



The next step in TP-less technology

The one lift philosophy

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The one-lift philosophy: the goal

- Suppose, a monopile installation vessel that was designed to install MP's and TP's
- In case of TP-less monopiles, this seldomly leads to the vessel being able to take more TP-less MPs on board due to available empty TP deck space (not under the right position for the main crane)
- There is TP deck space available for Skyboxes

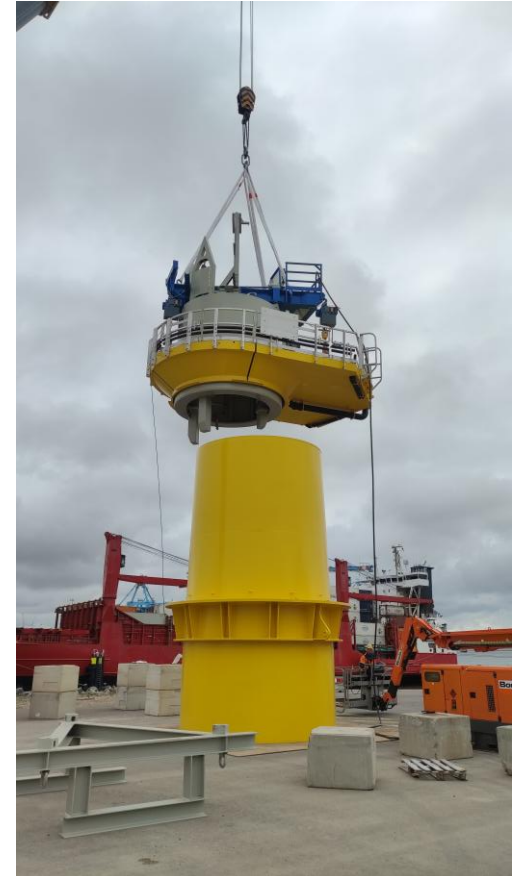


The one-lift philosophy: the goal

- Time is money, the Skybox installation sequence needs to be as fast as possible because of high day-rates of MP installation vessels
- We want to install **all we need - in one lift** being:
 - The Main Access Platform (the Skybox)
 - The internal Airtight Platform or internal cage
 - The Temporary Cover
- We want to install this **in the same weather that allows for MP upending and installation**
- Even in case of using a separate 2nd installation vessel for secondary steel: Skybox / the one lift philosophy creates significant offshore savings

Starting principles for the onshore test

- Installation time < **10 minutes** from deck lift-off to MP touch-down and Skybox installation
- **No personnel** necessary to cross from the MP installation vessel onto the foundation / Skybox
- The installation vessel can **continue** to the next MP installation **directly after touch down** and Skybox installation
- Remaining work can be done within one month after touch-down as sim-ops



How does it work?



Skybox

<https://www.skyboxonshore.com/skybox-one-art-philosophy>

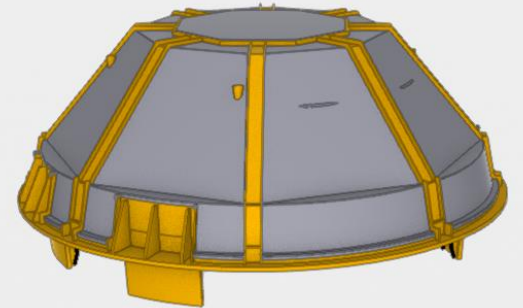
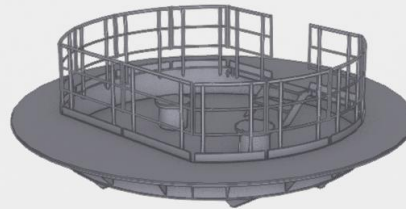
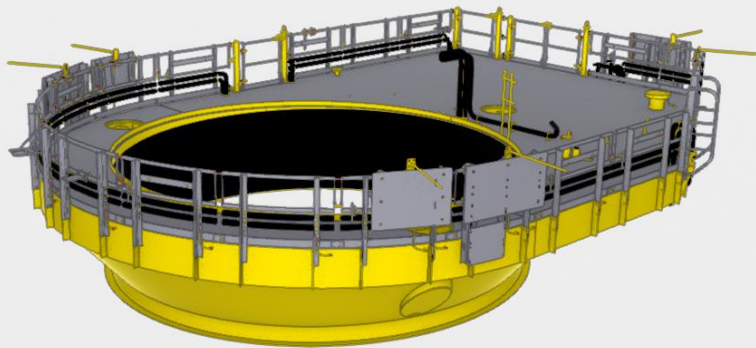
Lessons learned & next steps

- Installation time from deck to MP <10min: **Achieved**
- Fully remote installation without the need for having people on the foundation: **Achieved**
- Move functionalities from temporary cover into installation tool even more: **Next phase**
- Scale up from 1:2 (4m) scale to 1:1 (7.5m) scale: **Next phase**
 - Full scale Standard Skybox, Airtight Platform, Temporary Cover and Installation Tool
 - Make the setup suitable for a simple (jacuzzi-type) Airtight Platform but also for a full Internal Cage with multiple levels
 - Onshore testing for functionality and offshore testing for demonstration

Next step: our standard Skybox & Installation tool

3 separate components are placed next to each other in a prep-area at the mobilisation yard:

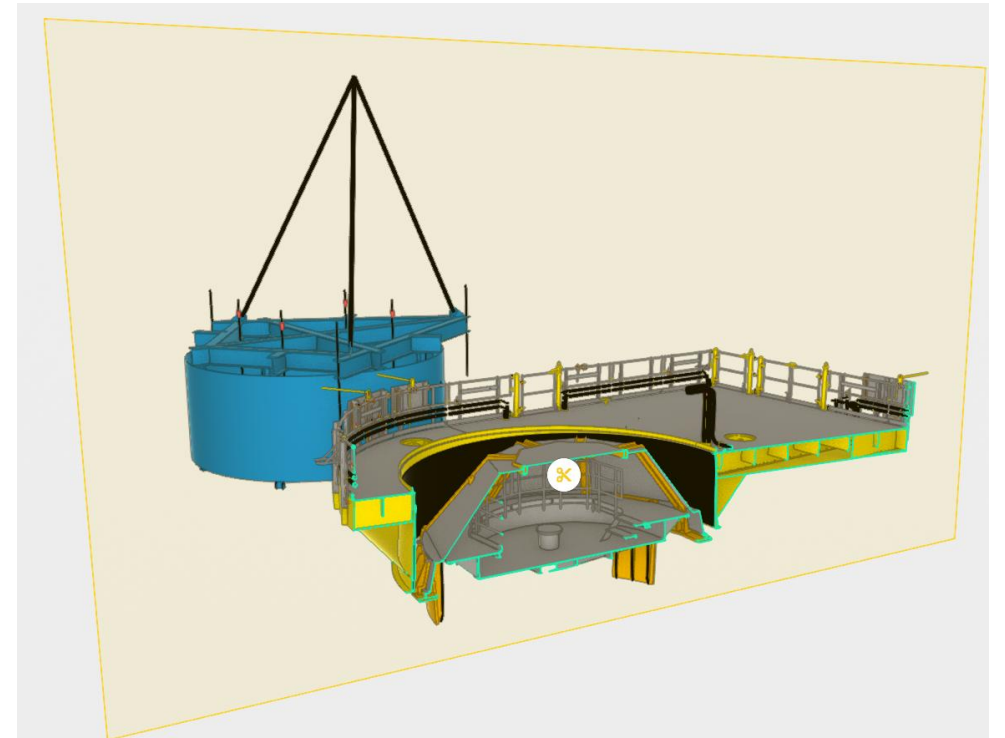
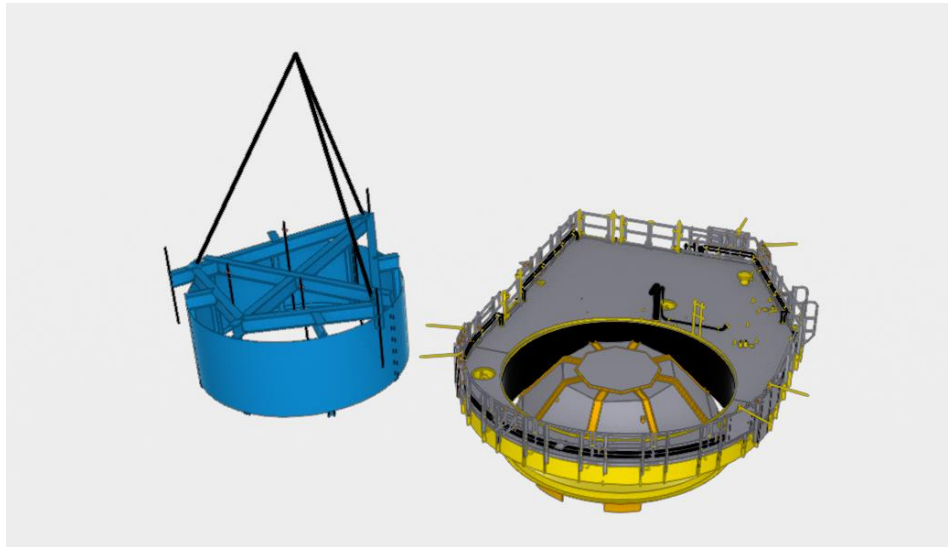
- The Main Access Platform (the Skybox)
- The Airtight Platform or internal cage
- The Temporary Cover



Next step: our standard Skybox & Installation tool

Stacking of the 3 components:

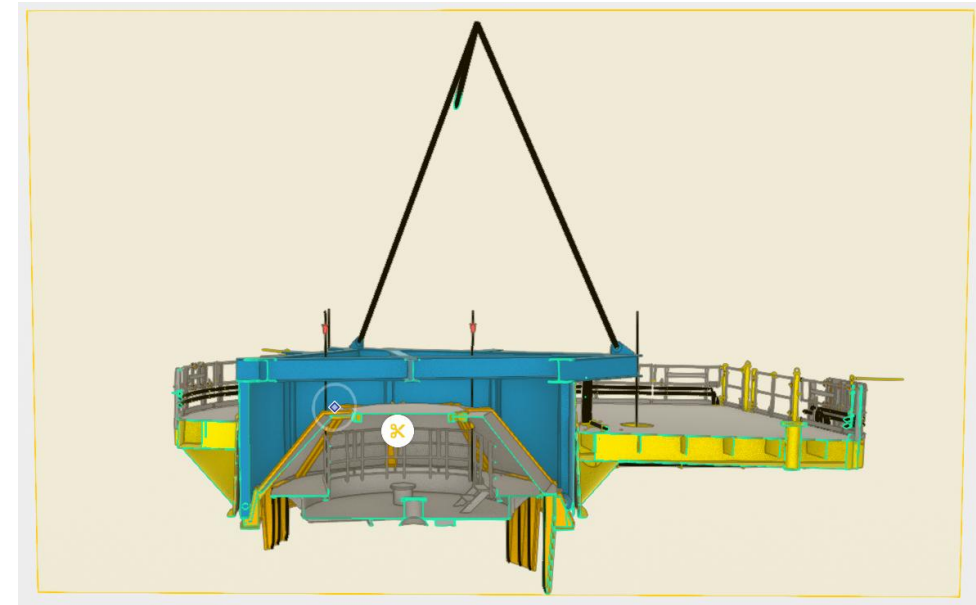
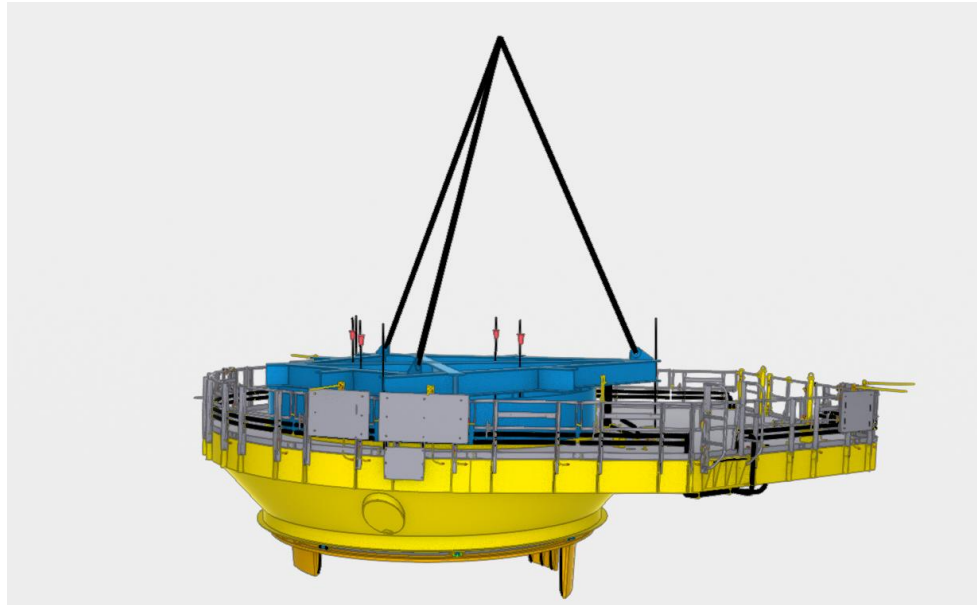
- The Temporary Cover over the Airtight Platform
- The Skybox over the Temporary Cover
- Can be done with installation tool or with separate crane



Next step: our standard Skybox & Installation tool

Ready for installation:

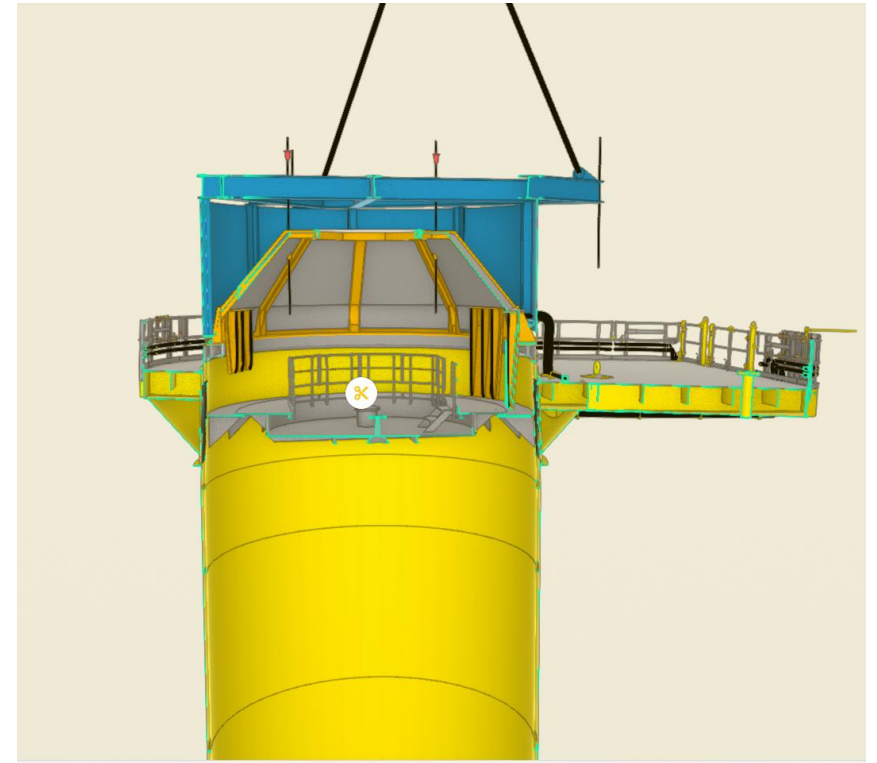
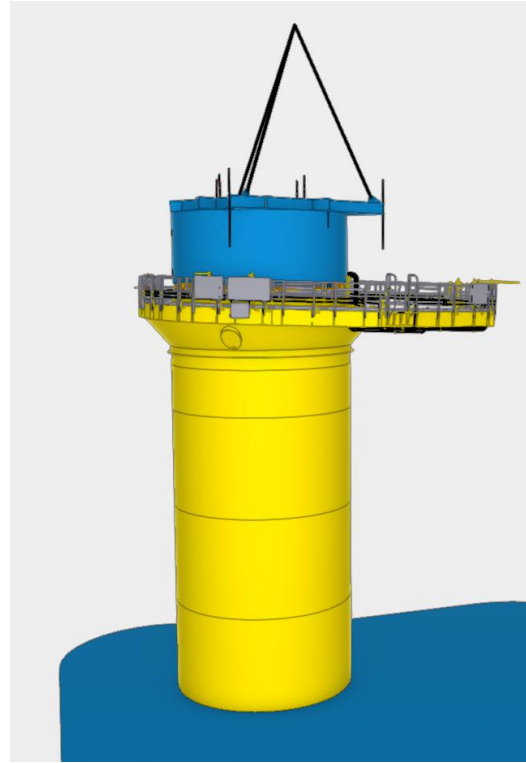
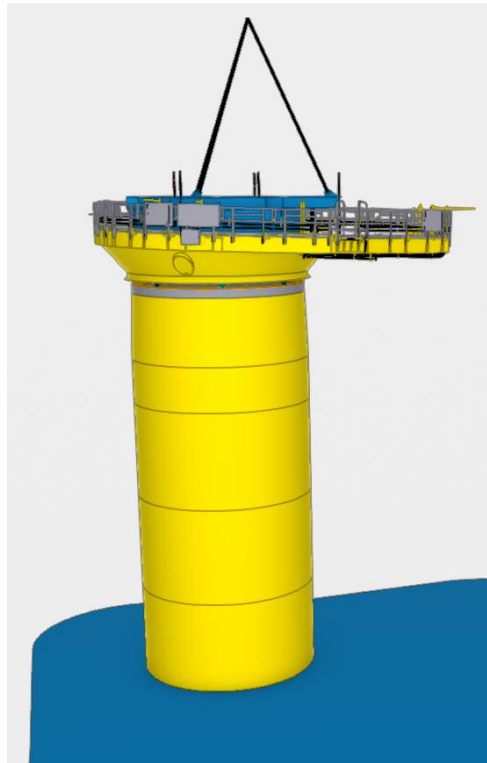
- The Skybox, the Airtight Platform and the Temporary Cover are all connected to the lifting tool, and placed **as one unit** onto the Skybox grillage on board of the MP installation vessel



Next step: our standard Skybox & Installation tool

Offshore installation on the monopile:

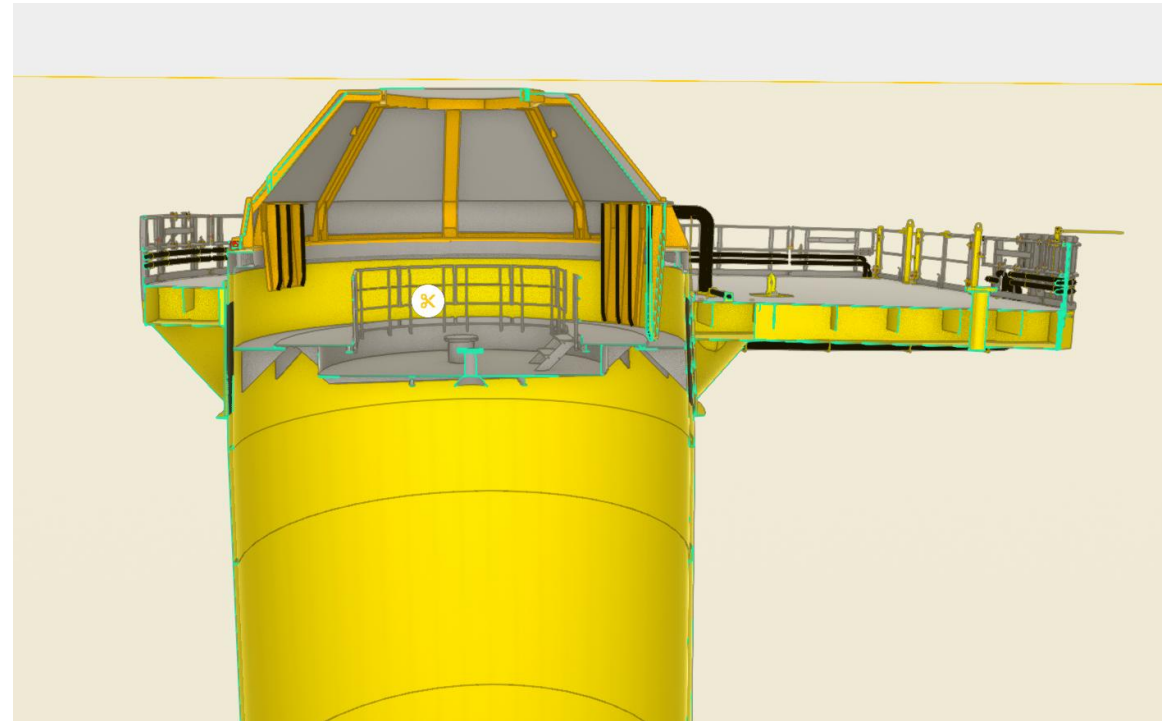
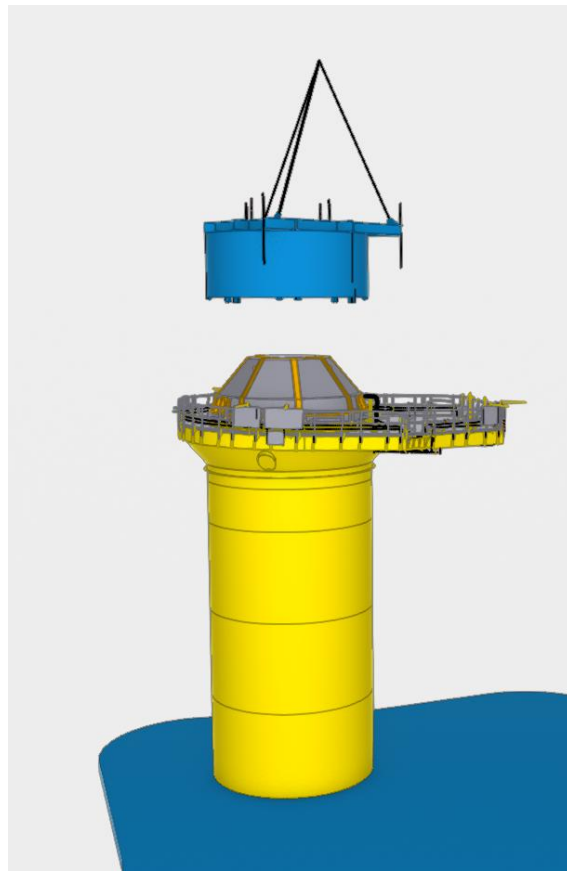
- The Skybox, the Airtight platform and the Temporary cover unit is placed on the MP **in one lift**
- Skybox and Airtight platform are both **remotely** lowered over/in the MP by the lifting tool



Next step: our standard Skybox & installation tool

End of installation on MP:

- Lifting tool removed
- Installation completed



Offshore savings study

- 3 Installation vessels selected:
 - Jack-up vessel or,
 - Floating Heavy Lift vessel or,
 - Smaller vessel for secondary steel
- Foundation types compared in this study:
 - Conventional MP/TP
 - TP-less MP with steel Main Access Platform and Boat landing
 - TP-less MP with concrete Main Access Platform
 - TP-less with Skybox and GUS
- Both P50 and P90 workability analysed
- Emission savings compared

Offshore savings quantified: time & cost

Summary of the net simulation project duration (days) for 100 installed foundations

Net simulation results (days)			Scenario			
			MP & TP	TP-Less	Skybox	Concrete Platform
Vessel	Monohull	a	100	104	90	125
	Jackup	b	130	135	120	156
	Separate vessel	c	-	-	70	70
	Separate grouting vessel	d	-	-	-	113

Cost savings per scenario MHV & Jack-up

MHV

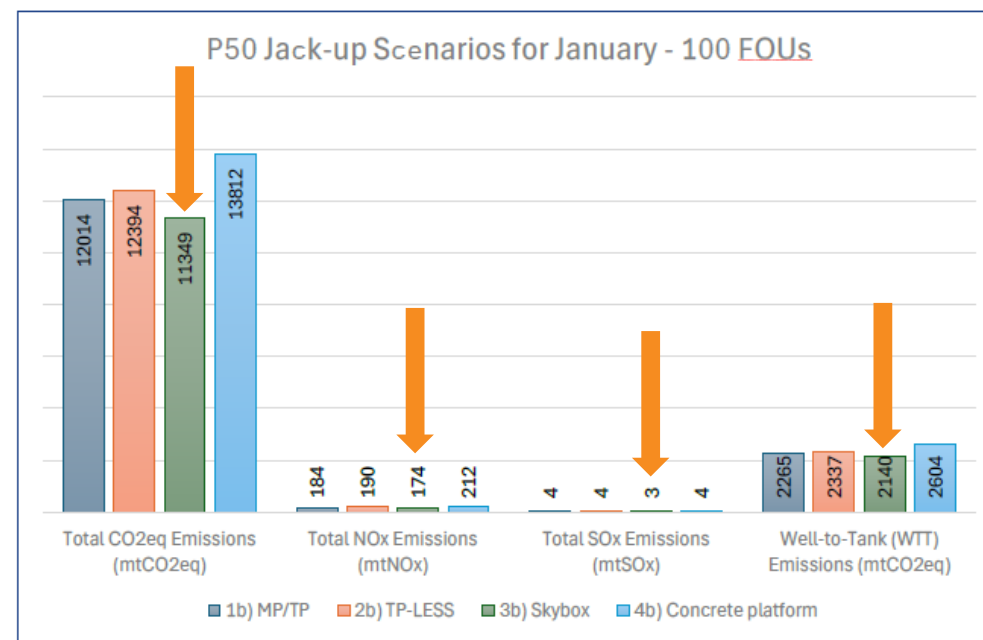
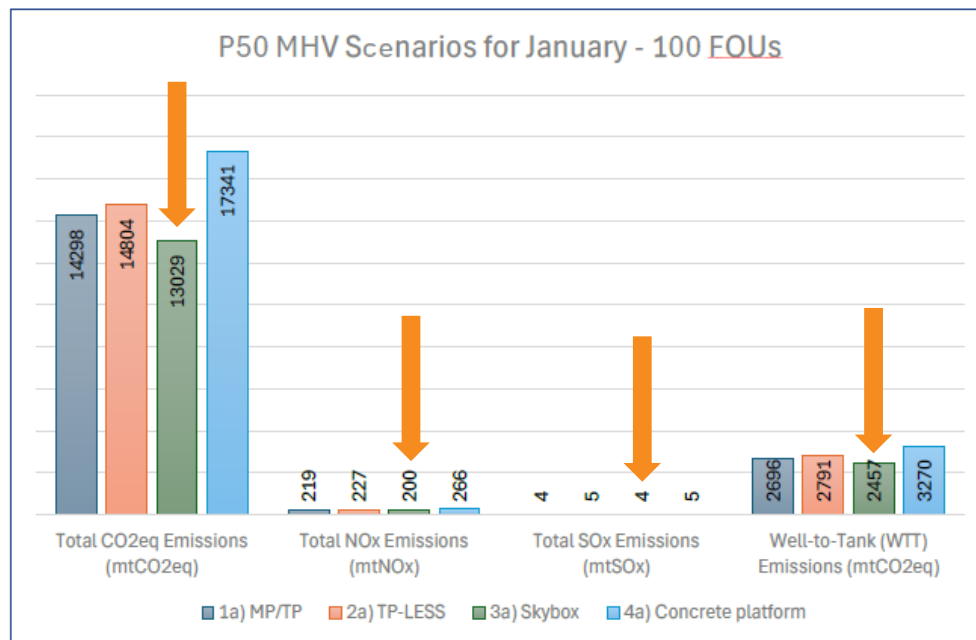
MP/TP	TP-less	TP-less concrete	TP-less Skybox
base case	+4%	+26%	-12%

Jack-up

MP/TP	TP-less	TP-less concrete	TP-less Skybox
base case	+2%	+23%	-10%

Cost savings for separate vessel depend on timing of sequence primary/secondary steel installation.

Offshore savings quantified: emissions



HLV - P50

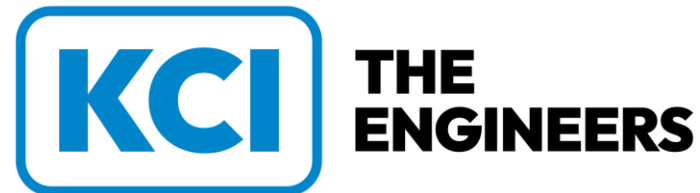
	MP/TP	TP-less	TP-less concrete	TP-less Skybox
CO2	110%	114%	133%	100%
Nox	110%	114%	133%	100%
Sox	100%	125%	125%	100%
WTT	110%	114%	133%	100%

Jack-up - P50

	MP/TP	TP-less	TP-less concrete	TP-less Skybox
CO2	106%	109%	122%	100%
Nox	106%	109%	122%	100%
Sox	133%	133%	133%	100%
WTT	106%	105%	122%	100%

Why develop Skybox installation tooling?

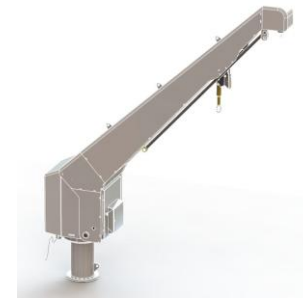
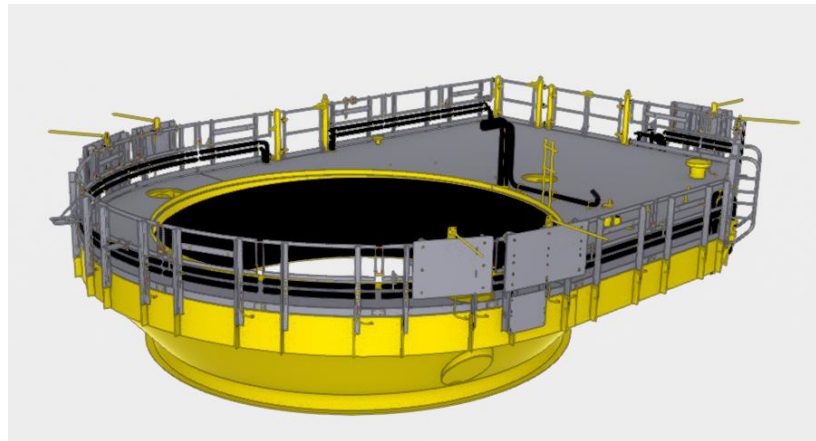
- In order to really bank on the **offshore savings**: tested and proven in close cooperation with leading T&I contractors
- The Skybox installation tooling can be **rented** (and re-used)
- Temporary Covers can be **rented** as well (re-useable CCM covers)
- Skybox grillage is scope of the T&I contractor (in cooperation with **KCI** and **DHLC**, if required, for interfacing with the Skybox and Skybox installation tooling)



Is Skybox really always without a boat landing?

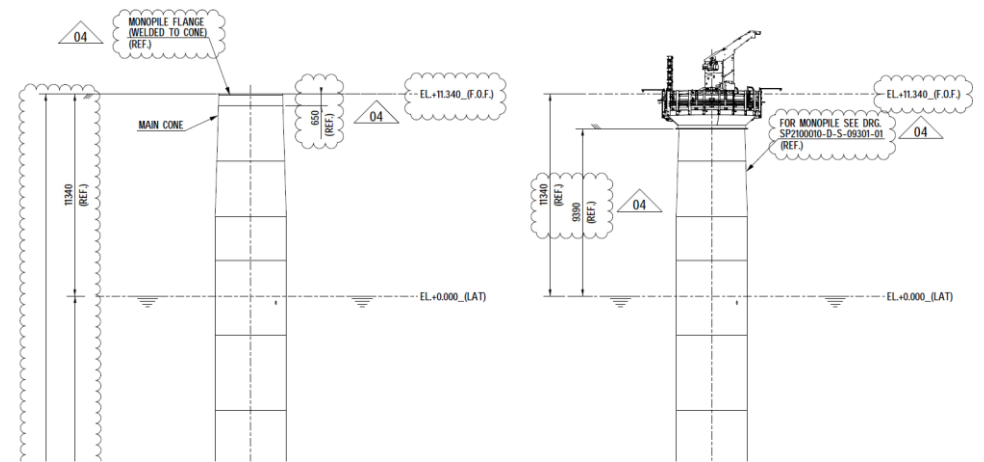
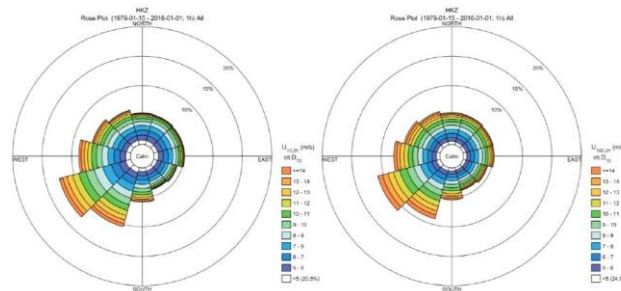
No, we sell Skybox in 3 steps:

- **Step 1:** we have our **STANDARD** Skybox offer ready for you consisting of:
 - A detailed **BOQ** (price), based on **GUS X2**
 - The Skybox 3D model
 - A concise data package with drawings and other specs (LV, material, coating, etc.)



Is Skybox really always without a boat landing?

- **Step 2:** we (KCI) will convert this standard design to your **SITE**, adapting the standard Skybox of step 1 towards:
 - Your **WTG OEM** requirements
 - Your project site's **wind & wave** data
 - Interfacing with your project specific **MP design**
- **Result:** updated BOQ / updated 3D model / MP interface loads



Is Skybox really always without a boat landing?

- **Step 3:** we (KCI and/or your secondary steel designer) will adapt step 2 to your

PROJECT

- All you want is possible, even a boat landing.
- Adding a boat landing brings Skybox cost closer to current TP-less designs, however still no MAP brackets required and no grouting/bolting of the MAP

→ In this way we (you) will see the cost evolution real time and STEP-BY-STEP





The next step in TP-less technology

Thanks for listening

Want to know more? Visit [Skyboxoffshore.com](https://www.skyboxoffshore.com)