1. Introduction

After the Paris Agreement, one can argue that CO₂ capture, transport and storage (CCS) has regained some of its position on the political agenda and that it has become even more evident and acknowledged that CCS is necessary to meet the targets under the agreement and to abate climate change. The recognition that CCS is not only a suitable tool to make energy production less harmful for the climate but also a crucial technology to reduce emission from certain industries like cement, steel and waste also seems to be growing.

Further, it seems to be evident that for the full-scale deployment of CCS, it is no longer a technological challenge. Having had a CO₂-EOR industry in the US for more than 40 years, Sleipner operating in Norway for more than 20 years and demonstration projects being initiated around the world, should emphasize that. Although there is always room for improvement and more technology development, the time has come to increase the efforts on what is needed to support the commercial deployment of CCS beyond technology development.

It is important to have a well-functioning framework to facilitate CCS activities, both political and legal. Parts of this framework will have to be provided for by the authorities. Other parts may or should be provided for by the industry itself. One of the private stakeholder initiatives is the International Standards Organization (ISO) project ISO TC265, an ongoing project that aims at standardizing certain aspects and activities relating to CCS and CO₂-EOR. Although several years are left before completion, this project has already produced several technical reports and standards.

This paper will go through some of the main benefits and concerns standardization represents for CCS and CO₂-EOR, some observations from the ongoing process and the challenges the ISO working groups are facing, and finally, some thoughts on how these standards may eventually form important parts of some jurisdictions’ framework for CCS and CO₂-EOR.

2. ISO TC 265

ISO standards are as a default “voluntary, consensus-based and market relevant” and the ISO TC265 initiative does not aim at being part of national, regional or international regulatory framework for CCS or CO₂-EOR activities. In 2011, ISO initiated a Technical Committee with five working groups working on standardization of activities in the field of CCS. The scope was later expanded to include CO₂-EOR operations. There are currently 18 participating and 10 observing countries contributing to the process, some of which have an existing regulatory framework for these activities, while others don’t. These differences pose both challenges and opportunities.
One of the challenges with an ISO standardization process, is the requirement that the standard shall not be country or framework specific. CO₂ may be treated as waste for one operation and a commodity for another, depending on the jurisdiction. Also, there are differences to the ownership and licensing regime of the potential storage complexes, pore space and petroleum reservoirs, in addition to requirements for post closure monitoring and transfer of liability. Add the ISO requirement of technology neutrality to this, to facilitate further technology development, prevent exclusion of some technologies and the support or endorsement of other, maybe patented, technologies, and you are facing quite the balancing exercise.

These observations further emphasize that not all parts of the CCS and CO₂-EOR operations are well-suited for an ISO standard. Some topics could potentially be subject to a separate standard, either or a national or regional level.

3. ISO standards as framework

Standards contribute to cost reduction, creating a system for testing, certification and accreditation as well as developing appropriate and secure products and systems. At the same time, standardization promotes knowledge sharing between private and public stakeholders worldwide, both during the process of writing them and when applied in projects. Having a standard may allow for the industry to regulate themselves how things are to be solved, instead of having to wait for the authorities to provide a framework. It may also provide for a way to regulate aspects of the industry’s commercial and technical activities which the authorities do not find a reason to regulate but which address issues like efficiency and best practice.

Despite the intended purpose of ISO standards, they may end up as national regulatory framework, either directly or indirectly. By integrating an ISO standard into national framework, the authorities can benefit from the opinion of experts without having to call on their services directly. No need to re-invent the wheel. Standards may be used to certify and meet some of the performance based requirements given in laws and regulation or as required by a permit. Sometimes, the industry may choose to apply a standard to meet the requirements imposed by the authorities and at other times, the authorities may require this approach. The latter is the case for the Norwegian full-scale project, in which the ISO standard for CO₂ storage was included as part of the terms of reference for the concept and FEED studies.

As the standards are written by people with international expertise and experience, they can further be an important resource for governments when developing public policy. International standards are adopted by authorities worldwide, and integrating them into national regulation ensures that requirements for imports and exports are the same, therefore facilitating the movement of goods, services and technologies from country to country.

Having standards supplementing the regulatory framework is a well-known strategy in countries like Norway and the US, and may generally often be found in jurisdictions with a complex regulatory framework in place. However, it may also be used as a way of helping countries that have not yet implemented a regulatory framework for CCS. By taking standards into consideration, they ensure not only an industry friendly framework but a best practice based framework that does not preclude innovation or favor any specific technology or stakeholder.