

NSW EPA Project

Emission Reduction Measures

Stakeholder workshop 14 November 2014

Scope

- The assessment of technical feasibility, ship-owner/operator costs and emission impacts of adopting emission reduction measures for ships of the fleet operating in the Greater Metropolitan Area (GMA).
- DNV GL will combine fleet information with DNV GL's comprehensive information on vessels technical/operational capabilities, knowledge on available emission reduction measures and their potentials and knowledge on policy instruments.
 - Commencement and project definition – MONDAY 27 OCTOBER, 2014
 - Stakeholder workshop – FRIDAY 14 NOVEMBER, 2014
 - Final written report including presentation – WEDNESDAY 18 FEBRUARY, 2015

DNV GL Experience

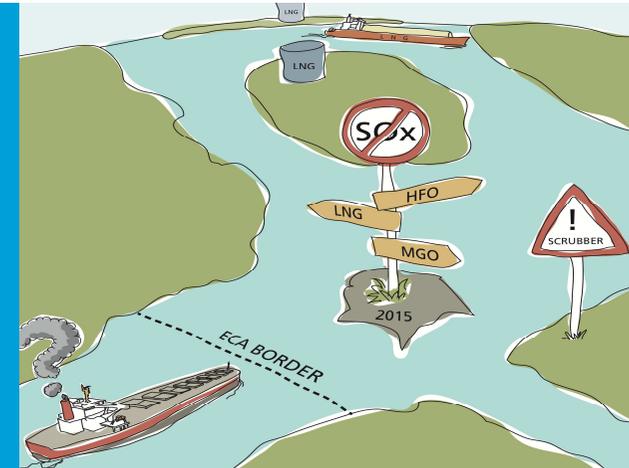
- Establishment of an AIS based environmental accounting model for ship emissions and discharges to sea - Norwegian Coastal Administration
- Analysis of ship traffic and emission for the Norwegian management plan for the North Sea, Norwegian Sea and Barents Sea – Norwegian Coastal Administration
- Heavy fuel oil in the Arctic – Identification of ships operating on HFO, modelling of fuel consumptions and air emissions – Council’s Protection of the Arctic Marine Environment (PAME).
- Black carbon emissions in Arctic (shipping and other sources) and dispersion modelling emissions – Council’s Protection of the Arctic Marine Environment (PAME).

SITUATION AND CRITICAL ISSUE

Risk of doubled fuel expenses from 2015

A bulk owner and operator was concerned about the stricter emission limits for SOX and NOX in the Baltic Sea Emission Control Area (ECA) from 2015 and 2016. This could potentially double their fuel bill

Their main goal was to evaluate potential different fuel choices and possibilities for emission purification



DNV GL SOLUTION

- Assist ship owner in identifying alternative solutions for complying with ECA requirements
- Evaluation of technical and financial risk of selected feasible solutions
- Assess environmental gains of the different solutions
- Benchmark system suppliers
- Implement a strategy for meeting future ECA requirements in a cost-efficient manner

VALUE DELIVERED

- Independent evaluation of the decision basis for the customer. Change to LNG as fuel turned out to be the financially and environmentally preferred choice
- The potential savings of the preferred LNG solution amounted to a max. USD 11 million (as NPV) over the remaining ship lifetime, compared to switching to low sulphur distillate (MGO) which was the most expensive choice. The cost basis covered additional investment and operational costs, hereunder expected taxes and port fees

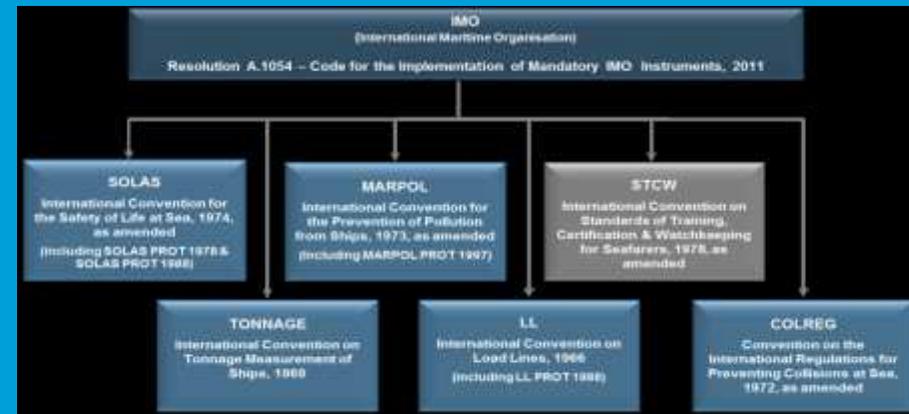
For more information please contact: environmentadvisory@dnvgl.com

Benefit Case - Maritime policy review

SITUATION AND CRITICAL ISSUES

Best practice in regulation

Development review of maritime policy for a European country. Purpose of the review was to provide the client with a list of concrete actions and recommendations to be used to develop the country's authorities' organisation, management system and work processes in line with internationally recognised best practices.



DNV GL SOLUTION

- Using the IMO Resolution A.1054 Code for Implementation of Mandatory IMO Instruments as a basis
- Use local regulations as a guidance for compliance
- Gather data through a series of interviews and documentation review

VALUE DELIVERED

- Gap definition between benchmark and the client
- Recommended actions to close each gap
- An overall plan for implementing actions in Maritime Policy Review and Quality Management System

For more information please contact: Terje.Sverud@dnvgl.com

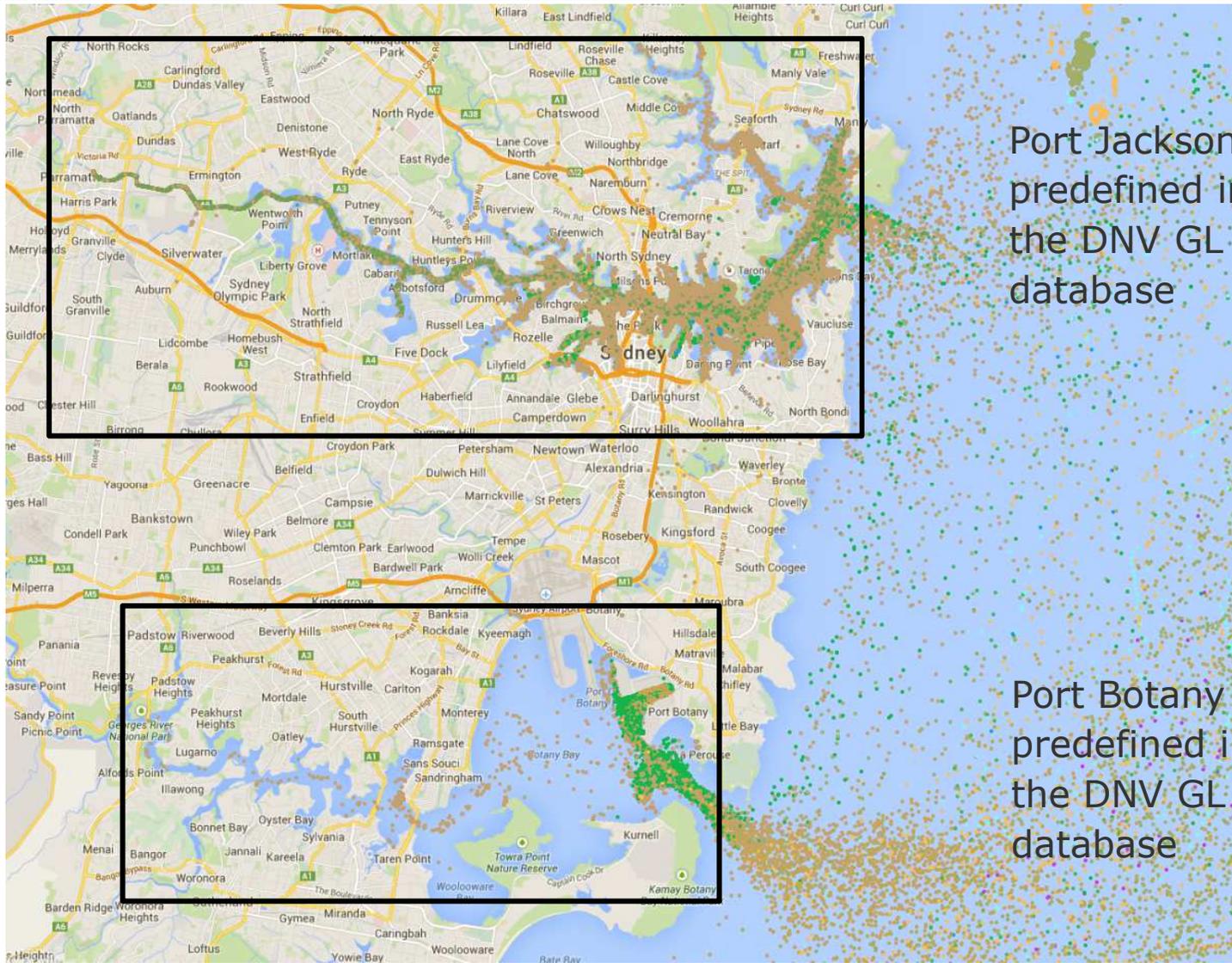
Approach (1/3)

- Establish an overview and description of measures used nationally and internationally to reduce ship emissions (in particular, but not limited to, PM2.5 & NO_x).
- Establish the 2013 base year emission inventory for the Greater Metropolitan Area (GMA), and detailed for ports of Port Jackson, Port Botany, Newcastle and Port Kembla.
- The ship movement data, supplied by NSW EPA, will be used as a quality assurance in the project to ensure that all vessels are included in the analysis.

Approach (2/3)

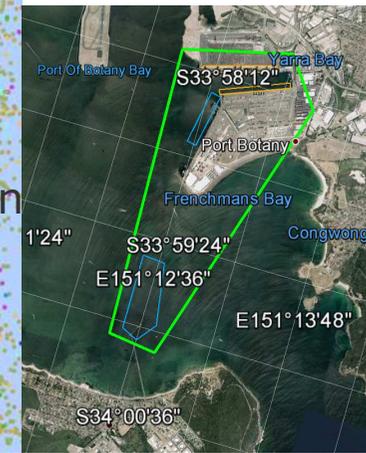
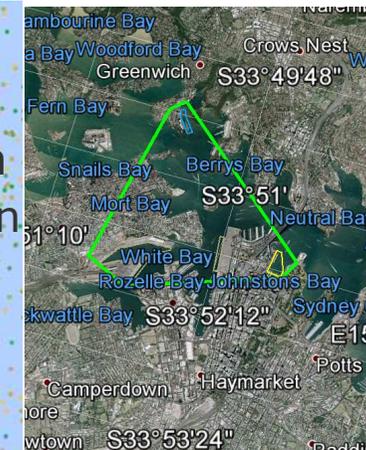
- Evaluation of:
 - available reduction measures for the specific ship segment(s), stage 1 for passenger and cruise and stage 2 for all vessel segments.
 - logistical and technical feasibility of adopting lower sulfur fuel (including fuel switching), seawater scrubbers, vessel speed reduction and shore side power for ships
- Summarise policy instruments, economic instruments, management practices, technological options and voluntary measures in place around the globe
- Forecasting of ship movements for the coming 20 years.

Sydney (Port Jackson) & Port Botany

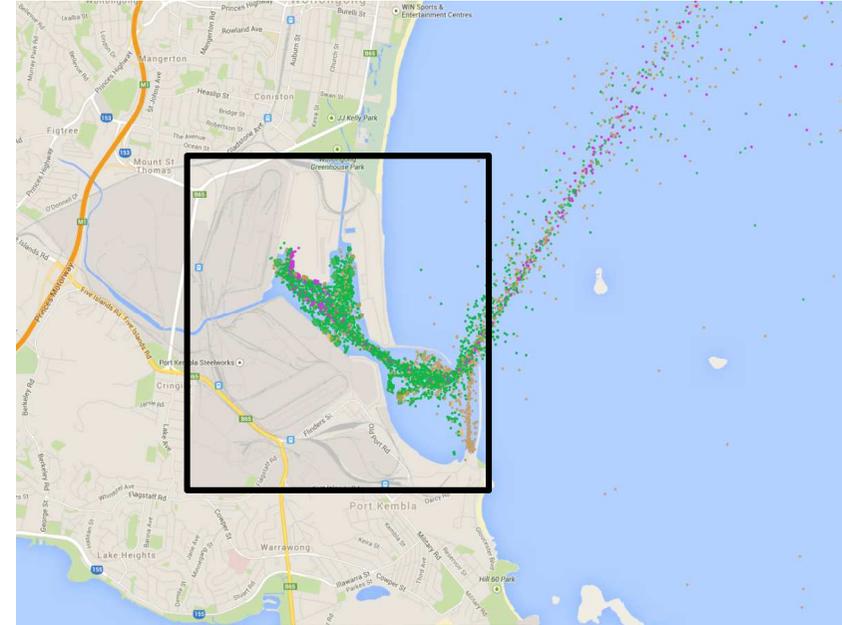
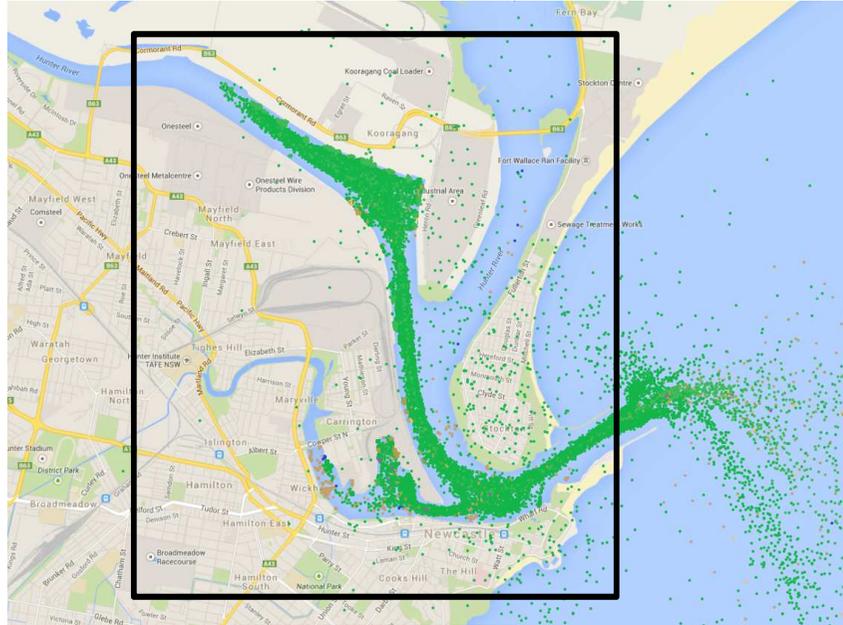


Port Jackson predefined in the DNV GL database

Port Botany predefined in the DNV GL database



Newcastle & Port Kembla



Newcastle predefined in the DNV GL database

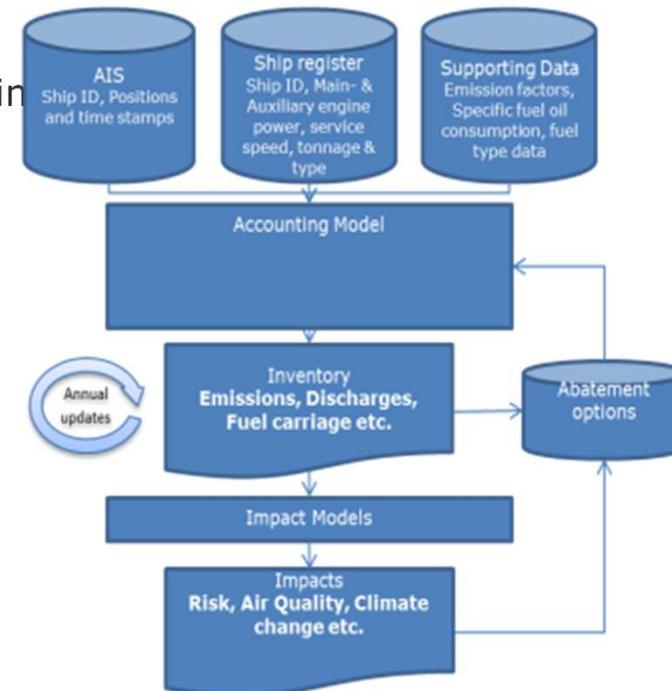


Port Kembla predefined in the DNV GL database

AIS based methodology (1/2)

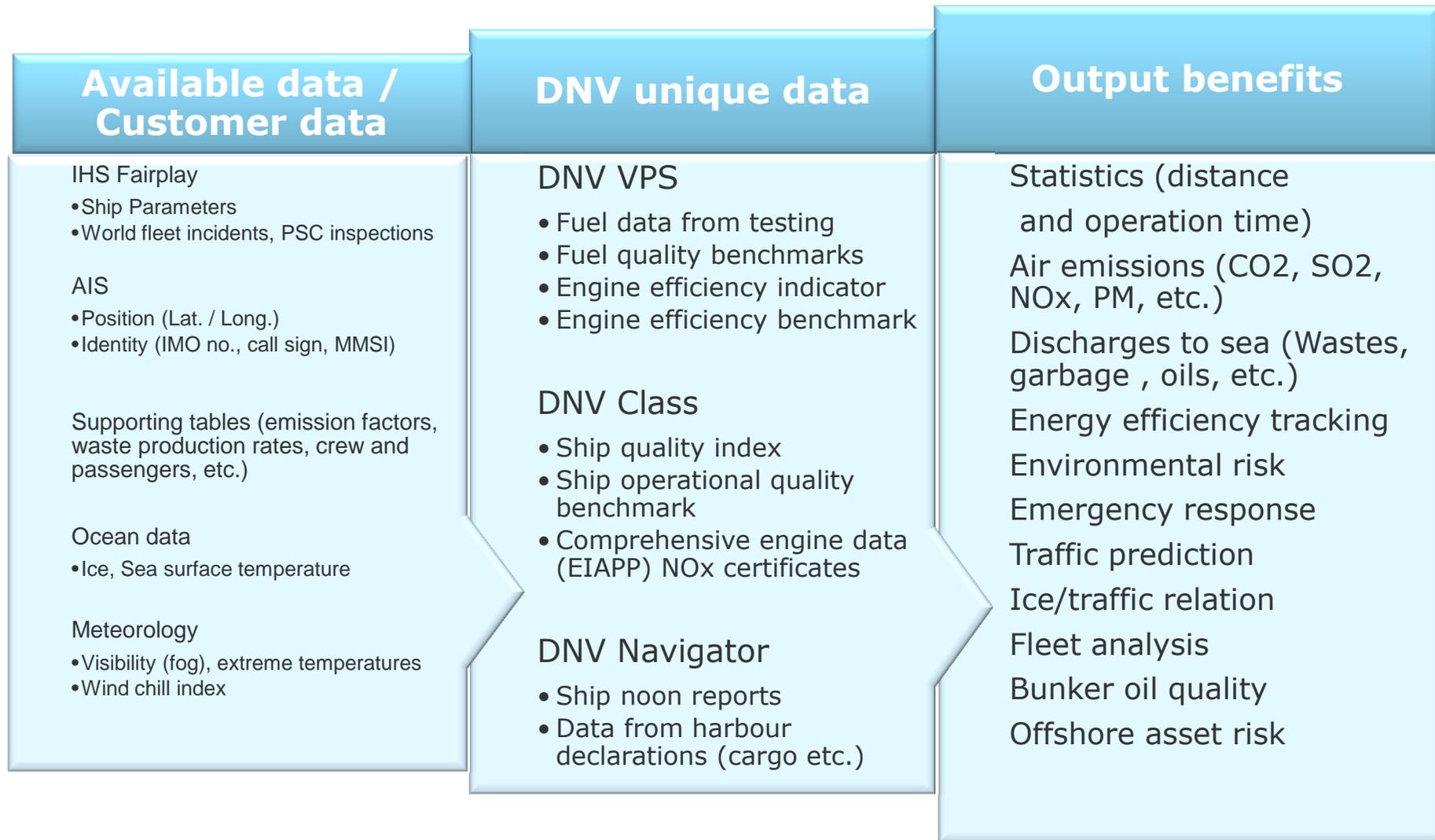


- Activity based emission modelling
 - Ship register data – engine installations
 - Single ship - speed profiles (from AIS ship tracking)
 - Spec fuel consumption profiles
 - Fuel consumption main/aux engines
 - Emission factors
- Results
 - Aggregated on ship types/sizes
 - Detailed analysis, speed, consumption,
 - Spatial distribution
 - Geographical presentation

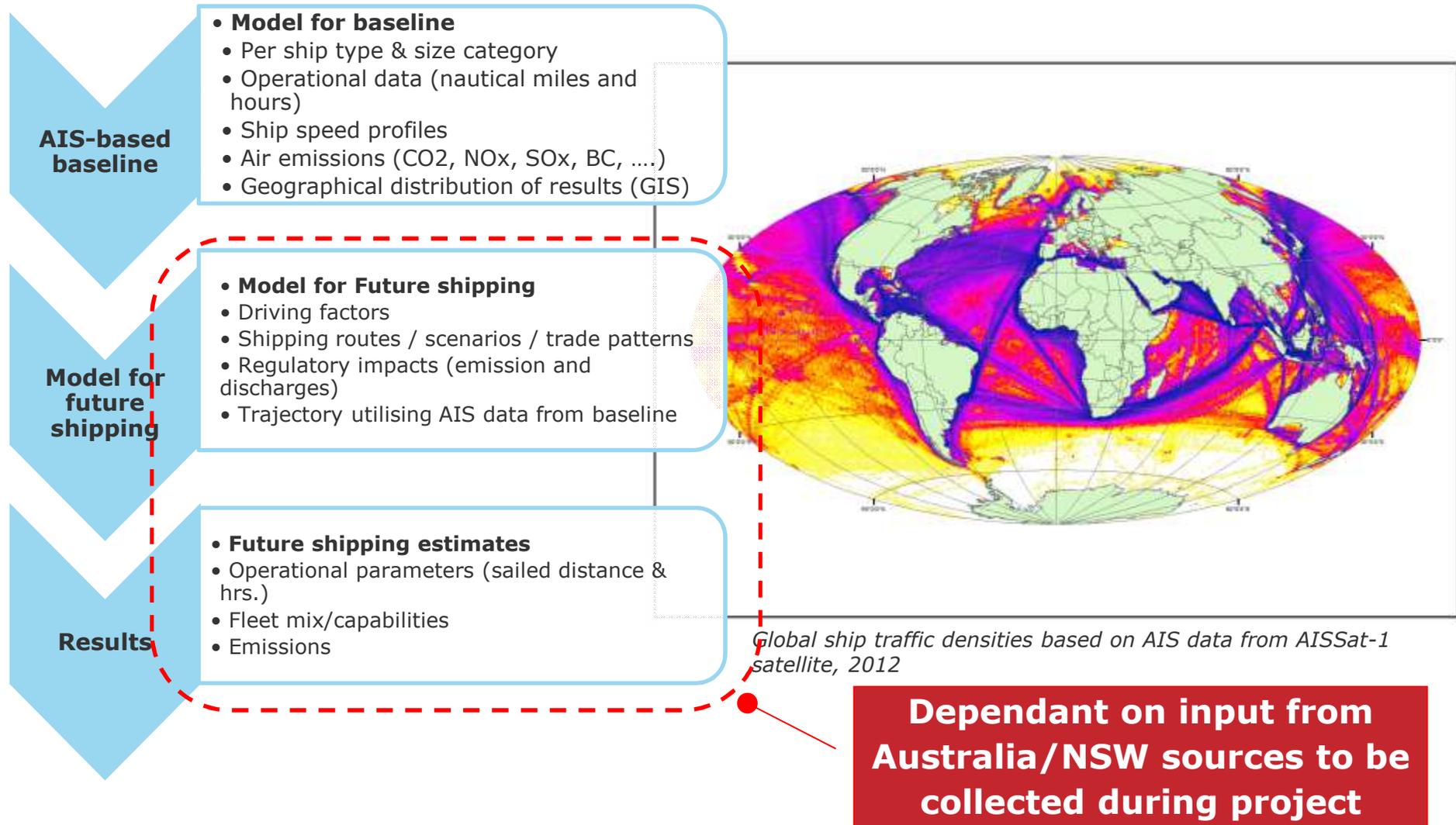


Source: DNV model for AIS based environmental accounting

AIS based methodology (2/2)



Baseline and forecasting



Stakeholder input (1/2)

- Selected stakeholder groups operating in and around the GMA of Sydney will be canvassed on a range of (applied) topics
- Including:
 - Port authorities within the GMA
 - Other government departments including NSW and Federal
 - Fuel suppliers
 - Ship owners
 - Ship operators
 - Shore-side power suppliers
- The approach for collecting input will be a combination of the following methods:
 - Face to Face interview
 - May be conducted over the phone/video conference
 - Electronic questionnaire
 - Sent to specific / identified individuals

Stakeholder input (2/2)

- All responses will be kept strictly confidential with no data or comments attributable to any particular source without prior permission
 - Global list of stakeholders listed by name for final report
 - Aggregated responses for final report
- Areas covered include the following:
 - Environmental policy, KPIs
 - Emissions abatement measures in-place
 - Future options being actively considered
 - Any operational procedures aimed at reducing emissions (name, brief description)
 - Experience with policy and/or regulations outside of Sydney GMA
 - Average sulphur content for bunkers
 - Emissions reporting

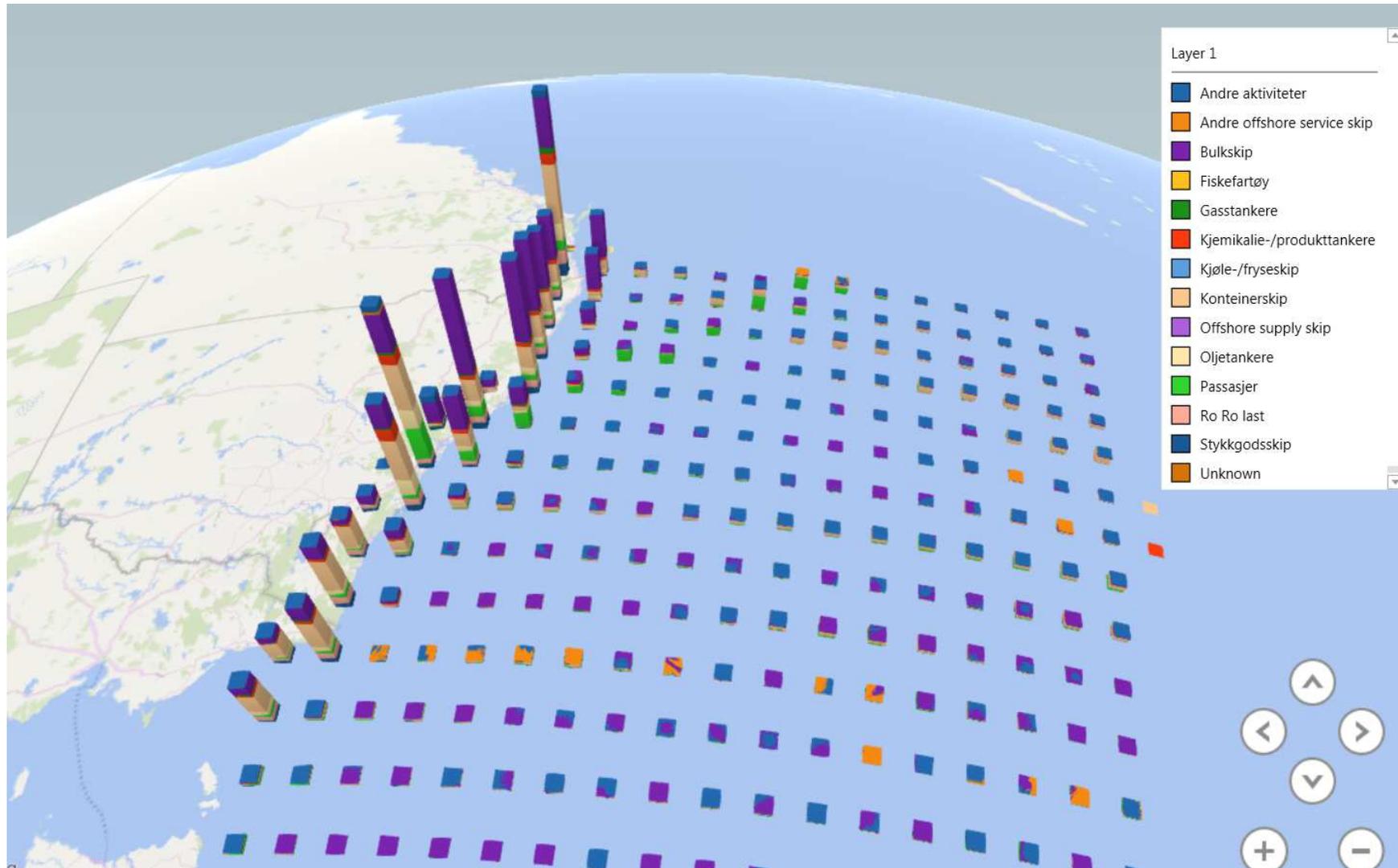
Unique vessels for the GMA 2013 – Preliminary results

	< 1000 GT	1000-4999 GT	5000-9999 GT	10-24999 GT	25-49999 GT	50-99999 GT	>= 100000 GT	Grand Total
Oil tankers			8	13		80	67	168
Chemical-/Prod tankers			3	38	17	59		117
Gas tankers			8	5		19	1	33
Bulk carriers				1	200	662	508	1386
General cargo vessels			7	93	70	17		187
Container vessels				6	23	172	69	271
RoRo vessels				2	1	59	144	206
Reefers			4	1	2			7
Passenger vessels	12	4				12	20	52
Offshore supply vessels	2	5						7
Other offshore service vessels		1	1				1	3
Other activities	72	8	2	4				86
Fishing vessels								
Unknown	340					2		342
Total	426	48	162	317	1082	808	22	2865

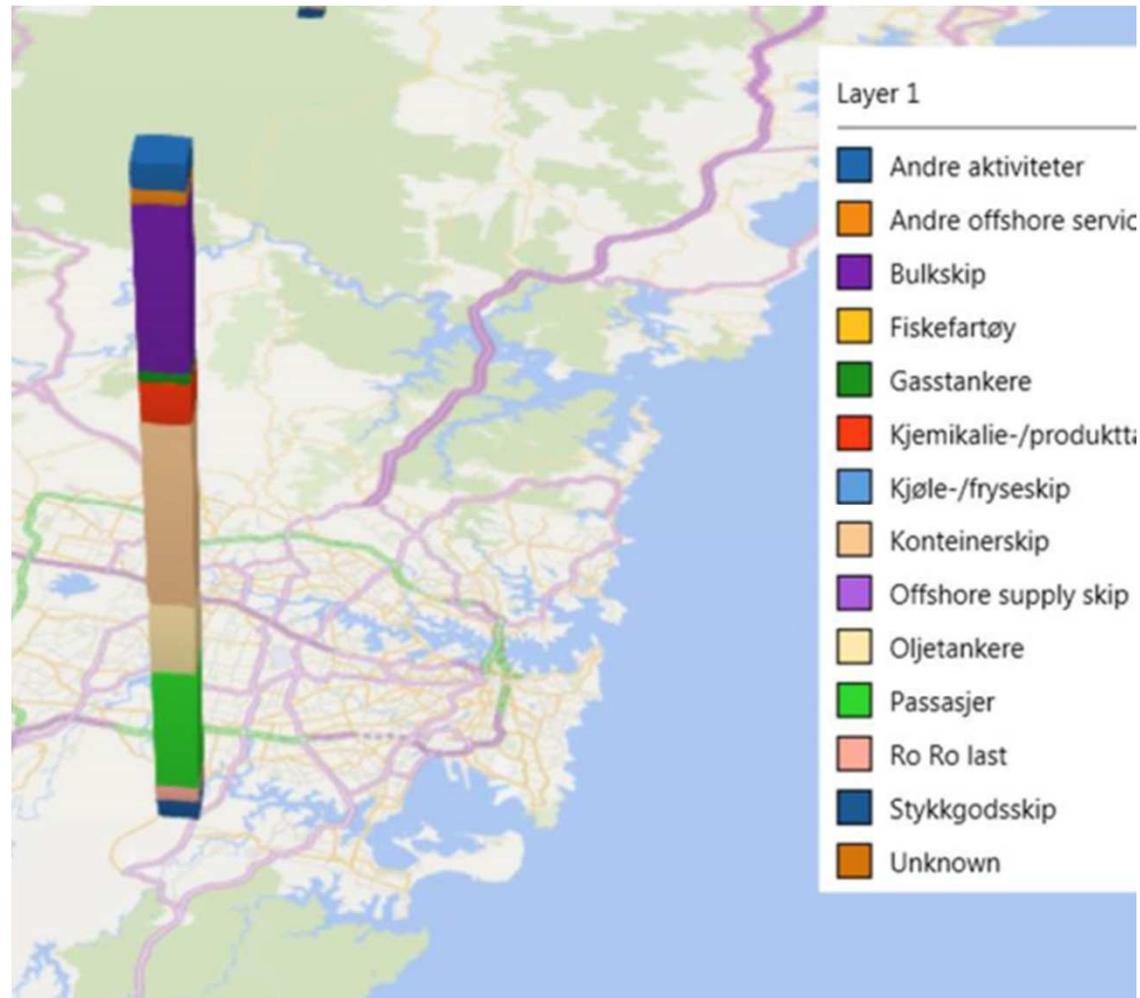
AIS based inventory for GMA 2013 – Preliminary results

	Sum of NauticalMiles		Sum of Hours		Sum of Fuel Consumption Metric Ton	
Oil tankers	121779	5 %	75122	5 %	16473	9 %
Chemical-/Prod tankers	88750	4 %	35683	2 %	10040	6 %
Gas tankers	24778	1 %	10590	1 %	2062	1 %
Bulk carriers	655592	27 %	259548	18 %	66962	37 %
General cargo vessels	91103	4 %	30387	2 %	7823	4 %
Container vessels	237593	10 %	61155	4 %	38800	22 %
RoRo vessels	76938	3 %	5613	0 %	7201	4 %
Reefers	684	0 %	57	0 %	25	0 %
Passenger vessels	312330	13 %	81023	6 %	24657	14 %
Offshore supply vessels	993	0 %	999	0 %	85	0 %
Other offshore service vessels	2787	0 %	7602	1 %	1146	1 %
Other activities	142934	6 %	232870	16 %	4741	3 %
Fishing vessels						
Unknown	629910	26 %	633796	44 %		
Total	2386170	100 %	1434444	100 %	180015	100 %

Preliminary review ... Spatial presentation of results – 1x1 degree



Preliminary review ... Spatial presentation of results



Measures being investigated ...

- A refined list of measures aimed to reduce emissions is being developed with NSW EPA.
- Based on global experience and local relevance
- For example:
 - Scrubbers
 - Low sulphur fuel
 - Shore-power (cold ironing)
 - EGR
 - Exhaust gas filters
 - Operational efficiency
 - Policy measures

Next steps

- Continued analysis building to emission map
- Ongoing collation of information regarding emission reducing measures
- Consultation with shipping, port and government stakeholders
- Draft report focusing on passenger shipping due end of 2014
- Draft report including other shipping types due end of January 2015
- Draft reports circulated to stakeholders end of January 2015 for comment
- Final report due mid February 2015 and presented to stakeholders shortly thereafter

Summary

- Project remit is to provide facts about emissions in GMA and possible emissions reducing measures
- Results used by EPA in health impacts cost / benefit analysis
- Wide consultation with Australian stakeholders
- Reference to international experiences in maritime operations, policy and regulations
- Include cost / emission assessment based on high-level business case analysis focusing primarily on ship-owner's financial perspective

For more details ...

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