EEOS 2022-2030 Domestic Savings Workshops

19th October 2021



Overview





Scope of workshops

Out of scope:

- The decisions
- The reasons behind the decisions
- The process for arriving at the decisions.

In scope:

- The implications of the decisions
- The implementation of the scheme
- Delivery requirements arising from the decisons
- Compliance with Annex V of the EED

Chatham house rules apply Session will be recorded for purposes of an accurate meeting note, but recording will be deleted immediately after.





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EEOS Policy Decisions

Domestic requirements

• Aileen Duffy, DECC

• 19th October 2021

Brief outline

- Thanks!
- Policy decisions relating to <u>domestic delivery</u>
 - General residential eligibility requirements
 - Energy poverty eligibility requirements
 - Requirements for all residential measures
- Document sets out decision making process and supporting reasoning for final decisions



Residential (general) delivery



is

- Savings will be eligible where:
- 1. the post-works BER achieves a 'minimum BER uplift'
- <u>AND</u>
- 2a. the post-works BER reaches a **B2 energy rating or better**
- <u>OR</u>
- 2b. the property is put on a 'B2 pathway', meaning the measures delivered move the property closer to achieving a B2 AND a BER Advisory report developed, discussed and provided to the occupant(s) following works.

New residential requirements



Not intended to specifically exclude:

- measures as part of a staged, or stepby-step, upgrade
- shallow measures, including full heating controls
- single measures
- measures as part of upgrade to costoptimal performance level
- any measure that can deliver savings

Are intended to move away from

- single, shallow measures
- measures that do not align with the fabric first principles
- measures that do not move the property closer to a B2 BER

The 'B2 Pathway'



- Aspect supporting <u>transition</u> to deeper retrofit delivery
- Not to support delivery of single, shallow measures
- Does not include measures that would need to be reversed/removed for the home to later achieve a B2
- B2 Pathway Advisory Report supporting future action
- To protect policy intent but allow B2 Pathway option, introducing minimum BER uplift

The Minimum BER Uplift



- Minded to set Minimum BER Uplift @ 100 kWh/m2/yr
- Taking account of initial SEAI analysis
- To strike balance of:
 - avoiding delivery of shallow upgrades with minimal savings,
 - accommodating transition to deeper retrofits

SEAI completing the analysis for setting the uplift value

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Energy poverty delivery (5% of savings)



- Savings will be eligible where:
- the measures have been delivered in an 'eligible energy poor home', which is a property:
- a. with a pre-works BER of an D2 rating or worse; and
- b. which is occupied by a person in receipt of a WHS-eligible payment
 - or is owned by a Local Authority/ Housing Association
- <u>AND</u>
- 2. the post-works BER reaches a B2 rating or better

Requirements for all residential



- Published pre and post BER (eligibility and savings)
- Can deliver eligible final energy savings (all included)
- Can be modelled in DEAP (standard methodology)
- Must meet all other relevant requirements

Domestic savings and BER

Seán O'Connor



Pre & Post BER

19th October 2021 Seán O'Connor



Overview



Residential delivery

Savings from measures will be eligible under the Residential Delivery Sub-target (excluding the Energy Poverty Sub-target) where:

1. The post-works BER achieves a "minimum BER uplift"

AND

2a. The post-works BER reaches a B2 energy rating or better (i.e. < 125 kWh/m²/yr)

OR

2b. The property is put on a "B2 pathway", meaning the energy efficiency measures delivered have moved the property closer to achieving a B2 energy rating AND a BER advisory report has been developed, discussed, and provided to the occupant(s) following works.

In meeting the above requirements:

- A published pre and post BER will be required to all residential measures from 1 January 2022.
- Any measure that can deliver eligible final energy savings, and which can be modelled in DEAP, will be eligible, subject to meeting all other relevant requirements.



Energy Poverty Delivery

Savings from measures will be eligible under the Energy Poverty Sub-target where:

- 1. The measures have been delivered in an "eligible energy poor home", which is a property:
 - a) With a pre-works BER of an D2 rating or worse (i.e. > 250 kWh/m²/yr); and
 - b) Which is occupied by a person is receipt of a WHS-eligible payment or is owned by a Local Authority/Housing Association

AND

2. The post-works BER reaches a B2 rating or better (i.e. < 125 kWh/m²/yr.).

In meeting the above requirements:

- A published pre and post BER will be required to all residential measures from 1 January 2022.
- Any measure that can deliver eligible final energy savings, and which can be modelled in DEAP, will be eligible, subject to meeting all other relevant requirements.



Building Energy Rating (BER)

- A Building Energy Rating (BER) Certificate is an indication of the energy performance of a property
- Properties are rated on a scale between A and G. Arated homes are the most energy efficient while G-rated are the least energy efficient.
- A BER is calculated using software called DEAP (Dwelling Energy Assessment Procedure).





BER Report Structure

- Property details
- Dimension details
- Ventilation details Building Elements Floors
- Building Elements Roofs
- Building Elements Walls
- Building Elements Doors
- Building Elements Windows
- Heat loss details
- Lighting and Internal Gains

- Water heating details
- Net space heat demand
- Space heat demand details
- Dist. System Losses and Gains
- Energy Requirements: Individual Heating Systems
- CHP data
- Summer internal gains
- Results





Property details

MPRN		Shared MPRN	No
BER Number		BER number assigned	N/A
Address line 1		to shared dwelling	
Address line 2		Type of Rating	Existing Dwelling
Address line 3		Purpose of Rating	Grant Support
County		Building Regulations	None
		Planning Reference	
Eircode		Date of Plans	
Dwelling Type	Semi-detached house		
Year of construction	1998	Assessor Name	
Dwelling Extension	No	Assessor Number	
Storeys	2	Date of Assessment	16/06/2021
0.01030	2	Assessor Comments	
		Assessor Description	

Dimension details

	Area [m ²]	Height [m]	Volume [m ³
Ground floor	45.94	2.45	112.55
First floor	45.94	2.70	124.04
Second floor	0.00	0.00	0.00
Third and other floors	0.00	0.00	0.00
Room in Roof	0.00	0.00	0.00
Totals	91.88		236.59

Ventilation details

		Number	Air Change Rate [ac/h]
Chimneys		0	0.00
Open Flues		1	20.00
Fans & vents		4	40.00
Flueless combustion room heaters		0	0.00
Has a permeability test been carried out	No 0.50	Is there a draught lobby on main entrance?	No
[ac/h]		Draught lobby air change [ac/h]	0.05
Intermediate infiltration rate	0.80	Openings infiltration [ac/h]	0.30
Number of sides sheltered	2	Structure type	Masonry
Adjusted infiltration rate [ac/h]	0.68	Is there a suspended wooden gro	No No
Effective air change rate [ac/h]	0.73	floor?	
Ventilation heat loss [W/K]	57.25	Windows/doors/attic hatches drau stripped [%]	ight 100.00
Adjusted result of air permeability test [ac/h]	0.00	Ventilation method	Natural ventilation
Manufacturer and Model name	N/A	How many wetrooms (inc. kitchen)? Is the N/A
Specific fan power [W/(l/s)]	0.00	vent. ducting flexible/rigid/both?	
Heat exchanger efficiency [%]	0.00	Is MVHR ducting uninsulated whe outside of insulated envelope?	re N/A
Electricity for ventilation fans [Kwh/y]	0.00	Adjusted heat exchanger efficien	cy 0.00
Heat gains from ventilation fans [W]	0.00		

Building Elements - Floors

Туре	Description	U/F Heating	In Roof	Age Band	Exposed Perimeter [m]	Area [m ²]	U- Value [W/m ² K]	Heat Loss (AU) [W/K]
Ground Floor - Solid		No	No	1994 - 1999	19.6	45.94	0.41	18.84
Non-Heat Loss Floor		N/A	No	1994 - 1999	N/A	45.94	0.00	0.00
Total area [m ²]								91.88

Building Elements - Roofs

Туре	Description	Insulation Thickness [mm]	Age Band	Area [m²]	U- Value [W/m ² K]	Heat Loss (AU) [W/K]
Pitched Roof - Insulated Ceiling	on	300	1994 - 1999	45.94	0.13	5.97
Total area [m ²]						45.94

Building Elements - Walls

Туре	Description	Wall is semi- exposed	Include in compliance check	Age Band	Area [m²]	U- Value [W/m ² K]	Heat Loss (AU) [W/K]
300mm Cavity		No	No	1994 - 1999	78.50	0.31	24.34
0							

Building Elements - Doors

Count	Туре	Description	Draught Stripped	Area [m ²]	U- Value [W/m ² K]	Heat Loss (AU) [W/K]
1	Solid exposed door	front	Yes	3.54	0.94	3.33
1	Solid exposed door	SIDE	Yes	1.73	0.94	1.63
Total are	a [m²]					5.27

Building Elements - Windows

Count	Glazing Type	Frame Type	Frame Factor	Solar Transm.	In Roof	Over shading	Orient.	Area [m ²]	U-value [W/m ² K]
1	Double-glazed, air filled	Wood/PVC	0.700	0.760	Yes	Very Little	Horizontal	0.61	3.10
1	Double-glazed, air filled (low-E, en = 0.15, hard coat)	Wood/PVC	0.700	0.470	No	Average or Unknown	East	6.04	1.31
1	Double-glazed, air filled (low-E, en = 0.15, hard coat)	Wood/PVC	0.700	0.470	No	Average or Unknown	North	6.74	1.31
1	Double-glazed, air filled (low-E, en = 0.15, hard coat)	Wood/PVC	0.700	0.470	No	Average or Unknown	South	4.39	1.31

Total area [m²]

17.78

Heat	loss o	letai	ls
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Total glazed area [m ²]	17.78	Glazing ratio	0.08
Total glazed heat loss [W/K]	23.15	Summer solar gain [W/m ²]	501.49
Total effective collection area [m ²]	4.21	Total element area [m ²]	193.43
Total plane heat loss [W/K]	77.25	Thermal bridging factor [W/m ² K]	0.1500
Fabric heat loss [W/K]	106.26		
Total heat loss [W/K]	163.51	Per m2	1.78
Lighting and Internal Gains			
ighting Design Calculation Method	Bulb type	Average Efficacy [lm/W]	66.90
	only	Top up lighting requirement [klmh/y]	0.00
ixed lighting provision [klmh/y]	3232.88	Energy required for top up lighting	0.00
nergy required for fixed lighting [kWh/y]	86.20	[kWh/y]	
nergy required for portable lighting kWh/y]	135.37		
Basic energy consumption for lighting	796.56	Water heating (In watts [W])	164.93
(Wh/y]		Occupants (In watts [W])	132.53
nnual energy used for lighting [kWh/y]	221.57	Mechanical ventilation (In watts [W])	0.00
nternal gains from lighting during eating season [kWh/hs] (In watts [W])	169.50 (29.06)	Heat loss to the cold water network (In watts [W])	-37.86
ighting (In watts [W])	29.06	Net internal gains (In watts [W])	486.28
ppliance and cooking (In watts [W])	197.62		

Lights

Count	Name	Description	Туре	Efficiency	Power [W]
8	Default LED/CFL		LED/CFL	66.90	

Water heating details

Are there distribution losses?	Yes	Is supplementary electric water heating used in summer?	No
Are there storage losses?	Yes		
Is there a solar water heating	No	Is there a combi boiler?	No
system?		Total hot water demand [kWh/y]	1082.73
Standard number of occupants	2.65	Temperature factor unadjusted	0.60
Number of mixer showers	0	Temperature Factor Multiplier	0.90
Number of electric showers	1	Hot water storage loss factor	0.02
Number of baths	1	[kWh/l d]	
Daily hot water use [Litres/d]	69.05	Volume factor	0.80
Hot water energy reqs. at taps [kWh/y]	920.32	Combi-boiler electricity consumption [kWh/y]	0.00
Distribution losses [kWh/y]	162.41	Adjusted storage loss [kWh/y]	653.39
Water storage volume [Litres]	238.00	Adjusted primary circuit loss [kWh/y]	507.11
Is manufacturers declared loss factor available?	No	Heat gains from water heating system [W]	164.93
Declared loss factor [kWh/d]	0.00	Output from supplementary	0.00
Manufacturer and Model name		heater [kWh/y]	
Insulation type	Factory Insulated		
Insulation thickness [mm]	40		
Combi-boiler Type	None	Output from main water heater	2243.22
Combi-boiler loss [kWh/y]	0.00	[kWh/y]	
Keep Hot facility	None	Annual Heat gains from water heating system [kWh/y]	1444.78
Storage Loss	653.39	WWHRS input to main system	0.00
Storage Type	Cylinder, indirect	[kWh/y]	
	manoor	WWHRS input to supplementary system [kWh/y]	0.00
Primary Circuit loss type	Boiler with uninsulat	ted primary pipework and with cylinder thermost	at
Primary circuit loss [kWh/y]	610.00	Heat Pump Type of DHW	Separate Hot
ls hot water storage indoors or in group heating system	Yes		Water Storage

Net space heat demand

Required temp. during heated hours	21.00	Length of one unheated period [h]	8
Required temperature rest of dwelling	18.00	Unheated periods per week	14
Living area percentage	18.49	Heat use during heating season [kWh/y]	5332.74
Required mean internal temperature [C]	18.55	Heat use for full year [kWh/y]	5502.82
Thermal mass category of dwelling	Medium-high		

	Utilisation factor	Intermittent heating
Internal heat capacity of dwelling [per m ²]	0.32	0.15
Internal heat capacity [MJ/K]	29.40	13.78

Space heat demand details

Month	Mean Ext. Temp [C]	Adj. Int. Temp [C]	Heat Loss [W]	Heat Use [kWh]	Gain/Loss Ratio	Utilisation Factor	Heat Use [W]	Useful Gains [W]	Solar Gain [W]
January	5.3	17.20	1946	1013	0.30	1.00	1361	585	101
February	5.5	17.22	1917	844	0.35	0.99	1256	661	180
March	7.0	17.38	1697	708	0.45	0.98	952	745	272
April	8.3	17.51	1506	492	0.57	0.96	683	823	370
May	11.0	17.78	1109	211	0.86	0.87	283	826	464
June	13.5	18.04	742	53	1.29	0.70	74	668	473
July	15.5	18.24	449	8	2.07	0.47	10	438	441
August	15.2	18.21	493	13	1.80	0.54	18	475	400
September	13.3	18.02	772	96	1.04	0.80	133	639	316
October	10.4	17.72	1197	389	0.59	0.96	523	675	220
November	7.5	17.43	1623	731	0.38	0.99	1015	609	128
December	6.0	17.27	1844	946	0.31	1.00	1272	572	88

Space Heating

Manufacturer & Model	Туре	Space Heating Standard	Fuel	Design flow temp[°C]	Daily Operation [h]	SH n Seasonal eff.	WH Seasonal eff.	Heats water
Daikin, ERGA04DV3	Heat pumps	I.S. EN 14825	Electricity	60	16	392.96	221.5	Yes
Boru, Croi Beag	Room heaters	N/A	Solid fuel	0	0	83.2	83.2	N/A

Dist. System Losses and Gains

Temperature adjustment [C]	0	Additional heat emissions due to non	0.00
Heating system control category	3	ideal control and responsiveness [kWh/y]	
Heating system responsiveness category	1	Gross heat emission to heated space [kWh/y]	5332.74
Mean internal temperature during heating hours [C]	18.55	Mean internal temperature [C]	17.44

	Number present	Boiler controlled by thermostat	Inside dwelling	Electricity consumption [kWh/y]	Heat gain [W]	
Central heating pumps	1	Yes	Yes	130	10	
Oil boiler pumps	0	No	No	0	0	
Gas boiler flue fan	0			0		
Warm air heating or fan coil radiators present	No			0	0	
Totals				130	10	

Note: Wet central heating systems are likely to have one or more central heating pumps.

Gains from fans and pumps associated with space heating system	58	Is there underfloor heating on the ground floor?	No
Average utilisation factor, October to May	0.97	U-Value of ground floor [W/m ² K]	0.00
Useful net gain [kWh/y]	56	Fraction of heating system output from	0.67
Net heat emission to heated space [kWh/y]	5276	ground floor Additional heat loss via envelope element	0.00
		Annual space heating requirement [kWh/y]	5276

Energy Requirements: Individual Heating Systems

Efficiency of main heating system [%]	392.96	Fraction of heat from secondary system	0.10
Manufacturer name	Daikin	Efficiency of secondary system [%]	83.2
Model name	ERGA04DV3	Energy required for main heating system	1208.43
Efficiency adjustment factor	1.00	[kWh/y]	
Adjusted efficiency of main heating system [%]	392.96	Energy required for secondary heating system [kWh/y]	640.95

Fraction of main space and water heat	N/A Efficiency adjustment factor		1.0000
from CHP		Adj. efficiency of main water heating	221.50
Heat demand from CHP	0.0	system [%]	
Efficiency of main water heating system	221.5	Water Heating Efficiency, nwh	125
[%]		Energy req. for main water heater [kWh/y]	2106.50
Manufacturer name	Daikin	Energy req. for secondary water heater	0.00
Model name	ERGA04DV3	[kWh/y]	
Heat Pump Type	Air to Water	Water Heating Standard	I.S. EN
			16147

	Fuel Type	Primary energy conversion factor	CO ₂ emission factor	
Main space heating system	Electricity	2.08	0.409	
Secondary space heating system	Manufactured Smokeless Fuel	1.20	0.392	
Main water heating system	Electricity	2.08	0.409	
Pumps, fans	Electricity	2.08	0.409	
Energy for lighting	Electricity	2.08	0.409	

CHP data

Heat output from CHP [kWh/y]	0.00	CHP Fuel type	N/A
Electrical efficiency of CHP		Energy delivered to CHP [kWh/y]	0
Heat efficiency of CHP		Electrical output from CHP [kWh/y]	0

Summer internal gains

Dwelling volume [m ³]	236.591	Total gains in summer [W]	987.77
Effective air change rate for summer		Temperature increment due to gains [C]	9.30
period [ac/h]		Summer mean external temperature [C]	15
Ventilation heat loss coefficient [W/K]	0.00	Heat capacity parameter	0.32
Fabric heat loss coefficient [W/K]	106.26	Temperature increment related to thermal	0.00
Heat loss coefficient under summer	106.26	mass [C]	
conditions [W/K]		Threshold internal temperature [C]	24.30
Total Solar Gains from Summer Period	501.49		
Internal gains [W]	486.28		

Results

	Delivered energy [kWh/y]	Primary energy [kWh/y]	CO ₂ emissions [kgCO ₂ /y]	
Main space heating system	1208	2514	494	
Secondary space heating system	641	769	251	
Main water heating system	1013	2107	414	
Supplementary water heating system	0	0	0	
Pumps and fans	756	1571	309	
Energy for lighting	222	461	91	
CHP input (individual heating systems only)	0	0	0	
CHP electric output (individual heating systems only)	0	0	0	

Renewable and energy saving technologies			
Energy produced and saved	0	0	0
Energy consumed by the technology	0	0	0
Total	3839	7422	1559
Per m ² floor area	41.79	80.77	16.97
Energy Rating	B1		

Questions?





Minimum BER uplift



- For Residential and Energy Poor credits to be eligible, the post-works BER must achieve a "minimum BER uplift"
- The policy intent is to set the minimum BER uplift at **100kWh/m²/yr** in primary energy
- Benefits:
 - To incentivise deeper energy retrofits
 - Further align EEOS with Government targets e.g. retrofitting 500,000 Irish homes to BER B2 standard or above by 2030.
 - Aligns with existing SEAI programmes e.g. One Stop Shops and Better Energy Community



How to calculate the minimum BER uplift

Pre BER Report

Results

	Delivered energy [kWh/y]	Primary energy [kWh/y]	CO ₂ emissions [kgCO ₂ /y]		Delivered energy [kWh/y]	Primary energy [kWh/y]
Main space heating system	15737	17311	5807	Main space heating system	1208	2514
Secondary space heating system	0	0	0	Secondary space heating system	641	769
Main water heating system	3178	3496	1173	Main water heating system	1013	2107
Supplementary water heating system	526	1094	215	Supplementary water heating system	0	0
Pumps and fans	795	1653	325	Pumps and fans	756	1571
Energy for lighting	650	1353	266	Energy for lighting	222	461
CHP input (individual heating systems only)	0	0	0	CHP input (individual heating systems only)	0	0
CHP electric output (individual heating systems only)	0	0	0	CHP electric output (individual heating systems only)	0	0
Renewable and energy saving technologies				Renewable and energy saving technologies		
Energy produced and saved	0	0	0	Energy produced and saved	0	0
Energy consumed by the technology	0	0	0	Energy consumed by the technology	0	0
Total	20886	24906	7786	Total	3839	7422
Per m ² floor area	227.32	271.07	84.74	Per m ² floor area	41.79	80.77
Energy Rating	D2			Energy Rating	B1	

271.07kWh/m2/y - 80.77kWh/m²/y

Post BER Report

Results

= 190.3kWh/m²/y



CO₂ emissions [kgCO₂/y]

494

251

414 0

309

91

0

0

0

0

1559

16.97

Primary Energy Vs. Final Energy

 Primary energy – Energy required to meet the dwelling's demand based on consumption at the point of production.

 Final energy – Energy required to meet the dwelling's demand based on <u>final consumption (or</u> <u>delivery).</u>









How to calculate final energy credits

Pre BER Report

Results

Energy Rating

C3

Delivered energy [kWh/y] Primary energy [kWh/y] Delivered energy [kWh/y] Primary energy [kWh/y] CO₂ emissions [kgCO₂/y] 6641 Main space heating system 3795 4281 Main space heating system 21086 23195 2775 Secondary space heating 0 0 Secondary space heating 7079 8495 system system 2706 3951 729 Main water heating system 1546 Main water heating system 3592 Supplementary water 0 0 0 0 0 Supplementary water heating system heating system 0 0 0 0 Cooling 0 Cooling 175 306 39 Pumps and fans 175 306 Pumps and fans 608 78 Energy for lighting 350 612 Energy for lighting 347 CHP input (individual 0 0 0 CHP input (individual 0 0 heating systems only) heating systems only) 0 0 0 0 CHP electric output CHP electric output 0 (individual heating systems (individual heating systems only) only) Renewable and energy Renewable and energy saving technologies saving technologies 0 0 0 Energy produced and saved Energy produced and saved 1200 2100 Energy consumed by the 0 0 0 Energy consumed by the 0 0 technology technology 32280 4666 Total 36555 7902 Total 8165 Per m² floor area 182.93 207.16 44,78 Per m² floor area 26.44 46.27

[32,280 + 0] - [4,666 + 1,200] = 26,414

26,414 * 91% (correction factor)

Energy Rating

= 24,037 kWh/yr (final energy savings)

Post BER Report

A2

CO2 emissions [kgCO2/y]

850

0

346

0

0

39

78

0

0

269

1045

5.92

0

Results

Concluding comments

- 1. Changes to EEOS Residential and Energy Poor Delivery
- 2. BER report and quality assurance overview
- Minimum BER uplift calculations and indicative amount (100kWh/m²/yr.)
- 4. Final energy calculations







Questions?





Closing statements



The Service – termed the "NAS Trusted Partner API" – will enable eligible participants to access electronic BER datafiles (JSON) in real-time via an Application Programming Interface (API) and to submit modified BER datafiles to the SEAI DEAP calculation engine to return estimated energy uplifts.

- A trial SEAI Service to enable the market to achieve government objectives of retrofitting 500,000 homes to a B2 rating
- Allows real time DEAP recalculations, in a format that can be applied to assist homeowner decision making on home retrofit investment.
- Focus on the impact that providing BER data and BER recalculation has on consumer decisions
- Foster innovation in the marketplace by incentivising application developers to build data driven solutions for homeowners to make the best decisions for their homes

https://www.seai.ie/pilot-projects/



Domestic Targets Delivery- Recap

- No deemed measures
- Only actions that register on BER can be counted
- Air tightness, MVHR, thermal bridging improvement can now contribute.
- Minimum BER uplift required
 - Energy Poor: from a D2 to a B2 (uplift > 135 kWh / m^2 / yr)
 - Non energy poor: (indicative 100 kWh / m² / yr in primary BER uplift)
 - Non energy poor B2 or put on B2 pathway
- Savings based on Final Energy "delivered energy" as reported in BER, adjusted for comfort taking and in-use factors
- Savings for renewable electricity generation (e.g. PV) are excluded
- No domestic credits for EVs



2021 Workshop schedule

Workshops to be scheduled on (a non-comprehensive list):

Domestic requirements - Pre and post BER, Minimum uplift (intro), final vs primary energy, (Tues)

Domestic requirements - Minimum uplift, how to register savings, homeowner advice, B2 pathway (Thurs) Domestic requirements - M&V requirements, correction factor, quality control, materiality, waivers (Nov)

Calendar invites to follow.



Thank you.



