Re-imagining Corporate Business Models for a Successful Energy Transition: Microsoft's Carbon Accountability Framework

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It has been widely accepted that a successful energy transition away from the current high-carbon, high-impact energy paradigm will require a diverse multi-pronged effort in all sectors of energy production and use[1]. To accomplish this, fundamental models of business, industry, transportation and civilian life must be re-evaluated and re-designed to accommodate this shift. As often overlooked in energy transition discussions, internal accountability programs within high energy use organizations can be an effective management tool to reduce overall energy consumption, as well as facilitate low-carbon energy infrastructure development. These types of programs must provide long-lasting and immediate interactions with the operational aspects of a business including behavioral, production, and maintenance duties, as well as foster continuing support for energy transition action.

Microsoft's Carbon Accountability Framework

As a prime model for internal corporate carbon accountability, the Microsoft Corporation has developed a broad portfolio of carbon accountability framework mechanisms, the most prominent of which includes an innovative internal carbon fee. The program, which was launched July 2012, is intended to bring carbon accountability to each division of Microsoft's operations by imposing a fee which internalizes the external costs of the company's carbon emissions[2]. Its launch coincided with a pledge to achieve net zero carbon emissions throughout all operations including data centers, software development labs, offices, and business air travel, which is a key step in guiding this framework's implementation. Following the net zero

emissions pledge, Microsoft began purchasing Renewable Energy Credits (RECs) and other offset credits to compensate for 100 percent of its energy consumption[3]. Besides the verification process these credits inherently undergo, there is also a set of standards enacted to ensure credits are generated local to actual consumption, and are from energy projects constructed within 5 years[4]. These standards ensure the predicted positive impact of the program is realized, and that the distributed nature of operations does not put any negative burden on local energy systems.

Internal Corporate Carbon Fee

Microsoft's carbon fee structure, which is similar to a state-based or nationally issued carbon tax, assigns a negative value to all internal and external carbon emissions. Where it differs however is in the scope and thorough implementation. Typical carbon taxes often only encompass one aspect of carbon emissions, for example, a fuel tax. In contrast, Microsoft's carbon fee is aimed at the 14 individual business groups (Operating Systems, Devices, Cloud and Enterprise, Marketing, etc.) within the corporate structure, and incorporates all carbon emitting activities throughout more than 100 countries[5]. Within these business groups, key stakeholders in the carbon emitting activities actively participate and generate feedback to the Environmental Sustainability team and the Corporate Finance department, who oversee the program.

The actual model for the carbon fee is quite simple. First, a thorough carbon emissions inventory is conducted for the entire corporate structure, which is used to assign the emissions requirements for each business group. Each group will then pay a fee proportional to their emissions, which will be collected into a central carbon fee fund. The price of the fee is dynamically adjusted to ensure proper accounting for the total cost of offset credits purchased, as well as the costs of internal energy initiatives, such as efficiency upgrades or low carbon energy

projects. From the central fund, a formal grant system with stringent criteria is used to award funds to energy investment projects throughout all aspects of operation from lighting and HVAC renovation, to infrastructure for behavioral modification like electric car charging ports[6].

This structure can work effectively in lieu of an externally mandated carbon pricing scheme as well as synergistically with an external tax or cap and trade program, making it extremely versatile. In essence, this corporate carbon fee model creates a "virtual simulation" of what such an external carbon price would impose on the company, while having the capability of being "cost-neutral" or even revenue-generating in the long term. Microsoft has opted to negate its emissions with offsets, which is a large motivating factor for this program, however if applied to another business model, carbon offsets are not mandatory.

Actions Driving Change

At the forefront of creating tangible impacts in the carbon intensity of operations as well as driving potential economic gains are the efficiency and behavioral change initiatives enacted across all Microsoft locations. As a technology innovation firm, many of these initiatives are technology based. While this facilitates the movement away from a technological lock-in with traditional practices, other businesses and industries may require outside consultation or other means to implement innovative action initiatives.

There are four main sources of operational energy consumption, and consequently carbon emissions, throughout Microsoft's structure; data centers, software development labs, offices, and air travel. Of these, all but air travel share the majority of electricity consumption, which accounts for approximately 95 percent of energy used[7]. For those categories, efficiency upgrades and behavioral changes are the most effective methods of consumption reduction.

Development and innovation of best management practices within the past decade has allowed for high-energy data centers, which are the backbone of Microsoft's information distribution system, to realize more efficient energy use. The company's overall efficiency, which is a ratio measured as power usage effectiveness (PUE) reached 1.40 in 2011, with the industry average of 2.00[8]. Over the course of the carbon fee program, these data centers have been able to reduce this ratio through practices including increased operating temperatures, "hot aisle" servers, and waterside and airside economizers.

Software development labs, in particular, the Redmond, WA campus, as well as other office buildings owned by Microsoft have seen massive efficiency upgrades to HVAC, lighting, and behavioral changes, including when appliances are used, and eliminating consumption when not in use. These facilities have also seen landmark developments in showcasing "big data," with over 35,000 pieces of various sensor-enabled equipment which is compiling over 500 million data points for the 118 building campus daily[9]. These data are collectively managed by a single software system to provide real-time feedback for maintenance and facilities personnel who can allocate resources for problematic infrastructure. The impact goes farther, with the capability influence decisions for project implementations and even behavioral changes, for example, by using near-term weather data to influence heating or air conditioning decisions automatically.

Lastly, air travel represents a large emissions impact for many distributed companies, and Microsoft has decided to limit business related air travel to last resort. In place, they have adopted the use of telepresence rooms, where large monitors and video calls can create a productive atmosphere over large distances.

Each of these areas has benefited from the massive innovative research power afforded through capital investments by Microsoft, and in such a sense, there is an internal epistemic

community of leaders in the field of technological efficiency. The proliferation of these technology instruments, like big data and best management practices, will ultimately depend on the discussions between these leaders around organized widespread implementation. In part, this is the mission of the sustainability efforts by Microsoft.

Business Incentives for an Energy Transition

The Microsoft carbon fee framework was in part constructed to be a new model for business management[10]. In this sense, they have provided an excellent starting point for other entities to develop their own carbon accountability program. Motivation to do so is generated from a variety of factors however, and depending on the industry may not rationally apply in decision making processes. Besides environmentally minded leadership, Microsoft cites two main reasons rationalizing their decision; cost and resilience[11]. Energy efficiency improvements has the capacity to greatly reduce operational costs paid to utilities, and investment in renewable technologies increases the resilience capacity for long term sustainability. In 2014 alone, Microsoft estimated efficiency upgrades in its Redmond, WA campus have reduced energy use by upwards of 11 percent, with a payback period of less than 2 years. These short-term gains coupled with long-term impact are certainly enticing results for some industries. Brand image and positive publicity also are powerful driving factors which may influence corporate decision making. One study which polled young adults (18-25) on their opinions about corporate climate action found 78 percent of respondents globally favored brands with initiatives to reduce carbon footprints[12].

Market-based opportunities like these can be promising motivating factors to incentivize action within current economic structures. By viewing these problems through an economic lens,

real world solutions become easier to accomplish, and economic return on investment is one of the largest factors governing business management.

Technological Barriers to Adoption

While Microsoft is at the forefront of applied technology, and has the resources to train the researchers, mechanics, contractors, and users of new technology, other industry and business fields may realize this as a barrier to adoption. For example, some factors of technological lock-in such as lack of professional experts and capital costs can prevent implementation of some of the action items discussed above. Without these actions which facilitate reduced carbon intensity, a carbon fee becomes moot. It is also a factor that some industry fields have a better standing for implementing internal carbon policies. For example, electricity and mining firms, along with general office-oriented business have a high level of readiness for sustainable transformation[13]. On the other hand, many industries are not in such a position, including food and beverage production, oil, and chemical manufacturing. Other policies may be needed to encompass all sectors, in particular those with the largest risk, and highest carbon impact.

To facilitate the shift away from carbon intensive energy systems, a wide array of mechanisms will be needed at varying levels of command. National and state-wide policies which incentivize such a transition are imperative to achieve a widespread impact, however internal policies such as Microsoft's carbon fee program are relevant to the discussion as well. Businesses and industry energy transitions can be realized more rapidly with the distribution and adoption of framework business models which address the external cost of carbon. As seen with the successes of Microsoft, such programs have the potential to decrease the carbon intensity of business, while at the same time providing economic and social benefits.

Notes

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4. Ibid., 18-19

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