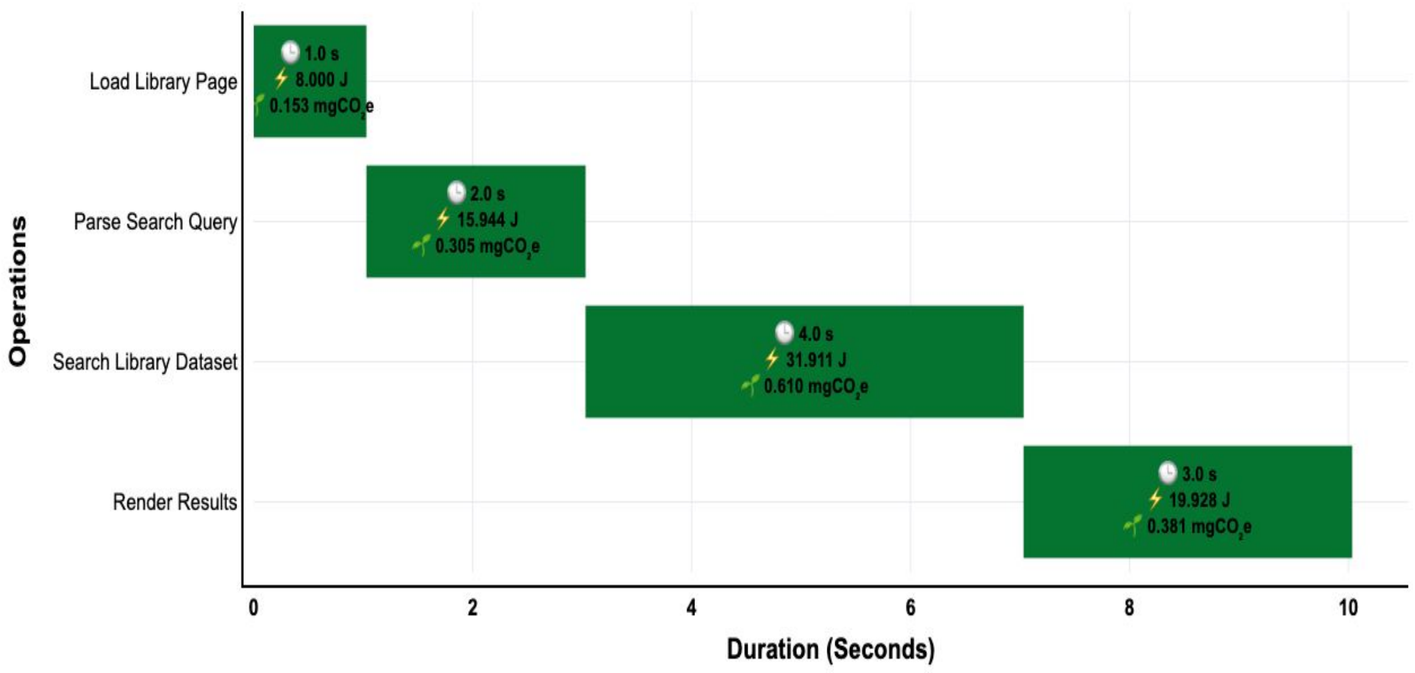
The **Carbon Emissions of Online Services** are **not** well **known** or **trusted**

We built a tool "**Firefly**" to measure the energy usage of the software that enables such services



An example of using an online service

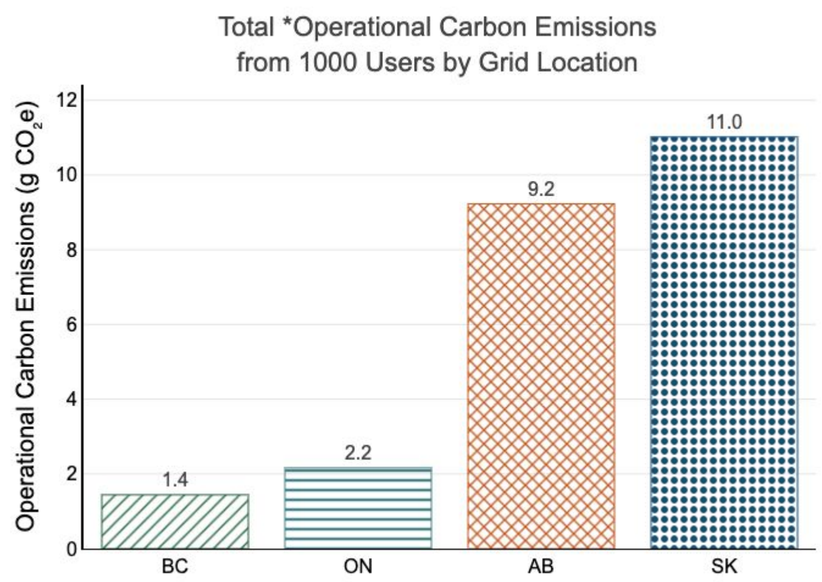
1. Load a webpage
2. Filter a list to find what you're seeking



Behind the scenes - services run to load the filtered list. In this case there are four components.

Firefly initiates measurements whenever a service runs and calculates the energy for each component. Here the full scenario used 91.3 J of energy.

Combined with the carbon intensity of the energy sources involved, a full accounting* of the carbon emissions from an online service is now possible



*Excluding embodied carbon

*Average grid carbon intensity using electricitymaps.com data, multiplied by 1.11(PUE)